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KNOWLEDGE FOR USE IN PRACTICE

ABSTRACTS

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Allergy

Heat Shock Proteins in Hives: Investigating HSP70 and Anti-HSP70 in Chronic Spontaneous Urticaria

Oral

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Objectives*

Chronic spontaneous urticaria (CSU) is a complex autoimmune disorder characterized by recurrent hives and angioedema. The underlying pathophysiology involves immune dysregulation, yet definitive biomarkers for diagnosis and monitoring remain elusive. Heat shock protein 70 (HSP70) functions as an endogenous “danger signal”, promoting mast cell activation and degranulation—key events in CSU pathogenesis. Anti-HSP70 antibodies have been associated with autoimmune CSU, contributing to chronic inflammation and disease persistence. This study aimed to quantify HSP70 and anti-HSP70 levels in CSU patients, exploring their potential as diagnostic markers and correlating them with clinical parameters.

Materials and Methods

This prospective study included CSU patients from Pauls Stradiņš Clinical University Hospital and Center for Diagnostics and Treatment of Allergic Diseases. Patient histories were collected, and peripheral venous blood samples were analyzed for HSP70 and anti-HSP70 levels using ELISA. Data were processed using Jamovi v. 2.3.28.

Results

Among 210 participants (mean age 42.8 ± 15.2 years, 77.6% female), 47.8% had urticaria with angioedema, 39.5% urticaria alone, and 12.7% had isolated mast cell-associated angioedema. Median HSP70 was 0.0287 ng/ml (IQR 0.00–0.146), and anti-HSP70 was 145 ng/ml (IQR 102–216). No significant differences in HSP70 or anti-HSP70 were observed across comorbidities ($p=0.283$, $p=0.248$), allergies ($p=0.589$, $p=0.517$), autoimmune diseases, or treatments, including antihistamines ($p=0.978$, $p=0.777$), omalizumab ($p=0.492$, $p=0.553$), cyclosporine ($p=0.243$, $p=0.178$), and other medications. No differences were found regarding bad habits, urticaria-provoking factors, symptoms, or disease activity. Moderate negative associations existed between anti-HSP70 and BMI ($r=0.159$, $p=0.002$), weak negative correlations between HSP70 and age ($r=0.117$, $p=0.029$), and weak positive correlations between HSP70 and anti-HSP70 ($r=0.108$, $p=0.043$).

Conclusions

In this study, HSP70 and anti-HSP70 levels showed no significant differences among CSU subgroups and demonstrated limited correlations with BMI, age, and select blood parameters. No meaningful associations with disease features or other clinical markers were observed, suggesting their diagnostic value remains limited.

Component Resolved Diagnostic versus Skin Prick Test: Diagnostic Test Comparison

Poster

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Objectives*

The increasing prevalence of allergies and rising diagnostic costs challenge healthcare systems. While molecular allergy tests (CRD) are becoming more accurate and affordable, their combination with skin prick tests (SPT) adds financial strain. This study evaluates the diagnostic reliability of SPT and CRD, examining discrepancies across allergen profiles and laboratories to address inter-laboratory variability and enhance accuracy.

Materials and Methods

A retrospective quantitative study was conducted at the Allergic Diseases Diagnosis and Treatment Center in Riga, Latvia, involving 120 patients who underwent both SPT and CRD at two separate laboratories. Statistical analysis was performed using SPSS and R software.

Results

Among all participants, 61% were female (mean age 33.21 years), SPT and CRD showed substantial agreement for *D. pteronyssinus* (Kappa = 0.748) and *D. farinae* (Kappa = 0.753), while moderate agreement was observed for birch (Kappa = 0.790) and timothy grass (Kappa = 0.785). Dog allergens showed no agreement (Kappa = -0.047), and significant variability was noted across laboratories, particularly for dog allergens. CRD revealed high detection rates for Der p 1 (71%), Der p 2 (81.6%), and Der p 23 (68.4%), indicating their relevance in Latvia. Sensitization to house dust mite allergens was the most prevalent in the study population, highlighting their significant role in allergen exposure. A strong positive correlation was identified between SPT papule sizes and total allergen component values for multiple allergens.

Conclusions

This study demonstrates substantial concordance between SPT and CRD for specific allergens, including house dust mites and pollen, with minor discrepancies observed for dog allergens and others, though not statistically significant. CRD revealed key allergen molecules pertinent to the Latvian population. While a strong correlation was found between SPT papule size and allergen component values, statistical significance for individual components was not achieved. These findings support integrating CRD with traditional SPT to enhance personalized allergy management.

Anthropology

Anthropological Investigations of the Population of Latvia in the 21st Century

Oral

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Objectives*

In the 30s of the 20th century, under the leadership of Professor J. Pīmanis, anthropological studies of the population of Latvia were carried out. In the summer of 2024, the “J. Pīmans project of anthropological investigation of the population of Latvia. Piebalga” was launched.

Research objectives: using portable express methods to determine the indicative health status of the research participants' support - locomotor apparatus, cardiovascular system and respiratory system; determine the anthropometric parameters for the analysis of century changes in the Piebalga population; study the demographics, mobility, and attraction of the study participants to the Piebalga region; to build a collection of biological samples for population genetics studies.

Materials and Methods

- 3D body scanning;
- determination of anthropometric parameters, body weight, blood pressure, vital capacity of the lungs;
- digital photo in two projections - frontal and sagittal;
- questionnaire, including demographic data, relation to Piebalga, information on health status;
- in random order – in-depth interviews.

Results

During the 14 days of the anthropological expedition, 679 participants aged between 1.5 and 99 years volunteered for the study.

Processing of primary data was developed in the form of 16 separate sub-projects (not including population genetics studies). Namely, social portrait of research participants, correlation of subjective complaints and anamnesis data with objective finding, analysis of body symmetry, scaling/comparison of 3D scanned images and anthropometric measurements, analysis of century changes.

Conclusions

The selected research design and methodology have allowed the study to cover a significant part of the county's population in a short time - approximately 10%, and to obtain unique data on the population of one county in Latvia.

Responsiveness of the population, without obvious personal or material motivation, shows the existence of significant potential in Latvian society to actively participate in anthropological research projects.

Evaluation of Sociocultural Factor Effects on General Health Status in Late Medieval–Early Modern Vilnius Inhabitants

Oral

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Objectives*

One might consider that history has conducted experiments with humans on a scale that will never be repeated in modern times. The aim of this study was to check the effects of variable factors on humerus and femur lengths as a proxy for general health status in the 14th- 18th century Vilnius population.

Materials and Methods

The general database consisted of over 2000 individual data. Following sociocultural variables were considered: period (13-15th, 16th, or 17th-18th centuries), socioeconomic status (elites vs laymen), confession (Orthodox, Catholic or Protestant), as well as biological markers: linear enamel hypoplasia (LEH) as an indicator of survived stress in childhood, cribra orbitalia (CO) and osteoperiostitis (OP) as signs of deficiencies and infections, dental caries, calculus, and dental attrition as a rough proxy of diet and $\delta C13$ and $\delta N15$ stable isotope values as indicators of diet in childhood (dentine) and during last decade of life (bone). Standard Student T-tests and Spearman correlations were used for statistical evaluation.

Results

Results revealed that, although stable isotope values were indicative of both secular changes (increase of protein consumption in the latest period, tendency towards less abrasive diet), social affinities (elites consuming more protein-rich diets) and confessions (Protestants consuming most protein-rich diets followed by Catholics and Orthodoxes), no clear associations between bone lengths and dietary indicators were revealed. There were no statistically significant associations with LEH, CO, and OP, suggesting successful catch-up growth of survivors of stresses experienced during childhood.

Conclusions

The tentative conclusion is made that the value of bone lengths as general indicators of health status and life experience in the past must be considered with caution.

The Research Council of Lithuania supported the study, grant No. S-MIP-23-59.

Multiform Morphology in the Digital Age: Evolution of Anatomical Studies with Virtual Dissection and 3D Printing

Oral

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Objectives*

This study aimed to: 1) analyze the evolution of anatomical studies through the incorporation of virtual dissection table “Anatomage” and three-dimensional (3D) printing, focusing on advancements from 2016 to 2024; 2) examine how these tools have influenced teaching methodologies in anatomy and anthropology courses; and 3) identify challenges and opportunities in modernizing traditional anatomical studies.

Materials and Methods

This study employed a qualitative approach to investigate the evolution of anatomical studies by integrating the virtual dissection table “Anatomage” and 3D printing. The study focused on advancements from 2016 to 2024. Participants included anatomy tutors (n = 10) from the Rīga Stradiņš University Department of Morphology, each with at least 2 years of experience utilizing both traditional teaching methods and modern technologies in anatomy education. Data collection involved semi-structured interviews to gather in-depth insights into tutors’ experiences and challenges for incorporating these tools into their teaching methodologies. Thematic analysis was employed to analyze the collected data, identifying recurring patterns and distinct insights.

Results

Tutors reported that the “Anatomage” table significantly improved their ability to demonstrate complex anatomical and anthropological structures, while 3D-printed models offered tactile advantages for understanding proportions and spatial relationships. The integration of these tools facilitated a multimodal teaching approach, appealing to various learning styles. Approximately 80% of tutors revised their practical class plans to include interactive demonstrations. However, challenges such as software glitches and limited functionality during advanced procedures were noted. Tutors expressed interest in collaborating with engineers and 3D printing specialists to create custom models.

Conclusions

The tutors have consistently emphasized the importance of the virtual dissection table and the use of 3D-printed models. They assert that while these modern tools provide valuable supplemental learning opportunities, they should not replace the foundational techniques of anatomical and anthropological study. These resources should be integrated into the curriculum to enhance and complement traditional methods.

Analysis of Cephalic Index in Latvian Residents from Different Regions Based on 1930s Data

Poster

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Objectives*

This study aims to analyse the cephalic index using data from the 1930s, collected from individuals in various regions of Latvia.

Materials and Methods

Anthropological expeditions led by J. Primanis were conducted in Piebalga (1936), Jurmala of Vidzeme (1937), and the Zemgale district (1939). Measurements included head length (HL) and head width (HW), both recorded in centimeters. The cephalic (head) index (CI) was calculated by dividing the maximum head width by the maximum head length, multiplied by 100, and expressed as a percentage. A total of 6857 adults were analysed.

The median and interquartile range (IQR) were used to describe non-normally distributed data. Data analysis was performed using IBM SPSS Statistics 29.0.

Results

The study included 2979 males (43.4%) and 3878 females (56.6%). The median CI for males was 80.65 (IQR: 78.41–82.74) in Zemgale, 81.77 (IQR: 79.47–83.99) in Jurmala of Vidzeme, and 81.54 (IQR: 79.08–83.77) in Piebalga. For females, the median CI was 81.03 (IQR: 78.93–83.15) in Zemgale, 81.64 (IQR: 79.26–84.00) in Jurmala of Vidzeme, and 81.38 (IQR: 79.12–83.91) in Piebalga.

The Kruskal-Wallis test showed statistically significant differences in the distributions of CI between the regions for both males ($p < 0.001$) and females ($p = 0.002$). Pairwise comparisons revealed significant differences between all regions for males ($p < 0.05$), while for females, differences were significant between Zemgale and Jurmala of Vidzeme ($p = 0.002$) and between Zemgale and Piebalga ($p = 0.027$).

Conclusions

The cephalic index reveals significant differences in cranial morphology among Latvian residents across regions during the 1930s. These findings indirectly suggest low population mobility between regions in Latvia during this period.

Anthropometric Analysis of Children Aged 1 to 15 in Piebalga, Latvia

Poster

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Objectives*

The study was conducted with the primary intention of thoroughly examining craniofacial anthropometric measurements and indices in a pediatric population comprising boys and girls aged 1 to 15 years from Piebalga, Latvia. The research sought to provide a comprehensive understanding of gender differences in various cranial and facial dimensions, systematically categorize the observed head and facial types, and contrast the findings with established developmental norms in the field.

Materials and Methods

The study included 95 participants, consisting of 52 boys and 43 girls, all within the 1 to 15-year age range from the region of Piebalga, Latvia in the year 2024. A set of key anthropometric measurements was collected, which encompassed not only height but also specific dimensions such as head length, head width, facial width, facial height, and head circumference. In addition, derived indices, including the cephalic and facial indices, were computed to facilitate a detailed classification of head and facial shapes. Statistical analyses were subsequently performed to effectively assess the differences between genders and to explore the patterns of proportional growth.

Results

On average, girls were taller, measuring 143.45 cm, compared to the boys' average height of 140.31 cm. Despite their shorter stature, boys exhibited broader cranial dimensions, displaying a larger head width (142.81 mm compared to 140.09 mm) and a greater head circumference (53.53 cm versus 52.89 cm). This trend was further reflected in facial measurements, as boys possessed wider facial structures, with measurements of 121.62 mm compared to 119.74 mm for girls. Both genders were classified as mesocephalic according to their cephalic indices (boys: 79.24; girls: 77.89) and as euryprosopic based on their facial indices (boys: 80.28; girls: 81.22).

Conclusions

The findings highlight significant and pronounced gender-specific differences in craniofacial dimensions. Both groups align with the expected patterns of growth appropriate for their age.

Anthropometric Data Insights from Detailed Measurements in Piebalga, Latvia

Poster

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Objectives*

This study analyzed the anthropometric measurements, body mass index (BMI), and waist-to-hip ratio (WHR) of a diverse population of participants from Latvia, Piebalga. The high values of BMI and WHR are associated with unfavorable cardiovascular disease risk factors (Rafsanjani et al., 2024).

Materials and Methods

The study included 565 participants, comprising 213 men and 352 women aged 18 to 99. Key anthropometric measurements, including height, weight, waist, and hip circumferences, were collected. BMI and WHR values were calculated for each participant. The data were analyzed using the statistical software program IBM SPSS Statistics 28.0 and Microsoft Office Excel. Descriptive analysis was performed on all variables, calculating means and standard deviations. T-tests and ANOVA were used to compare differences between groups. A statistical significance level of $p < 0.05$ was established to ensure the reliability of the findings.

Results

The average height of all participants was 170.73 ± 10.01 cm, and their average body weight was 81.57 ± 17.46 kg. Men had a higher average BMI of 28.33 ± 4.76 compared to women's average BMI of 27.67 ± 6.09 . Men also had a larger average waist circumference (97.81 ± 12.16 cm) than women (85.87 ± 13.85 cm). Conversely, women had a slightly larger average hip circumference (105.34 ± 12.71 cm) than men (103.12 ± 8.06 cm). Men had a WHR of 0.95, indicating a high risk for metabolic and cardiovascular diseases, while women had a WHR of 0.82, indicating a low risk. Participants aged 41-50 and those in the 51-60 and 61-70 ages also exhibited higher BMIs and waist circumferences compared with other ages.

Conclusions

The study reveals significant sex differences in anthropometric measurements, with men having larger body sizes and higher BMI values. WHR is an essential health risk indicator, with men showing higher values. These findings highlight the importance of monitoring body measurements as key indicators of health risks across different age groups

Association between Body Mass Index, Blood Pressure and Resting Heart Rate in Adults from Piebalga, Latvia

Poster

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Objectives*

The purpose of this study was to examine the differences in the relationship between body mass index (BMI), resting heart rate (RHR), systolic blood pressure (SBP) and diastolic blood pressure (DBP) among participants from Piebalga, Latvia.

Materials and Methods

This retrospective study analyzed data from 565 participants from the region of Piebalga, Latvia, collected in the year 2024. The study comprised 213 men and 352 women, with an age range of 18 to 99 years. Measurements taken from each participant included systolic and diastolic blood pressure readings from both the left and right arms, pulse rate, body height, and weight. Participants were classified into four groups based on their Body Mass Index (BMI) according to World Health Organization (WHO) categories: underweight, normal weight, pre-obese, and obese. Further analysis revealed sex and age specific trends. Statistics was conducted using Excel for Microsoft 365, and employing ANOVA test to evaluate differences among these groups.

Results

In the obese group, systolic blood pressure (SBP) was, on average, 13 mm Hg higher (137 ± 18 mm Hg vs. 124 ± 17 mm Hg) and diastolic blood pressure (DBP) was 9 mm Hg higher (89 ± 11 mm Hg vs. 80 ± 9 mm Hg) compared to the normal weight group. Additionally, men in the obese group had higher SBP and DBP (143 ± 17 mm Hg and 90 ± 11 mm Hg) than women (134 ± 17 mm Hg and 89 ± 11 mm Hg). Older participants generally exhibited higher SBP and DBP, regardless of BMI category. No statistically significant difference was found in resting heart rate (RHR) between the groups.

Conclusions

Higher BMI in Piebalga adults is linked to increased blood pressure, especially in older and male participants. Interventions like lifestyle changes and reducing BMI are crucial to prevent hypertension and cardiovascular diseases in this region.

Antimicrobial Resistance

Antimicrobial Resistance Profile of *Pseudomonas aeruginosa* in a Level IV Healthcare Institution in Latvia, 2011–2024

Oral

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Objectives*

Pseudomonas aeruginosa are opportunistic, gram-negative, aerobic bacilli widely distributed in the environment and healthcare settings. *P.aeruginosa* is one of the most frequent causes of nosocomial infections, accounting for 7.1% – 7.3% of cases in healthcare facilities. In recent years, an increasing prevalence of multidrug-resistant (MDR), extensively drug-resistant (XDR) and pandrug-resistant (PDR) *P.aeruginosa* strains has been observed, prompting the WHO in 2017 to classify *P.aeruginosa* as a priority pathogen for the development of new antimicrobial agents.

The aim of this study was to estimate the prevalence of MDR, XDR, and PDR *P.aeruginosa* in a level IV healthcare institution.

Materials and Methods

From 01.01.2011. to 31.10.2024. 405 *P.aeruginosa* strains were isolated from various human biological specimens at the microbiology laboratory of the North Kurzeme Regional Hospital, Latvia. Identification of bacterial strains was performed using the VITEK 2 Compact system. Antimicrobial susceptibility testing was conducted using the minimum inhibitory concentration method and the Kirby-Bauer disk diffusion method.

Results

The isolated *P.aeruginosa* strains were obtained from the following biological specimens: sputum (32.1%), urine (17.3%), bronchial lavage (14.8%), wounds (12.3%), various catheters (11.1%), blood (6.2%), ear samples (2.5%), surgical materials (2.5%) and cavity aspirates (1.2%).

Antimicrobial susceptibility testing was conducted for imipenem, meropenem, piperacillin-tazobactam, ciprofloxacin, amikacin, ceftazidime, cefepime, tobramycin and colistin. The results showed that 38.3% of *P.aeruginosa* strains were MDR, 16% were XDR, 2% were PDR, and 43.7% were susceptible to all tested antimicrobial agents. The highest resistance rates were observed for piperacillin-tazobactam (50.4%), imipenem (48.9%), ciprofloxacin (47.4%), and meropenem (45.7%). In contrast, the highest sensitivity rates were observed for colistin (84.4%), amikacin (57.3%), ceftazidime (49.4%) and meropenem (43.7%).

Conclusions

Over half (56.3%) of the isolated *P.aeruginosa* demonstrated extensive resistance to frequently used antimicrobial agents, significantly reducing treatment options for patients. Resistance was highest against penicillins, carbapenems and fluoroquinolones, which are commonly used in hospital settings.

Antimicrobial Resistance Related Mortality in the Clinical University Hospital of Latvia

Oral

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Objectives*

Antimicrobial resistance (AMR) poses a significant global health threat, with an estimated 35,000 annual deaths in the EU/EEA and projected global cumulative deaths of 39.1 million attributable and 169 million associated from 2025 to 2050. In Latvia, 5 AMR-attributable deaths per 100,000 inhabitants in 2020 were estimated. Despite infectious diseases ranking as the 9th leading cause of death, AMR-specific mortality data in Latvia are unknown and not analyzed. This study aims to analyze AMR-related deaths in the Clinical University Hospital of Latvia.

Materials and Methods

Data from electronic medical discharge documentation in the period of January 1, 2024, to June 30, 2024, were analyzed. Date of death, infection-related diagnoses, identified microorganisms, tested materials, and detected resistance mechanisms was included. Infections were coded using the ECDC Point Prevalence Survey diagnosis/site coding list.

Results

Among 883 deaths during the study period, 419 involved infections, and 80 deceased (9.1% of all deaths; 19.1% of infection-related deaths) had multidrug-resistant (MDR) infections. The leading causative microorganisms were *Klebsiella pneumoniae* (52.5%), *Acinetobacter baumannii* (27.5%), and *Escherichia coli* (16.3%). Primary infection sites included bronchoalveolar lavage (36.3%), blood (32.5%), and urine (15%). Pneumonia (42.5%) and urinary tract infections (22.5%) were the most common diagnoses. Resistance mechanisms included extended spectrum beta lactamase (ESBL) production (42.5%), OXA-48 carbapenemase (16.3%), and KPC carbapenemase (10%).

Conclusions

MDR infections contributed to nearly every 10th of in-hospital deaths. Retrospective short-period analysis limits distinction between AMR-attributable and associated deaths, underscoring the need for detailed investigations and enhanced AMR mortality surveillance to assess the true burden. A further long term surveillance system is needed to enhance the AMR burden analysis.

Bacteremia Surveillance as an Antimicrobial Resistance Limiting Tool

Oral

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Objectives*

In Latvia, 68.3% of hospital-administered antibiotics are prescribed for community-acquired infections (ECDC PPS, 2022–2023). Infectious disease (ID) specialist consultation in case of bacteremia is a key intervention of antimicrobial stewardship. Since 2021, Pauls Stradins Clinical University Hospital (PSCUH) has implemented an electronic bacteremia monitoring system to improve reporting of bacteremic patients.

Materials and Methods

We collected data from electronic bacteremia monitoring system over a two-year period (2022–2023), including department, identified microorganisms, empirical antibacterial therapy, and actions recommended by ID specialist (e.g., escalation, de-escalation, cessation, switch to oral therapy, or no change). A more detailed analysis was performed on *Staphylococcus aureus* bacteremia (SAB) due to its high mortality and complication rates. Blood culture (BC) practices and overall antibiotic usage were analysed from 2021 to 2023.

Results

The median rate of BC sets was 61.1 per 1000 bed-days. The total number of positive BC episodes was 1300 in 2022 and 1395 in 2023. A significant portion of BC were collected in the emergency department (ED), composing 31% of all BC in 2022 and 32% in 2023. The most frequently reported microorganisms overall were *S. aureus* (18%), *E. coli* (17%), and *K. pneumoniae* (11%) in 2022; and *E. coli* (21%) and *S. aureus* (19%) in 2023. Overall, antibiotic de-escalation occurred at 19.5%. In comparison, in methicillin-sensitive *S. aureus* cases, de-escalation to anti-staphylococcal therapy occurred in 39%. The intrahospital mortality rate for SAB decreased from 37% in 2022 to 30% in 2023. In the ED, the use of AWaRe access group antibiotics increased from 49.35% in 2021 to 59.24% in 2023.

Conclusions

Bacteremia surveillance promotes the early switch to targeted antibacterial therapy.

ID specialist consultation often resulted in de-escalation to narrow-spectrum antibiotics, particularly in SAB cases, potentially resulting in improved treatment outcomes and a reduced selection pressure for antibiotic resistance.

Bacteriophages as a Model for Antiviral Susceptibility Detection on Metal Surfaces

Oral

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Objectives*

Bacteriophages are utilized progressively more often as a substitute of pathogen viruses in various research, including detection of antiviral properties.

E. coli bacteriophage Q β are frequently used as surrogates to noroviruses to express the behavior in the environment or during disinfection treatment due to their similar structural organization and sensitivity to oxidants.

Materials and Methods

The antiviral activity was assessed using a modified ISO 21702:2019 method and bacteriophage plaque assay. The study utilized *E. coli* DSM 5210 and bacteriophage Q β DSM 13768. Experimental materials included titanium, copper, zinc, nickel, lead, steel, and plastic.

A 5 μ L aliquot of bacteriophage suspension ($\sim 1 \times 10^8$ plaque-forming units (PFU)/mL) in TSB broth was applied to the materials. After the designated exposure times (1, 2, or 4 hours), the materials were rinsed with 500 μ L of TSB broth to collect the bacteriophages.

E. coli cultures were grown in TSB broth for 4 hours. Subsequently, 100 μ L of the bacterial suspension was mixed with 50 μ L of the collected bacteriophages in 4 mL of molten 0.7% TSA. The mixture was then poured onto TSA plates and incubated overnight at 37°C. Plaques were counted to determine the antiviral effect of the materials.

Results

The results were obtained from all tested materials, demonstrating that this method is suitable for detecting antiviral properties. Copper exhibited a 100% antiviral effect. The antiviral effects of other materials ranged from 60% to 90%, but these did not show a significant difference compared to plastic. This indicates that, aside from copper, the other materials did not possess significant antiviral effects.

Conclusions

This method is suitable for further experiments to detect antiviral effects. Copper demonstrated the best antiviral properties. Additional experiments with different materials and other bacteriophages are necessary to assess their antiviral properties and ranges.

Diversity and AMR Gene Profiles of *Campylobacter jejuni* and *Campylobacter coli* Clinical Isolates, Genotyped in National Microbiology Reference Laboratory between September 2022 and October 2024

Poster

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Objectives*

Campylobacter sp. are ranked among the most common foodborne pathogens, as nominated by WHO. More than 400 campylobacteriosis cases have been diagnosed in Latvia since September 2022. National Microbiology Reference laboratory assessed the diversity of *Campylobacter sp.* clinical isolates obtained from three central and three regional hospitals and sentinel practitioners spanning five regions of Latvia during three-year term. 30% of the isolates are attributable to a surveillance project (2022–2023) and the more recent isolates (50%) were obtained during a wave of campylobacteriosis observed at a central hospital (2024). The phylogenetical assessment of the most dominant *Campylobacter jejuni* ST types – ST464, ST2123, and ST6532 was provided.

Materials and Methods

80 faecal/rectal specimens were submitted for precision analysis by the Whole Genome Sequencing. Bioinformatic analysis was performed by an in-house pipeline Ardetype v0.1.0-dev (Bodrenko & Vangravs, GitHub). At least two votes from AMRFinderPlus v3.12.8 (database v2024-05-02.2), ResFinder v4.5.0 (database v2024-03-22), RGI v6.0.3 (database card_v3.2.9), were considered for the presence of a gene.

Results

Eight *Campylobacter coli* isolates (ST1055, ST1582, ST7159, ST7989, ST8195) each harbored *gyrA* and *tet(O)* genes. Half of *Campylobacter jejuni* isolates were assigned to ST50 (n=6), ST19, ST21, ST45, ST51, ST53, ST122, ST572, ST583, ST658, ST918, ST1701, ST1947, ST2274, ST2823, ST6175, or ST9897. Each of these isolates harbored at least one of *bla*_{OXA-61}-like, *bla*_{OXA-184}-like, *tet(A/O)*, *gyrA*, *aph*-like, or *sul2* genes.

Sixteen ST464 isolates (intra-cluster distance 0–8AD, median 3, IQR 2–4), all harboring *bla*_{OXA-61/193}, *tet(O)*, and *gyrA*, were detected during 2022–2024.

Eleven ST2123 isolates (0–4AD, median 2, IQR 1–2), all harboring *tet(O)* and *bla*_{OXA-193}, and ten ST6532 isolates (0–7AD, median 3, IQR 2–4), all harboring *tet(O)* and *gyrA*, were detected during 2024.

Conclusions

Almost half of the campylobacteriosis cases observed at a central hospital (2024) were attributable to the clusters of *Campylobacter jejuni* ST2123 and ST6532, undetected during the previous interregional surveillance analysis in Latvia.

Investigating the Incidence of ESKAPE Organism-Associated Bloodstream Infections across Multiple Departments at Pauls Stradins Clinical University Hospital during 2021–2023

Poster

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Objectives*

To investigate the Incidence and Results of bloodstream infections due to ESKAPE Organisms (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, Enterobacter Spp.) among various departments at Pauls Stradins Clinical University Hospital during the years 2021-2023.

Materials and Methods

The study involved blood culture samples from 588 participants in which 33 of whom had two organisms and 3 had three organisms making for a total of 627 unique patient-organism combinations.

A total of 6486 tests were made.

Results

Among the 6486 tests, 4583 cases were Sensitive (70%), 1455 cases were Resistant (22.4%), 448 cases were Intermediate (6.9%) and 179 cases were Multidrug Resistant (that is 2.8% of Total Cases and 12.9% of all Resistant Cases) and the individual organisms are as follows within the total: S. aureus at 3392 (52%), K. pneumoniae at 1560 (24%), Enterobact spp. at 640 9.8%, E. faecium at 426 (6%), and both A. baumannii at 220 (3%) and Paeruginosa at 248 (3%) respectively.

The organisms that exhibited the greatest incidences of resistance and multidrug resistance relative to the proportion of their isolates were Enterococcus faecium and Acinetobacter baumannii at approximately 50% of either. Acinetobacter baumannii however was the majority in the total with 121 cases (55.1%) being Resistant out of a total of 220 cases and 27 of those being Multidrug Resistant (21% of Resistant Cases, 12% of Total Cases). The greatest incidence came from the Emergency Department.

Conclusions

The incidences of ESKAPE-associated bloodstream infections remain a significant concern regarding the morbidity and mortality of resident patients afflicted by nosocomial infections by ESKAPE Organisms due to their high adaptability and propensity for multidrug resistance within healthcare institutions.

Such results reflect requirement for further surveillance of antimicrobial therapy and infection control procedures as well as managing risk factors (chronic diseases in patients, unnecessary antibiotics) and understanding microbial pathogenicity further.

Phenotypic Characterisation of Different *Salmonella enterica* Serotypes in Latvia, 2022–2023

Poster

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Objectives*

In 2024 WHO included fluoroquinolone-resistant *Salmonella* spp. in Bacterial Priority Pathogens List as high-priority pathogen. The aim of this study was to determine antimicrobial resistance in different *Salmonella enterica* serotypes in Latvia.

Materials and Methods

This study was conducted with 225 strains of *Salmonella enterica* obtained from January 2022 to December 2023 in Latvia. The growth of *Salmonella* was performed on *Salmonella*, *Shigella* agar (SSag), Muller Kauffmann Tetrathionate Novobiocin Broth, Bismuth Sulfit Agar. Agglutination and serotype detection was performed using O and H antigen – Statens serum Institut diagnostic reagents. For antimicrobial susceptibility detection Liofilchem reagent and bio Merieux E-test were used. The antimicrobials evaluated were ampicillin (AMP), cefotaxime (CTX), ceftazidime (CAZ), chloramphenicol (C), gentamicin (GN), meropenem (MEM), pefloxacin (PEF), sulfamethoxazole/trimethoprim (SXT). All data was organized in Microsoft Excel. Statistical analysis was performed in IBM SPSS and involved descriptive and inferential statistics (Fisher-Freeman-Halton Exact Test, Mann-Whitney U Test, Chi-Square Test). A p-value of <0.05 was considered significant.

Results

There was found resistance to pefloxacin in 30 isolates (14,4%). Resistance to ampicillin was found in 25 isolates (11,96%), *S.typhimurium* and *S.brandenburg* have had higher tendency to be resistant to ampicillin ($p < 0,05$) comparing to other serotypes. Resistance to sulfamethoxazole/trimethoprim was found in 10 isolates (4,8%), *S.infantis* and *S.brandenburg* have higher tendency to be resistant to sulfamethoxazole/trimethoprim comparing to other serotypes ($p < 0,05$). Resistance to chloramphenicol was found in 10 isolates (4,8%). 1 isolate (*S.rissen*) was resistant to 7 antimicrobials. 2 isolates (*S.brandenburg*, *S.infantis*) were resistant to 6 antimicrobials. 5 isolates (2 *S.typhimurium*, *S.heidelberg*, *S.brandenburg*, *S.derby*) were resistant to 4 antimicrobials.

Conclusions

In Latvia there is higher *Salmonella enterica* resistance to pefloxacin, ampicillin, chloramphenicol and sulfamethoxazole/trimethoprim comparing to other antimicrobials. Our study shows the importance of antimicrobial susceptibility monitoring of *Salmonella* spp. Prevention and control of infections are important to control the spread of resistance.

Arrhythmology

Extrasystole Prevalence among Master Basketball Players

Oral

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Objectives*

Master athletes are at increased risk of atrial fibrillation and coronary artery disease. The aim was to examine master basketball player supraventricular, ventricular ectopy prevalence that can predispose to these conditions, correlation with age and length of playing basketball.

Materials and Methods

Cross-sectional research enrolling master basketball players. A cardiopulmonary stress test was made focusing on supraventricular, ventricular ectopy. Data was collected, processed using SPSS Statistics using descriptive and inferential statistics (Pearson Correlation).

Results

61 master athletes (enrolled March 2024 – September 2024), medium age - 64 years (SD 7.8). 5 participants (8.2%) had supraventricular extrasystoles (SVES). During rest - 0 participants; warm-up - 2 (3.3%); exercise 5 minutes - 3 (4.9 %); 10 minutes - 2 (3.3%); recovery phase - 2 (3.3%) of which 1 (1.6%) also during exercise. SVES did not have a statistically significant correlation with length of playing basketball but had a statistically significant correlation with age ($p=0.002$). 24 (39.3%) master athletes had ventricular extrasystoles (VES). During rest - 4 (6.6%); warm-up - 9 (14.8%); 5 exercise minutes -12 (19.7%) of which 2 (3.3%) at maximal excursion; 10 minutes - 5 (8.2%) of which 1 (1.6%) during maximal excursion; 15 minutes - 4 (6.6%) of which 3 (4.9%) at maximal excursion; at 20 minutes - 3 (4.9%) and all at maximal excursion. At recovery 2 (3.3%) had VES. There was no statistically significant correlation with age or length of playing basketball.

Conclusions

Prevalence of SVES among master basketball players is 8.2% which correlates with the athletes' age ($p=0.002$) but not with the length of basketball playing. VES are seen for 24 (39.3%) of athletes and did not have a statistically significant difference with age or length of playing basketball.

Project funding: National Research Programme “Sport”: Innovations, methodologies and recommendations for the development and management of the sport sector in Latvia. (VPP-IZM-Sports-2023/1-0001)

Quality of Life in Patients with Atrial Fibrillation Undergoing Pulmonary Vein Isolation: Short Term Follow-Up Study

Oral

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Objectives*

Atrial fibrillation (AF) significantly impacts the quality of life (QoL) of affected individuals. Pulmonary vein isolation (PVI) has emerged as a therapeutic approach to manage AF and improve QoL. This study aimed to assess the QoL in patients with AF undergoing PVI.

Materials and Methods

97 AF patients undergoing PVI (radiofrequency 52.6% (n = 51) and cryoablation 47.4% (n = 46)) at Pauls Stradins Clinical University Hospital were included in the study. QoL was measured using the 36-Item Short Form Survey (SF-36) before PVI and during a follow-up period of 5.98 ± 1.97 months.

Results

The study consisted of 60.8% (n = 59) males, with a mean age of 60.06 ± 11.61 years. 67.0 % (n = 65) of patients had paroxysmal AF, and 33.0 % (n = 32) had persistent AF. SF-36 questionnaire revealed major improvement across multiple QoL domains post-PVI, reaching statistical significance of $p < 0.01$. Patient factors, such as female gender ([Estimate 21.26, 95% CI (7.18, 35.35)], $p < 0.01$), persistent AF ([Estimate 15.49, 95% CI (2.83, 28.15)], $p = 0.02$) and restored sinus rhythm ([Estimate 14.35, 95% CI (1.65, 27.06)], $p = 0.03$) were associated with significantly improved QoL.

Conclusions

PVI in patients with AF positively influences various dimensions of QoL, as evidenced by significant improvement across multiple SF-36 domains. These findings emphasize worsened QoL in patients with AF and the potential benefits of PVI enhancing the overall well-being of individuals with AF.

Autoimmunity

Association of Baseline Lipopolysaccharide Binding Protein with EDSS Dynamics in Patients with Relapsing-Remitting Multiple Sclerosis

Oral

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Objectives*

Multiple sclerosis (MS) is a chronic autoimmune inflammatory condition of the central nervous system (CNS) marked by the destruction of myelin and subsequent damage to axons, leading to a deterioration in both motor and sensory abilities. Relapsing-remitting multiple sclerosis (RRMS) is the most common form of MS, characterized by episodes of neurological symptoms (relapses) followed by periods of recovery (remissions). Predicting the disease course during the early inflammatory phase of RRMS is crucial for timely treatment adjustments, minimizing clinical relapses and disability, and achieving improved long-term outcomes.

Materials and Methods

This study included 58 individuals diagnosed with RRMS, all exhibiting an Expanded Disability Status Scale (EDSS) score of less than 4. Baseline magnetic resonance imaging (MRI) was conducted to evaluate brain and spinal cord lesions, while disability levels were assessed using the EDSS both at baseline and during follow-up assessments. Additionally, enzyme-linked immunosorbent assays (ELISA) were utilized to quantify blood-based inflammation markers in plasma at baseline.

Results

Findings revealed a significant correlation between baseline levels of lipopolysaccharide-binding protein (LBP) and increases in EDSS scores over a short follow-up period of 8 to 10 months. Notably, this prognostic relevance of LBP was predominantly observed in patients who had undergone disease-modifying treatments (DMT) prior to the study.

Conclusions

The study suggests that the level of LBP may be among the predictors of disability progression in RRMS over short follow-up periods, particularly in those receiving treatment. It highlights the possible effect of endotoxins in the pathogenesis of RRMS and neurological disability despite the use of DMT and the absence of new relapses during follow-up. However, further research is needed to better understand the mechanisms through which endotoxins affect disease progression and to explore potential interventions that could mitigate their impact on patients with RRMS.

Health Status after the COVID-19: Two-Year Longitudinal Study

Poster

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Objectives*

The World Health Organization defines the post-COVID-19 condition as the continuation or development of new symptoms three months after the initial SARS-CoV-2 infection, lasting at least two months without an alternative explanation. Our study aimed to investigate the health status of patients hospitalized with COVID-19 in 2020 after two years to detect the post-COVID-19 condition and its reasons.

Materials and Methods

The study included 98 patients (50 females) aged 20 to 71. Patients were interviewed, and routine clinical tests, autoantibodies against liver tissue, markers of extracellular matrix, and epithelial cell apoptosis (ELISA) were detected.

Results

For two years, 88% of patients had been vaccinated against SARS-CoV-2, and 33% of patients reported reinfection. Since the hospitalization, the general, cardiorespiratory, neurological, joint, and muscle symptoms have decreased significantly. However, the median number of new symptoms lasting more than three months after the first COVID-19 episode was 4 (IQR [1; 8]), and they were found for 76% of patients. These symptoms were associated with a higher count of symptoms during the first COVID-19 episode and higher levels of leukocytes and lactate dehydrogenase after two years.

After two years, persistent symptoms were found in 82% of patients. However, they were not associated with reinfection, vaccination against SARS-CoV-2, the severity of the first episode, or chronic diseases. There were no differences in routine clinical tests and additional biomarkers among patients with new symptoms and without them.

Conclusions

The persistent symptoms after the first COVID-19 episode can point to the post-COVID-19 condition in more than two-thirds of patients. However, no association between biomarkers and symptoms, reported after two years, limits the attribution of symptoms to post-COVID-19 conditions.

B cell Immunity

GdIgA+ B cell Differentiation in IgA Nephropathy

Oral

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Objectives*

IgA nephropathy (IgAN) is the most common primary glomerulonephritis and a frequent cause of end-stage renal disease. The pathogenesis of IgAN is conceptualised by the multi-hit model. It integrates observations from studies of IgAN patients showing increased production of galactose-deficient IgA1 (GdIgA1, hit 1), the generation of antibodies against it (hit 2), immune complex formation (hit 3), and the mechanisms of immune-complex-mediated kidney injury (hit 4). As the source of the pathogenic antibodies B cells are central to IgAN development, yet they have been absent from the multi-hit model.

Materials and Methods

We combine flow cytometry, confocal microscopy of mucosa-associated lymphoid tissue (MALT) and in vitro Peyer's patch modelling to characterise GdIgA1+ B cells in IgAN and uncover the molecular requirements and developmental niches for their differentiation.

Results

We identify a GdIgA1+ B cell population that is increased in the peripheral blood of IgAN patients. IgAN patients further have an expanded population of GdIgA+ antibody-secreting cells (ASCs), which correlate with serum IgA levels. Implicating dysregulation at mucosal surfaces as the driver of such B cell differentiation, we found a correlation between lipopolysaccharide in the serum and IgA+CD27- B cell frequency. These B cells are the putative precursors of GdIgA1-producing ASCs.

Conclusions

This provides mechanistic insight into the B cell source and differentiation pathways that are central to IgAN pathogenesis. We propose that dysregulated immunity in the mucosa may drive *de novo* B cell activation within germinal centres, giving rise to GdIgA+ CD27- B cells and subsequently IgA-producing plasmablasts. These data integrate B cells into the paradigm of IgAN pathogenesis and allow further investigation of this pathway to uncover biomarkers and develop therapeutic interventions.

Basic Medical Science

Characterisation of *GSTM1* and *GSTT1* Genetic Variability and Its Role in the Development of Drug-Induced Hepatotoxicity in Patients with Drug-Susceptible Pulmonary Tuberculosis

Poster

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Objectives*

Both glutathione S-transferases M1 and T1 (*GSTM1* and *GSTT1*) are enzymes detoxifying various xenobiotics. In patients with tuberculosis (TB) receiving isoniazid, *GSTM1* and *GSTT1* null genotypes may potentially increase the risk of drug-induced hepatotoxicity (DIH). However, data on the impact of specific genetic variants is limited. This study characterised *GSTM1* and *GSTT1* genetic variability and assessed its relationship with DIH in patients with drug-susceptible pulmonary TB.

Materials and Methods

The study included 35 patients admitted to the Centre of Tuberculosis and Lung Diseases, Riga East University Hospital. DIH status was determined based on serum aminotransferase levels before and 10–12 days after treatment initiation. *GSTM1* and *GSTT1* genes were sequenced using a custom next-generation sequencing protocol targeting exons and untranslated (UTR) regions with flanking sequences. Sequencing data were processed using the Galaxy platform. Statistical analyses were performed using IBM SPSS Statistics 29.0.0.

Results

Sequencing data for the *GSTM1* and *GSTT1* genes were generated for 15 (42.9%) and 32 (91.4%) patients, respectively; they were classified as *GSTM1*+ and *GSTT1*+ genotype carriers with at least one sequenceable allele. In total, 21 *GSTM1* variant (three exonic, 17 intronic, one 3'UTR) and 15 *GSTT1* variants (two exonic, 12 intronic, one 3'UTR) were identified. The *GSTT1* variants were not further analysed due to low inter-patient variability. After adjusting for biological sex, age and baseline serum alanine aminotransferase levels, neither *GSTM1/GSTT1* genotypes nor the investigated *GSTM1* variants (exonic: rs1056806, rs1065411; intronic: rs11101983, rs113639525, rs72989301, rs737497; upstream: rs412543) were significant predictors of DIH, observed in 14.3% (5/35) of patients.

Conclusions

This study provides novel insights into *GSTM1* and *GSTT1* genetic variability in patients with TB. While the incidence of DIH aligns with previous reports, no significant relationship was observed between the *GSTM1/GSTT1* genotypes or the investigated *GSTM1* variants and the development of this adverse drug reaction.

Initial Insights from Shallow Whole Genome Sequencing (sWGS) of Seminal Plasma Cell-Free DNA in Idiopathic Male Infertility

Poster

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Objectives*

This study investigates the potential of seminal plasma cell-free DNA (sp-cfDNA) as a biomarker for idiopathic male infertility. By examining sp-cfDNA fragments obtained through shallow whole genome sequencing (sWGS), we aim to assess its potential to identify molecular signatures linked to infertility mechanisms and evaluate its diagnostic utility in distinguishing infertility-related alterations from normal conditions.

Materials and Methods

Seminal plasma samples from three normozoospermic (NORMO), three oligozoospermic (OA, including two with cryptozoospermia), and four azoospermic (AZO, no sperm cells) individuals with normal karyotypes and no Y chromosome microdeletions were analysed. Sp-cfDNA was extracted, sequenced (Illumina NextSeq 500), and analysed for alignment (*bwa-mem*) and bacterial DNA composition (*kraken2*).

Results

AZO samples exhibited bacterial DNA content 100-200 times higher than OA and NORMO groups ($0.153 \pm 0.26\%$ vs $0.001 \pm 0.001\%$ and $0.001 \pm 0.00018\%$, respectively). Mitochondrial DNA coverage in AZO samples was twice as high as in OA and NORMO ($56 \pm 41x$ vs $19 \pm 14x$ and $15 \pm 3x$), with no correlation to sperm concentration, suggesting these DNA parameters are independent of sperm count and are likely associated with infertility. Personalized insights into individual cases revealed particularly intriguing findings: One azoospermic individual exhibited bacterial DNA levels 500–1000 times higher than other samples, with abnormal chromosomal coverage (1.6x greater X and 2.9x lower Y chromosome coverage), hinting at possible testicular mosaicism and microbiome alterations. In another azoospermic case, the predominance of *Gardnerella* (69%) and *Lactobacillus* (21%) DNA, combined with a low Shannon index (0,81 vs 1,49-2,95 in other samples), suggested severe seminal dysbiosis, which may be linked to disrupted testicular microenvironments or subclinical infections.

Conclusions

Group- and individual-level sp-cfDNA differences underscore its potential as a diagnostic tool for male infertility. Extreme bacterial DNA levels and chromosomal anomalies in specific cases highlight the need for validation studies to confirm these findings and investigate underlying mechanisms.

Mice Breeding Strategies: PAIR versus TRIO

Poster

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Objectives*

This study aimed to optimize the breeding of transgenic (B6.Cg-Tg(K18-ACE2)2Prlmn/J) and wild-type (C57BL/6J) mice for experimental purposes by evaluating two breeding setups—trios (one male, two females) and pairs (one male, one female). The objective was to compare these models based on the number of pups weaned, weaning indexes, and the average interval between litters to assess their efficiency and practicality.

Materials and Methods

A breeding colony was established using transgenic and wild-type mice acquired from the Jackson Laboratory. Heterozygous mutant animals were crossed with wild-type animals. Breeders were organized into trios or pairs based on experimental needs, and breeding performance was evaluated by measuring: the number of pups weaned per female, weaning indexes (pups weaned per female per week), average time interval between litters. Fisher’s exact test was used to determine statistical significance.

Results

Pairs yielded more pups on average (5.93–6.93; 95% CI) compared to trios (4.48–6.09; 95% CI), though this difference was not statistically significant ($p = 0.81$). Animals producing two or more litters demonstrated robust weaning indexes of at least 1.3 pups per female per week. While the average litter interval was similar between models, the variability was much higher in the trio setup (39.0 ± 18.1 days), supporting the observation of fewer pups per female in this model.

Conclusions

Both breeding models have distinct advantages and disadvantages. Trios can accelerate breeding but pose a higher risk of pup mortality and require more management. Pairs, while yielding more pups on average with less variability, occasionally suffer from compatibility issues. The choice of model should align with specific experimental goals, balancing productivity with practicality.

Role of Cytokines and Inflammatory Mediators in Demyelination

Poster

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Objectives*

The purpose of the study was to examine the involvement of neuroinflammation in demyelination, with a particular focus on how cytokines and other inflammatory mediators contributed to the onset of demyelinating diseases, such as multiple sclerosis and peripheral neuropathy.

Materials and Methods

26 articles from PubMed, Scopus and Google Scholar databases, published in the last 10 years, were analyzed. The keywords used to conduct the research were “neuroinflammation”, “demyelination” and “cytokines”. Inclusion criteria were focused on studies investigating the role of inflammation in demyelination and its impact on neurological diseases. Publications were selected based on relevance and year of publication, while those not addressing the mechanisms of neuroinflammation or the role of cytokines were excluded.

Results

Neuroinflammation was described as a complex process initiated by the activation of glial cells, such as astrocytes and microglia. These cells are involved in the production of proinflammatory cytokines, including IL-1, IL-6 and TNF- α , which contribute to myelin degradation, intensifying oxidative stress and attracting immune cells to sites of damage, worsening inflammation. An imbalance between proinflammatory and anti-inflammatory cytokines, such as IL-10, were responsible for the progression of the demyelinating disease. Elevated levels of IL-6 and TNF- α were associated with severe symptoms in multiple sclerosis. It was reported that acute-phase proteins, such as C-reactive protein, and chemokines, such as MCP-1 and IL-8, facilitate leukocyte migration, further amplifying tissue damage. These metabolic changes not only damaged myelin, but also led to neurodegeneration, worsening functional impairments.

Conclusions

Neuroinflammation, driven by cytokines and other inflammatory mediators, was shown to be an important factor in demyelination. Understanding these mechanisms was considered vital for creating targeted treatments to reduce inflammation and to protect myelin. Monitoring cytokine levels was proposed as a valuable strategy to assess disease progression and to identify patients likely to benefit from anti-inflammatory therapies.

Biomaterials in Dental Sciences

Immunological and Anti-Microbial Activity of Platelet-Rich Fibrin

Oral

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Objectives*

Platelet-rich fibrin (PRF) is an autologous biomaterial characterized by a rich content of thrombocytes and various bioactive molecules. It is used for soft and hard tissue regeneration in various fields of medicine. The immunological properties of PRF rely on its ability to release autologous growth factors and cytokines in supra-physiologic concentrations. Anti-microbial activity is well established, but its mechanism is not clearly known. The application of PRF is expanding, but there is a lack of knowledge about its basic properties. This study aimed to determine the connection between the immunological and anti-microbial activity of i-PRF.

Materials and Methods

In the study were included 21 adult patients from the RSU Institute of Stomatology. Peripheral blood samples from the patients were obtained, and i-PRF was prepared according to the Choukroun protocol after centrifugation at parameters 700 rpm for 3 and 4 minutes for females and males. i-PRF samples were frozen and further used for ELISA analysis to measure Transforming growth factor β 1 (TGF β 1), Platelet-derived growth factor (PDGF), Epidermal growth factor (EGF), Vascular endothelial growth factor (VEGF), Interleukin 1 (IL1). For i-PRF anti-bacterial evaluation against reference cultures of *Klebsiella pneumoniae* (ATCC 10031), *Staphylococcus aureus* (ATCC 25923), *Porphyromonas gingivalis* (ATCC 33277) and *Fusobacterium nucleatum* reference culture (ATCC 25586) agar-diffusion method was used to measure Zone of inhibition (ZOI).

Results

i-PRF contains abundant concentration of TGF β 1, PDGF, EGF, VEGF. TGF β 1 was found to be in the highest concentration, IL1 was found in the lowest concentration. Almost no anti-bacterial activity was found against tested bacteria. Only one i-PRF sample demonstrated ZOI against *S. aureus*.

Conclusions

Our results demonstrated that freezing and thawing processes reduce the anti-bacterial activity of i-PRF. i-PRF is rich in growth factors and has remarkable regenerative potential. The abstract has been created within the funding of the project “RSU internal and RSU with LSPA external consolidation”, No. 5.2.1.1.i.0/24/I/CFLA/005.

Management of Occlusoproximal Caries Lesions in Primary Teeth: Systematic Review and Network Meta-Analysis

Poster

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Objectives*

The management of occlusoproximal caries lesions in primary teeth remains a significant challenge for dentists, with the optimal treatment strategy yet to be clearly defined. This study aimed to evaluate, through a systematic review of the literature, the most effective approach for managing these lesions.

Materials and Methods

A systematic search was conducted in February 2024 across MEDLINE/PubMed, Web of Science, Scopus, EMBASE, and ProQuest databases. Randomized clinical trials involving primary teeth with less than 30% sample loss, a minimum follow-up of 12 months, and comparing at least two different treatment modalities were included. A network meta-analysis was performed, with treatment success as the primary outcome. Risk of bias was assessed using the RoB 2 tool, and evidence quality was graded using the GRADE system.

Results

From 1,261 initially identified studies, only seven met the eligibility criteria. The strategies analyzed included the Hall Technique (HT), non-restorative cavity control (NRCC), conventional restorative treatment (CRT), silver diamine fluoride (SDF), and atraumatic restorative treatment (ART). HT demonstrated the highest efficacy (80.8%), while no significant differences were observed among the other strategies. Only two studies were classified as low risk of bias, with the remainder showing high risk due to issues such as selective outcome reporting.

Conclusions

In conclusion, although the Hall Technique emerged as the most effective approach, the low quality of available evidence necessitates cautious interpretation of these findings.

Clinical Microbiology

Mycoplasma pneumoniae Detection and Characterisation, 2023–2024

Oral

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Objectives*

Mycoplasma pneumoniae (MP) is one of the most common causes of community-acquired pneumoniae, primarily treated with macrolide. Emergence of macrolide-resistance *Mycoplasma pneumoniae* (MRMP) is observed worldwide and is associated with point mutations in the V domain of the 23SrRNA of MP.

The aims of this study is to evaluate the prevalence of MP and MRMP in Latvia, 2023-2024, validate the effectiveness of different molecular methods for MP macrolide resistance detection.

Materials and Methods

The study included 2161 samples from patients tested by routine multiplex respiratory pathogens real-time panel in NRL in 01.2023-10.2024. The presence of macrolide resistance mutations was detected by Sanger sequencing in 165 samples from MP DNA positive hospitalized patients with signs of pneumonia (95/165 - from REUH Emergency Medical Care Admission clinic tested MP positive with express multiplex real-time respiratory panel). 30/165 samples additionally were tested in parallel by three other methods: commercial and published in-house real-time PCR, real-time PCR with high resolution melt(HRM) analysis.

Results

From 01.2023 till 11.2023 5/790 (0,6%) MP positive samples identified and 151/1371(11%) in the same period of 2024. MP with macrolide resistance associated mutations was detected in 47/165 (29%) patients. The most common substitution was A2063G 44/165 (27%), rarely observed - A2063AG (1/165), A2064G (1/165), A2064AG (1/165). In-house real-time method for MRMP testing demonstrated full concordance with results of Sanger sequencing (30/30).

Conclusions

Significant increase (from 0,6% in 2023 to 11% in 2024) of *Mycoplasma pneumoniae* DNA positive samples was estimated. Macrolide resistance *Mycoplasma pneumoniae* was detected in 47/165 (28%) of analysed samples, mostly associated with A2063G mutation (27%). This rate of MRMP is much higher in comparison with published data from other European countries (5,1%). Validated in-house real-time PCR tests is method of choose for faster in comparison with Sanger sequencing and effective MRMP detection.

Analysis of Potential Fungal Infection Causative Agents Isolated from Skin and its Derivates in CL 2022–2023y

Poster

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Objectives*

The aim of the study was to analyze the results of biomaterial cultures, mainly from the skin and its derivatives, sent for microbiological examination for pathogenic fungi and conditionally pathogenic fungi at the Central Laboratory (CL), as possible causative agents of fungal infection.

Materials and Methods

From August 2022 to September 2023, in the microbiology department of the CL, patient samples (skin, mucous membranes, nails, etc.) were cultured for pathogenic and conditionally pathogenic fungi following an internal laboratory procedure by inoculating pathological material onto Mycoline (Biomerieux) medium with microscopy and identification with MALDI TOF (Bruker) of the colonies suspected to fungi.

Results

Out of 3664 samples, 2246 (61.3%) microbiological examinations were positive for fungal growth and 1418 (38.7%) were negative. From positive samples in 355 (15.8%) more than one causative agent was found. Dermatophytes were isolated from 379 (16.9%) samples. By species (71.2%) *Trichophyton rubrum*, (6.9%) *Trichophyton tonsurans*, (3.4%) *Microsporum canis* and (18.5%) *Trichophyton spp.* Pathogenic dermatophyte fungi *Epidermophyton sp.* were not found. In 767 (34.15%) samples yeast like agents were isolated. By species (12.0%) *Meyerozyma guilliermondii*, (11.1%) *Candida parapsilosis*, (6.3%) *Candida albicans*, (31.7%) *Candida spp.*, (2.0%) *Exophiala spp.* and (36.9%) other yeast like fungi. Non-dermatophytes were isolated from 1100 (48.98%) samples. By species (25.0%) *Penicillium spp.*, (19.3%) *Alternaria spp.*, (17.1%) *Aspergillus spp.*, (8.1%) *Scopulariopsis sp.*, (10.2%) *Mucor spp.* and (20.3%) other non-dermatophytes.

Conclusions

1. The most commonly isolated pathogenic dermatophyte fungi were *Trichophyton spp.* and *Microsporum spp.*
2. The largest non-dermatophytes group of isolates can only be assessed as potential pathogens of fungal infections in combination with clinical data.
3. Due to significant numbers of isolated yeast-like fungi in clinical samples in combination with clinical data it would allow determining whether the isolated fungus is clinically significant, or it is a part of normal skin and its derivatives microflora.

Detection, Isolation and Whole Genome Sequencing of *Campylobacter ureolyticus* Isolate from Non-Diarrheal Sample in National Microbiology Reference Laboratory of Latvia

Poster

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Objectives*

Campylobacter ureolyticus is still underdiagnosed in the cases of gastroenteritis and extra-intestinal infections. The traditional approach for *Campylobacter sp.* identification in the samples of the diarrheal source is biased towards the growth conditions less suitable for the anaerobic and slow-growing *Campylobacter ureolyticus*. Consequentially, *Campylobacter ureolyticus* is still considered as an emerging pathogen and the subsequent necessity, implementation and adjustment of the surveillance protocols as well as the development of the more rapid diagnostic assays typically focus on the more common *Campylobacter* species.

Some sporadic cases of extra-intestinal *Campylobacter ureolyticus* infections have been identified in blood cultures and surgical materials at Riga East University Hospital. This study focused on a recent isolate from an abscess drainage submitted for whole genome sequencing in the National Microbiology Reference Laboratory (NMRL).

Materials and Methods

The sample underwent anaerobic cultivation on the Shaedler agar with Vitamin K1 and 5% Sheep Blood (Becton Dickinson GmbH, Germany), incubated at 37°C under an anaerobic atmosphere (GENbag anaer, bioMérieux, France). Colonies were identified by MALDI-TOF mass spectrometry (Vitek MS, bioMérieux). DNA was extracted with DNeasy Blood Tissue kit (Qiagen), followed by library preparation with DNAPrep (Illumina, USA) and sequencing on Illumina NovaSeq6000 in 150PE read length configuration (ave. 5 million paired-end reads per sample). Bioinformatic analysis was performed by an in-house pipeline Ardetype v0.1.0-dev (Bodrenko & Vangravs, GitHub), employing Fastp v0.22.0, Shovill v1.1.0, chewBBACA v3.1.2 (cgmlst.org scheme v2023-05-08), 7-gene MLST v2.19.0 (PubMLST v2020-02-24).

Results

The colonies were identified as *Campylobacter ureolyticus* and the species identification was subsequently confirmed by ribosomal multilocus sequence typing (rMLST) with 100% support.

Conclusions

This study demonstrates the NMRL's proficiency in cultivating and genotyping the fastidious bacterium *Campylobacter ureolyticus*.

NMRL contributes to the global knowledge and will share the obtained genomic data with the public sequence depositories for a subsequent improvement of the molecular typing methods for this underrated pathogen.

In vitro Antibacterial Effect of Five Essential Oils Against Human Pathogens

Poster

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Objectives*

Development of resistance to different antimicrobial agents are significant problem nowadays that suggests finding new additional available options for dealing with a problem. Essential oils, from the beginning of history have been applied to different purposes. Several studies suggest antimicrobial activity of essential oils.

Materials and Methods

In total, we tested five essential oils in different concentrations to three- gram negative bacteria, three- gram positive bacteria and one fungi. Essential oils were chosen to be one of the most common ones used in various solutions. Pathogens were applied on petri dish plates agar providing a solid surface for bacterial growth. Onwards discs were applied with different concentrations of essential oil. Incubating the plates overnight, presence or absence of a zone of inhibition around the discs were measured. Bacteria were chosen to be one of the most frequent pathogens causing diseases, with high risk of resistance. Results were compered to different concentrations with highest and lowest activity, whether the amount of concentration correlates with increase in activity, the most pronounced activity at the lowest concentration.

Results

Most of the antibacterial activity were observed to *Coriandrum sativum* essential oil. Lowest were observed to *Pinus sylvestris* and *Matricaria chamomilla* essential oils. In some cases, the increase in concentration did not correlate with the increase in activity, indicating that the permeability of the pathogens cell wall depends on a certain concentration of essential oil.

Conclusions

This study and result suggest that there are other substances with properties of antimicrobial activity like essential oils which may be used for medical purposes.

Prevalence and Tetracycline Resistance of *Ureaplasma* species and *Mycoplasma hominis* in Latvia, 2014–2024

Poster

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Objectives*

Ureaplasma spp. and *Mycoplasma hominis* have been identified as important human pathogens of considerable urogenital problems such as non-gonococcal urethritis, cervicitis and Pelvic inflammatory disease. Tetracyclines belong to the first-line treatment of human urogenital infections caused by *Mycoplasma hominis* and *Ureaplasma* spp.

The goal of this study was to determine the prevalence and resistance to tetracyclines among *Mycoplasma hominis* and *Ureaplasma* species isolates obtained from patients of the Infectiology Centre of Latvia, from January 2014 to November 2024.

Materials and Methods

12030 clinical samples were obtained from cervix and urethra. Antibiotic susceptibility of the bacteria was determined using the Mycoplasma IST2 and Mycoplasma IST 3 (bioMérieux, France).

Results

Our study indicated that the overall prevalence of total *Ureaplasma* spp./*Mycoplasma hominis* was 37% positive (4410 of 12030) from 2014 to 2024.

In 2014 positive 43% (846/1968) of them tetracycline resistance 0.83% (7/846),
in 2015 positive 44% (520/1178) tetracycline resistance 1.35% (7/520),
in 2016 positive 45% (427/959) tetracycline resistance 1.87% (8/427),
in 2017 positive 42% (365/865) tetracycline resistance 1.64% (6/365),
in 2018 positive 43% (375/867) tetracycline resistance 1.87% (7/375),
in 2019 positive 32% (446/1378) tetracycline resistance 1.52% (7/446),
in 2020 positive 32% (438/1378) tetracycline resistance 1.14% (5/438),
in 2021 positive 30% (336/1107) tetracycline resistance 8.33% (28/336),
in 2022 positive 30% (265/877) tetracycline resistance 14.72% (39/265),
in 2023 positive 31% (245/791) tetracycline resistance 19.18% (47/245),
in 2024 positive 22% (147/662) tetracycline resistance 29.25% (43/147).

Conclusions

According to our data, tetracycline resistance increased from 0.83% to 29.25% in the last eleven years. Resistance to tetracyclines in *Mycoplasma hominis* and *Ureaplasma* spp. has been associated with the presence of the tet(M) determinant.

Results of Wastewater Surveillance for Non-Polio Enteroviruses in Latvia 2024

Poster

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Objectives*

Wastewater surveillance has been improved over the years, and one of proven criteria for the detection of non-polio enteroviruses (NPEVs). NPEVs have been associated with an aseptic meningitis, encephalitis, hand, foot and mouth disease and myocarditis. It is a powerful tool to rapidly detect the circulation of pathogens. The aim of a study is to represent diversity of circulated enteroviruses in the wastewaters.

Materials and Methods

Samples collected from eight places on the territory of Latvia. Center for Disease Prevention and Control of Latvia performed concentrated sewage collection with grab method. One litre of raw sewage transported to the laboratory in a cold transport container (+4 °C). The general procedure consists of the centrifugation of 500 ml sample, then separation with a two-phase method according to World Health Organization requirements and virus isolation in cell culture. Positive sewage sample with observed cytopathic effect typed using neutralization reaction that allowed detect specific enterovirus type.

Results

There were collected 115 sewage samples in 2024. Coxsackieviruses (Cox) B5 detected in 21 sewage samples, echoviruses (Echo) 6 and Echo 25 - in five samples each, Echo 30 – in three samples, Echo 13, Echo 11 and Cox B4 – in two samples each, Echo 1, Echo 3, Echo 7, Cox A7, Cox A24 and Cox B3 – in one sample each. Four samples of positive Cox B viruses were un-typed.

Conclusions

There were identified enterovirus species as coxsackieviruses and echoviruses. Detected broad spectrum of circulated non-polio enteroviruses – Cox A7, Cox A24, Cox B3, Cox B4, Cox B5, Echo 1, Echo 3, Echo 6, Echo 7, Echo 11, Echo 13, Echo 25, Echo 30. Sequencing method applied for characterization of un-typed enterovirus isolates. Environmental surveillance has a potential role in the monitoring of circulated enteroviruses.

Salmonella enteritidis and Salmonella typhimurium Molecular Characterisation in Latvia, 2022–2023

Poster

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Objectives*

To analyse different *S. enteritidis* and *S. typhimurium* MLST7 collected from human samples from 2022 to 2023.

Materials and Methods

Between January 1, 2022, and December 31, 2023 225 samples (faeces, urine, blood, puncture, pus) were tested in National Microbiology Reference Laboratory, originating from different Latvian hospitals. DNA isolation was performed by Qiagen DNeasyR Blood & Tissue Handbook protocol, concentration measured with Qubit Thermo Fisher, library prepared according to Qiagen QIAseq FX DNS Library Kit Handbook for microorganisms libraries preparation, library measured using Tape Station, sequencing performed with MiSeqDx, NextSeq550DX, data collection and analysis was done in Microsoft Excel.

Results

The tested male/female ratio was 109/116. Median age of the patients was 27 years with <12 months being the youngest and 91 years being the oldest infected patient. Faeces were the most common sample type (n=218), followed by urine (n=3), blood (n=2), puncture (n=1) and pus (n=1). Most patients had moderate symptoms (70,3%), followed by unknown (17,4%), mild (9,1%), severe (2,3%), asymptomatic (0,9%). There were different *S. enteritidis* MLST7 (MLST7 11 n=123; MLST7 3233 n=2) and *S. typhimurium* (MLST7 19 n=13; MLST7 34 n=3; MLST7 36 n=2; MLST7 3537 n=2; MLST7 3137 n=2; There were 32 different serovars detected in total. In one case *S. typhi* MLST7 2 was identified.

Conclusions

Salmonella infections are often caused by different serovars, however most common serovar identified in Latvia was *S. enteritidis* with MLST7 11 followed by *S. typhimurium* MLST7 19. Most common sample type was faeces. Patient Median age was 27. Most common clinical presentation was moderate symptoms and most suspected specific origin of infection was egg produce.

Trends in *Pneumocystis jirovecii* Infections: 5-year PCR-based Study in National Microbiology Reference Laboratory of Latvia

Poster

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Objectives*

Pneumocystis jirovecii is the fungal etiological agent of *Pneumocystis* pneumonia (PP). PP mostly affect the immunocompromised patients and is one of the most common pulmonary infections in individuals with impaired cell-mediated immunity, including those infected with the human immunodeficiency virus (HIV). Occasionally, the infection can be life-threatening.

Materials and Methods

From January of 2019 till October of 2024 overall 2437 samples (bronchial lavage (45.67%), sputum (16.58%), nasopharyngeal swab (NP swab) (37.55%) and others (0.27%)) from various regions of Latvia were tested by real time PCR (Amplisens or Genesig). Nucleic acid was extracted by NucliSENS easyMAG automated system (BioMeriux). The patients ages ranged from infants to 98 years with male/female ratio 1515/922.

Results

In total 313/2437 (12.84 %) *P.jirovecii* DNA positive samples were detected. The distribution of positive samples was: sputum (15.14%), bronchial lavage (12.23%) and NP swab (12.68%). PCR inhibition were observed in 2.83% cases, with highest rate in sputum (7.20 %). Quantity of tested/positive samples by year were - 2019 (292/16.10%), 2020 (319/19.75%), 2021 (359/15.32%), 2022 (499/11.82%), 2023 (584/9.25%), until 10.2024 (384/9.11%). The tested male/female ratio was 1515/922 with positive proportion 13.73%/11.39%. By age groups tested/positive ratio were 0-9y(148/6.76%), 10-19y(82/0%), 20-29y(69/2.9%), 30-39y(341/14.66%), 40-49y(515/16.70%), 50-59y(421/11.16%), 60-69y(466/14.38%), 70-79y(293/12.63%), ≥80y(102/13.73%).

Conclusions

The highest proportion of PP positive cases were observed in sputum (15.14%), similar proportion in bronchial lavage (12.23%) and NP swab (12.68%). The highest rate of PCR inhibition was observed in sputum as well. The positive PP sample ratio was slightly higher in males than females. Since 2019, the number of samples tested annually has increased (from 292 in 2019 to 584 in 2023), while the proportion of positive samples has decreased (from 16.10% in 2019 and 19.75% in 2020 to 9.25% in 2023 and 9.11% until 10.2024). The highest numbers and proportions of positive samples were observed in age groups: 40-49y (515/16.70%) and 60-69y (466/14.38%).

Dentistry and Related Sciences

Challenges and Opportunities in Adopting Minimally Invasive Caries Management: Perspectives from Latvian Dental Hygienists

Oral

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Objectives*

This study investigates the experiences of dental hygienists in Latvia regarding the integration of minimally invasive dentistry (MID) techniques in paediatric caries management. It aims to identify practical challenges and opportunities within the public dental healthcare system.

Materials and Methods

A qualitative approach was used to explore the perspectives of six dental hygienists selected through purposive sampling (Ethics Approval: RSU #22-2/500/2021). Following informed consent, semi-structured interviews were conducted in-person or online, audio-recorded, transcribed, and subjected to inductive content analysis. Adherence to the Consolidated Criteria for Reporting Qualitative Research (COREQ) ensured methodological rigour. This study is part of the larger study, “Dental Professionals’ Views on Non-Invasive and Minimally Invasive Caries Management Strategies in Latvia” (Protocol 10.17605/OSF.IO/2BK7A). Funding: FLPP lzp-2022/1-0047.

Results

Participants acknowledged the potential of MID techniques, including Silver Diamine Fluoride (SDF), to enhance paediatric dental outcomes. However, significant obstacles hindered widespread adoption, including limited professional training, inadequate resources, and resistance from some dentists. Facilitating factors included a strong interest in professional development, better public awareness campaigns, and supportive health policies promoting MID.

Conclusions

Dental hygienists view MID as a transformative approach to paediatric dentistry but face systemic and educational barriers. Enhanced training, better resources, and public and professional education are essential to boost acceptance and adoption, improving paediatric oral health in Latvia.

Comparative Analysis of Prophage Gene Content in *Veillonella Atypica* Isolates from a Periodontitis Patient and Healthy Individuals: Pilot Study

Oral

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Objectives*

Veillonella atypica plays dual roles in oral health: beneficially contributing to nitrate reduction and pH moderation, but during dysbiosis, it thrives alongside pathogens like *Porphyromonas gingivalis*, supporting periodontitis progression. Despite its metabolic versatility, the role of prophages in *V. atypica*'s adaptation remains unclear. This pilot study aimed to identify and characterize prophage-encoded genes in *V. atypica* strains from healthy individuals and a periodontitis patient to assess their functional contributions.

Materials and Methods

Saliva samples from one periodontitis patient (P1) and two healthy participants (C1, C2) were collected. *V. atypica* was isolated, DNA extracted via the phenol-chloroform method, shotgun metagenomic libraries were prepared and sequenced on Illumina MiSeq machine. De novo assembly of genomes was done using Unicycler. Complete *V. atypica* genome from GenBank (ASM3269583) was analyzed alongside. Prophages were identified using VirSorter2, functional annotation was conducted using Phold, protein functions were validated using HH-pred homology detection.

Results

Prophages (full and partial) were identified in all *V. atypica* genomes - two prophages in reference genome, two in P1 isolate, four in C1, and three in C2. Some prophages shared notable genomic similarities, suggesting that certain prophage types might be present in multiple *V. atypica* strains. Variations between prophages were also observed. Unique notable genes in P1's prophages included a nitroreductase gene and toxin-antitoxin system gene (RelE-like toxin).

Conclusions

The results of this study suggest that prophages in *Veillonella atypica* may serve as active contributors to its dual behavior in the oral microbiome. The discovery of a nitroreductase gene within a prophage from the periodontitis isolate suggests potential involvement in nitrate/nitrite metabolism. This pilot study is limited to its small size of participants, and reliance on saliva isolates, which may not fully represent *V. atypica*'s role in periodontitis. Despite these limitations, results emphasize the importance of phage-bacteria interactions in oral dysbiosis and systemic health.

Economic Evaluation for Minimal Intervention Paediatric Caries Management Strategies in Latvia

Oral

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Objectives*

In Latvia, there are 137,850 children up to 6 years of age, yet the national budget funds treatment for only 22% (n=30,492; year 2022), highlighting the need for alternative solutions to expand coverage. We aim to estimate if minimally invasive (MI) treatments could optimise resource allocation to provide comprehensive treatment for carious lesions in all children up to six years of age.

Materials and Methods

We utilised a cohort of patients from a previous clinical trial (10.1038/s41598-024-58850-w) that evaluated the effectiveness of non-invasive treatments for dental caries. A random sample of patients was recalled (Riga Stradins University Ethics Committee (22-2/500/2021)) after two years for a clinical assessment of all treatments performed by two calibrated examiners in the RSU Stomatology Institute. After identifying all treatments performed on each child, we calculated the total cost and normalised it by age. The cost of each treatment was calculated using 2024 data from the National Health Service fees in Latvia. Funding: FLPP lzp-2022/1-0047.

Results

A total of 129 children in the treatment group were included in the study (Females. 45%). Median age was 7.12 years (IQR: 6.11–7.88). The mean annual cost per child was €99.7 (95% CI: €90.6–€109.0). The estimated total cost for treating 65,000 children requiring dental care is €6,472,285 based on the mean annual cost per child (95% confidence interval €5,888,129 to €7,066,440). For the remaining caries-free children, there would be a need for an additional €3,750,196 for preventive annual visits. Utilising the MI approach, it is anticipated that €10,222,481 of the 13 million euros available would be allocated to cover the treatment of dental caries for children up to the age of six.

Conclusions

Implementing MI caries management strategies could fully cover the necessary treatment costs for children under the age of 6 requiring caries care in Latvia.

Infraocclusion of Retained 2nd Mandibular Primary Molars in Case of 2nd Mandibular Permanent Premolar Agenesis

Oral

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Objectives*

The objective of this study is to evaluate the prevalence of 2nd mandibular premolar agenesis and infraocclusion of retained 2nd mandibular primary molars.

Materials and Methods

The study sample for current research was derived from a previous study by Meistere et al., 2024. In that cross-sectional retrospective study, 2692 panoramic radiographs of adolescent patients were included, focusing on determining the prevalence of hypodontia. Patients with agenesis of at least one mandibular permanent 2nd premolar were included in current research providing 156 patients as a study sample. The study sample consisted of 93 females and 63 males, all aged 11-14 years old (M=156 months, SD=14 months) without any genetic syndromes in their medical history. Panoramic examination was done between August 2020 and September 2021 at Riga Stradins University Institute of Stomatology unrelated to this study. Panoramic radiographs were retrospectively analyzed to determine presence of infraocclusion. Infraocclusion was measured as a ratio between line *a* (distance from the distal cusp of the primary mandibular molar) and line *b* (crown height of the lower permanent first molar). Infraocclusion ratio of more than 0.2 was considered clinically significant and a ratio of 0.5 or more classified this tooth as being in poor condition.

Results

Prevalence of mandibular 2nd premolar agenesis was 5.8%. Overall 236 missing permanent mandibular 2nd premolars in 156 patients were recorded. Only 138 (58.5%) predecessor primary molars were present. Any signs of infraocclusion were noted in 32 primary molars and infraocclusion of more than 0.2 was reported in 87.5% of molars, but 0.5 or higher – in 28.1%. The mean ratio of infraocclusion was 0.36 (MIN=0.1; MAX=0.73; SD=0.16).

Conclusions

Prevalence of mandibular 2nd premolar agenesis was 5.8%. Any signs of infraocclusion were noted in 32 primary molars and in almost 90% cases the ratio of infraocclusion was more than 0.2.

New Approach to the Non-Surgical Management of Periodontal Furcation Involvement Defects: Study Protocol

Oral

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Objectives*

Background: Periodontitis is a complex, long-lasting inflammatory condition affecting the periodontium, leading to the deterioration of periodontal tissues and potentially resulting in tooth loss. Furcation involvement (FI) is a consequence of the advancement of periodontal disease caused by the destruction of the periodontal tissues situated between the roots of multirrooted teeth. Non-surgical periodontal interventions are not fully effective in regenerating Class II FI defects. Some systematic reviews have indicated that host modulators and antimicrobials may offer additional advantages in the treatment of FI defects.

Objective: This randomised, single-blinded, split-mouth clinical trial aims to evaluate the effectiveness of using an oscillating chitosan brush in conjunction with enamel matrix derivative (EMD) for non-surgical periodontal therapy of furcation-involved defects in the molars.

Materials and methods: This study is being conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Riga Stradins University (protocol No. 2-PĒK-4/529/2023; date of approval: 11th of September 2023 and No. 2-PĒK-4/659/2024; date of approval: 04th of November 2024).

Inclusion criteria are stage III or IV periodontitis with first or second molars with Class IIA or IIB buccal or lingual furcation defects. Furcation defects in each quadrant will be randomly allocated to either the test group (Oscillating Chitosan Brush with EMD) or the control group (Oscillating Chitosan Brush alone).

Clinical periodontal measurements, such as mobility, recessions, probing pocket depth, furcation involvement, and clinical attachment level, will be evaluated at baseline and week 12. Samples of gingival crevicular fluid (GCF) and subgingival plaque from FI defects in test and control sites will be gathered at baseline and 4 weeks and sent for analysis of the proteomic profile of GCF and differences in the microbial profile.

Relationship between Maxillary Transverse Dimension and Impacted Canines

Oral

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Objectives*

To compare the transverse dimension of an individual's maxilla between the sides with and without impacted canine using cone-beam computed tomography (CBCT).

Materials and Methods

A total of 104 CBCT images of patients with unilaterally impacted maxillary canines (79 palatally impacted and 25 buccally impacted) were examined. The maxillary transverse dimensions were measured at the dental, alveolar, basal, and nasal levels of the first premolars and molars using 3D Slicer software. Differences between the sides were assessed using paired-sample t-tests. The difference between the non impacted side and impacted side was correlated with age using Spearman's correlation test with additional linear regression analysis.

Results

Statistically significant differences were observed in the premolar alveolar width (0.35 mm, $p = 0.029$) and basal width (0.47 mm, $p = 0.021$), regardless of the impacted canine position, with the canine impaction side being narrower. In the palatal canine impaction group, the premolar basal width on the impaction side was significantly narrower by, on average, 0.4 mm ($p = 0.027$). No significant differences in total maxillary widths were found between the palatal and buccal canine impaction groups. The premolar alveolar width in females and the pre-molar basal width in males were significantly narrower on the impaction side (by, on average, 0.38 mm, $p = 0.019$ and 1.03 mm, $p = 0.004$, respectively). In males, age was positively correlated with the differences in pre-molar dental width ($r = 0.504$, $p = 0.005$), molar dental width ($r = 0.533$, $p = 0.004$), premolar alveolar width ($r = 0.441$, $p = 0.015$), and molar alveolar width ($r = 0.481$, $p = 0.011$). With each year of life, the difference in pre-molar dental width, molar dental width, and premolar alveolar width increases by 0.041 mm ($p = 0.037$), 0.045 mm ($p = 0.028$), and 0.118 mm ($p = 0.003$), respectively.

Conclusions

Canine impaction is associated with a local narrowing of the maxilla in the premolar region, which is influenced by gender and age.

Role of Biochemical and Microbiological Properties of Granulation Tissue in Periodontal Regeneration

Oral

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Objectives*

This PhD thesis will investigate the regenerative role of granulation tissue in the treatment of periodontitis, analysing the differences between infra- and supra-osseous granulation tissues in smokers and non-smokers. Periodontitis is a prevalent oral disease resulting from dysbiotic microbial interactions, affecting both oral and systemic health. Conventional periodontal treatments require the removal of granulation tissue, although current research indicates that these tissues may possess regeneration capabilities.

Materials and Methods

Two groups – non-smoking and smoking patients with Stage III-IV Grade B-C periodontitis undergoing periodontal maintenance therapy and exhibiting residual pockets and infra-osseous defects – will be recruited from the Riga Stradins University Institute of Stomatology clinic. Granulation tissue samples will be obtained during periodontal surgery for biochemical and microbiological examination at Turku University. Healing markers will be evaluated using flow cytometry, and microbial virulence will be assessed by enzymatic methods, with statistical analyses performed to assess correlations.

Results

The findings of this project will be important for the field of periodontology, as recent studies have emphasised the regeneration potential of granulation tissue, questioning its routine removal. Unlike other studies, this project will examine infra- vs. supra-osseous granulation tissue biomarkers, microbiological makeup, and distinctions between smokers and non-smokers.

Conclusions

This study seeks to enhance surgical periodontal treatment by examining the properties of the understudied granulation tissues.

Validation of Lower Digital Dental Models Superimposition Methods

Oral

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Objectives*

The superimposition of pre- and post-treatment records is important for assessing changes during orthodontic tooth movements. Superimposing dental models is preferred over methods involving radiological investigations due to radiation concerns and precision. For the superimposition of dental models, stable anatomical structures are necessary, which presents a problem for the lower jaw. The aim of the study is to test alternative superimposition methods for the lower jaw.

Materials and Methods

Cone beam computed tomography (CBCT) and intraoral scans were collected from 30 patients three weeks (T1) and one year (T2) after orthognathic surgery. The lower dental model superimposition was carried out using four different methods: CBCT, best-fit, molar, and landmark-based. Dolphin 12.0 Premium software (Dolphin Imaging & Management Solutions, Chatsworth, CA, USA) and 3D Slicer software (version 4.10.0 release) were used. Statistical data analysis was performed with Jamovi (v.2.5). Friedman's test was used to compare dental movements in the x, y, z axes using each superimposition method. The root mean square (RMS) was calculated between the superimposed models. The intraclass correlation coefficient (ICC) was used for the reliability of the superimposition.

Results

The mean RMS for the landmark method was 0.256 mm, for the molar method 0.256 mm, and for the best-fit method 0.214 mm. The mean ICC coefficient ranged from 0.999 to 0.998. The dental movements showed significant differences among the methods in the x-axis for all methods, ranging from 0.43 mm for molars using the best-fit method to 0.003 mm for incisor using the molar method. In the y-axis, differences were found only for the best-fit and landmark methods. No differences were found for the dental movements in z-axis.

Conclusions

The tested superimposition methods are suitable for superimposition, but the assessment of dental movements has to be carried out considering the restrictions of each method.

Development and Validation of the Latvian Version of the Orofacial Esthetic Scale

Poster

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Objectives*

This study was done to develop and validate the Latvian version of the Orofacial Esthetic Scale (OES-LV) and to assess its psychometric properties.

Materials and Methods

The OES is an eight-item instrument with seven items addressing esthetic impacts of the orofacial region and an eighth item for a global assessment. It applies an 11-point scale, with summary scores ranging from 0 (worst) to 70 (best). The English version of OES was translated into Latvian and back-translated (forward-backward method). Evaluation was done by the research team following necessary revisions and changes. The final version (OES – LV) was developed and applied to patients visiting RSU SI Prosthodontics department for the first appointment or a follow-up visit as well as RSU students, dividing patients (n=100) into 4 groups: Esthetically impaired (n=25);

Functionally impaired (n=25); Follow up (treated) patients (n=25); Students (as controls) n=25. To evaluate test-retest reliability testing was repeated with a distance of 2–4 weeks apart and no dental intervention performed between the two assessments. The internal consistency of the questionnaire was evaluated using Cronbach's alpha (α) coefficient and inter-item and item-total correlations. Discriminant and convergent validities were assessed within the different groups.

Results

A total of 100 individuals participated in the study. Internal consistency, test-retest reliability and convergent validity of the OES-LV was satisfactory.

Conclusions

The OES-LV is a reliable and valid questionnaire and has good psychometric properties therefore is a valuable instrument for the assessment of self-perceived orofacial esthetics among adults in Latvia.

Evaluation of Spheno-Occipital Synchrondrosis as an Age Estimation Tool Using Cone-Beam Computed Tomography in Latvian Individuals

Poster

Dr. Zanda Bokvalde¹, Prof. Laura Neimane¹

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Objectives*

Main objective was to assess and evaluate spheno-occipital synchrondrosis (SOS) fusion stage in relation to the real age in 14-21 year old individuals.

Materials and Methods

CBCT data of 92 patients were retrospectively evaluated. CBCT were retrieved from database of RSU Stomatology institute clinic, images were taken for different clinical purposes. SOS fusion was graded in 4 stages (0-3) – from completely open with no evidence of fusion till completely fused appereance of bone. Futher it was evaluated in relation to age and sex.

Results

- Fisher Exact test showed no statistically significant association ($p=0.150$) between the SOS fusion stage and gender.
- It was found that there is a statistically significant ($p<0.01$) association between chronological age and SOS fusion stage – it was found higher with increasing age group

Conclusions

In this study it was observed that there could be connection between SOS fusion stage and chronological age, where SOS fusion stage had the tendency to be higher for older individuals.

Possible Role of Epstein-Barr Virus (EBV) and Human Herpesvirus 7 (HHV-7) Infection in Pathogenesis of Recurrent Aphthous Stomatitis

Poster

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Objectives*

Recurrent aphthous stomatitis (RAS) is a multifactorial disease that affects approximately 25% of the population. It is characterized by mucosal destruction linked to immune response dysregulation and stimulation by unidentified antigens. This work explores a possible role of EBV and HHV-7 in aphthous stomatitis pathogenesis.

Materials and Methods

The cohort comprised 31 adult patients diagnosed with recurrent aphthous stomatitis who visited the RSU Clinic of Oral and Maxillofacial Surgery and Oral Medicine between dates 21.06.2021- 05.08.2024. Data were collected from patient medical records, structured interviews and clinical evaluations. Saliva samples were taken on the first visit, stored at -80°C degrees and later transported to the Institute of Microbiology and Virology for the quantitative detection of EBV and HHV-7 genomic DNA using real time PCR with corresponding primers. Descriptive statistics were used to identify clinical patterns and correlation with laboratory indices.

Results

The cohort comprised 31 patients. Ulcer occurrences ranged between 1 and 5, with a median of 2 per patient. Ulcer Severity Scores (USS) predominantly clustered between range 12 to 37. Gastroesophageal reflux disease (GERD) emerged as the most frequently associated chronic condition, often coexisting with stress, hypertension, and celiac disease. EBV genomic sequences were detected in 25 (81%) and HHV-7 genomic sequences in 30 (97%) patients saliva samples. The median for EBV was 2063.35 copies/mL (7 patients > 10⁵ copies/mL) and HHV-7 was 112348.955 copies/mL (17 patients > 10⁵ copies/mL). USS showed a skew toward higher severity in 14 patients with high viral load (1 with EBV, 9 with HHV-7, and 4 with both).

Conclusions

This study suggests a possible link between the presence of EBV and HHV-7 genomic sequences in saliva and RAS pathogenesis. Co-occurrence with conditions like GERD, stress, and celiac disease highlights its multifactorial nature, with viruses likely contributing rather than causing the disease. Larger studies are needed to confirm these findings.

Presence of Temporary Cement in Dentine Tubules after Removal of Temporary Restoration. SEM Analysis. In vitro study

Poster

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Objectives*

Numerous perspectives have been discussed regarding the influence of temporary cements, various surface pretreatment protocols prior to adhesive cementation, and key predictive factors. The success of adhesive restorations relies heavily on the cleanliness of the abutment surface to ensure a robust bond between the resin cement and the abutment. This in vitro study aimed to evaluate whether temporary cement residues could be identified within the cross-sections of dentine tubules.

Materials and Methods

Six teeth were mounted in acrylic blocks (Pattern Resin LS, GC America Inc., Alsip, IL, USA) and ground flat under water cooling (Superflex Diamond disk, Fine, Edenta) to expose the dentine surfaces. Temporary acrylic overlays (Success CD, Promedica Dental Material GmbH, Neumunster, Germany) were cemented using Temp Bond NE (Kerr Dental Kerr Corporation, Orange, CA, USA) under 15N of pressure for 60 seconds, ensuring consistent force application across all specimens. The samples were stored in a moist environment at room temperature for one day. Subsequently, the temporary overlays were removed from three specimens, and any cement residue was eliminated using a dental instrument, followed by polishing with pumice and a rotating brush until no visible residues remained. For the other three samples, cement residues were left intentionally unaltered. All six specimens were then rinsed with water and fractured along their vertical axis. The fractured surfaces were analyzed using scanning electron microscopy (SEM) (Tescan Mira/LMU, Brno-Kohoutovice, Czech Republic) and energy-dispersive X-ray (EDX) analysis (Oxford Instruments X-MaxN detector, 150 mm², Oxford, United Kingdom) to detect zinc (Zn) ions, a key component of temporary cements. The Zn ions, derived from zinc oxide (CAS No. 1314-13-2, 60–100%), were noted in the material safety data sheet provided by the manufacturer. The presence of Zn particles in the dentine tubules indicated the infiltration of temporary cement residues.

Results

Zn ions were detected in all three untreated specimens (100%), while only one of the three treated specimens (33%) exhibited Zn ion presence. SEM analysis confirmed that despite mechanical removal, cleaning, and polishing of the tooth surface, zinc ions were still found within the dentine tubules.

Conclusions

The results suggest that residual particles from temporary cement can consistently penetrate dentine tubules, even after extensive cleaning and polishing[1].

[1]Effect of Temporary Cement, Surface Pretreatment and Tooth Area on the Bond Strength of Adhesively Cemented Ceramic Overlays—An In Vitro Study, *Dent. J.* 2023, 11(1), 19; <https://doi.org/10.3390/dj11010019>

Prevalence of Middle Mesial Root Canal and the Related Variations in the Canal Anatomy in Mandibular First Molars: Cone-Beam Computed Tomographic Study

Poster

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Objectives*

This study aimed to evaluate the prevalence of middle mesial canal (MMC) in the mesial root of mandibular first molars and to analyze its configuration using a sample of cone-beam computed tomography (CBCT) images.

Materials and Methods

CBCT scans of 127 patients containing mandibular first molars with no previous root canal treatment and no root resorption were retrospectively evaluated. Data regarding the sex, age, side, presence of MMC canal, and its configuration were recorded. The MMC was classified into 4 categories according to its relationship with mesiobuccal and mesiolingual canal: independent (type I), confluent (type II), mesiolingual confluent (type III) and mesiobuccal confluent (IV). Data were analyzed using the Pearson Chi-square test and Welch Two Sample t-test with a level of significance set at $p < 0.05$.

Results

Of 127 mandibular first molars 18.9% (95% confidence interval [CI]: 12.7-27.0%) had the MMC. No significant differences were found between genders ($p=0.342$), age groups ($p=0.210$) or between the right and left mandibular first molar ($p=0.904$). 41.7% of the MMC were of type IV (mesiobuccal confluent), 29.2 % of type II (confluent), 25% of type III (mesiolingual confluent) and 4.2 % of type I (independent).

Conclusions

According to the results of this study, the prevalence of MMC in the mesial root of mandibular first molars was 18.9%. MMC merged with mesiobuccal canal (type III) presented with higher prevalence compared to other types of MMC. Clinicians should consider the potential presence of MMC in mandibular first molars.

Satisfaction and Patient-Related Outcomes with the Care and Use of a Single Metal-Ceramic Crown after an 8-Year Wearing Period

Poster

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Objectives*

To analyze patient satisfaction and comfort with metal-ceramic crowns placed 8 years ago, as well as the impact of their hygiene habits, using survey questions.

Materials and Methods

Patients treated in Rīgas Stradiņš University Institute of Stomatology 8 years ago who received MC single crown were invited to participate in study. A questionnaire was used to assess the respondents' hygiene habits and self-reported outcomes regarding their restored tooth. Likert scale questions were combined into three categories: hygiene habits (tooth brushing frequency, rinsing, interdental cleaning), patients' satisfaction, and possible convenience barriers caused by its use. The questions in each of these dimensions were combined into one aggregated variable showing the percentage of the maximum possible value. Methods of descriptive statistics and correlation analysis were applied.

Results

38 responders participated in the study, 19 males, 19 females aged between 29 and 80 years (mean - 52,8). 82% of the restored teeth were premolars and molars. Participants reported high satisfaction with MC crown in general (94%). However, a large proportion of responders noted issues such as food impaction (63%). Hygiene habits were good for approximately half of the responders with regular dentist visits and hygiene procedures such as daily tooth brushing and interdental cleaning and the vast majority (82%) did not observe neither gingival bleeding nor unusual odor.

No statistically significant correlations were found between satisfaction and hygiene habits and between satisfaction and convenience barriers, while correlation between hygiene habits and convenience barriers was negative (Spearman's rho = - 0.4, p=0.013).

Conclusions

Patients show high satisfaction with MC crowns after 8 years. Specialists should pay attention to increasing regular dental visits after placing crowns and promote interdental cleaning. Increasing the patient response rate to the questionnaire would increase the power of the study allowing to confirm the anticipated correlations.

Dermatology

Dermatoscopy in Diagnostics of Benign Formations and Malignant Cancers of the Skin

Poster

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Objectives*

The aim - to update dermatoscopy as the method of examining patient's skin *a capite ad calcem* or from head to heel.

Materials and Methods

Manual dermatoscopy *a capite ad calcem*, with precise HEINE DELTA 30 dermatoscope equipped with polarized and nonpolarized light, was applied in 240 selected patients, who came to regular visit to a dermatologist in Clinical Centre for Skin and Sexually Transmitted Diseases, Riga 1st hospital, for check-up of body nevi. Inclusion criteria were female and male gender patients in age group 50-99, who were never diagnosed with any skin cancer. The two-step dermatoscopy algorithm was applied. The first step differentiates melanocytic lesions from nonmelanocytic lesions. The second step was the detection of specific melanocytic lesions, therefore, in dermatoscopy pigment distribution and blood vessel patterns are crucial. To standardize, the three-point checklist was applied. The descriptive statistics method was applied in data analysis.

Results

From 240 analyzed patients (183 female, 57 male) in 7 (5 female, 2 male) malignant skin cancers were diagnosed in dermatoscopy examination, consecutively they were referred to the Oncology Centre of Latvia for treatment. In 1 male patient *lentigo maligna* melanoma was detected. The challenges observed - first, precision. The training of a specialist in dermatoscopy takes thorough education. Understanding the importance, dermatoscopy is taught to dermatologists, as well as to students and residents of Riga Stradins University in the subject of Dermatology. Second – management, to devote enough time for thorough skin examination. Third – proper standardized description of the dermatoscopic findings by different specialists. The fourth – biopsy, the diagnostic method of the golden standard, has to be taken if cancer is suspected.

Conclusions

Dermatoscopy is precise diagnostic method for pigmented and nonpigmented benign and malignant skin lesions. The growing number of malignant skin cancers actualizes the necessity for development of novel diagnostic techniques for dermatoscopy.

Effect of Kinesiotaping in Treatment of Cellulite: Methodological Approach of Effect on Skin Texture and Structure

Poster

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Objectives*

There is an even greater lack of research on the effect of kinesio tape on dermatofunctional pathologies, especially cellulite.

The aim - to assess the effect of a new beauty therapy method on skin texture and structure in different stages of cellulite.

Materials and Methods

Participants were randomly assigned to three experimental (E1 (1 stage cellulite), N=10; E2 (2 stage cellulite), N=10; E3 (3 stage cellulite), N=10) and one control (C, N=10) groups and assessed at baseline, after four, and eight weeks for body composition, thigh girth, the condition of the dermis, the stage of cellulite, the skin temperature. The intervention of kinesiotaping lasted for four weeks periods with a 4-week pause apart and mid-intervention testing in between. At the end of the research, the final testing was applied.

A fan-shaped taping technique was applied to the subjects of the experimental group.

Study sample: 40 women (18-45 age). Inclusion criteria: normal BMI; Stage I, II, III cellulitis (according to CELLULITE SEVERITY SCALE CSS). Exclusion criteria: Pregnancy; Edema; Obesity; Overweight; Deep vein thrombosis; Inflammatory or infectious skin diseases in taped areas.

Descriptive statistics (mean, SD) was used to inspect participants' characteristics and measures' distribution prior to the intervention. A repeated-measures ANOVAs with time as within- and group (E vs. C), cellulite stage (1 vs. 2 vs. 3 vs. 4) and age as between-participants factors were performed on each dependent variable.

Results

The results of this study will add to the knowledge: about the application of additional measures and possible benefits in the case of cellulite; The effect of kinesio tape on skin texture and structure in the presence of cellulite of different severity; The effect of kinesio tape on anthropometric parameters in the presence of cellulite of different severity;

The residual effect of kinesio tape.

Digital Innovations

Wireless Continuous Monitoring of Patient Vital Signs in Hospital Setting

Oral

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Objectives*

Study was performed within Health Acceleration initiative by National Health Service and aims to evaluate the accuracy and reliability of automated vital sign measurements obtained using the Inicare Nura system compared to manual spot-check measurements performed by nurses in hospital setting. The study assesses the time required for manual measurements to establish benchmarks for potential time savings offered by the Nura system and its impact on hospital ward workflows. Evaluation of user experience, interface design, and product usability was conducted to enhance the Inicare Nura solution and to draw broader conclusions about the efficiency and impact of automation in hospital processes.

Materials and Methods

The Inicare Nura solution was used in trial from Inicare BV, the Netherlands. It consists of hardware and software components which are integrated into a complete solution to automatically monitor vital signs such as Body temperature, Heart Rate, Blood Oxygen Saturation and Systolic and Diastolic Blood pressure within a general ward environment. Every patient included was monitored for 3 days in a row wearing a disposable wireless Smartstrap. Parallely, all patients had manual routine measurements of mentioned vital signs 3 times per day. The trial was performed in a hospital at the Internal Medicine ward with 38 patients included. Inclusion and exclusion criteria was applied. In order to compare the automatic measurements with the manual measurements, which are done on a routine basis, data was compared in an anonymous way retrospectively.

Results

Trial discovered marked time saving of automatic wireless vital sign measurements compared to manual measurements. Individual trend lines of patient(s) emphasize the importance of monitoring these vital parameters continuously and significantly improves patient safety by providing vital signs record available for assessment of patient condition.

Conclusions

Trial demonstrates economical and quantitative rationale for introduction of automatic measurements as well as pronounced quality and patient safety aspect in hospital settings.

3D Technologies in Custom Orthoses Creation for Acute Treatment in Hospital Settings

Poster

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Objectives*

This study explores the implementation of 3D scanning and printing technologies to address the lack of custom-made medical devices in hospital settings, particularly for acute treatment of patients with musculoskeletal, neurological, and burn-related complications. The objective is to improve patient outcomes while significantly reducing total treatment costs by minimizing the need for extensive rehabilitation or corrective surgeries.

Materials and Methods

A comprehensive analysis of European healthcare workflows and medical device regulations was conducted, focusing on barriers to implementing custom-made devices in hospitals. Interviews with healthcare professionals and orthotic device manufacturers helped shape a workflow for creating 3D-printed orthoses. Cost-benefit analyses were performed to compare the expenses associated with early intervention using 3D-printed orthoses to delayed interventions requiring extended physiotherapy or surgical correction. The proposed workflow was tested in simulated hospital scenarios involving burn patients and musculoskeletal complications.

Results

The study demonstrated that early application of 3D-printed orthoses significantly reduces the progression of deformities, leading to better patient outcomes. From an economic perspective, this approach decreased total costs per patient by reducing the need for prolonged rehabilitation and complex surgical interventions. For example, custom orthoses applied to burn patients during acute care minimized scarring-related deformities, thereby avoiding future high-cost corrective measures. The workflow also proved to be cost-effective in terms of device production and hospital implementation.

Conclusions

Integrating 3D printing technologies into hospital workflows during the acute treatment phase offers a dual benefit: improving clinical outcomes and decreasing overall healthcare costs. By preventing complications early, hospitals can avoid costly secondary interventions, benefiting both patients and healthcare systems. Legislative adaptations are essential to facilitate the adoption of this innovative approach across European healthcare settings.

Implementation of 3D Scanning for Precise Calculation of Burn-Injured Body Areas

Poster

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Objectives*

The study aims to develop and evaluate a medical tool utilizing 3D scanning technology for precise calculation of burn-affected body areas, addressing the limitations of conventional estimation methods such as the Rule of Nines and the palm method. These traditional approaches, reliant on professional judgment, can result in inaccuracies that disproportionately affect vulnerable groups such as children and infants.

Materials and Methods

A comprehensive literature review was conducted alongside qualitative interviews with burn specialists in Latvia to understand clinical needs. Prototype algorithms for manual 3D body surface area calculations were developed and tested using widely available 3D scanners. Trials were performed in simulated environments with healthy volunteers to optimize calibration and establish accuracy benchmarks.

Results

The 3D scanning-based algorithm demonstrated significantly improved accuracy compared to traditional estimation techniques. Preliminary results highlight the potential of this method to enhance precision in determining burn-affected areas, particularly in cases where accurate medication dosages are critical for pediatric patients.

Conclusions

The developed method shows promise as a transformative approach to burn assessment by leveraging 3D scanning technology. However, further refinement is necessary to automate calculations and integrate the Rule of Hand into the scanning algorithm for real-time analysis. This advancement could standardize burn assessments, improving treatment outcomes globally.

Digital Transformation in Healthcare

Initial Version of the Depression Scale for Adolescents in Latvia

Oral

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Objectives*

This research is being conducted within the framework of the National Research Program project “Development of a new computer-based assessment method for measuring and monitoring adolescent mental health outcomes in post-COVID pandemic conditions” (No. 1-PB-2/8/2024) and focuses on the development of Depression scale which will be part of a broader mental health screening tool for adolescents.

Materials and Methods

To operationalize the construct of depression, an initial item pool was developed in the first phase of the study. Based on the ICD-11 criteria for a depressive episode, 16 sub-constructs were identified, resulting in a 69-item pool.

Content validity was assessed iteratively by six experts who rated items’ relevance and clarity. Following expert feedback, items were refined and re-evaluated. A Content Validity Index was calculated for each item. As a result, 19 items were left for further empirical approbation in clinical and general population sample. Parental and participants informed consent was obtained for adolescent participation, adhering to ethical guidelines of Rīga Stradiņš University Ethics Committee.

Results

A two-stage assessment scale was developed based on the results. A brief screening section (four items) was designed to identify individuals who would benefit from a more in-depth assessment (15 items). Cut-off points, sensitivity, and specificity were calculated. The scale demonstrated strong psychometric properties. Concurrent validity was demonstrated by correlating scale scores with the WHO-5 and single-item measures of life satisfaction and self-esteem.

Conclusions

The scale’s strong psychometric properties and its ability to differentiate between adolescents with and without depressive symptoms make it a valuable tool for clinical assessment and intervention. The scale’s brevity and ease of administration make it a practical tool for assessing depressive symptoms in adolescents, particularly in busy clinical settings.

Keywords: Adolescent, Content validity, Concurrent validity, Depression symptoms, Face validity, Psychometric properties, Scale development.

Drug Delivery Systems

Comparing Polymer Drug Loading Methods and Solubility Parameters

Oral

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Objectives*

Polymers are widely used as drug carriers in implants and dosage forms. To produce such carriers, drugs and polymers need to be compatible in terms of solubility, drug stability and release. To reduce time and experimental costs to produce such drug carriers a predictive model is needed. This study aims to investigate Hansen solubility parameters between drug and polymer and how they apply to different drug loading methods.

Materials and Methods

Hansen solubility parameters for drugs were established using Yamamoto-Molecular break method in HSPiP v6.0.04 software. Polylactic acid (PLA) parameters were established with solvent experiments. Eleven sample types were made by dissolving polylactic acid and one of the model drugs (benzocaine, celecoxib, prednisolone, indomethacin, metronidazole, paracetamol, lidocaine, ibuprofen, diclofenac, ketoprofen and naproxen) in chloroform and casting a film by evaporation. Samples were loaded in concentrations from 120, to 1150 mmol/g. Samples were then tested by FTIR-ATR, DSC, X-ray diffraction. Drug concentrations were determined by HPLC-UV method.

Results

Hansen solubility parameters predict best relative solubility in PLA for benzocaine, ketoprofen, indomethacin and poor solubility for paracetamol, with other drugs in between. X-ray diffraction shows amorphous structure for highly loaded samples of benzocaine and indomethacin, while other drugs show crystal formation. Experiments with DSC show that PLA and benzocaine form an eutectic mixture with decreased glass transition temperature, meaning the formation of high concentration solid solution.

Conclusions

For now, samples made with solvent casting method alone show that Hansen solubility parameters predict relatively high drug loading capacity for drugs with exceptionally close parameters- benzocaine and indomethacin. While for solvent casting method one limitation on drug loading capacity is drug solubility in solvent used for casting, other loading methods, like vacuum compression molding and hot melt extrusion, could show higher drug loading capacity. This and studies on stability and drug release will be investigated further.

Development of Size Exclusion Chromatography-Based Method for Analysis of Pharmacokinetics and Biodistribution of Nanoparticles

Oral

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Objectives*

Cancer remains one of the most significant contributors to global mortality and morbidity. Conventional treatments are widely employed, but are frequently associated with severe side effects, underscoring the need for innovative therapeutic strategies. Nanoparticles encapsulating therapeutic agents can enhance biocompatibility, minimize systemic toxicity, and improve tumor specificity by leveraging the enhanced permeability and retention (EPR) effect. Despite their potential, high variability in pharmacokinetic profiles, biodistribution, and tumor accumulation—driven by colloidal instability and tumor vasculature heterogeneity—complicates nanoparticle size optimization for effective cancer therapy.

Materials and Methods

This study utilized a previously developed nanoparticle material known for maintaining its size in vivo to establish a robust method for simultaneously assessing multiple nanoparticle concentrations within single blood and tissue samples. Key methodologies included the development of nanoparticle extraction protocols, separation of extracted nanoparticles by size, and the quantification of nanoparticle concentrations using fluorometry. Calibration curves were constructed for nanoparticles ranging in size from 10 to 30 nm across biological samples, including blood, liver, spleen, and kidney. These calibration curves enabled the detailed analysis of size-dependent biodistribution in liver, spleen, and kidney tissues. Nanoparticle concentrations in blood were also measured at various time points to evaluate circulation dynamics.

Results

The study developed a method capable of precise size-based assessment of nanoparticle biodistribution and pharmacokinetics. Calibration curves provided accurate measurements of nanoparticle concentrations across multiple biological samples. The analysis revealed that nanoparticles with a hydrodynamic diameter of 19 nm exhibited the longest circulation times in blood. Biodistribution studies further highlighted size-dependent accumulation patterns in the liver, spleen, and kidneys.

Conclusions

The method developed in this study offers a promising tool for addressing questions regarding the optimal nanoparticle size for tumor targeting via passive accumulation. By providing a precise and reliable approach to assess nanoparticle pharmacokinetics and biodistribution, this work lays the foundation for further optimization and application in cancer nanomedicine.

Enhancing Tissue Engineering through Liposomes Containing Bioactive Molecules

Oral

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Objectives*

Regenerating oral soft tissues after ablative surgery, trauma or oral cancer remains a significant challenge. Oral cancer treatment typically involves surgery combined with chemotherapy and radiation, often resulting in substantial soft tissue loss, particularly in the gums. The key obstacles to regeneration include limited cell ingrowth, inflammation, and associated pain. Wound healing relies on processes like cell migration, proliferation, and differentiation, regulated by growth factors. Insulin-like growth factor 1 (IGF-1) plays an essential role in promoting cell proliferation but cannabidiol (CBD) has anti-inflammatory, wound-healing and pain-relief effect. Combining IGF-1 and CBD offers a promising strategy to enhance tissue regeneration while reducing chemotherapy-induced side effects. The delivery of IGF-1 and CBD will be achieved through encapsulating into liposomes.

Materials and Methods

Liposomes were synthesized using cholesterol and various phospholipids via thin-film hydration method. CBD was incorporated during synthesis but IGF-1 – during hydration process of the liposomes. The release of CBD and IGF-1 was determined using ultra performance liquid chromatography and ELISA method, respectively. The *in vitro* cytotoxicity tests were conducted with gingiva-derived mesenchymal stem cells (GMSC) isolated from human patients according to the decision No. 6-1/12/47 (26.11.2020) of Riga Stradiņš University Research Ethics Committee.

Results

The encapsulation of CBD and/or IGF-1 reduces the particle size of liposomes. The release profile of IGF-1 was more gradual from liposomes containing both IGF-1 and CBD. In general, the cell viability for all liposomes is not lower than 70%. Liposomes with IGF-1 show increased cell proliferation due to the mitogenic effect of IGF-1.

Conclusions

Based on the cell viability results, all investigated samples are considered as non-cytotoxic, according to the ISO 10993-5:2009. This research was supported by M-era.Net 2 project INJECT-BIO (GA No. ES RTD/2020/14), EU's Horizon 2020 research and innovation programme (Baltic Biomaterials Centre of Excellence, GA No. 857287) and Post-doctoral grant No. RTU-PG-2024/1-0011 (under project No. 5.2.1.1.i.0/2/24/I/CFLA/003).

Surrogate Models in Pharmaceutical Dissolution Testing: Case Study

Oral

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Objectives*

Surrogate modelling or metamodeling enables the creation of simplified, predictive models that approximate complex systems or processes. These models use mathematical methods to capture relationships within the data. Surrogate models can study the dissolution process of solid dosage forms (tablets) as an alternative to the experimental approach with the USP Apparatus. Model-based process development is necessary to avoid empirical or trial-and-error approaches. In turn, approximation models, such as surrogate models, replace high-fidelity simulations, which allows for reduced computational costs. Compared to, for example, the artificial intelligence approach, surrogate models require a smaller amount of data.

Materials and Methods

The surrogate model is built using training input and output data from laboratory experiments for the paracetamol-purified water binary system in USP2. Central Composite Design was used to create the design of experiments. As model inputs (factors) are selected, three angular velocities for USP2 paddle rotation and three tablet positions in the vessel. The release rate of the active pharmaceutical ingredient is chosen as the output (response) parameter.

Results

The best-fitting factor-response map is obtained using the response surface method with polynomial approximations. More complex and computationally demanding models, applying the Computational Fluid Dynamics approach, verify the surrogate model. The coefficient of determination R^2 confirmed model validity.

Conclusions

For the analyzed cases of tablet dissolution, the best results are obtained by forming a surrogate model using low-order polynomial approximation models.

Design and Development of Fluorinated Amphiphilic Lipids Based on 1,4-Dihydropyridine Core for Advanced Delivery Applications

Poster

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Objectives*

Interest in fluorinated surfactants has grown due to their advanced properties. Fluorous amphiphiles support in forming uniform nanoparticles, preventing protein denaturation, enabling efficient endocytosis and lower cytotoxicity. Recently, fluorinated pyridinium-based surfactants have shown great potential as drug and gene delivery systems.

The aim of the study was to design and synthesis of original fluorinated amphiphilic lipids on 1,4-dihydropyridine (1,4-DHP) core and evaluation their self-assembling properties.

Materials and Methods

A series of amphiphilic fluorinated 1,4-DHP derivatives was synthesized *via* fluorination of 1,4-DHPs with *N*-fluoroquinine and introduction a pyridine moiety through palladium catalyzed reactions and subsequent *N*-quaternization of pyridine moiety. The self-assembling properties were studied and Zeta-potential values were determined using dynamic light scattering (DLS) measurements, nanoparticle samples were prepared by the ethanol injection method. LogP values were calculated using Schrödinger Maestro interactive properties module.

Results

Original 3,5-difluoro-2-methylene-4-aryl-tetrahydropyridines were synthesized in 23-69% yields from 1,4-DHPs in reaction with *N*-fluoroquinine. Bromination with *N*-bromosuccinimide yielded 2-(bromomethylene) derivatives, followed by Suzuki coupling with 4-pyridylboronic acid producing 2-(pyridin-4-ylmethylene)-tetrahydropyridines in 20-21% yields. The pyridine moiety quaternization with various alkyl halides yielded desired amphiphiles in 23-99% yields.

The amphiphilic fluorinated pyridine derivatives formed nanoparticles with an average diameter of 57-200 nm and polydispersity index (PDI) values in the 0.20-0.55 range for the freshly prepared samples. Zeta-potential values varied from 5.5-51.6 mV. LogP values were in the 3.49-17.73 interval. After one month storage sizes of nanoparticles were 53-150 nm, PDI values – 0.20-0.40.

Conclusions

The properties of the nanoparticles obtained from amphiphilic fluorinated 1,4-DHP derivatives are significantly influenced by variations in the structure and length of alkyl groups. The data showed that all compounds with at least one dodecyl chain formed stable nanoparticles.

Funded by the RRF grant No.57/BMC/PA (RRF project No.5.2.1.1.i.0/2/24/I/CFLA/001).

Development of Marine Polysaccharide and Silk Fibroin Hydrogels

Poster

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Objectives*

Wounds are injuries to biological tissues characterized by impaired functions and limited ability to regenerate, particularly when complicated by infections. Chitosan (CS), fucoidan (FC) and silk fibroin (SF) were chosen as biopolymers for hydrogel preparation due to their ability to enhance healing process and ensure protection and optimal wound bed environment.

Materials and Methods

SF was extracted from *Bombyx mori* silkworm cocoons by boiling them in 0.02 M Na₂CO₃ solution, followed by dissolution in a CaCl₂-EtOH-H₂O mixture (1:2:8 molar ratio). The resulting SF solution was dialyzed and lyophilized to obtain regenerated SF. SF and FC solutions were prepared by dissolving the respective powders in water, while CS solution was dissolved in 1 % (w/w) acetic acid. Hydrogels were synthesized by mixing these solutions in various mass ratios (3CS-1FC-8SF; 4CS-1FC-8SF and 8CS-1FC-8SF) and subsequent lyophilization and neutralization with 0.5 M NaOH. A final lyophilization was used to obtain porous scaffolds.

Results

An increase of SF concentration led to an increase of gel fraction and compressive strength, with the highest values observed in the hydrogel composition 8CS-1FC-8SF, 81,10 ± 1,04 % and 43,35 ± 4,67 kPa respectively. Increase of CS concentration, however, resulted in the formation of larger pores within hydrogel matrix, leading to higher water absorption capacity and lower mechanical properties. The highest water absorption capacity (1453 ± 92 %) was observed by hydrogel formulation 3CS-1FC-8SF.

Conclusions

Physicochemical properties – morphological, mechanical and swelling characteristics – were found to significantly vary with the concentration of CS, FC and SF in formulations. Hydrogel formulation 3CS-1FC-8SF exhibited the most appropriate properties for wound healing applications.

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Enhancing Nanoparticle Features through Ethylene-Bridged Cationic Moieties and Branched Ester Chains in the 1,4-Dihydropyridine Core

Poster

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Objectives*

Over the past two decades cationic 1,4-dihydropyridines (1,4-DHP) have been frequently studied as nanodelivery systems due to their ability to form liposomes. To function effectively as transport systems, liposomes must exhibit stability, biocompatibility, the ability to encapsulate and deliver therapeutic agents efficiently to target sites. The properties of liposomes are highly dependent on the specific lipids included in their composition. Notably, previous studies have shown that modifications in lipid structures can optimize the desired liposome properties.

The aim of this study was to determine the influence of branched alkyl ester moieties in positions 3 and 5, as well as *N*-pyridinium substituent at positions 2 and 6 introduced via ethylene bridge to 1,4-DHP core on physicochemical and self-assembling properties, and to characterize nanoparticles formed by these compounds.

Materials and Methods

1,4-DHP amphiphiles were synthesized in multistep procedure. Liposomal samples were prepared using the ethanol injection method, with a final compound concentration of 0.1 mM. The self-assembling properties were evaluated and nanoparticles characterized with dynamic light scattering method, but the monolayer properties - with the Langmuir-Blodgett trough techniques. Critical micelle concentration (CMC) and RNA encapsulation were determined by spectrofluorometry.

Results

Cationic 1,4-DHP exhibited self-assembling properties and formed nanoparticles with average diameters of 60-124 nm and the polydispersity index values in the range of 0.272 to 0.560 for freshly prepared samples. No significant changes in liposome characteristics during one month storage. Characterization of lipid monolayer properties, CMC and lipoplexes formed by RNA will be presented. Also the influence of the alkyl chain length and branching on characteristics of liposomes will be discussed.

Conclusions

Introduction of branched ester groups and ethylene-bridged cationic moieties into the structure of amphiphilic 1,4-DHPs strongly affects their self-assembling properties.

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Taste-masked Pellets of Sodium Warfarin, Prepared by Hot Melt Extrusion

Poster

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Objectives*

This study aimed to investigate and highlight the underexplored potential for personalizing warfarin dosing by developing taste-masked matrix pellets through hot melt-extrusion (HME) and thermal post-processing. The impact of drug load (10, 20, and 30 wt.%) was assessed on the duration of thermal post-processing (to achieve the desired aspect ratio AR) and on drug release. The ‘smoothing’ approach shows promise for improving mouthfeel and potentially enhancing patient compliance, though further research is needed.

Materials and Methods

A matrix pellets consisting of warfarin sodium clathrate and Kollicoat® Smartseal 100 P was successfully prepared using HME. The extruded filament was characterized by measuring its elastic modulus. The microparticles were thermally treated to produce ‘smoothened’ particles, which were analyzed using optical microscopy, and drug release (in 0.1 M HCl and PBS pH = 6.8) was assessed.

Results

Thermal treatment of the filament particles reduces their length and increases their diameter due to the elastic deformation of the polymer macromolecules. After cutting, the microparticles have sharp edges, but thermal treatment brings their AR closer to 1, visibly enhancing their ‘smoothing’. The correlation between elastic modulus and drug loading for warfarin filament samples is nearly linear ($R^2 = 0.9769$). After 60 minutes, drug release reaches at least 80% in all cases, indicating that this formulation is not a good fit for an immediate-release dosage form. No significant dissolution was observed in PBS pH = 6.8. Drug loading clearly influences the time to reach 50% drug release, but no correlation is observed with the tSA/V ratio.

Conclusions

By varying the drug loading and matrix pellet size, different dosing options can be achieved. While the dependence on drug loading in the matrix pellets has been demonstrated, the influence of tSA/V has not been explored, leaving opportunities for further investigation.

Fever in Children

Upper Respiratory Tract/ENT and Flu-Like Infections in a Single Northern European Paediatric Emergency Department: Comparative Study of 2017 and 2024 Flu Seasons

Oral

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Objectives*

Paediatric febrile upper respiratory tract infections (URTI) are one of the major reasons for non-urgent emergency departments (ED) attendance. Aim of our study is to explore characteristics of children with fever and URTI/ear, nose and throat (ENT) infection/flu-like illness and their management in a single Northern European ED during influenza season with 6-year interval to identify new/persistent imperfections.

Materials and Methods

In the MOFICHE study (substudy of PERFORM project) we recruited children aged 0–18 years presenting to Latvian Children's Clinical University Hospital Emergency Department (ED) with fever $\geq 38.0^{\circ}\text{C}$ during the peak of influenza season (January to April) in 2017 and a comparative cohort in 2024. Routinely registered data from ED healthcare records were analysed.

Results

Out of 3325 children with fever, who visited ED in 2017, 57.8% (n=1921) had URTI/ENT/flu-like infection. Majority of them were young (median age 3.3 years), healthy (comorbidities recorded in 8.8%), self-referred (56.7%), with a duration of fever <48h (64.5%). Low triage urgency was assigned to 65.6%, normal SpO₂/work of breathing registered in 99.8 and 99.1% of patients. Blood laboratory testing was conducted in 52.9%, diagnostic imaging in 17.6%, other tests in 41.2% of patients. CRP level was tested in 52.7% of patients (median 9.5 mg/L). Nasopharyngeal viral tests were performed in 1.9% of cases due to their low availability in 2017, rapid streptococcal throat test in 20.0%. Antibacterials were prescribed to 31.9% of patients. Only 16.2% of patients were admitted.

Conclusions

A large proportion of ED attendances in 2017 were non-urgent visits by children with fever and URTI/ENT infection/flu-like illness. However, an overuse of ED resources was observed with laboratory testing/imaging being performed in more than half and antibacterial medications being prescribed in almost third of the cohort. The comparative data of the 2024 cohort will be presented during the conference and will demonstrate if the observed tendencies persist.

Antibiotic Prescription Patterns for Children with Febrile Upper and Lower Respiratory Tract Infections in a Single Northern European Paediatric Emergency Department during Influenza Season 2017 and 2024

Poster

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Objectives*

Acute respiratory tract infections are among major reasons for emergency department (ED) visits and the most common reason for inappropriate antibiotic prescriptions. The aim of our study was to explore and compare the patterns of antibiotic prescriptions for children with acute febrile upper respiratory tract/ear, nose and throat/flu-like infection (URTI) and lower respiratory tract infections (LRTI) in a single Northern European ED during influenza season in 2017 and 2024.

Materials and Methods

In the MOFICHE study (PERFORM project) we included children aged 0-18 years attending the Children's Clinical University Hospital Emergency Department with fever $\geq 38.0^{\circ}\text{C}$ and respiratory symptoms during influenza season from January to April 2017. A comparative cohort was recruited in 2024. Routine ED medical records were analysed.

Results

Of 3325 febrile children visiting ED in 2017, 56.8% (n=1921) had URTI and 21.4% (n=712) LRTI as a primary focus of infection. Patients with LRTI received antibiotics 7 days before ED visit more often than with URTI (19.7% vs 11.2%, $X^2(1)=32.0, p<0.01$). Systemic (44.0% vs 32.5%, $X^2(1)=29.4, p<0.001$) and broad spectrum antibiotics (31.4% vs 16.1%, $X^2(1)=28.6, p<0.001$) were prescribed more frequently at ED to patients with LRTI than URTI. Parenteral route of administration of antibiotics was used more frequently in patients with LRTI (45.3% vs 18.5% with URTI, $X^2(1)=73.6, p<0.001$). For URTI amoxicillin (46.7%) and penicillin (24.8%) and for LRTI amoxicillin (69.0%) and macrolides (17.9%) were mostly prescribed. The duration of antibacterial treatment for both URTI and LRTI was generally 6-7 days (50.7% and 55.6%, respectively).

Conclusions

More than 3/4 of ED attendances in the first four months of 2017 were due to febrile URTI/LRTI. Despite URTI usually being self-limiting viral infections, one third of URTI patients received antibiotics. Almost a third of patients with LRTI received broad-spectrum and nearly a half-parenteral antibiotic. The patterns of antibacterial prescription within the 2024 cohort will be presented during the conference.

Genetics and Molecular Diagnostics of Rare Diseases

Revisiting Lowe syndrome: Report on Atypical Phenotypic Expression linked to Hypomorphic Genetic Variant

Oral

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Objectives*

Lowe syndrome is a rare X-linked disorder, characterized by major abnormalities in the eyes, kidneys and central nervous system.

We report an atypical case with a novel *OCRL* gene variant, who presents with milder symptoms of Lowe disease other than prenatally diagnosed bilateral congenital cataracts. The patient’s mother has minor cataract at the age of 37 with no additional findings. Three months after birth a mild muscular hypotonia was detected but gross motor milestones were reached within normal range. Sitting at 9 months, walking at 15 months old, first words- at 12 months, and currently does not display neurodevelopmental delay. At 12 months-albuminuria (15.44 mg/l) was detected for the first time. At 4 years of age, the patient’s laboratory results revealed creatinine 172ml/min/1.73m², hyperfiltration and cystatin C 1.07 mg/l. These findings are currently interpreted as indicators of unspecified impairment of renal tubular function. At 2 years old, he had an episode of febrile seizures; his EEG revealed no pathology, MRI showed unspecific subcortical microlesions in the frontal lobe. And minimal line-like demyelination consistent with tigroid pattern demyelination.

Genetic testing surprisingly revealed a maternally inherited in-frame single amino acid deletion in the (NM_000276.3)*OCRL*: c.1704_1706del p.(Ser.568del) a variant of uncertain significance. Given that clinical picture would be too mild for a typical Lowe syndrome diagnosis, we have initiated functional testing of the variant, which showed impaired membrane targeting of the mutant *OCRL* protein (which is a known mechanism for pathogenic *OCRL* variants causing Lowe syndrome), proving that the variant is deleterious.

Still we speculate that his mild condition could indicate a partially retained *OCRL* function, making it a hypomorphic variant. Based on 3D structure analysis, the variant may have an effect on the folding of catalytic domain and its activity. Altogether this evidence supports that the variant is classified pathogenic.

Comparative Evaluation of Genetic and Classical Testing for Epidermolysis Bullosa

Poster

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Objectives*

Background: Epidermolysis bullosa (EB) is a heterogeneous group of rare genetic disorders characterized by skin fragility and blister formation following minor trauma. EB affects approximately 1 in 20,000-50,000 live births globally, impacting both genders and all ethnicities equally. The main subtypes include EB simplex (70%), dystrophic EB (20%), junctional EB (10%) and the rare Kindler syndrome. Mutations in over 20 genes, such as KRT5, KRT14, COL7A1 and LAMA3, with autosomal dominant or recessive inheritance patterns, are responsible for the onset of the EB.

Objectives: This study compares genetic testing and traditional diagnostic methods to estimate their clinical utility in EB.

Materials and Methods

A meta-analysis of recent publications was performed, using data from genetic tests, including next-generation sequencing (NGS), whole-exome sequencing (WES) and Sanger sequencing, next to conventional methods like immunofluorescence mapping (IFM) and transmission electron microscopy (TEM).

Results

IFM and TEM provide valuable insights into protein dysfunction and structural anomalies. TEM identifies the level of skin cleavage and ultrastructural abnormalities, but can be limited by biopsy artifacts and requires expertise. IFM helps localize defective proteins, but doesn't detect genetic mutations.

Genetic testing, particularly NGS and WES, facilitates the identification of pathogenic variants, determines inheritance patterns and supports genetic counseling and prenatal diagnosis. It's crucial in cases of genetic heterogeneity or when IFM and TEM results are inconclusive. NGS allows for the detection of mosaicism and predictive carrier status. However, genetic testing has limitations, including the need for bioinformatics support, specialized expertise and potential unavailability in some regions.

Case reports show that combining methods improves diagnostic accuracy. For example, a patient with ambiguous clinical findings benefited from NGS, which identified a novel mutation later confirmed by TEM findings.

Conclusions

A combined diagnostic approach integrating genetic and traditional methods maximizes accuracy, emphasizing the importance of genetic testing for EB diagnosis, management and prenatal planning.

Genetics in Cardiology

Persistent Foramen Ovale-Associated Migraine

Oral

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Objectives*

To evaluate the effectiveness of percutaneous transcatheter PFO closure in reducing the frequency and prevalence of migraine with or without aura. The study also aims to assess its impact on headache medication use and overall quality of life. It hypothesizes that PFO closure can significantly reduce or eliminate migraine attacks by addressing potential triggers, such as microemboli and vasoactive substances.

Materials and Methods

This prospective study analyzed data from the Latvian Cardiology Center database (2010–2024) on patients who underwent PFO closure. Participants were contacted for consent and surveyed via phone or email regarding migraines before and after the procedure. The survey included demographic data, migraine history, headache frequency, medication use, provoking factors, and subjective life quality.

Results

Before PFO closure, 24 participants experienced migraines, including 21 with aura (88%). Migraines resolved in 16 patients (66%) post-procedure, with others reporting reduced frequency and intensity. Aura symptoms decreased by 74% in females and 84% in males, with complete elimination in 50% of cases, indicating a notable improvement in neurological symptoms. Headache medication use dropped by 61% in females and 80% in males. Migraine frequency, which ranged from several times weekly to a few times yearly, showed a significant reduction. No recurrent TIA or stroke events were observed. Additionally, 12 participants reported improved daily functioning and quality of life post-procedure.

Conclusions

PFO closure significantly reduces migraine prevalence, severity, and medication use, improving quality of life. The results suggest that PFO may contribute to the development of migraines, particularly those with aura. These findings highlight the potential role of PFO closure in managing migraines and preventing cerebrovascular events. Further research is needed to confirm these results and explore post-procedure management strategies, including long-term effects and the role of antiplatelet therapy.

Gynaecological Oncology and Cancer Prevention

Associated Risk Factors among Women Attending Colposcopy Clinic with High-Grade Squamous Intraepithelial Lesions and Above (HSIL+)

Oral

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Objectives*

Different patient-dependent factors may affect cervical precancerous lesions(CIN) progression and cervical cancer(CC) development,and this complex interplay is still not fully understood. Our study aimed to identify factors associated with high-grade squamous intraepithelial lesions and above(HSIL+) in Latvia.

Materials and Methods

This study utilized data from a cross-sectional study conducted in Latvia between February 2021 and April 2022.Participants included women of CC screening age (25–70 years) who either visited one of 10 selected general practitioner(GP) practices(2 GPs per region) or were referred to a colposcopy clinic due to abnormal cervical cytology.Data collection involved a paper-based questionnaire and vaginal self-sampling for high-risk human papilloma(HR-HPV) testing.Samples were analyzed using the Cobas 6800 System(Roche) to detect HPV16,HPV18, and other HR-HPV31/33/35/39/45/51/52/56/58/59/66/68.The study compared two groups of women: those recruited through GP practices who tested HPV-negative,and those referred to colposcopy clinics who were positive for CC invasion,CIN II-III, or CGIN II-III (HSIL+).To identify associated factors,univariate and multivariate binary logistic regression models were used,adjusting for social and demographic variables.Statistical significance was set at $p<0.05$.

Results

CC invasion was significantly associated with lower levels of education(OR22.18, $p=0.003$ and OR 5.89, $p=0.03$ for primary and secondary education vs.university degree),poor self-rated financial situation(OR 7.59, $p<0.001$),daily smoking(OR 9.05, $p=0.002$),weekly alcohol use(OR5.81, $p=0.03$)and lifetime non-use of hormonal contraception(OR for use 0.20, $p=0.01$).After adjustment, only financial situation and smoking remained statistically significant. HSIL+ significantly associated with younger age(OR for 50+ vs.£49 0.35, $p=0.001$),primary education(vs.university degree OR7.60, $p<0.001$),daily(OR4.02, $p<0.001$)or casual(OR2.66, $p<0.001$)smoking, weekly(OR2.82, $p=0.02$)or casual(OR1.96, $p=0.01$)alcohol use, higher numbers of lifetime sex partners(OR4.76, $p<0.001$ and OR4.12, $p<0.001$ for 6+and 3-5 partners),longer interval since the last gynecological visit(OR for 1-5 years ago 0.36, $p=0.002$)and lifetime non-use of hormonal contraception(OR for use 0.53, $p=0.007$). After adjustment age,education, smoking, number of sex partners,and the time since the last gynecological visit remained statistically significant.

Conclusions

Our study highlights that cervical cancer invasion,as well as CC invasion combined with CINII-III and CGINII-III,are associated with both health-related behaviors and socioeconomic factors.

Comparison of Vaginal Microflora before and after Loop Electro-Excisional Procedure: Preliminary Results

Oral

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Objectives*

Our study objective was to compare vaginal microflora before and three months after loop electro-excision.

Materials and Methods

We enrolled 18-45-year-old women who had scheduled loop electroexcision procedures (LEEP) due to high-grade cervical intraepithelial neoplasia at Riga East University hospital. After women gave their informed consent, material from the upper vaginal fornix was taken for pH measurement and wet-mount microscopy. pH level >4.4 was considered abnormal. For wet-mount microscopy, the material was spread on the glass slide, air-dried, and later rehydrated with a drop of normal saline. Phase-contrast microscopy was performed by Laura Luse. Vaginal smears were collected before and three months after the LEEP. Microscopic examinations included the evaluation of lactobacillary grades (LBG). LBG were divided according to the proportion between lactobacillus and other bacteria (Donders' modification of Schröder's classification), normal flora: LBG I—dominant presence of lactobacillus morphotypes, no other bacteria; LBG IIa—lactobacilli dominance, but other bacteria present, and altered flora LBG IIb—other microorganisms outnumbering lactobacilli; LBG III—no lactobacilli, other bacteria present. Abnormal vaginal microflora was considered in case of LBG IIb and LBG III on microscopy. Results were compared with the Chi-square test.

Results

We report preliminary results from 15 women. Before LEEP 9 (60%) women had lactobacilli-dominated flora and 6 (40%) had abnormal microflora. There was no significant difference between groups before LEEP. After LEEP more women 12 (80%) had lactobacilli-dominated flora and 3 (20%) had abnormal microflora. A significant difference ($p < 0.02$) was noted between normal and abnormal microflora before and three months following excision.

Conclusions

Trend towards healthy vaginal microflora after LEEP was observed, more patients should be enrolled to explore it further.

Incidence and Types of Postoperative Complications of Simple, Radical Vulvectomies and Vulvectomies with Reconstruction

Oral

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Objectives*

The primary treatment for vulvar cancer is surgery, which aims to remove the tumor radically. Reconstructive surgery is increasingly used for wound closure; it allows for radical tumour removal. The aim of this study is to compare the incidence and types of early postoperative complications between simple, radical vulvectomies and vulvectomies with reconstruction.

Materials and Methods

A retrospective research study included 184 vulvar squamous cell carcinoma (SCC) patients who underwent surgical treatment from 2012 to 2022 at Riga East Clinical University Hospital, Oncology Centre of Latvia. Data was collected from the hospital's inpatient and outpatient medical records. Data processing was performed in IBM SPSS Statistics 29.0.0.0 using the Pearson chi-squared test.

Results

A total of 184 patients with vulvar SCC were included in this study. The mean age of patients was 68.67±11.67 years. 59.9% (n=124) of patients had stage I vulvar SCC; 6.8% (n=14) - stage II; 19.8% (n=41) - stage III; 2.4% (n=5) - stage IV. 207 surgeries were analysed. A simple vulvectomy was performed in 82 (39.6%) patients, radical vulvectomy in 96 (46.4%) and vulvectomy with reconstruction in 29 (14%) patients. Postoperative complications were observed in 34 (16,4%) patients. From these patients, wound dehiscence was observed in 31 (15.0%) cases, wound inflammation/infection – 6 (2,9%), necrosis - 3 (1,4%), hematoma – 1 (0,5%). Patients who underwent vulvectomy with reconstruction had a higher tendency for postoperative complications, such as wound dehiscence (34,5%) (p=0,005), necrosis (10,3%) (p=0,009) and longer hospital stay (average 29,59 days) (p<0,001) compared to other types of surgery.

Conclusions

In most cases, vulvar cancer is diagnosed in the early stages. The study shows that vulvectomy with reconstruction has a higher tendency of postoperative complication, such as wound dehiscence and necrosis, and longer hospital stay compared to other groups.

Cervical Cancer Screening Patterns Among HIV-Positive Women in Latvia

Poster

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Objectives*

HIV-positive women are at a significantly higher risk of developing invasive cervical cancer compared to the general population. Latvia, with one of the highest HIV incidence rates in the European Union (7.5 per 100,000 females in 2022), faces persistent challenges in cervical cancer prevention. An organized population-based screening program was introduced in 2009, with primary HPV screening added in 2022. This study aimed to assess cervical cancer (CC) screening patterns among HIV-positive women in Latvia from 2015 to 2022.

Materials and Methods

This observational study utilized data from the Register of Patients Suffering from Certain Diseases, analyzing the screening history of HIV-positive women aged 25–69 years recorded in the National Health Service system about state-paid outpatient services between 2015 and 2022. An organized CC screening episode was identified using health claims with the diagnosis code Z12.4.

Results

In 2022, Latvia registered 1870 HIV-positive women, 1787 of whom were within the screening age range. The mean age was 42.6 years. Between 2015 and 2022, the mean annual screening coverage was 22.6% among HIV-positive women, significantly lower than the 36.1% coverage for the general population ($p < 0.0001$). While 82.2% ($n = 1,537$) of HIV-positive women received at least one screening invitation, only 37.6% ($n = 578$) underwent at least one screening test. In 2022, coverage for organized screening was 33.2% among HIV-positive women compared to 46.7% for the general population. HPV positivity was significantly higher in HIV-positive women (28.8%) compared to HIV-negative women (8.0%) ($p < 0.0001$).

Conclusions

This study underscores critically low cervical cancer screening coverage among HIV-positive women in Latvia, despite their elevated risk. Targeted interventions are urgently needed to enhance screening participation and improve preventive care for this vulnerable population.

First Eight Months of the Patient Contribution and Collaboration to the Oncology Research through Informed Consent in Riga East University Hospital

Poster

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Objectives*

The real-world data has immense value and potential to drive regional and global knowledge for cancer research and precision medicine. Patients with breast cancer have recently been given a chance for informed consent to contribute to the clinical and genomic data obtained from blood and/or tumor samples. The patient's informed consent enabled the research team to complement a reference collection of the regionally relevant biomarkers.

Materials and Methods

Targeted gene sequencing for 115 blood and six tumor samples was performed using Pillar oncoReveal BRCA1&BRCA2+CNV panel on Illumina (Illumina, USA) MiSeq Reagent Kits v2 in 150PE configuration (1.5M read pairs), followed by variant analysis by omnomicsNGS-Alaboratorija-GRCh38, v2.11.2. (Euformatics Oy, Finland). Median 2.30M (IQR 1.50-3.2M) and 2.36M (IQR 2.05-3.12M) reads were obtained for 19 *BRCA1/2* positive and 102 negative samples with a median average coverage of 8305 (IQR 4633-12331) and 9829 (IQR 6723-12155).

Results

Twelve clinicians addressed 126 patients to contribute the eventually obtained genomic data for further research. The majority of the patients (96%, 121/126) consented to collaborate.

We detected seven and three pathogenic *BRCA1* and *BRCA2* variants with overall median allele frequency 49% (IQR 46-51%) and median read depth 4573x (IQR 203-8991x). The *BRCA1* transcript variants c.5117G>A (n=4) and c.5266dup (n=6), recently known as founder pathogenic variants in Latvia, dominated the results.

Other detected *BRCA1* variants were the pathogenic c.4035del (n=2), c.4357+1G>A, c.4675G>A, c.5136G>A, c.5251C>T. The detected *BRCA2* variants were the pathogenic c.4409_4410del, c.4784_4785insATAGGG, c.4799del, and likely pathogenic c.4489_4490insACTTATTTACCAAGCA, c.7316del.

Conclusions

The need for inter-institutional collaboration, streamlined patient involvement in cancer care, and nationwide clinical data availability are critical issues in oncology. These aspects are essential for advancing cancer research and improving patient outcomes.

We established a harmonized one-step practice between clinicians, laboratory, and researchers to include the patients' choice to contribute to cancer research and observed a high rate of patient support.

Müllerian Adenosarcoma: Case Report

Poster

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Objectives*

Müllerian adenosarcoma is an uncommon biphasic tumor made up of a benign glandular component and a malignant, though typically low-grade, stromal component. Uterine adenosarcoma is a rare malignant tumor, accounting for 8% of all uterine sarcomas and less than 0.2% of all uterine malignancies. It is more frequently observed in perimenopausal or postmenopausal women. Patients may present with symptoms such as abnormal vaginal bleeding or pelvic pain, though a large percentage are asymptomatic. Macroscopically, the uterine cavity often contains an exophytic, polypoid mass that may extend through the cervix. Microscopically, the architecture often shows a broad, leaf-like appearance, where the malignant stroma compresses the benign epithelium. Another pattern includes rigid cyst formation, with large, dilated, cystic structures lined by benign epithelium, tightly encased by malignant stroma. A characteristic feature is periglandular cuffing, where stromal cells condense beneath the epithelium. Due to the rarity of adenosarcomas, diagnostic pathology and immunohistochemical staining techniques for these tumors are limited. Immunohistochemical staining of sarcoma components is usually highly positive for CD10, WT1, estrogen receptor, and progesterone receptor. However, in cases of sarcomatous overgrowth, the expression of these markers typically decreases, reflecting dedifferentiation of the mesenchymal component. In the case presented, a 74-year-old woman was initially diagnosed with an endometrial polyp after an incomplete removal during uterine curettage. The biopsy sample confirmed a diagnosis of uterine adenosarcoma based on morphological changes and immunohistochemical staining. The patient subsequently underwent a hysterectomy, adnexectomy, and adjuvant treatment, and has shown no disease progression over the past four years. This case report aims to highlight the importance for pathologists to recognize the morphological features of these neoplasms, distinguishing them from other biphasic (epithelial and mesenchymal) tumors, both benign and malignant.

Two Years of Human papillomavirus (HPV) Screening in National Microbiology Reference Laboratory of Latvia: Achievements and Results

Poster

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Objectives*

Analyze screening data of HPV types in NMRL and to compare positive screening results to cytology Pap tests results.

Materials and Methods

From 1 July 2022 to 30 September 2024 were tested 2304 screening screening cervical swabs. Samples were collected from various clinical settings and tested by real time PCR to identify 14 high-risks (HR) HPV types: 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68. Positive screenings swabs were subjected to cytology Pap test.

Results

Positive results were obtained from 308 samples (13.37%). A total count of HPV DNA positive results was 377, indicating that some samples were positive for more than one HPV type. Specifically, 252 samples (81.82%) contained one HPV type, 44 (14.29%) had two types, 11 (3.57%) had three types, and one sample (0.32%) contained four types. The most common HPV types were 16 (13.79%), 68 (11.14%), 66 (9.55%).

Cytology Pap test results from the positive swabs showed 166 normal findings (53.90%), 82 samples (26.62%) showed Low-Grade Squamous Intraepithelial Lesion (LSIL), 34 (11.04%) - Atypical Squamous Cells - Undetermined Significance (ASC-US), 8 samples (2.60%) for High-Grade Squamous Intraepithelial Lesion (HSIL) and 7 samples (2.27%) - abnormal squamous cells (ASCH).

The highest positivity rate was observed in the age group 31-40 years - 36.36%, followed by 32.47% in the age group 41-50, 13.64% in the age group 51-60, 10.71% - 61-70 age group, and 6.49% in the age group 26-30.

Conclusions

As expected, HPV type 16 was the most prevalent oncogenic type, consistent with findings from other European countries. The screening results indicate effective and timely detection of changes in cervical swabs. However, our age group findings contradict World Health Organization (WHO) data, what shows the highest HPV prevalence in age group 25-29. HPV tests for women aged 26-30 were performed only if cytology results were positive.

Gynaecology

Analysis of the Latvian Human Papillomavirus Type 16 Isolate Whole-Genome Sequencing Data from Cervical Carcinomas within the Global Context of Publicly Available Complete HPV16 Genome Sequences

Oral

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Objectives*

Cervical squamous cell carcinoma, which is predominantly caused by high-risk human papillomaviruses (hrHPV), is the fourth most prevalent cancer among women. This study aimed to investigate the genomic variability of HPV16 (the most oncogenic hrHPV type) isolates from Latvia and compare their genetic makeup with isolates originating elsewhere.

Materials and Methods

Local women (n=84), aged 42.2±10.1 years, participated in a prospective study (Ethical approval: RSU N2-PĒK-4/415/2022) and regularly visited a gynecologist. Cervical biopsies were collected, formalin-fixed, and paraffin-embedded in case of the observed pathologies. DNA was extracted and analyzed for 14 hrHPV genotype presence using PCR (AllplexHPV14, Seegene). Samples with high HPV16 load (n=24) underwent whole genome sequencing using the Illumina platform. Demultiplexed reads were mapped onto the human genome reference extended by an HPV16 reference genome. Variant analysis and isolate consensus sequence generation were done using iVar. Evolutionary analyses within a global context were performed using the custom-tuned Next-strain framework.

Results

Sixteen complete local HPV16 isolate genomes were reconstructed from WGS data of samples collected in Latvia during 2012-2023. Isolate sequences show high conservation with ≤0.36% genome divergence from the reference genome. A total of 93 non-redundant variants were identified, with previously undocumented mutations localized primarily in non-coding genomic regions. E7 protein sequences were fully conserved. Capsid proteins L1 and L2 showed the highest variability, demonstrating a cluster of characteristic amino acid (aa) substitutions. Certain substitutions observed, including S220T (E1), P219S, T310K (E2), and L90V (E6), were earlier associated to increased pathogenicity and/or cancer risk.

Conclusions

HPV16 genomes circulating in Latvia exhibit low variability. Single nucleotide polymorphisms (SNPs) observed were earlier identified in geographic regions distant from Latvia. SNPs yield aa substitutions shaping viral pathogenicity and/or antiviral immune response. These findings indicate uniform direction of HPV16 evolution, with implications for epidemiology, vaccine design, and personalized management of HPV-associated pathologies. Supported by FLPP project lzp-2021/1-0484.

Findings from the IMAGiNE EURO Study: Women’s Experiences of Respectful Maternity Care in Healthcare Facilities Across 22 Countries Over 3.5 Years

Oral

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Objectives*

Respectful Maternity Care (RMC) is widely recognized as essential by scientific societies and international agencies, yet multicountry studies capturing women’s experiences remain limited. This study presents findings from the IMAGiNE EURO study, which assessed women’s perceptions of RMC across 22 countries using a standardized, validated questionnaire.

Materials and Methods

Women aged 18+ who gave birth in healthcare facilities between March 2020 and September 2023 participated via a validated questionnaire in 27 languages, capturing 15 key RMC measures. Univariate and multivariate analyses were conducted, an RMC index was calculated, and correlations with COVID-19 trends were explored.

Results

A total of 74026 women accessed the questionnaire, 67064 (90.6%) provided consent to participate, and 50641 (81.3%) were included in the analysis. Only a small fraction of women (3089, 6.1%) experienced during their childbirth all the 15 RMC measures reflecting positive practices (from 0.2% in Serbia to 20.2% in Luxembourg). Overall, 7749 (15.3%) reported feeling abused, with the most frequent being emotional abuse. Lack of dignity (26.9%, from 11.6% in Belgium to 62.1% in Serbia) and privacy (23.5%, from 10.4% in Switzerland to 70.5% in Serbia) were frequent. High rates of poor communication (33.1%) and exclusion from decision-making (40.4%) were observed across all countries. The RMC index showed significant variation between countries but did not correlate with COVID-19 trends.

Conclusions

These findings highlight widespread inequities in RMC across Europe, emphasizing the need for urgent action to uphold human rights in maternity care. Adequate resources and capacity-building for health professionals are essential to improve RMC practices.

Hematology

Antigen-specific B cell Responses in Treatment Naive and Chemotherapy-Receiving Chronic Lymphocytic Leukemia Patients

Oral

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Objectives*

Chronic lymphocytic leukaemia (CLL) is associated with secondary immunodeficiency, but mechanistic insight into the dynamics of B cell responses is lacking. While altered non-malignant B cell composition is already present in the early stages of CLL, it is unknown how this impacts foreign antigen-specific B cell differentiation, such as SARS-CoV-2 vaccination in untreated and chemotherapy-treated patients.

Materials and Methods

We recruited CLL patients who met the WHO-2017 and the International Workshop on CLL diagnostic criteria; CLL patients were either treatment naïve (CLL-TN) (n=23) or chemotherapy-receiving (CLL-CTx) (n=11). The healthy control group (HCs) (n=16) was composed of age- and sex-matched individuals. We characterized the overall non-malignant B cell landscape in relation to the development and phenotype of SARS-CoV-2 spike protein-specific B cells in CLL-TN and CLL-CTx patients compared to HCs following SARS-CoV-2 vaccination. Using flow cytometry, we analysed the number and phenotype of B cells with reactivity against the SARS-CoV-2 spike protein among peripheral blood mononuclear cells. Fluorochrome-labelled antibodies against CD24, CD38, CD27, CD11c, CXCR5, IgM, IgD and IgG allowed us to further assess B cell development, differentiation, and function. Anti-SARS-CoV-2 spike IgG levels were determined by ELISA. Results were considered statistically significant at $p < 0.05$.

Results

Despite prominent alterations in peripheral non-malignant B cell subsets in patients with CLL, the absolute numbers of circulating SARS-CoV-2 spike-specific B cells in CLL-TN and CLL-CTx were comparable to HCs. Furthermore, when characterizing the phenotype of SARS-CoV-2 spike-specific B cells, approximately half were IgG class-switched and only a minority had the IgD⁺CD27⁻ double negative B cell phenotype in all groups. Preserved SARS-CoV-2 response was supported by anti-SARS-CoV-2 spike IgG levels.

Conclusions

These data suggest that despite the major alterations in B cell subsets, the differentiation of SARS-CoV-2 spike-specific B cells is preserved in CLL-TN and CLL-CTx patients.

Contemporary Insights into Molecular-Genetic Spectrum of Chronic Myeloid Leukemia

Oral

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Objectives*

The objectives of the research were to identify and evaluate the molecular-genetic patterns of chronic myeloid leukemia (CML).

Materials and Methods

Our cohort study included 180 CML patients, who were treated between 2007 – 2023 at the Institute of Oncology from Moldova. The quantitative real-time PCR was used with the aim to determine the BCR-ABL gene p210 and p190 transcripts. The b2a2, b3a2/ b2a2, b3a2, b3a3 and e1a2 / p190 transcription products were identified by nested/multiplex PCR. The study was related to the ambulatory and hospitalized care.

Results

BCR-ABL1 fusion gene exceeded 50% of the cellular composition in the majority of patients of the total group (108 or 60.4%) and in the subgroups of patients related to the CML phase. The percentage of BCR-ABL1 gene expression below 25% was recorded only in 18 (10.1%) patients, being especially detected in the chronic phase (17 or 94.1%). BCR-ABL1 gene expression values exceeded 50% in most patients (9 or 62.5%) with advanced stages of CML, especially in the acceleration phase (7 (77.8%) patients). The dynamics of the BCR-ABL1 gene expression values suggest that the transformation of the disease into advanced stages might be associated with their increase due to the continuous expansion of the leukemic clone in the bone marrow. The most frequent transcript proved to be b3a2 (75 cases or 53.2%) ($p < 0.001$). The b3a3 transcript was identified as the rarest (2 cases or 1.7%) ($p < 0.001$). The b3a2 transcript prevailed at the time of disease diagnosis in all phases: early chronic (50.0%), late chronic (53.3%), accelerated (50.0%) and acute (66.7%) ($p < 0.001$). The b3a2 (50.0%) and b2a2 (33.3%) transcripts predominated in patients with the accelerated phase. Patients with b3a2 (66.7%) and b3a3 (33.3%) transcripts prevailed ($p < 0.001$) in the acute phase.

Conclusions

Molecular-genetic screening at diagnosis and monitoring under the treatment are crucial for CML phase identification and outcomes evaluation.

Bioinformatic Analysis and Literature Review on Transcription of Epstein-Barr Virus Encoded Latent Genes in Chronic Leukocytic Leukemia B-cells

Poster

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Objectives*

It is well known that the Epstein-Barr virus (EBV) can infect any type of B-cells, expressing the CD21 (Complement receptor type 2, CR2). Chronic lymphocytic leukemia (CLL) cells also could be infected by EBV. Thus, *in vivo*, EBV-infected CLL cells makes less than 0.01% of a total B-cell count. Noteworthy, even *in vitro* infected cells do not proliferate, because one of the transforming proteins, Latent membrane protein1 (LMP1), is not expressed. LMP1 could be transactivated by the EBV-encoded nuclear antigen 2 (EBNA-2), in the complexes with cellular transcription factors (TF), and by few cellular factors on their own. We aimed to find such cellular factors that are not expressed or inhibited in CLL cells.

Materials and Methods

A bioinformatic analysis of the open expression databases and the special algorithms to analyse the LMP1 promoter region.

Results

We found several genes, encoding proteins enabling transactivation and/or inhibition of the LMP1 promotor. There are RELA-RELB, RELB-RELB, ATFF2-c-JUN, and PAX5-TFAP2 among them. Noteworthy, according to our data, expression of TFAP2 is almost 20 folds lower in CLL cells, compared to normal B-cells, activated with anti-CD40 and IL4.

We have shown earlier that the TGFB-SMAD2/3 and IL-2-STAT2/5 (JAK-STAT5) pathways are not active in CLL cells at the basal level. Treatment of CLL cells with IL2 and TGFB did not result in these pathways activation either. This is due to very low expression of the SMAD2 and the absence of SMAD3-SMAD4 heterodimers in the nucleus. Low levels of STAT5 phosphorylation were also detected.

Conclusions

The study on the molecular mechanisms of the regulation of cellular signaling pathways in CLL cells is vitally important for the development of individualized therapies.

Characteristics of Aggressive Extranodal Non-Hodgkin Lymphomas in Young Adults

Poster

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Objectives*

1. To investigate the incidence of aggressive extranodal non-Hodgkin lymphoma in young adults;
2. To research the epidemiological, clinical and diagnostic characteristics of the study group;
3. To reduce the number of people diagnosed in advanced stages;

Materials and Methods

The following research methods were used: epidemiological, descriptive statistics, comparative, clinical-analytical. The type of non-Hodgkin's lymphoma was identified in accordance with the criteria of the International Classification of Hematopoietic and Lymphoid Tissue Tumors revised by WHO in 2016. Histological, immunohistochemical, and flow cytometry examinations were used to confirm the diagnosis.

Results

Within the research group in our clinic, it was observed that the variant of diffuse large B-cell lymphoma (DLBCL) - 31.25% and B-lymphoblastic lymphoma - 31.25% predominate, followed by T-lymphoblastic lymphoma - 18.75%, adult T-cell lymphoma - 12.5% and follicular lymphoma grade IIIB - 6.25%. Among the extranodal lesions, a higher incidence was observed in stomach lesions- 31.25%, followed by skin - 25%, palatine tonsils - 12.5% and bone tissue - 12.5%, then soft tissues, nasopharynx and lung, each constituting 6.25%. The clinical picture of aggressive extranodal NHL depends on: the location of the primary focus, the degree of extension but also the morphological variant. The gold standard for the diagnosis of lymphoma based on current international guidelines (Lugano and ESMO) is considered to be surgically excised tissue biopsy.

Conclusions

The number of young adults suffering from aggressive extranodal lymphomas is constantly increasing. Aggressive extranodal lymphomas are often confused with diseases. The earlier the stage, the better the results of treatment there will be better and higher survival. In young adults, it is observed a predominance of large B-cell lymphoblastic lymphoma and DLBCL lymphoma is observed.

Histology

Appearance and Distribution of Voltage-Gated Sodium Channels in Excitable and Non-Excitable Cells of the Human Brain

Oral

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Objectives*

Sodium currents were first discovered by Hodgkin and Huxley using the voltage clamp technique, as reported in their groundbreaking series of papers in 1952. The molecular characterization of sodium channels (Nav) in excitable cell membranes was subsequently conducted in the 1980s. Current knowledge highlights their pharmacological and electrophysiological diversity, as well as their unique tissue-specific expression patterns. Alterations in voltage-gated sodium channels and ionic imbalances within neural networks have been implicated in epilepsy. This study aims to investigate the appearance and distribution of voltage-gated sodium channels in the brains of epileptic patients.

Materials and Methods

The brain samples were obtained from the Netherlands Brain Bank, Netherlands Institute for Neuroscience, Amsterdam (open access: www.brainbank.nl). Immunoexpression of voltage-gated sodium channels in different regions of the human brain was detected using conventional immunohistochemistry.

Results

The expression of Nav varied across the human brain regions studied. The expression of Nav1.1 and Nav1.7 was weak in all regions, including the hippocampus, cerebellum, and temporal lobe, whereas Nav1.2 expression was intense in the white matter, as well as in the granule layer and the lower part of the molecular layer of the cerebellum, and weak in the hippocampus. In the cerebellum, non-excitable cells, such as astrocytes and microglia, exhibited weak Nav1.1 expression.

Conclusions

Navs are expressed in excitable cells, such as neurons, as well as in non-excitable cells like astrocytes and macrophages. This diversity underlies a broad spectrum of effector functions, including cell excitability, ion homeostasis, and signaling.

Automatic Segmentation of Morphological Structures, Metastasis Detection, and 3D Model Reconstruction from Medical Imaging Utilising Artificial Intelligence Based on Deep Neural Network Methodologies

Oral

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Objectives*

Deep learning has significantly advanced medical imaging. The application of AI-based methods to tasks such as metastasis detection, segmentation of interstitial cells of Cajal (ICC), and the generation of anatomically accurate 3D models highlights the potential of these technologies in improving medical workflows. This study integrates findings from multiple projects to evaluate the utility and effectiveness of deep learning in clinical practice and medical education.

This study aims to evaluate the application of deep neural networks in:

1. Automated segmentation of complex anatomical structures.
2. Detection and localization of metastatic lesions in CT scans.
3. Automated counting and analysis of ICCs in histological images.
4. Reconstruction of 3D anatomical models for educational purposes.

Materials and Methods

CT scans of spinal metastases (38 cases) and vertebrae (115 cases) were processed using U-Net based architectures. Mandibular CBCT scans (188 cases) were analyzed using ResNet-101 for osteoporosis detection. The ICC cell analysis relied on a YOLO-based architecture, which accurately segmented and quantified cell distributions. Radiological data were post-processed with 3D Slicer to create 28 3D models.

Results

Segmentation and Detection

The U-Net architecture achieved high accuracy in vertebra segmentation, with DSC values between 0.87 and 0.96. Metastasis detection was more challenging, with DSC values of 0.71 for lytic lesions and 0.61 for sclerotic lesions.

Cell Counting

The YOLO-based cell counting model achieved high accuracy in identifying ICC distributions in histological samples. Automated cell counts showed strong concordance with manual counts, significantly reducing time required for analysis.

3D Model Reconstruction

A total of 28 anatomically accurate 3D models were reconstructed and printed. These models can be used in educational setting to improve student understanding of complex anatomical structures.

Conclusions

Deep learning models effectively automate critical tasks in medical imaging, including segmentation, detection, and cell counting. Integrating artificial intelligence-driven technologies into medical education connects theoretical knowledge with practical skills, promoting innovation and improving results.

Can Anatomy Still Offer a Terra Incognita for Scientists?

Oral

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Objectives*

Anatomy remains a foundational science that continues to offer valuable insights across numerous scientific disciplines. Far from being fully explored, it stays a vibrant field with ongoing discoveries and applications. It underpins surgical techniques, medical imaging (MRI, CT scans), and is necessary in innovations, like robotic surgery or new surgical approaches. Detailed anatomical knowledge is essential for organ transplants, prosthetics, and regenerative medicine, including advancements in bioengineering such as 3D-printed organs. The human brain's complex structure is still being explored, with ongoing studies into functional areas and neural pathways, using tractography as the imaging method of choice. Anatomy assists paleontologists and evolutionary biologists in reconstructing ancient life forms and forensic anatomy can aid forensic science in crime investigations. Anatomy also informs biomechanics, helping improve athletic performance and injury prevention through better understanding of musculoskeletal function. Variational anatomy, especially concerning new surgical techniques and more detailed imaging methods, features its renaissance and meta-analytic data including different populations serve for better orientation in various clinical procedures. A plethora of examples supporting all the mentioned fields is a proof that anatomy is not a scientifically dead discipline and but offers enough topics for clinically oriented anatomists or anatomically oriented clinicians, who considered a thorough knowledge of anatomy both a cornerstone and advantage of their clinical work.

Evaluation of 12 Cleft Candidate Gene Proteins in Human Cleft Lip and Palate Tissue

Oral

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Objectives*

Morphopathogenesis of cleft lip and palate is still an unresolved problem. Defects in certain cleft candidate genes have been associated with orofacial cleft formation. These genes encode proteins which control orofacial tissue growth and formation, but their exact localization in tissue and interrelations have not been well described. The primary aim of this research was to assess and compare the distribution of 12 cleft candidate gene coded proteins in different cleft lip and palate tissue types.

Materials and Methods

Unilateral cleft lip (UCL), bilateral cleft lip (BCL) and cleft palate (CP) mucosal tissue was gathered during cleft plastic surgery. UCL group had 36 patients, BCL – 13 patients, CP – 26 patients. Two control groups were formed from patients without clefts – one with 7 patients who had labial frenectomy and the other with 5 patients from the historical collection of the Institute of Anatomy and Anthropology of Rīga Stradiņš University). Immunohistochemistry was used to identify the following cleft candidate gene proteins: BarH-like Homeobox 1 (BARX1), Distal-less Homeobox 4 (DLX4), Forkhead Box E1 (FOXE1), Homeobox B3 (HOXB3), Muscle Segment Homeobox 2 (MSX2), Paired Box Transcription Factor 7 (PAX7) and 9 (PAX9), Receptor-like Tyrosine Kinase (RYK), Sonic Hedgehog (SHH), SRY-box Transcription Factor 3 (SOX3), Wingless-type MMTV Integration Site Protein 3A (WNT3A) and 9B (WNT9B).

Results

The 12 evaluated proteins were identified within all patient groups and controls with variable distribution. Statistically significant correlations between protein-containing cells were calculated in each group.

Conclusions

WNT9B, WNT3A, SOX3 were the most notable in control tissue, while SHH, PAX7, HOXB3, FOXE1 were found in moderate number and almost no BARX1 and MSX2-containing cells were detected. Increased BARX1, FOXE1, HOXB3, MSX2 was seen in UCL group, while BCL group had reduced SHH and elevated PAX9 and DLX4. UCL, BCL and CP tissue had elevated RYK, MSX2 and reduced WNT9B, WNT3A, SOX3.

Two-Week Changes in Cytokines and Antimicrobial Proteins of Milk in Mastitis-Affected Free-Stall Barn Cows

Oral

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Objectives*

Bovine mastitis requests to search for new diagnostic methods in the detection of the early inflammation stage. Within the ICRAD project “Channel-based biosensors to support a precision agriculture approach for improved bovine mastitis management” one of the goals was the research for early inflammation markers in the milk of cows with different mastitis forms.

Materials and Methods

Three experiments were developed: the evaluation of cytokines and antimicrobial proteins of milk in the 1st round covering the first 3 days of disease; in the 2nd round of the second part of 1st disease week and the 3rd round of the 2nd disease week. Milk from 45 Holstein Friesian cows divided into 3 groups: healthy, subclinical and clinical, was used. Milk was tested by immunohistochemistry for IL-1,2,-4,-8,-10,-12,-13,-17A, TNF α , IFN γ , TGF β -1 and β -Def 2,-3. Microbiota of milk were tested in different season.

Results

The stable increase of IL-2 and TGF- β 1 within the first 3 days of mastitis-affected and healthy cows was observed. The stable expression of IL-2 IL-4, IL-17A and TGF β -1 from day 4 to day 14 in the milk of subclinical and clinical mastitis affected animals and in the healthy cows' milk was observed. The decrease of IL-10, β -def2, and β -def3 within the first 3 days and following days 4-14 in milk of subclinical and clinical mastitis animals was revealed. The presence of a rich bacterial microbiome (*S. aureus*, *S. uberis*) in the milk of healthy animals, as well as changing bacterial species between the collecting rounds occurred.

Conclusions

Milk IL-10 and β -Def 3 can be used as possible diagnostic biomarkers of early/prolonged inflammatory phase in subclinical and clinical mastitis. The presence of different microbes excludes the possibility to detect precise inducer of the mastitis. High expression of IL-2, IL-4, IL-17a and TGF β -1 positive cells into the mastitis-affected milk rises question about the factors that influence this elevation.

Characterisation of Galactin (Gal-10) in Cleft Lip and Palate (CLP) Affected Tissue

Poster

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Objectives*

Deficiency in palatal shelf elevation and fusion, but foremost chronic inflammation is caused by a numerous defence factors, which can lead to cleft lip palate. While Galectin -10 (Gal-10) connection to other local inflammatory processes has been debated, for cleft-affected patients information about local inflammation and tissue regeneration is scant. This study is based on evaluating potential role of Gal-10 in ontogenetical aspect for cleft-affected patients tissue.

Materials and Methods

Twenty-one children/their parents suffering from non-syndromic craniofacial clefts and undergoing surgery, with ages altering between 8 months and 12.7 years of milk or mixed dentition donated their material. Eight individuals in total were evaluated as controls, 3 for mixed dentition undergoing lip frenula surgery and 5 without orofacial defects for milk dentition. Number of Gal-10 positive cells in both groups were graded with the semiquantitative method, later evaluated by nonparametric statistical methods.

Results

Notably higher number of Gal-10 cells were found for children with cleft-affected epithelium in mixed dentition and connective tissue in milk dentition control. Notably elevated was also number of Gal – 10, in accordance with age, from milk to mixed dentition and in both patient and control samples. Evident differences were seen when comparing expression of Gal-10 in muscles between milk and mixed dentition aged children, with milk dentition age tissue higher levels in comparison to the mixed dentition.

Conclusions

Proposition of a possible role as a provider of epithelial barrier function and local defence factor is based on the relative absence of Gal-10 in healthy palate, with its increase in CLP epithelium in correlation with age from milk to mixed dentition. Palatal muscles are not the main source for Gal-10 expression neither healthy, nor cleft affected tissue. Insignificant Gal-10 in healthy mixed and milk dentition group connective tissue justify the individual changes, which do not depend on the CLP.

Evaluation of Human Beta Defensin- 2, 3, 4 and Apoptosis in Placentas of Different Gestational Ages

Poster

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Objectives*

The growth of the fetus depends on the interaction between the mother and the fetus through the placental interface. Evaluation of human beta defensin-2, 3, 4 (HBD-2, 3, 4) and programmed cell death in the human placenta and its correlations with pregnancy results not only helps to better understand the role of protective factors and their possible interactions with placenta tissue, but may also have clinical significance in reproductive medicine.

Materials and Methods

The research material was obtained from 15 patients with gestational age from 28 weeks to 40 weeks. The study analyzed the HBD-2, 3, 4 immunoreactive cells and apoptotic cells in placentas. The biotin–streptavidin biochemical method was used for the detection of human beta defensins. Staining of apoptotic cells by TUNEL was processed by a standard in situ cell death detection kit. The relative distribution was assessed by a semi-quantitative counting method.

Results

We observed that the relative number of HBD-2 positive cytotrophoblasts, extraembryonic mesodermal cells, and endothelial cells tends to decrease during higher gestational weeks. HBD-3 and HBD-4 were mainly produced in extraembryonic mesoderm and Hofbauer cells. We found an increase in HBD-3 expression with a higher gestational age. The expression of HBD-4 showed a tendency to decline in cytotrophoblasts, although statistically significant increases were observed in positive endothelial cells of HBD-4 in higher gestational weeks. Apoptotic cells were found in all sampled placentas of different gestational ages; generally, their amount decreased as the gestational age of the placenta advanced.

Conclusions

The increased expression of tissue protection factors (HBD-3, HBD-4) in later gestational week may indicate these factors as the most significant protectors of placenta in ontogenetic aspect. Apoptotic cells are characteristics of all post-delivery placentas of various gestational ages; their number decreases with advanced gestation, suggesting a change to other mechanisms of cellular disposal.

Histopathology

Aberrant Epithelial-Mesenchymal Transition in Parathyroid Pathology

Oral

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Objectives*

Primary hyperparathyroidism, defined as autonomous overproduction of parathyroid hormone (PTH), represents the third most common endocrine disorder. The advancements in the laboratory medicine, radiology and surgery have changed its diagnostic paradigm and ensured effective treatment. However, new therapeutic options might be desirable, especially in aging population, highlighting the need for research on the pathogenesis of primary parathyroid lesions. Epithelial-mesenchymal transition (EMT), an important event in tumour pathogenesis, remains underexplored in parathyroid neoplasms. EMT is defined as loss of epithelial features and acquirement of mesenchymal phenotype. Thus, the aim of our study was to evaluate epithelial-mesenchymal transition in primary parathyroid pathology.

Materials and Methods

Immunohistochemical (IHC) visualization of mesenchymal intermediate filament (IF) vimentin, epithelial IF cytokeratin (CK) 19 and cellular adhesion molecule E-cadherin was applied to investigate parathyroid adenomas (102), multiglandular parathyroid disease (MPD; 27 cases), normal parathyroid glands (NG; 45) and parathyroid carcinomas (5). The slides were analyzed by computer-assisted morphometry. IHC reactivity was classified into four intensity levels: 0, negative; 1, low; 2, moderate and 3, high. The relative extent was measured as the fraction of cells (%) expressing the given marker at the given intensity level. The final IHC score was calculated as the sum of the mathematical products of the intensity and the relative extent. Descriptive and analytic statistics was performed, including Kruskal-Wallis test.

Results

Compared to NG (mean score±standard deviation, 0.28±0.37), MPD (0.33±0.39) and parathyroid adenomas (0.57±0.91) showed a trend to up-regulation of vimentin that was even higher in parathyroid carcinomas (1.08±1.05; p=0.105). The mean score of CK19 was 0.26±0.23 in NG, 0.82±0.93 in MPD, 0.84±0.84 in adenomas and 1.02±1.35 in carcinomas; the difference was statistically significant (p=0.012). E-cadherin levels were 2.25±0.67 in NG, 0.96±0.92 in MPD, 1.00±0.71 in adenomas and 1.27±0.39 in carcinomas (p=0.753).

Conclusions

In parathyroid parenchyma, mesenchymal differentiation by expression of vimentin increases along with the biological potential of parathyroid lesions. CK19 parallels vimentin levels, showing “epithelial-mesenchymal correlation”. Cellular adhesion by E-cadherin decreases in all proliferative parathyroid lesions, compared to normal glands, but E-cadherin levels in parathyroid carcinomas are higher than in benign tumours. Thus, cellular adhesion and expression of IFs changes in parathyroid pathology, but these changes differ from classic epithelial-mesenchymal transition.

Advancing Neurological Disease Diagnostics: From Tissue Staining and Sequencing to AI-Assisted Language and Vision Models

Oral

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Objectives*

Neuropathology, the cornerstone of neurodegenerative disease diagnostics, relies on histological assessments to identify hallmark tissue abnormalities such as Lewy bodies, amyloid plaques and neurofibrillary tangles. Pathology staging assessment schemes based on staining techniques, have been indispensable in understanding the pathological mechanisms of diseases like Alzheimer’s and Parkinson’s. However, these manual staging schemes are time-intensive and subject to variability in interpretation. The integration of artificial intelligence (AI), particularly supervised models and advanced unsupervised vision models, has begun to transform neuropathological workflows, offering enhanced precision, reproducibility, and scalability.

Deep learning algorithms trained on large datasets of digitized histological slides can now identify subtle, disease-specific tissue patterns with accuracy rivalling expert pathologists. These models enable the automated quantification of pathological features, such as plaque burden or neuronal loss, which are critical for diagnosis and staging. Moreover, AI-assisted tools facilitate the discovery of previously unrecognized microstructural changes, potentially uncovering novel biomarkers of disease.

While the primary focus remains on histological data, the integration of AI with other modalities, such as genetic and imaging data, offers a more comprehensive understanding of disease progression.

Chronic Rhinosinusitis with Nasal Polyps in Latvia

Oral

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Objectives*

Chronic rhinosinusitis (CRS) is characterized by diverse inflammation patterns. Modern approach to understanding CRS lies in classifying inflammatory in CRS affected nasal tissue. Our aim was to use identified tissue markers IL-1, IL-4, IL-6, IL-7, IL-8, IL-10, IL-12, Ki 67, HBD-2, HBD-3, and LL-37 to classify specific endotypes in chronic rhinosinusitis with nasal polyps (CRSwNP).

Materials and Methods

The research group included 48 samples taken from patients with CRSwNP during surgery. The control group comprised 17 samples of normal healthy nasal mucosa. A hierarchical cluster analysis was performed. Tissues were stained for IL-1, IL-4, IL-6, IL-7, IL-8, IL-10, IL-12, Ki 67, HBD-2, HBD-3, and LL-37 immunohistochemically. A semi-quantitative counting method was used.

Results

Most of the factors demonstrated increased presence in connective tissue and decreased presence in epithelium of nasal polyps when compared to controls. Distinctive correlation patterns were observed. Five distinctive endotypes of CRSwNP with different biomarker patterns were found. Significant differences in tissue factors between clusters were observed. Lund-Mackay score results were significantly higher in cluster 4 compared to that of cluster 1 ($p = 0.024$). Different correlation patterns were observed between primary and recurrent polyp samples.

Conclusions

Five endotypes of chronic rhinosinusitis with nasal polyps (CRSwNP) are defined by various combinations of type 1, type 2, and type 3 tissue inflammation patterns. In the Latvian population, endotypes linked to neutrophilic inflammation or a mix of neutrophilic and type 2 inflammation are most common. Higher values of the proliferation marker Ki 67 do not correlate with more intense inflammation in the tissue samples of CRSwNP.

Comparative Study of Acquired Cholesteatoma in Paediatric and Adult Populations

Oral

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Objectives*

Complex characterisation and determination of relative amount and distribution of remodelling, proliferation, inflammation, local defence, angiogenetic factors and SHH gene protein of the cholesteatoma tissue in an ontogenetic aspect.

Materials and Methods

Tissues were obtained from 25 adults and 25 children during cholesteatoma surgery. Tissues were immunohistochemically stained for MMP-2; MMP-9; TIMP-2; TIMP-4; Ki-67; NF- κ B; IL-1; IL-10; H β D-2; H β D-4; VEGF, SHH. The slides were analysed by light microscopy using a semi-quantitative method. Kruskal – Wallis's test was used to detect statistical differences between groups.

Results

On average, a few to moderate (+/++) MMP-2; an occasional (0/+) MMP-9; a few(+) TIMP-2; moderate to numerous (+/+++) TIMP-4; an occasional (0/+) Ki-67; a moderate (++) number of NF- κ B; a few to moderate (+/++) IL-1, IL-10 and H β D-2; an occasional (0/+) H β D-4; a few to moderate (+/++) VEGF and moderate to numerous (+/+++) SHH positive cells were observed in adult and paediatric cholesteatoma. There were no statistically significant differences in all cell factors between both groups.

Similar positive correlations were found in both groups between the following: MMP-2 in matrix and perimatrix (r=0.574 adults, r=0.803 children); MMP-9 perimatrix and TIMP-4 perimatrix (r=0.664 adults, r=0.490 children); IL-1 matrix and IL-10 perimatrix (r=0.777 adults, r=0.781 children); Ki-67 in perimatrix and NF- κ B in perimatrix (r=0.538 adults, r=0.641 children); IL-10 matrix and H β D-2 matrix (r=0.841 adults, r=0.828 children).

Conclusions

In children and adults' cholesteatoma, without minor individual variations, there is virtually no difference in tissue remodelling, cell proliferation, pro and anti-inflammatory cytokine and antimicrobial peptide secretion, angiogenetic processes, and SHH gene protein stimulation.

Elaboration of Morphological Model to Evaluate Long-Term Hepatobiliary Consequences of COVID-19

Oral

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Objectives*

Given the frequent and severe lung damage in Covid-19 patients, most early Covid-19 studies focused on the analysis of pulmonary processes. However, biochemical signs of hepatocellular injury, such as elevated blood levels of alanine aminotransferase and aspartate aminotransferase, were often observed in the acute phase of Covid-19 (Aloisio et al., 2021). Liver cells abundantly express ACE2 receptors, which are necessary for SARS-CoV-2 binding (Malik et al., 2021), and in an animal model, viral replication in hepatocytes, as well as changes in hepatocyte morphology without inflammatory infiltrate in liver tissue (Yang et al., 2021), have been experimentally demonstrated. Morphological data on acute Covid-19-induced liver injury in humans have mostly been obtained from autopsies; they reflect various features, among which steatosis, necroapoptotic processes, inflammation in the lobules, endothelium or portal fields, dyscirculatory changes and fibrosis predominate (Malik et al., 2021). Thus, there is a shortage of data on human liver pathology caused by Covid-19 in long term. We aimed to elaborate a morphological model to evaluate long-term hepatobiliary consequences of Covid-19.

Materials and Methods

The study was performed within the frames of innovative multidisciplinary project “SARS-CoV-2 and Covid-19 contexts for hepatobiliary system pathologies, their histological, biochemical, radiological and clinical characteristics and prevention options for these pathologies” (Izp-2021/1-0442) as a prospective morphological and immunohistochemical evaluation of liver tissues and biliary ways in the enrolled patients. The histochemical panel comprised visualisation by haematoxylin-eosin, PAS, Perls and Masson’s trichrome methods, while immunohistochemistry was focused on typing of inflammatory cells and identification of endothelium.

Results

The assessed tissues (122 samples) were well-suited to evaluate the morphology of liver parenchymatous cells (61/61) and biliary epithelium (61/61). There were only minor features of hydropic swelling of hepatocytes. Steatosis was found in 32.8% of liver samples, and was invariably mild (<25%). Cholestasis in hepatocyte cytoplasm was found in 18/61 cases. Regeneration of liver cells was evident. The microcirculatory bed (morphology of endothelium, presence or absence of thrombosis and/or organised thrombi and emboli) was clearly distinguishable. No evidence of thrombosis, thrombembolism or organised thrombi was present (0/122). Inflammation was present in most samples of liver parenchyma (53/61), and it showed periportal activity in 5/61 samples. The size of infiltrates was suitable for immunohistochemical typing. Fibrosis was limited to portal fields and occasional foci, attributable to complicated gallstone disease.

Conclusions

The morphological evaluation of liver and biliary tissues is an outstandingly good complementary model in Covid-19 research, allowing to observe and quantify different pathological changes in parenchymatous cells and microcirculation. Metabolic changes can be observed, including steatosis and cholestasis. Inflammatory infiltrate can be quantified and evaluated both by cellular composition and activity. Morphological evaluation of fibrosis is an accurate estimate, complementing radiological data.

Identification of Distinct Osteoarthritis Subgroups via Cluster Analysis

Oral

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Objectives*

Osteoarthritis (OA) is a heterogeneous joint disease, with synovial inflammation (synovitis) reflecting one of its dimensions. Our aim was to explore if cluster analysis as a machine learning approach is effective for stratification of OA patients into distinct subgroups based on clinical data, pain assessments, immunostaining of synovial tissue, and synovial fluid analysis, as well discovering the key attributes of each subgroup. We sought to determine if cluster-analysis-based subgroups differ from synovitis-severity-based classification.

Materials and Methods

Thirty-one OA patients comprised the study. Clinical data acquisition and pain tests were performed for all patients before arthroplasty. Synovium and synovial fluid samples were obtained during surgical intervention. Synovitis severity was evaluated according to Krenn grading system. The expression of NF- κ B, TNF- α , and TGF- β was evaluated via immunohistochemistry in synovial tissue and ELISA in synovial fluid. Statistical data analysis and cluster analysis was conducted using JMP Pro V17.

Results

Four distinct OA subgroups were identified, which did not match with the three-group classification based on synovitis severity. The first subgroup included only males with the shortest symptom duration, severe pain, low-grade synovitis, and higher NF- κ B expression in synovium and synovial fluid. The second subgroup consisted of females with diabetes, hyperlipidemia, obesity, and greater serum CRP levels. It coupled with moderate pain, higher synovitis, and elevated TNF- α expression in synovial fluid. The third subgroup showed the longest symptom duration, but the lowest pain, no synovitis and negligible pro-inflammatory marker expression in synovium and synovial fluid. The fourth subgroup showed severe pain, no comorbidities, the highest synovitis grade, and notable expression of pro-inflammatory markers in synovium and synovial fluid.

Conclusions

This study supports the existence of distinct OA subgroups. The mismatch of cluster-analysis-based subgroups with synovitis-severity-based, highlights the power of machine learning approach to capture clinically meaningful OA subgroups for uniform stratification of patients for clinical trials and treatment development.

CDX1, SHH, IHH Genes and their Protein's Role in Ladd's Band Development

Poster

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Objectives*

Abdominal adhesions are divided in post-inflammatory and congenital. Ladd's band is a type of congenital intra-abdominal adhesion - they are fibrous ligaments that extend from the large bowel to the abdominal wall. The main cause is thought to be abnormal intestinal rotation during the embryonic period, and these ligaments can lead to small bowel obstruction requiring postnatal surgery. Some reports suggest that certain genes associated with intestinal malrotation (CDX1, SHH, IHH) may contribute to the formation of Ladd's band.

Materials and Methods

Specimens of 10 patients aged the first three postnatal months with Ladd's band obtained during the first adhesion removal surgery were analyzed. The material of 8 patients obtained during inguinal hernia surgery developed the controls. Gene (CDX1, IHH, SHH) expression was analyzed using in situ hybridization method and their proteins - using immunohistochemistry. Semi-quantitative method was used for positive cell count. Relationships between factors were analyzed using Spearman correlation coefficient.

Results

CDX1 protein appeared in similar number of fibroblasts, endotheliocytes, macrophages and mesotheliocytes of patients and control groups. CDX1 gene appeared just in some fibroblasts. SHH protein appeared in increased number of fibroblasts, endotheliocytes, macrophages and mesotheliocytes of patients. The same gene appeared just in some fibroblasts and endotheliocytes. Also, IHH gene positive structures appeared in similar number of different cell types in patients and control groups. Some moderate correlations appeared between different SHH protein and CDX1 protein positive cells.

Conclusions

SHH protein appears as significant factor in Ladd's band formation indicating the tissue repair and regeneration. Rich expression of gene protein in fibroblasts makes this type of cell important for embryonic adhesion development. CDX1 and IHH gene proteins seem to be less associated with this type of adhesion pathogenesis. SHH and CDX1 gene proteins, but not the same genes are probably playing role in the Ladd's bands formation.

Host-Pathogen Interaction

Disease-Targeted Physical Activity Programme as a Therapeutic Strategy for Fibromyalgia: Pilot Study

Oral

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Objectives*

The study aims to evaluate the efficacy of a disease-targeted physical activity program in alleviating FM symptoms. Key outcomes include changes in the Widespread Pain Index (WPI) and Symptom Severity (SS) scale, with biomarker analyses to follow upon study completion.

Materials and Methods

Twenty-eight FM patients (aged 18–60) were enrolled and divided into two groups: a control group and an intervention group participating in an 8-week, disease-targeted physical activity program. This regimen features simplified yoga-based exercises, customized to patient subgroups based on symptom severity and physical capacity, performed three times weekly. Mid-intervention (week 4) and post-intervention (week 8) clinical assessments were conducted.

Results

Mid-term analyses show a statistically significant improvement in WPI and SS scores among the intervention group compared to the control group, indicating enhanced symptom management and improved quality of life. No adverse events were reported. Biomarker analysis is underway to further elucidate the physiological effects of the intervention.

Conclusions

These promising mid-term results highlight the potential of a disease-targeted physical activity program as a safe and effective therapeutic option for FM patients. This approach not only improves clinical outcomes but also offers an opportunity to deepen our understanding of the underlying pathophysiology of fibromyalgia through biomarker analysis. Furthermore, a parallel study conducted on patients with Crohn's disease has demonstrated similar clinical benefits, including improved symptom scores and a reduction in Calprotectin levels, reinforcing the broader applicability of this therapeutic strategy across chronic inflammatory conditions. Final findings will provide valuable insights into tailored, evidence-based interventions.

Analysis of Bile Samples in the Context of COVID-19 Consequences

Poster

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Objectives*

The consequences of SARS-CoV-2 infection in the hepatobiliary system are not fully understood. SARS-CoV-2 virus can infect the epithelium of the gastrointestinal tract. Moreover, some studies reported the presence of SARS-CoV-2 RNA in bile during acute COVID-19. Considering that the liver is the primary site for cholesterol synthesis, which has been excreted into bile, the assessment of cholesterol homeostasis can help to detect the implications of COVID-19 on the hepatobiliary system. Therefore, our study analyzed operative bile samples according to subjective COVID-19 history and measurements of inflammatory reaction.

Materials and Methods

The study included 61 patients (mean age was 56 ± 16 years, 46 females) who underwent laparoscopic cholecystectomy due to acute (n=31) or chronic (n=30) cholecystitis. In operative bile samples, SARS-CoV-2 virus RNA (PCR), total cholesterol (TC), high-density lipoprotein cholesterol (HDLC), and low-density lipoprotein cholesterol (LDLC) were detected. Before surgery, the TC, its fractions, and inflammatory markers were assessed in blood samples.

Results

One-half of patients noted a history of COVID-19. SARS-CoV-2 virus was not detected in any bile samples. There were no differences in TC, HDCL, and LDCL in bile and serum samples according to COVID-19 status. The level of LDLC in bile correlated with LDCL in blood ($rs=0.27$, $p<0.05$). We also found negative correlations of TC and its fractions in bile with serum ferritin, IL-6, and C-reactive protein and positive correlations with prothrombin index, transferrin, and albumin.

Conclusions

Despite no evidence of the presence of the virus in bile and the relationship between COVID-19 anamnesis and cholesterol homeostasis, analysis of bile pointed to decreased production or excretion of cholesterol by the liver under inflammation.

IgA Nephropathy

Are There Specific Changes in Microbial Composition in Patients with Immunoglobulin A Nephropathy?

Oral

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Objectives*

Functional changes in the intestinal mucosal immune system, presumably caused by genetic, dietary, and infectious factors, contribute to the development of immunoglobulin A nephropathy (IgAN). This study investigated the gut microbiome composition and functional pathways in IgAN patients and compared them with healthy controls (HC).

Materials and Methods

The study enrolled adults with IgAN at Pauls Stradiņš Clinical University Hospital from January 2020 to December 2022. IgAN patients had two visits with a 6-month interval. HC with normal kidney function and no pathological changes in urinalysis were enrolled. Stool samples were collected, 16S rRNA sequencing was performed.

Results

Seventy-one patients with IgAN and 23 HC were enrolled in this study. The median age in the IgAN group was 39 years, and in the HC group, it was 46 years. The majority (over 60%) of participants in both groups were men, with a body mass index of 26 kg/m². Fourteen IgAN patients had kidney transplantation, and nine received dialysis. No significant changes in the variability of microbial composition by genus and phylum were observed between the two groups and in IgAN group after 6 months. Patients on dialysis and those who had undergone transplantation showed significant changes in microbial diversity compared with IgAN patients with preserved kidney function or HC. No changes in diversity were observed in patients with or without proteinuria or hematuria. Multiple nucleotide- and nucleoside-biosynthesis-related pathways and glycolysis from glucose-6-phosphate were more prominent in IgAN patients.

Conclusions

Patients on kidney replacement therapy showed significant changes in microbial diversity compared with IgAN patients with preserved kidney function or HC. We found no significant changes in gut microbial diversity between IgAN patients and healthy individuals. Functional activity of the gut microbiome should be further examined.

Risk Factors for IgA Nephropathy Progression: Insights beyond Galactose-Deficient IgA1 Levels

Oral

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Objectives*

IgA nephropathy (IgAN) is a common glomerular disease predominantly affecting young adults. It often progresses to end-stage kidney disease, and its pathogenesis is closely linked to galactose-deficient IgA1 (Gd-IgA1). This study aims to identify the key risk factors driving the progression of IgAN.

Materials and Methods

The study included patients diagnosed with biopsy-confirmed IgAN. Patients were divided into two groups based on their annual eGFR decline: Group 1 (decline >5 ml/min/1.73 m²) and Group 2 (decline ≤5 ml/min/1.73 m²) using the CKD-EPI 2021 formula. Kidney failure was defined as sustained kidney replacement therapy (KRT) or an eGFR <15 ml/min/1.73 m². Statistical comparisons were conducted using the Mann-Whitney U test, Chi-squared, or Fisher's exact tests.

Results

A total of 46 patients with IgAN (mean age: 42 ± 10 years; 67% male) were included. Half experienced an eGFR decline >5 ml/min/1.73 m². Median GdIgA1 levels were greater in group 2 (8175 ng/ml; IQR: 5959–10840) than in group 1 (5305 ng/ml; IQR: 3996–8818, p=0,03). In contrast, group 1 exhibited a significantly higher uACR (median: 0.34 g/g, IQR: 0.34–1.27) relative to group 2 (median: 0.15 g/g, IQR: 0.09–0.44; p = 0.002). Cardiovascular diseases were significantly more prevalent in group 1 (17 patients, 30.4%) compared to group 2 (1 patient, 4.3%) (p = 0.047). In group 1, 16 patients (65.2%) developed kidney failure, including 7 (30.4%) who required KRT and 9 (39.1%) who reached an eGFR <15 ml/min/1.73 m², while no cases of kidney failure occurred in group 2 (p < 0.001). No significant differences were observed between the groups regarding hypertension, ACEI/ARB use, or body mass index.

Conclusions

Our findings indicate that disease progression in IgAN may not be directly determined by GdIgA1 levels in patient serum. IgAN progression is influenced by other factors, such as the presence of cardiovascular comorbidities and elevated proteinuria.

Imaging (Radiology)

Accentuation as a Novel Principle of Perceptual Organisation: Insights into Cognitive Mechanisms and Clinical Applications

Oral

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Objectives*

This study introduces and examines the principle of accentuation as a novel and impactful mechanism in perceptual organization. Defined by subtle dissimilarities or discontinuities, accentuation profoundly alters global percepts, inducing geometric distortions, orientation shifts, apparent motion, and visual paradoxes. Through a series of experiments, we demonstrate that accentuation not only interacts with but can supersede classical Gestalt principles, significantly influencing figure-ground segregation, shape perception, and lexical processing. Our findings reveal that accentuation operates as an independent organizing principle, leveraging salience-driven attentional mechanisms to generate striking perceptual effects. Moreover, we establish its broader applicability by demonstrating the significant impact of accentuated stimuli on eye-tracking performance in neurodegenerative patients, highlighting its potential for both theoretical and clinical advancements.

Developing and Testing an AI-based Tool for Acute Ischemic Stroke Detection in Non-enhanced CT (NECT)

Oral

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Objectives*

The aim of this experimental study was to develop and test an AI tool for detecting acute ischemic stroke (AIS) in non-enhanced CT (NECT) scans.

Materials and Methods

To create a reliable AI model, we organized the dataset into three distinct groups:

- **Patients with acute ischemic stroke (AIS)** within 24 hours from symptom onset.
- **Patients with other brain abnormalities.**
- **Patients without pathology.**

Each group consists of 100 head NECT scans. Each scan has manually contoured lesion labels, which were used as ground truth for training.

Results

The trained model was evaluated using an independent test set of 150 NECT scans. The model successfully detected acute stroke signs (either hypodensity or hyperdense artery) in 87.5% of the cases. The model missed hypodense areas in some cases, possibly due to subtle early changes or low contrast between the lesion and surrounding tissue (false negative). The model had a false positive rate of 37%.

Conclusions

The AI tool demonstrated good performance in detecting acute stroke signs at the examination level (87.5% accuracy) but faced challenges at the slice level and segmental level. The false positive rate of 37% is a significant limitation that needs to be addressed.

These results indicate that while the AI tool is promising, further refinements and optimizations are necessary, especially to reduce the false positive rate and improve detection accuracy at the slice and segmental levels. Future work will focus on enhancing the model's precision and sensitivity to ensure it can be reliably used in clinical settings.

From Ultrasound Guided to CT Guided Procedures

Oral

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Objectives*

To evaluate the transition and integration of imaging modalities from ultrasound (US)-guided to computed tomography (CT)-guided procedures, focusing on their respective roles in diagnostic accuracy, procedural success, and patient safety. This study aims to highlight the indications, advantages, limitations, and complementary uses of these techniques in interventional radiology.

Materials and Methods

A retrospective analysis was conducted on interventional radiology cases performed at a tertiary care center over five years. Cases were categorized into two groups based on imaging guidance modality: ultrasound-guided and CT-guided procedures. Data collected included:

- Type of procedures performed (biopsies, drainages, ablations, etc.)
- Patient demographics and clinical indications
- Success rates and complication rates
- Procedure time and radiation exposure (if applicable)

Results

Preliminary findings revealed:

1. Ultrasound-guided procedures were primarily used for superficial and real-time interventions due to their accessibility and lack of ionizing radiation.
2. CT-guided procedures demonstrated superior precision in deep-seated or anatomically complex cases, particularly when real-time visualization was less critical.
3. Procedure times varied significantly based on the modality, with ultrasound being faster on average.

Conclusions

Both ultrasound- and CT-guided interventions are integral to interventional radiology, each excelling under specific clinical conditions.

While ultrasound offers advantages in accessibility and real-time guidance, CT provides unmatched accuracy for complex cases. Optimizing patient outcomes requires careful selection of imaging modality tailored to procedural and anatomical needs.

Further studies could explore hybrid approaches and advanced techniques to integrate these modalities effectively.

Integrative Analysis of Carotid Plaque Instability: Multimodal Ultrasound, CTA, and Histology in Focus

Oral

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Objectives*

Evaluate the effectiveness of contrast enhanced ultrasound (CEUS) in comparison to CT angiography (CTA) and superb microvascular imaging (SMI) for verification of atherosclerotic plaque instability.

Compare obtained multi-parametric data from US and CT with histological results.

Materials and Methods

During the prospective research, 89 patients underwent Doppler ultrasound examination. All consecutive patients with atherosclerotic plaques and stenosis over 50% in the carotid arteries were enrolled for the study following SMI, CEUS and CTA. Plaque instability was assessed using each modality, with particular attention to neovascularization. For surgically treated patients also histological evaluation of the plaque was performed. Neovascularization was classified in three grades (no, Grade 1, Grade 2) after which statistical analysis was performed.

Results

- By performing CTA unstable plaques were found in 22 (24.7 %) patients.
- Using CEUS method neovascularization was detected in 46 (51.7%) plaques, 26 (29.2%) were grade 1 and 20 (22.5%) were grade 2 neovascularized. A statistically significant, strong correlation was found between the CEUS method and the results of histology ($r_s = 0.458$; $p = 0.0001$) CEUS was the most sensitive method for evaluating plaque instability (80.56% sensitivity, 77.78% specificity, accuracy – 79.29%).
- SMI detected fewer neovascularized plaques (23 - 25.8%) compared to CEUS but correlated significantly with CEUS findings ($r_s = 0.669$; $p = 0.0001$).
- CTA correlated with the maximum systolic rate ($r_s = 0.458$, $p = 0.001$) and the diastolic systolic rate at the stenosis site ($r_s = 0.385$, $p = 0.004$).

Conclusions

- CEUS method can show the amount of neovascularization within the plaque, determine vulnerability of the plaque, and has a high level of agreement with histological findings.
- CEUS and SMI have low diagnostic value in cases of calcified plaques.
- CEUS is the most sensitive method for diagnosing neovascularization in an unstable plaque.

Interventions in Kidney: Biopsies and Tumour Focal Ablations

Oral

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Objectives*

To evaluate the role of image-guided kidney interventions, including biopsy, cryoablation, and microwave ablation, in diagnosing and treating renal pathologies. This study aims to analyse procedural success, safety profiles, and clinical outcomes of focal tumour therapy.

Materials and Methods

A retrospective review was performed on patients undergoing kidney biopsy, cryoablation, and microwave ablation at a tertiary care center over a two-year period. Patient demographic data, functional status, tumour location, size, ablation needle count, ablation volume, postoperative complications were retrospectively assessed.

Results

Procedures were conducted under ultrasound or CT guidance. 34 patients prior to percutaneous treatment underwent biopsy, with positive yield of 94,2%.

Percutaneous cryoablation was used in 15 patients and microwave ablation in 1 patient. In all treated patients sufficient ablation safety margin was obtained. Minor complication (e.g. hematuria which does not necessitate surgical or other type of invasive treatment) in 1 patient and no major complications were observed. 12 patients presented for follow-up CT scans showed no viable tumour tissue in ablated kidney.

Conclusions

Image-guided kidney interventions play a pivotal role in diagnosis and minimally invasive treatment. Biopsy provides reliable diagnostic accuracy with minimal risk. Cryoablation and MWA are effective therapies for renal masses, providing efficient radical focal therapy with complication rate not exceeding previously reported in the literature.

Interventions in Liver: Transarterial Chemoembolisation (TACE) and Microwave Ablation (MWA)

Oral

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Objectives*

To analyze and compare the efficacy, safety, and clinical outcomes of Transarterial Chemoembolization (TACE) and Microwave Ablation (MWA) in the management of primary and metastatic liver malignancies. The study focuses on patient selection criteria, procedural techniques, and long-term oncologic outcomes.

Materials and Methods

A retrospective cohort study was conducted on patients undergoing TACE and MWA for liver malignancies at a tertiary care center over a five-year period. Data included:

- Patient demographics, tumor type, and size
- Indications for intervention (e.g., hepatocellular carcinoma, colorectal metastases)
- Technical success rates
- Complication rates (minor and major)

Results

Preliminary results indicated:

1. **TACE:** Effective in controlling tumor progression, particularly in intermediate-stage hepatocellular carcinoma (HCC) patients.
2. **MWA:** Demonstrate local control for smaller tumors (<3 cm).
3. Combination treatments **TACE followed by MWA** could improve outcomes in selected patients.
4. Patient selection based on **tumor burden and liver function** is critical in optimizing outcomes.

Conclusions

Both TACE and MWA are valuable interventions for managing liver malignancies, with complementary roles. TACE is suited for larger or multifocal tumors, while MWA is highly effective for local control in smaller lesions. A multidisciplinary approach, combining the strengths of these modalities, can enhance patient outcomes. Further studies should focus on refining selection criteria and exploring combination therapies to maximize efficacy and safety.

Neurodegenerative Impacts on Different Levels of Cognitive Processing: Evidence from Midlevel Vision and Spatial Cognition

Oral

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Objectives*

Our studies aim at identifying impacts of neurodegenerative impairments at different levels of perceptual and cognitive processing. Our innovation is (a) to complement different formats and speeds of processing, (b) using stimulus-driven perceptual organization tasks requiring no additional effort from patients.

Materials and Methods

A between-group experimental design was applied to neurodegeneratively impaired individuals (n=21, Mean age 56.2 (SD 6.5), Male 42%) and healthy controls (n=21, Mean age 53.0 (SD 7.9), Male 19%). Participants were tested on allocentric and egocentric spatial cognition (mental rotation (Shepard & Metzler, 1988) and perspective taking (Kozhevnikov & Hegarty, 2001)). In mid-level vision, participants were tested on stimulus-driven perceptual grouping, segmentation, and perception of accentuation (Pinna et al., 2018).

Results

In the tasks of spatial cognition and midlevel perception, there are significant impairments in the group of neurodegenerative patients if compared to healthy controls. In the spatial tests, results are better in the control group, however, the effect of gender must be taken into account. Overall results in the eye tracking study: the average number of fixations in the clinical group is smaller than in the control group (in average 29% across all stimuli) and average fixation duration is longer (for accentuated stimuli the average difference across stimuli types is 42% while for non-accentuated stimuli the difference is smaller –13% on average). The maximal, average, and total saccade amplitude and the measurements of saccadic velocity are higher in the control group

Conclusions

According to our results, spatial cognition and mid-level vision are differentially sensitive regarding the neurodegenerative impairments. These findings are crucial for developing non-invasive techniques for early diagnosis of neurodegenerative impairments.

This is the first study showing (a) sensitivity of mid-level processes and (b) interrelations between the mid-level perception and spatial cognition in neurodegenerative impairments.

Bowel Traumatic Injury in Polytrauma Patients CT Scan Comparison with Acute Surgical Findings and Most Likely Complications

Poster

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Objectives*

Compare CT scan findings with acute operative findings to identify common findings and hidden injuries and errors in radiology practice.

Materials and Methods

Polytrauma patients with radiologically confirmed bowel trauma in 2018-2023.

Retrospective analysis of data collected from the CT scan images and acute surgery reports.

Results

Polytrauma patients: 57., out of which 11 acute surgeries were performed due to bowel injury.

CT findings include: focal free fluid (50%), large scale free fluid (27%), focal tissue swelling (27%), thickened bowel wall (16%), hemoperitoneum (10%), focal free air (5%), hyperenhancement bowel wall (4%), hypoenhancement (4%), pneumoperitoneum (4%), visible perforation site (3%), active extravasation (2%), intramural air (2%),

Injury locations: jejunum (19), colon ascendens (8), colon descendens (7), colon sigmoideum (5), colon transversum (5), ileum (4), duodenum (4), ileum (4), caecum (3).

In 4 cases additional findings were noted during surgery: in 2 cases a bowel deserosalization, which was not indistinguishable at CT slides; in 1 case, abscess formation site findings were too dubious in CT slides; and in 1 case, a bowel injury was described in less volume than actual.

In 6 cases, a checkup CT was performed within 2 weeks; complications were found in 2 cases: abscess and ileus.

Pexy type to resection type operation proportion for small bowel injuries 4:3

Pexy type to resection type operation proportion for large bowel injuries 1:4

Conclusions

1. The most common injury sites were jejunum and colon.
2. Colon injuries will more likely result in a wider-scale resection-type operation.
3. Significant bowel injuries rarely occur but could be missed by CT slides, and diagnostic laparoscopy should be used if clinical suspicion arises.

Mesenterial Blood Vessel Traumatic Injury in Polytrauma Patients CT Scan Comparison with Acute Surgical Findings and Most Likely Complications

Poster

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Objectives*

Compare CT scan findings with acute operative findings to identify common findings and hidden injuries and errors in radiology practice.

Materials and Methods

Politrauma patients with radiologically confirmed mesenteric blood vessel trauma from 2017 I-2024 IV. Retrospective analysis of data collected from the CT scan images and acute surgery reports.

Results

Polytrauma patients mesenteric injury: 41 patients.

23 patients had mesenteric vessel trauma in combination with bowel trauma.

CT findings include focal contusion (67%), and focal free fluid (25%). Large scale free fluid (17%), hematoma <5cm (16%), blood extravasation (7%), laceration (7%), hematoma >5 cm (3%).

Due to mesenteric vessel trauma, eight patients experienced various scale bowel ischemization issues; two patients had complete bowel avascularization that was already apparent on CT, and two patients had necrotic small intestine that became apparent during acute surgery.

Eight patients with various scale bowel ischemization: 6 corresponded to the ileum, 1 to the jejunum, and 1 to colon ascendens.

Four patients required acute laparotomy because of severe laceration or extravasation.

Four patients were operated within the timeframe of 3 days.

Only two of the four patients omental fractures were visible on CT scans.

Pexy operation applied on two omental fractures, other two omental fractures were resected.

Seven patients who had a follow-up CT scan within 2 months showed no complications of treated mesenteric trauma.

Conclusions

1. Most direct mesenteric trauma should be visible on CT slides
2. Seldom occurring instances of bowel ischemization brought on by mesenteric trauma that might be noticeable during laparoscopy or as time passes between the CT scan and the acute operation.
3. The ileum was the most frequently affected site of mesenteric bowel ischemia brought on by mesenteric trauma.
4. Mesenterial trauma and omental fractures could lead to internal hernia, further evaluation of patients and prospective evaluation is recommended for further study.

Multiparametric Ultrasound Evaluation of Long-Term Liver Damage in COVID-19

Poster

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Objectives*

To assess long-term changes in liver stiffness and other multiparametric ultrasound (mpUS) markers of liver damage in patients with a history of COVID-19 infection.

Materials and Methods

A cohort of patients with known previous COVID-19 infection of varying degrees of severity underwent two subsequent mpUS scans: first, within a period of 3 to 6 months after COVID-19, and then repeatedly 3 years later. Clinical and biochemical markers of liver damage were correlated with data gathered on mpUS, which included quantitative measurements of liver stiffness, dispersion and hepatic attenuation.

Results

58 patients were included in the study, of which 30 were men and 28 women. The patients' mean age was 46.4 years (\pm SD 12.9). MpUS scans in the 3-to-6-month period revealed increased liver stiffness and steatosis (attenuation) values. Repeated scans in the 3-year follow-up revealed differing paths of progression for parenchymal alterations: the median attenuation values increased from 0.56 to 0.60 dB/cm/MHz ($p < 0.001$) and the mean stiffness values decreased from 5,09 to 4,60 kPa ($p < 0.001$). No significant interval change was observed in hepatic dispersion ($p > 0.05$) and the difference between liver stiffness based on patient characteristics like age and sex was also found to be insignificant ($p > 0.05$).

Conclusions

Long-term mpUS follow-up in patients after COVID-19 infection revealed two differing paths of alterations. An initial increase followed by a subsequent slight decrease of liver stiffness values could be suggestive of a reduction or complete resolution of hepatic inflammation in the early to late post-COVID-19 period. At the same time a concurrent long-term increase in hepatic attenuation could point to initial stages of increased hepatic fat accumulation, although measurements did not reach the diagnostic threshold for hepatic steatosis. The results necessitate further inquiry into the underlying cellular mechanisms of long-term liver injury after COVID-19 and possibly, more broadly, systemic viral infections in general.

Pre-Treatment Predictive Radiological Parameters of Rectal Cancer Response to Neoadjuvant Chemoradiation Therapy

Poster

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Objectives*

Pre-treatment radiological parameters of rectal cancer may serve as prognostic indicators of the expected tumor response to neoadjuvant chemoradiotherapy (nCRT). Magnetic resonance imaging (MRI) plays a crucial role in the evaluation of the primary tumor and in restaging.

Materials and Methods

Patients with morphologically and radiologically verified stage II and III rectal adenocarcinoma who received nCRT followed by radical surgical treatment during the period from 2016 to 2021 at Pauls Stradiņš Clinical University Hospital (Riga, Latvia) were included. A pelvic MRI was performed for pretreatment evaluation and restaging after nCRT. Pretreatment parameters included cT, cN, stage of the disease, tumor circumferential extent (TCE) and length (TL), and distance from the anal verge (DAV). Restaging was conducted according to the mrTRG classification. Post-treatment tumor pathomorphosis was evaluated in formalin-fixed, paraffin-embedded (FFPE) tissue samples according to the Dworak classification. Statistical analysis was performed using MS Office Excel 2010 and EasyMedStat (version 3.38).

Results

A total of 54 patients were involved in the study. Stages included: IIA (n=3), IIB (n=2), IIIA (n=5), IIIB (n=21), and IIIC (n=23). The mean TL was 6.38 cm (SD 3.01), DAV was 6.4 cm (SD 3.47), TCE was 78.74% (SD 22.89). The mean time interval for restaging was 8.24 weeks (SD 1.9). The distribution according to mrTRG: mrTRG1–5; mrTRG2–16; mrTRG3–22; mrTRG4–11; mrTRG5–0. A smaller pre-treatment TCE was associated with a higher probability of achieving a better mrTRG (p=0.011). No statistical significance was found in the relation between mrTRG and pre-treatment stage (p=0.663), cT (p=0.313), cN (p=0.849), DAV (p=0.118), and TL (p=0.05). The mrTRG was found to be compatible with the pathohistological response in surgical specimens (p<0.001).

Conclusions

A smaller pre-treatment TCE of rectal cancer on pelvic MRI is associated with a better mrTRG on restaging. Post-treatment pelvic MRI findings are compatible with the pathohistological response.

Simulation-Based Assessment of Proton Radiography Across Energy Levels: Investigations on Optimum Imaging Energy

Poster

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Objectives*

This study evaluates the feasibility of using high-energy protons, generated by the CERN NIMMS helium synchrotron, to improve PR imaging quality. By testing proton energies from 250 to 700 MeV on anatomical phantoms representing the head and pelvis, we aim to assess improvements in image clarity and dose accuracy.

Materials and Methods

Monte Carlo simulations in Geant4 modeled proton interactions at six energy levels (250–700 MeV). Homogeneous water phantoms representing head (16 cm depth) and pelvis (32 cm depth) regions were used to evaluate spatial and contrast resolution. Spatial resolution was assessed with an aluminum cube, while contrast resolution was analyzed using cylindrical tissue-equivalent materials. Particle characteristics (position, momentum, angle, energy) were recorded for 2D image reconstruction using the Most Likely Path (MLP) formalism.

Results

Simulations showed that high-energy protons (600–700 MeV) enhanced spatial resolution and depth penetration, reducing multiple Coulomb scattering effects. At 16 cm depth, spatial resolution improved by 25% when increasing energy from 330 to 600 MeV. At 32 cm depth, contrast resolution was optimal at 500 MeV, minimizing blurring effects. However, higher energy protons reduced WEPL accuracy due to detector limitations. The 330–500 MeV range provided the best compromise, offering improved resolution and dose efficiency while maintaining manageable energy resolution.

Conclusions

High-energy protons (600–700 MeV) are promising for enhancing PR spatial resolution and depth penetration, but trade-offs in WEPL accuracy limit their application. The optimal energy range for clinical PR lies between 330–500 MeV, providing a balance between spatial resolution, WEPL accuracy, and dose efficiency. Future advancements in detector technology, data filtering, and accelerator integration are critical for addressing current limitations and enabling PR for widespread clinical use. These findings highlight the potential of PR to enhance dose delivery precision in proton therapy.

Ultrasound in Diagnosis of Upper Limb Lymphedema

Poster

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1. Alexander Dubček University

Objectives*

The aim of this poster is to compare the accuracy of diagnostic measurements of upper limb lymphedema in women after breast surgery due to breast cancer. We compared commonly used examination methods in the treatment of upper limb lymphedema with diagnostics using sonography. In sonography, we focused on measuring changes in interstitial tissue and thickening of the skin and soft tissues before treatment, during treatment, and after treatment of lymphedema.

Materials and Methods

Case study. Women diagnosed with lymphedema C50. Measurements were taken at four locations around the shoulder joint, 10 cm above the elbow joint, 10 cm below the elbow joint, and in the area of the metacarpus. We compared numerical measurements using tailor’s measuring with the accuracy of sonography. The study was conducted from June 3, 2024, to July 31, 2024. A total of 5 patients aged between 40 and 71 years were examined. Sonographic examination was performed using the B&C 400 ultrasound device, with a linear probe of 10-18 MHz and a linear probe of 7-12 MHz until 2020, connected to PACS. This marked the first steps in the case study.

Results

The ultrasound examination of the upper limbs revealed that the results are consistent with the circumference of the limb. These measurements are specific, precise, and focused on describing the thickness of the skin and changes in the interstitial tissue. For initial assessment, measuring the circumference of the limb is physically sufficient. However, ultrasound examination accurately captures changes in the tissue and allows for the differentiation of early secondary lymphedema

Conclusions

We recommend including ultrasound examination of the soft tissues, skin, and subcutaneous tissue of the upper limb in the diagnostic methods for lymphedema in women after breast cancer surgery. This approach is quick, accurate, cost-effective, and provides more information than physical measurement of limb circumference. It allows for the identification of lymphedema at an early stage, leading to timely therapy and halting the pathological process of tissue remodeling with appropriate intervention.

Immunology

Early Identification of Immunodeficiencies: Results from the First Year of SCID Screening in Latvia

Oral

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Objectives*

Newborn screening for severe combined immunodeficiency (SCID) was implemented in Latvia on April 1, 2023, to enable early identification and management of immunodeficiency disorders. This study describes the clinical evaluation and diagnostic outcomes of two infants identified through the screening program.

Materials and Methods

SCID newborn screening was performed using T-cell receptor excision circles (TREC) and kappa-deleting recombination excision circles (KREC) measured from dried blood spot (DBS) samples. Infants with abnormal or inconclusive results underwent further testing according to the national screening algorithm. Infants with persistent abnormalities referred for immunological and genetic evaluation.

Results

Out of 20,660 newborns screened, 10 were referred to immunologist for evaluation. 6 had no significant immunological abnormalities, 4 showed changes in the immunophenotyping and thus were referred to geneticist. In 2 kids no pathogenic variants were identified, while two infants were diagnosed with underlying conditions. Case 1: Inconclusive TREC and KREC results were followed by a repeat showing TREC 0.94 (cut-off: 4) and KREC undetectable. The infant, presenting with dysmorphic features - bossed forehead, long fingers, low-set ears, almond-shaped eyes - was diagnosed with Jakobsen syndrome through chromosomal microarray analysis. Case 2: Persistently low TREC levels (0.99; 2.31; 1.99) The infant was referred to an immunologist, and flow cytometry revealed reduced T-cell counts (CD3, CD4, CD8) with normal immunoglobulin levels (IgA, IgM, IgG). Genetic evaluation with a next-generation sequencing (NGS) panel for primary immunodeficiency confirmed a diagnosis of DiGeorge syndrome.

Conclusions

SCID screening in Latvia effectively identified two infants with immunological abnormalities requiring further investigation. These cases underscore the importance of systematic follow-up and interdisciplinary collaboration in early diagnosis and management of rare genetic syndromes.

Comorbidities in Hereditary Angioedema (HAE) Patients in Latvia: Clinical and Epidemiological Assessment

Poster

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Objectives*

Hereditary Angioedema (HAE) is a rare autosomal dominant disorder caused by C1-inhibitor deficiency or dysfunction, leading to recurrent swelling episodes. Comorbidities complicate disease management, potentially exacerbating HAE by triggering more frequent or severe attacks, reducing quality of life, and necessitating multidisciplinary care. This study examines the clinical burden of comorbidities among Latvian HAE patients.

Materials and Methods

12 confirmed Latvian HAE patients were analyzed. Patient records were reviewed to document comorbidities, focusing on cardiovascular, mental health, dermatological, respiratory, and systemic conditions. Mental health assessment was performed using the Generalized Anxiety Disorder-7 (GAD-7) scale.

Results

Among the 12 patients, 2 were asymptomatic cases identified through familial screening, including a child under 1 year of age. Comorbidities were prevalent among symptomatic patients:

- 1. Mental Health Disorders:** Generalized anxiety disorder (GAD) was observed in 3 patients (30%), moderate anxiety in 2 patients (20%), mild anxiety in 5 patients (50%), indicating a significant psychological burden.
- 2. Dermatological Issues:** Psoriasis was reported in 2 patients (20%), suggesting potential immune involvement.
- 3. Respiratory and Systemic Conditions:** Bronchial asthma was observed in 2 patients (20%). Metabolic and gastrointestinal issues, including hypercholesterinemia, gastritis, fatty liver disease, and gastroesophageal reflux, were identified in 1 patient. No allergies were identified, only sensitizations were observed.
- 4. Cardiovascular Conditions:** Arterial hypertension was identified in 1 patient (10%), indicating possible vascular dysregulation.
- 5. Neurological and Musculoskeletal Issues:** Carpal tunnel syndrome and neurological disorders were documented in 1 patient with generalized anxiety disorder, highlighting the multisystem nature of HAE comorbidities.

Conclusions

This study reveals a notable prevalence of comorbidities among Latvian HAE patients, with mental health disorders being most prominent. Cardiovascular conditions and systemic conditions underscore the necessity for a comprehensive, multidisciplinary approach to care. The psychological burden, particularly generalized anxiety disorder, warrants targeted mental health interventions alongside standard HAE management to improve outcomes.

Longitudinal Study of Antibody Dynamics in Healthcare Workers during Successive Periods of SARS-CoV-2 Variant Dominance

Poster

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Objectives*

The aim of this study was to evaluate the dynamics of anti-RBD IgG titers following COVID-19 vaccination during periods characterized by the prevalence of different SARS-CoV-2 variants.

Materials and Methods

The study included healthcare workers who completed primary COVID-19 vaccination series. The primary vaccination series were defined as receiving either two doses of a Pfizer-BioNTech or Moderna mRNA vaccine, one dose of the Janssen vaccine, or having a confirmed case of COVID-19 after receiving a single vaccine dose.

Blood samples for anti-RBD IgG testing were collected every three months. Cases of COVID-19 confirmed by PCR or rapid antigen test were recorded throughout the study.

Distinct periods of SARS-CoV-2 variant dominance in Lithuania were as follows: the Beta variant circulated from October 1, 2020, to July 1, 2021, followed by the Delta variant until December 31, 2021, the Omicron variant until July 31, 2022, and subsequently the Omicron XBB subvariant.

Results

This study included 1778 participants. Mean age of participant was 46.51±12.7 years, with 84.5% of participants being female.

Most COVID-19 cases and the highest anti-RBD IgG levels were observed during the spread of the Omicron XBB variant (20,071.51±13,043.26 AU/mL), significantly higher than during the Omicron (18,458.38±14,556.41 AU/mL), Beta (5,879.57±7,505.74 AU/mL), and Delta (3,990.13±7,644.65 AU/mL) variant periods (p<0.001). Anti-RBD IgG levels during the Omicron variant spread were significantly higher than those observed during the Beta and Delta variant periods. The lowest anti-RBD IgG levels were recorded during the Delta variant period. This trend was consistent among participants regardless of whether they had a history of COVID-19 or reported no prior infection.

Conclusions

These findings highlight the dynamic nature of immune responses during the pandemic, influenced by variant-specific and vaccination factors. Anti-RBD IgG levels were highest during Omicron XBB period and lowest during Delta period, regardless of prior infection, suggesting a distinct immunogenic profile for each variant.

Serum B-cell Activating Factor (BAFF) Levels are Unrelated to SARS-CoV-2-Specific T cell and Spike-Specific Antibody Responses

Poster

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Objectives*

Predominantly antibody deficiencies (PADs) are inborn disorders marked by immune dysregulation and increased infection susceptibility. Genetic defects in TNF receptor pathways, including B-cell Activating Factor (BAFF) receptors, are linked to impaired vaccine responses. BAFF reflects B-cell activity and immune regulation. This study explored the relationship between serum BAFF levels and SARS-CoV-2 spike-specific immune responses in PAD patients.

Materials and Methods

The study included 31 PAD patients (16 with common variable immunodeficiency (CVID) and 15 with selective IgA deficiency (SIgAD)) and 15 controls. Serum BAFF levels, total immunoglobulins, spike-specific antibodies, and cellular responses were measured via ELISA. Spike-specific T-cell responses were assessed using interferon-gamma release assays, and lymphocyte subsets were analyzed via flow cytometry.

Results

CVID patients exhibited higher BAFF levels (1226.5 pg/ml [IQR=814]) compared to controls (916 pg/ml [IQR=343]) or SIgAD patients (876 pg/ml [IQR=301], $p=0.041$). BAFF levels negatively correlated with total IgG ($rs=-0.396$, $p=0.028$), IgM ($rs=-0.536$, $p=0.002$), switched memory B cells ($rs=-0.475$, $p=0.007$), and IgM-only memory B cells ($rs=-0.368$, $p=0.042$), but not with spike-specific IgG ($p=0.833$). In T-cell subsets, BAFF correlated negatively with total CD4+ cells ($rs=-0.493$, $p=0.005$) and naïve CD4+ cells ($rs=-0.519$, $p=0.003$) but positively with terminally differentiated CD4+ cells ($rs=0.384$, $p=0.033$) and effector memory CD8+ cells ($rs=0.488$, $p=0.006$). BAFF levels were unrelated to spike-specific T-cell responses ($p=0.960$). Clinically, serum BAFF levels were higher in patients with lymphadenopathy (1490 pg/ml [IQR=1311] vs. 920 pg/ml [IQR=416], $p=0.022$) and splenomegaly (1567 pg/ml [IQR=2025] vs. 910 pg/ml [IQR=381], $p=0.004$) compared with those without these conditions.

Conclusions

While serum BAFF levels were not associated with SARS-CoV-2-specific responses, they correlated with immunoglobulin levels, memory B cells, and certain T-cell subsets. Additionally, elevated BAFF levels were associated with clinical features of benign polyclonal lymphoproliferation, highlighting BAFF as an important biomarker of B-cell proliferation and chronic inflammation.

Infections in the Development of Non-Communicable Diseases

Connection between Autoimmune Hepatitis and the Microbiome

Oral

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Objectives*

Autoimmune hepatitis (AIH) is a severe disease, AIH incidence and prevalence have increased. This literature review focuses on available information about the role of microbiome involvement and potential treatment of AIH.

Materials and Methods

Databases used: Scopus, Pubmed, Cochrane library. Overall >150 relevant research publications were identified by using keywords “autoimmune hepatitis” and “microbiome”, from those 33 were included.

Results

In AIH oral and faecal microbiota diversity significantly differed from healthy controls in multiple studies. Studies show mixed results, however propose enrichment of *Veillonella*, *Streptococcus*, *Akkermansia*, *Faecalibacterium*, *Lactobacillus*, (LPS)-bearing Gram-negative bacteria and connect *Enterococcus gallinarum* as some of the bacteria that are negatively associated with AIH.

Bacteria considered to have positive or protective effect in AIH was *Bifidobacterium*, *Bacteroides acidifaciens*, and other butyrate-producing bacteria.

As liver protective substances and interventions- synbiotic (*L. acidophilus*, *B. Infantis* + konjac glucomannan oligosaccharides (KGMO)), RIP3 kinase inhibitor (GSK872), faecal microbiota transplantation and probiotics were showing promising results.

Increased intestinal permeability, disturbance of the microbiome (mostly reduced diversity and total load of gut bacteria, expansion of potential pathobionts, decrease of SCFA-producing microbiota), bacterial or lipopolysaccharide translocation, antibiotic use in past 12 months, aberrant selection of T cells in the thymus, dextran sulfate sodium salt administration, TLR4/NF-κB and NLRP3/Caspase-1 signaling pathway and RIP3 activation were associated or seemed to promote liver injury in AIH.

Conclusions

Gut microbiota may contribute to, but seems isn't sufficient for AIH development. Faecal microbiota transplantation and probiotics are associated positively with AIH and could be a potential therapy adjunctive. Microbiota-targeted oral and faecal biomarkers could serve as diagnostic tools for AIH. Oral and faecal microbiome is a broad research field and more research is needed to understand its significance in autoimmune hepatitis.

Dynamics of Liver Injury in the post-COVID Period

Oral

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Objectives*

Based on our study in the frame of the State Research Program on COVID-19 (2020 year), more than half of hospitalized patients with the first COVID-19 episode had a hepatocellular liver injury and increased serum liver fibrosis marker as hyaluronic acid (HA), hepatocyte apoptosis marker as cytokeratin 18 M30 fragment (CK18-M30) and liver fibrosis index (FIB-4). This study aimed to assess liver injury during 18-36-month follow-up.

Materials and Methods

The longitudinal study included 72 patients (mean age was 54 ± 14 years, females were 54%) from the previous cohort (September-December 2020). According to the WHO classification, 28% of patients had severe and critical COVID-19. Liver injury was defined as an increase in liver enzymes more than two times. HA and CK18-M30 were measured in serum by ELISA, and FIB-4 was calculated.

Results

Twenty-eight (40%) patients had liver injury in acute COVID-19. ALT, GGT, LDH, bilirubin levels, apoptosis, and fibrosis markers decreased during follow-up. However, signs of liver injury persisted in eight out of these patients after 18-36 months. In turn, two out of 42 patients who did not have liver injury during hospitalization started to have signs of it. A recovery trend without excluding the possibility of liver tests worsening was confirmed by McNemar's test, $\chi^2(1) = 14.73$, $p < 0.001$. During follow-up, 30% of patients had reinfection without hospitalization.

Conclusions

Liver injury in the first COVID-19 was reversible with a tendency for recovery, regardless of reinfection. However, liver injury persisted in some patients or developed due to other factors during 18-36 months after the first COVID-19.

EBV Infection Affects Immune Cell Mobility in Treatment-Naive Patients with Chronic Lymphocytic Leukemia

Oral

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Objectives*

Immune dysregulation, including autoimmune complications, is common in chronic lymphocytic leukemia (CLL). EBV is a widespread human herpesvirus, nonetheless, is associated with a number of autoimmune diseases. High EBV DNA loads in peripheral blood (PB) of CLL patients were associated with poor overall survival in several reports. The aim of this work was to assess, in treatment-naïve CLL patients, the cell-surface expression of the negative prognostic marker CD38 and the inflammatory chemokine receptors CCR1 and CCR2 in PBMC subsets in association with the EBV DNA loads and presentation of anemia and/or thrombocytopenia.

Materials and Methods

Expression of the cell-surface markers in PBMC subsets was analyzed using multi-parameter flow cytometry. EBV DNA viral loads in PBMCs were determined using commercial quantitative PCR kit. The Mann–Whitney U test and the Student's t-test were applied. The study was funded by the projects: LZP No.lzp-2018/1-0156 and RSU No.6-ZD-22/14/2022.

Results

EBV DNA has been detected in 21 (38.2%) out of the 55 patients. We have found that in the EBV-positive (≥ 5 copies/ 10^5 PBMCs) patients, the proportions of the CCR2-expressing monocytes and CD19-negative (designated as T/NK) lymphocytes were significantly decreased compare to the EBV-negative (< 5 copies/ 10^5 PBMCs) patients. Clinical examination has defined anemia and/or thrombocytopenia (A/TCP) in 13 patients: 6 in the EBV-negative group and 7 in the EBV-positive group. T-test showed significant decrease of the percentages of the CCR2-expressing monocytes and CD19⁺CD5⁻ lymphocytes in the EBV-positive A/TCP patients compared to the EBV-negative A/TCP patients.

Conclusions

Chemokine receptors and corresponding chemokines constitute an important network that regulates migration of immune cells. Expression of CCR2 on immune cells promotes migration of these cells. Impaired immune cell mobility in CLL patients with the detectable EBV DNA obviously contributes to progression of the disease. Detection of CCR2 on PBMCs can be suggested for CLL prognosis, thus ensuring individual treatment selection.

Hepatobiliary Inflammation in Patients Having History of COVID-19

Oral

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Objectives*

During the Covid-19 pandemics, biochemical features of hepatocellular damage were reported in Covid-19 patients. The pathogenesis of these changes remained unclear, hypothetically including viral replication in liver cells, hypoxia-induced damage, immune-mediated injury or side effects of intense treatment (Aloisio et al., 2021). Certain hepatic viral infections have high potential to transform into a chronic active disease, and Covid-19 is known to have the capacity to induce prolonged health deterioration (Zeuzem et al., 2024). Thus, it is mandatory to assess the long-term hepatobiliary sequelae of Covid-19.

Materials and Methods

The study was performed within the frames of innovative multidisciplinary project “SARS-CoV-2 and Covid-19 contexts for hepatobiliary system pathologies, their histological, biochemical, radiological and clinical characteristics and prevention options for these pathologies” (Izp-2021/1-0442) as a prospective morphological and immunohistochemical evaluation of liver tissues and biliary ways in the enrolled patients.

Results

Both in patients who have been affected by Covid-19 (32) and in control group (29), the studied liver tissues frequently showed mild to moderate polyclonal chronic inflammation with periportal activity in a fraction of patients, as reflected by hepatic activity index according to Knodell score. Thus, moderate (score 3 of 4) portal inflammation was observed in 37.5% of patients having history of Covid-19, contrasting with 14.3% of control cases ($p>0.05$). Moderate (<50%) periportal inflammation was present in 25.0% and 7.2% of cases, respectively. Liver steatosis was observed in both groups (31.3% vs 34.5%; $p>0.05$), but remained mild (<25%). Morphological signs of cholestasis showed strong correlation with complicated gallstone disease. Signs of hepatocyte regeneration were more frequent and extensive in patients having history of Covid-19; occasionally, foci of regenerating hepatocytes were observed. In the study group, these foci were not associated with presence of CD68+ or CD163+ macrophages or any other inflammatory infiltrate.

Conclusions

History of Covid-19 is not associated with statistically significantly more extensive inflammation in liver tissues or biliary ways. However, signs of hepatocyte regeneration are present.

Myalgic Encephalomyelitis / Chronic Fatigue Syndrome (ME/CFS) and Long COVID: Shared Challenges and Opportunities in Chronic Disease Management

Oral

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1. Rīga Stradiņš University

Objectives*

Objectives. Chronic non-communicable diseases (NCDs) represent an increasing global burden, projected to account for 86% of all annual deaths by 2050. Myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS) and post-COVID-19 condition (long COVID) exemplify under-recognized, NCDs-related, high-burden chronic conditions that share overlapping symptoms and pathophysiological mechanisms. This scoping review aims to examine the epidemiological, biomedical, and socio-economic dimensions of ME/CFS and long COVID, with a focus on identifying challenges and opportunities for advancing research, prevention, and care.

Materials and Methods

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) guidelines, systematically identifying studies from databases, grey literature, and key policy reports. Inclusion criteria focused on epidemiological data, patho-physiological insights, and socio-economic impacts of ME/CFS and long COVID. Studies on common mechanisms, such as immune dysfunction, mitochondrial abnormalities, and autoimmunity, were emphasized. Additionally, integrative care models and social determinants of health were reviewed to map potential solutions.

Results

Results. ME/CFS and long COVID share significant symptom overlap, including chronic fatigue, post-exertional malaise, cognitive impairment, and autonomic dysfunction. Pathophysiological mechanisms involve immune dysregulation, mitochondrial dysfunction, and possible autoimmunity driven by molecular mimicry. Despite promising studies, research remains fragmented, and coordinated efforts are lacking. Socio-economic analysis reveals a substantial global economic burden, with long COVID alone contributing nearly one trillion USA dollars annually. Stigma and insufficient awareness exacerbate patients' challenges, highlighting the need for improved education and integrative care approaches.

Conclusions

Conclusions. ME/CFS and long COVID exemplify emerging challenges in chronic disease management, underscoring the urgency for interdisciplinary research and patient-centered care. Addressing shared pathophysiological mechanisms could pave the way for targeted therapies, while integrative care models and robust epidemiological studies are essential for mitigating societal and economic impacts. Coordinated global efforts are crucial to advancing the understanding, prevention, and management of these debilitating conditions. Project No. LZP-2024/1-0343

Evaluation of Hepatobiliary Microcirculation and Fibrosis in Patients Having History of COVID-19

Poster

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Objectives*

The global outbreak of coronavirus disease 2019 (COVID-19), triggered by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), caused one of the deadliest pandemics in the recent history, claiming more than seven million lives. The virus targets angiotensin-converting enzyme 2 receptor that is expressed on pulmonary alveolar epithelium (type 2), as well as on endothelium (Six et al., 2022). Thus, acute respiratory distress syndrome with widespread pulmonary microvascular thrombosis is among the best-known manifestations of severe COVID-19 (Viksne et al., 2022). However, the ongoing research on COVID-19 pathogenesis has highlighted even higher importance of the endothelial damage, resulting in the concept of immunothrombosis (Avdonin et al., 2024). In this report, we focused on vascular and fibrotic changes in hepatobiliary tissues of patients having history of COVID-19.

Materials and Methods

The study was performed within the frames of innovative multidisciplinary project “SARS-CoV-2 and COVID-19 contexts for hepatobiliary system pathologies, their histological, biochemical, radiological and clinical characteristics and prevention options for these pathologies” (Izp-2021/1-0442) as a prospective morphological (visualisation by haematoxylin-eosin and Masson’s trichrome stains) and immunohistochemical (CD31) evaluation of hepatobiliary tissues in the enrolled patients (61).

Results

The liver sinusoids, portal arterioles, portal and central venules as well as the blood vessels of extrahepatic biliary ducts lacked morphological signs of microvascular thrombosis or organised mural or occlusive thrombi/thrombemboli. Endothelial swelling was limited to areas of acute inflammation, caused by complicated gallstone disease. Signs of hepatocyte regeneration were more frequent and extensive in patients having history of COVID-19; occasionally, foci of regenerating hepatocytes were observed. There was no evidence of bridging fibrosis (fibrosis score 3 of 4 by hepatitis activity index (HAI) according to Knodell’s score) or liver cirrhosis (HAI fibrosis score 4). Focal fibrosis was observed in correlation to complicated gallstone disease. The fibrotic foci lacked colocalisation with groups of regenerative hepatocytes.

Conclusions

In the current study, we did not find significant long-term vascular or fibrotic pathological changes in the hepatobiliary tissues of patients, having history of COVID-19. However, focal regenerative changes in hepatocytes indicate active repairment.

Infertility

Biochemical Correlation between Inhibin B and FSH in Spermatogenesis: Mechanisms, Pathways, and Regulatory Interactions

Oral

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1. Faculty of Medicine, student, Nicolae Testemițanu State University of Medicine and Pharmacy, 2. Nicolae Testemițanu State University of Medicine and Pharmacy

Objectives*

To analyze the biochemical interplay between Inhibin B and Follicle-Stimulating Hormone (FSH) in spermatogenesis, emphasizing their molecular mechanisms, feedback regulation, and roles in maintaining testicular homeostasis.

Materials and Methods

A comprehensive review of literature from PubMed and ScienceDirect was conducted, focusing on the pathways through which FSH and Inhibin B regulate spermatogenesis. Key topics included FSH signaling at the Sertoli cell level, Inhibin B synthesis/secretion, and its negative feedback on pituitary FSH production.

Results

Spermatogenesis is governed by the precise interaction of FSH and Inhibin B. FSH, secreted by the anterior pituitary, activates Sertoli cells via FSH-specific receptors, initiating the cAMP/PKA signaling pathway. This cascade promotes transcription of genes essential for Androgen-Binding Protein (ABP) production, IGF-1 synthesis, and germ cell survival. Sertoli cells respond to FSH by secreting Inhibin B, a dimeric glycoprotein that suppresses pituitary FSH synthesis, maintaining optimal testicular conditions for germ cell development. Disruptions in this feedback loop, such as low Inhibin B with elevated FSH, are linked to non-obstructive azoospermia, whereas normal Inhibin B with high FSH suggests obstructive azoospermia. Inhibin B also exhibits paracrine effects, supporting germ cell maturation, apoptosis regulation, and testicular microenvironment stability.

Conclusions

The FSH-Inhibin B axis represents a cornerstone of spermatogenesis regulation. FSH stimulates Sertoli cells, fostering a favorable environment for germ cells, while Inhibin B ensures hormonal balance via negative feedback. These mechanisms elucidate key biochemical networks underlying male fertility, offering insights for future research and therapeutic interventions.

Authors: Briceag Maria (student), Ecaterina Pavlovschi (PhD, associate professor)

Intensive Care and Anesthesiology

Anterior Quadratus Lumborum Block for Postoperative Pain Management in Colorectal Surgery: Case Series

Poster

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Objectives*

Colorectal surgery is associated with significant postoperative pain affecting recovery and patient satisfaction. While thoracic epidural analgesia (TEA) remains the gold standard for pain management, peripheral regional anaesthesia techniques like anterior quadratus lumborum block (QLB-A) may offer effective analgesia with fewer complications. Currently, data on QLB-A use in colorectal surgeries is limited.

Materials and Methods

We present a case series of six patients (ASA I-III) undergoing colorectal surgery with bilateral QLB-A for postoperative pain management. All patients received Sol.Bupivacaine 0.3%-25ml per side combined with general anaesthesia and standard multimodal analgesia(MMA) including Paracetamol 1gx4 and Dexketoprofenum 50mg x2 intravenously. Light opioid Pethidin parallelly to MMA was used if pain intensity was NRS > 5. Pain was assessed using Numeric Rating scale (NRS 0-10) and opioid consumption was monitored for the first 24 hours postoperatively.

Results

The series included three laparotomies (LT) and three laparoscopic (LPS) surgeries. Three patients (64 y. male , with LPS sigmoid resection, 45 y., and 75 y. female with LPS right hemicolectomy required no opioids, maintaining NRS scale ≤ 3 with MMA only. Two patients (53 y. , female with LT small bowel surgery and 65 y. male, with LT right hemicolectomy) required minimal opioid supplementation (100 mg per 24 h pethidine) while maintaining NRS≤ 3. One patient undergoing LPS rectal surgery required 200 mg per 24 h pethidine with a maximum NRS of 6.

Conclusions

This case series demonstrated that bilateral QLB-A, combined with MMA, may provide effective postoperative pain control in colorectal surgeries LPS and LT approaches and may offer an alternative to EA. Most patients (5/6) maintained low pain scores with minimal or no opioid requirements. Further prospective studies are warranted to validate these findings and to establish the role of QLB-A in improved recovery protocols for colorectal surgery comparing with EA.

Choice of Tactics in Airway Management for Otorhinolaryngology-Oncological Patients: Three-Case Series Analysis

Poster

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1. Rīga Stradiņš University; Riga East University Hospital

Objectives*

To present the diversity of tactics and their justification for managing difficult airways in three series of ORL cases.

Materials and Methods

Three predictable difficult airway ORL cases were retrospectively selected in a randomized manner, from 2024, at RAKUS, LOC. The choice of tactics was based on the following criteria: patient physique, extent and localization of the oncological process, surgical requirements and indications. The analysis focused on: the justification for the tactics, signs of a difficult airway (Mallampati (M), mouth opening, tracheal deviation, adiposity), the volume of surgery, and the benefits and drawbacks of the methods.

Results

Three planned patients. No. 1: Unspecified cervical lymphadenopathy - awake laryngeal mask (LM) placement. No. 2: Laryngeal cancer with increasing dyspnea, hoarseness - awake tracheal intubation (TI). No.3: Laryngeal cancer - awake tracheal intubation with fiberoptic intubation (FOI). Tactic choice: No.1: Due to lymphadenopathy, mouth opening < 3.5 cm, M-2, adiposity III (BMI 44.4 kg/m²). High risk of inability to ventilate, perform laryngoscopy, and intubate. Surgical volume: biopsy. Tactic: awake placement of a 3rd size LM, if good seal and ventilation, perform induction anesthesia and be ready to intubate through the LM. No.2: M-2, tumor covering the vocal cords. Surgical volume: laryngeal tissue biopsy and tracheostomy. Tactic: awake TI with a 6.5 mm tube. No. 3: The patient is thin, with narrow airways, M-3, laryngeal tumor displaces the trachea to the right, covering the vocal cords. Surgical volume: laryngeal tissue biopsy and tracheostomy. Tactic: TI with FOI. Airway management was successfully achieved for all patients. No significant hemodynamic or oxygenation fluctuations were observed. SpO₂ after airway management: 96%, 100%, and 100%.

Conclusions

The choice of tactics for managing difficult airways requires an individualized approach, considering signs of difficult airways, the spread of oncology and its impact on the airways, as well as the volume and indications for surgery.

Clinical case “Possible Complications and Techniques of Anesthesia During Thyroid Tumour Resection with Tracheal Deviation and Main Vessels Compression”

Poster

***Ms. Ekaterina Zhuravleva*¹, *Prof. Agnese Ozoliņa*², *Dr. Jānis Verners Birnbaums*³, *Dr. Sergejs Grigorjevs*⁴**

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Objectives*

The aim is to demonstrate anesthesia considerations regarding medication choice, intubation technique and preparation for possible emergency outcomes in patient with malignant nontoxic thyroid tumor resection and tracheal & esophageal deviation, a.carotis & v.jugularis compression.

Case presentation

Women, 72 years, presenting with 2nd stage controlled arterial hypertension, obesity 2nd stage (BMI 37.8). Three months history of hoarseness, dyspnea, progressing dry cough. Thyroid gland US and CT were performed. Diagnosis: intrathoracic multiple nontoxic nodules in goiter stage 3 with tracheal and esophageal deviation, both main bronchi and a.carotis & v.jugularis on the left side compressions. Subacute hyperthyroidism, TIRADS 4A, Bethesda 3.

Based on imaging, tumor location was expected to be retrosternal, requiring sternotomy, and extremely close to large vessels. Therefore, operation team included thoracic and vascular surgeons as well.

Anesthesia considerations: ASA 4. General anesthesia with awake intubation using flexible bronchoscope due to potential difficult airway (Mallampati III, airway compression, short & thick neck, OSA), central venous catheter (femoral vein), arterial catheter (radial artery) . During intubation: Midazolam 1mg i/v , Remifentanyl (1mg/50ml) - 0.2 mg/h i/v and topical lidocaine spray ~30mg , after intubation: Propofol 200mg i/v and Mivacurium 14mg, maintenance: inhalation of Sevoflurane (MAC 0.8 to 1.2) and i/v Remifentanyl 0.4 mg/h, during anesthesia: i/v Ephedrine 20 mg and Norepinephrine 0.03–0.08 mcg/kg/min, Dexamethasone 8mg i/v, Metaclopramide 10mg i/v, Dexketoprofen 50mg i/v. Intraoperative nerve monitoring was applied to avoid *N.laryngeus recurrens* damage. For postoperative analgesia superficial parasternal intercostal plane block was the primary choice. But ability to use collar (Kocher) incision technique helped to avoid sternotomy, so regional anesthesia was not necessary. Sedoanalgesia was prolonged till the next day to avoid tracheomalacia complications in the ICU.

Conclusion

Surgery was successfully performed without experiencing emergency outcomes due to multidisciplinary team approach and precise preparation in preoperative setting.

Clinical Efficacy of the Oxiris® Membrane in Patients with Refractory Septic Shock: Comparison between Isolated Hemadsorption and Continuous Veno-Venous Hemofiltration Modalities

Poster

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Objectives*

Sepsis is a life-threatening condition caused by a dysregulated host response to infection leading to organ dysfunction. To lower the toxic threshold of cytokines and endotoxin, a hemadsorption device such as Oxiris® is used as adjuvant therapy for sepsis. In this study, we compared two hemadsorption treatment modalities – novel isolated hemadsorption (HA) modality and conventional continuous veno-venous hemofiltration (CVVH) modality.

Materials and Methods

This prospective observational study included patients with refractory gram-negative septic shock treated with Oxiris® membrane at Pauls Stradiņš Clinical University hospital intensive care unit (ICU) during 2022-2024. Norepinephrine (NE) dose, serum lactate level, vital signs and endotoxin concentrations were analyzed prior to treatment and 12 hours after Oxiris® treatment. Additionally, the expenses, mortality and ICU-days of two treatment modalities were compared.

Results

Seven patients were enrolled in our study. Three received HA modality and four patients received CVVH (mean age 62 years and 64 years, mean SOFA score 6 and 10, mean basal endotoxin concentration 1.18EU/mL and 0.79EU/mL, respectively). Mean ICU days in the HA group was 13.3 and CVVH group – 16.5. In HA group endotoxin concentration reduced by 12% (from 1.18 EU/mL to 1.04 EU/mL) and NE support by 46% (from 0.6 µg/kg/min to 0.32 µg/kg/min), while in CVVH group endotoxin increased by 28% (from 0.79 EU/mL to 1.00 EU/mL), although NE support was reduced by 26% (from 0.36 µg/kg/min to 0.27 µg/kg/min). Lactate levels decreased by less than 2% in both groups. No death occurred in either group during ICU stay. Comparing 12-hour expenses, the HA method was 37% cheaper.

Conclusions

The results of our study show that novel HA modality has a positive clinical effect in reducing endotoxin and NE and lower costs compared to the conventional CVVH modality. However, further studies should be conducted to evaluate further differences and outcomes between these methods.

Continuous Renal Replacement Therapy (CRRT) with Cytosorb in Rhabdomyolysis Syndrome: Case Report

Poster

***Mr. Vasile Vlad*¹, *Dr. Viorica Cospormac*¹, *Dr. Corina Gutium*¹, *Dr. Octavian Calancea*¹, *Dr. Olga Cernei*¹, *Mrs. Mihaela Coşpormac*¹, *Mr. Dumitru Coniuc*¹**

1. Nicolae Testemiţanu State University of Medicine and Pharmacy

Objectives*

Rhabdomyolysis is a clinical syndrome characterized by skeletal muscle necrosis, associated with the release of myoglobin and creatine kinase into the bloodstream triggered by muscle injuries. The clinical course can vary from mild forms to severe complications such as multi-organ failure, electrolyte imbalances, acute renal failure, acute respiratory distress syndrome, disseminated intravascular coagulation.

A 19-year-old female patient, diagnosed with leptospirosis, presented with severe thigh pain, morbilliform rash, asthenia, and brown urine following intense physical exertion. Upon admission, her general condition was serious, determined by multiple organ dysfunction: acute hepatic dysfunction with cytolysis syndrome (AlAt 335mmol/l, AsAt 1216 mmol/l), acute renal failure (anuria, creatinine 1103 µmol/l, urea 288 mmol/l, hyperkalemia 5.8 mmol/l), acute respiratory failure (hypervolemic pulmonary hila on chest radiography) against a background of leptospirosis with rhabdomyolysis (myoglobin 1000ng/ml, creatine kinase 10682 U/l). Estimated mortality: SAPS II 68.1%, APACHE II 49.7%, SOFA 50%. Intensive polymodal therapy was initiated with hemodialysis, followed by continuous veno-venous hemodiafiltration (CRRT) and the application CytoSorb device for 48 hours. After treatment, creatinine decreased to 196 µmol/l, myoglobin to 112 ng/ml, creatine kinase to 324 U/l. The first 250 ml of urine appeared. Six days after initiating CRRT, the patient entered into polyuria (diuresis+ultrafiltrate 5500 ml). On the 7th day, CRRT was discontinued (diuresis 1700 ml). The clinical condition continuously improved, and on the 9th day, she was transferred to the ward. After 20 days of hospitalization, the patient was discharged (normal diuresis, creatinine 113 µmol/l, urea 6 mmol/l, potassium 3.9 mmol/l, creatine kinase 52.4 U/l, myoglobin 70 ng/l, AlAt 37 mmol/l, AsAt 18 mmol/l), under the supervision of her family doctor.

CRRT is effective in stabilizing the patient, eliminating myoglobin, and restoring homeostasis. The early use of the CytoSorb device represents a promising option in managing acute renal failure associated with rhabdomyolysis.

Effect of Type of Anaesthesia on Pain, Mental Status and Patient Satisfaction after Elective Total Hip Replacement Surgeries

Poster

Dr. Linda Strēlniece¹, Prof. Agnese Ozoliņa¹

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Objectives*

This study analyses how different anaesthesia types affect postoperative pain, mental status, and patient satisfaction following elective THR.

Materials and Methods

Prospective study examined 32 elective THR patients in 2024 (Ethical Nr. 2-PĒK-4/83/2023). Anaesthesia types included General Anaesthesia (GA, 28.1%), GA with Peripheral Nerve Block (PNB, 43.8%), Spinal Anaesthesia (SA, 18.8%), and SA with PNB (9.4%). PNB utilized either the Fascia Iliaca Block (FIB) or Pericapsular Nerve group (PENG). Pain was measured with Visual Analogue Scale (VAS) at 1, 6, 12, 24 hours post-surgery, identifying rebound pain (VAS >7). All patients received standard analgesia. Mental status was evaluated using the Modified Mini-Mental State (MMS) exam at 6 hours, and satisfaction was gauged through questionnaire. Data were analysed with IBM SPSS ($p < 0.05$).

Results

The study involved 15 females and 17 males (age: 67 ± 11 years, ASA: 2 ± 0.5). Rebound pain appeared in GA and SA patients (33% each), less in GA+PNB (21%) and absent in SA+PNB. At 1-hour, lowest pain scores were in SA+PNB: 0.3 ± 0.6 and SA: 1.0 ± 2 , then GA + PNB: 2.7 ± 3 ; GA: 4.9 ± 2.4 ($p < 0.003$). After 6 and 12 hours, SA+PNB demonstrated lower pain scores, $p < 0.3$; $p < 0.2$. Pain scores 24 hours after THR were similar across anaesthesia types, with averages: GA 3.3, GA+PNB 2.5, SA 2.7, SA+PNB 2. PENG block yielded better analgesia vs FIB (1.3 ± 0.4 vs. 2.6 ± 2.3 , $p < 0.005$). The highest MMS score was in SA: 30; $p < 0.002$ compared to GA: 27.4 ± 0.7 and GA + PNB: 28 ± 2 . In SA group 83.3% were fully satisfied, while 57.1% in GA+PNB; $p < 0.4$.

Conclusions

SA and SA+PNB provided better analgesia in the first 12 hours post-surgery. PNB in both SA and GA groups, especially with PENG block, reduced pain further. Patients undergoing SA had higher mental status scores and satisfaction rates.

Evaluation of Risk Factors for Development of Myopathy in Mechanically Ventilated Critically Ill Patients: Pilot Study

Poster

Dr. Iuliana Feghiu¹, Dr. Emilia Surugiu¹, Dr. Viorica Cospormac¹, Dr. Olga Cernei¹, Prof. Victor Cojocaru¹, Mrs. Mihaela Cospormac¹, Dr. Doriana Cojocaru¹

1. Nicolae Testemițanu State University of Medicine and Pharmacy

Objectives*

Critical Illness Myopathy (CIM) is associated with a poor prognosis and increased mortality. We evaluate risk factors for CIM in mechanically ventilated patients.

Materials and Methods

Retrospective study. Evaluated clinical and laboratory data from 136 medical records of patients in ICUs mechanically ventilated for more than 5 days who developed CIM in 2023. Assessed: procalcitonin level (PCT), C-reactive protein (CRP) level, blood glucose and use of non-depolarizing muscle relaxants. Statistical analysis performed with the statistical program GraphPad Prism 8.0. To assess the relative risk (RR), sensitivity (Sn), specificity (Sp) and positive predictive value (PPV) was performed Fisher's exact test. Statistical data are presented as mean with 95% confidence interval (95% CI).

Results

CIM was detected in 34 (25%) patients. Of them, 20 (58.82%) women and 14 (41.18%) men. Statistical analysis revealed a high sensitivity but low specificity for the risk of CIM correlated with increased PCT (RR 1.94 (95%CI 0.82 -5.07), Sn -0.88 (95%CI 0.73 – 0.93) and Sp 0.23 (95%CI 0.16 – 0.32) (p=0.2)) and CRP (RR 2.7 (95%CI 0.87 -1.01), Sn -0.94 (95%CI 0.80 – 0.98) and Sp 0.17 (95%CI 0.11 – 0.26) (p=0.15). More specific for CIM have proven to be blood glucose levels and administration of non-depolarizing muscle relaxants. Correlation for blood glucose was: RR 1.5 (95%CI 1.2 -1.9), Sn -0.30 (95%CI 0.22 – 0.40) and Sp 0.90 (95%CI 0.81 – 0.95) (p=0.0016). For use of non-depolarizing muscle relaxants: (RR 5.1 (95%CI 2.6 -9.9), Sn - 0.73 (95%CI 0.56 – 0.85) and Sp 0.77 (95%CI 0.68 – 0.84) (p=0.0001)). High PPV for developing CIM correlated with hyperglycemia (PPV of 0.82 (95% CI 0.66 – 0.92) and non-depolarizing muscle relaxants (PPV of 0.52 (95% CI 0.38 – 0.65).

Conclusions

The highest risk for CIM is hyperglycemia and the use of non-depolarizing muscle relaxants. Both criteria are with a high specificity and PPV.

Impact of Transversus Abdominis Plane Block on Postoperative Analgesia in Ileostomy Closure Surgery: Prospective Cohort Study

Poster

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Objectives*

Regional anaesthesia techniques, like a *transversus abdominis plane* (TAP) block, aim to reduce opioid usage, but evidence of their effectiveness after ileostomy closure surgery is still developing. This study, therefore, assesses the TAP block's impact on opioid consumption and patient satisfaction after these surgeries.

Materials and Methods

This prospective cohort study involved 42 ASA I-III patients, with an average age of 59.57 years (95% CI=55.66-63.48), including 20 females (47.62%) who underwent ileostomy closure surgery under general anaesthesia in 2023–2024. Patients were randomly assigned to either a TAP block (n=20) or a control group (n=22). We administered the TAP block post-surgery via a lateral approach using 30 ml of 0.25% bupivacaine and 8 mg of dexamethasone intravenously. All patients received standard multimodal analgesia with NSAIDs, paracetamol, metamizole, and opioids as required (NRS>6). We evaluated postoperative pain and satisfaction with analgesia via a modified American Pain Society Patient Outcome Questionnaire (0-10 scale) 24 hours post-surgery, using descriptive statistics, chi-squared, and independent samples t-tests in SPSS Statistics 27.0.1.0.

Results

During the first 24 hours, the TAP group experienced 49.3% lower average pain intensity than the control group (mean: 2.35 vs 4.64; p<0.001). The TAP group also required opioids 83.9% less (mean: 0.30 vs 1.86; p<0.001) frequently ($\chi^2=30.240$; p<0.001). Additionally, they had 57.5% fewer pain-related activity limitations (mean: 2.05 vs 4.82; p<0.001) and 52.2% less need for additional analgesia (mean: 2.50 vs 5.23; p<0.001). Notably, none in the TAP group reported nausea or vomiting, compared to 22.7% in the control group (p=0.023). As a result, patient satisfaction with analgesia was 23.8% higher in the TAP group (mean: 8.55 vs 6.91; p<0.001).

Conclusions

Our findings suggest that the TAP block effectively lowers opioid consumption and postoperative pain intensity for patients recovering from ileostomy closure surgery. Furthermore, it enhances patient satisfaction and minimises opioid-related side effects like nausea and vomiting.

Necrotizing Fasciitis in a 38-Year-Old Female with History of Intravenous Drug Use: Case Report

Poster

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Objectives*

Necrotizing fasciitis is a life-threatening soft tissue infection that spreads rapidly, causing severe tissue necrosis, sepsis, and, in many cases, multi-organ failure. It requires prompt diagnosis and aggressive treatment, including surgical debridement and antibiotic therapy. In this case, we report a 38-year-old female with a history of chronic hepatitis C and intravenous drug abuse, presenting with extensive NF complicated by septic shock.

Materials and Methods

A 38-year-old female was admitted to Emergency Department on 02.03.2024. She arrived in an unconscious state with severe hemodynamic instability, including hypotension (BP: 70/40 mmHg), tachycardia (HR: 130/min), tachypnoea (RR: 30/min), and hypoxia (SpO₂: 84%). According to the EMS report, the patient had experienced seizures, and a phlegmon of the right arm was noted following the event.

Results

This case underscores the critical role of emergency physicians in managing NF:

Rapid Recognition: The emergency physician's high index of suspicion led to prompt diagnosis. Key indicators included:

- Patient history (chronic hepatitis C, IV drug use)
- Severe pain disproportionate to physical findings
- Rapid progression of symptoms and systemic toxicity

Immediate Action: The ED team's swift response included:

- Rapid resuscitation
- Early blood cultures and laboratory tests
- Prompt initiation of broad-spectrum antibiotics
- Urgent surgical consultation

Use of LRINEC Score: The high LRINEC score (11 points) aided in confirming the diagnosis, demonstrating its utility in the ED setting.

Multidisciplinary Approach: Early involvement of surgical teams facilitated rapid intervention.

Antibiotic Stewardship: Initial broad-spectrum coverage was crucial, later tailored based on culture results.

Conclusions

This case demonstrates the importance of early diagnosis, aggressive surgical management, and multidisciplinary care in the treatment of necrotizing fasciitis. The patient's history of intravenous drug use and chronic hepatitis C likely contributed to the severity of the infection. This case exemplifies the crucial role of emergency physicians in the early diagnosis and management of necrotizing fasciitis.

Patients' Satisfaction with General Anaesthesia or Spinal Anaesthesia during Hip Replacement Surgery

Poster

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Objectives*

Patients' satisfaction is one of the major issues in patient-centered health care. Our objective was to analyze the patient's satisfaction in the early postoperative period, depending on the method of anesthesia used – general (GA) or spinal (SA) – after hip replacement surgery.

Materials and Methods

A retrospective study included 372 patients who underwent hip replacement surgery at RAKUS “Gaiļezers.” SA was used in 30.6% of cases, from which we collect data for 78 patients and 78 randomly selected patients in the GA group. Demographic data, ASA class, anesthesia and surgery duration, use of peripheral nerve blocks (PNB), and hospitalization length were analyzed. Patient satisfaction was assessed through telephone interviews using a modified Leiden Perioperative Care Patient Satisfaction Questionnaire.

Results

Demographic data were similar. In the SA group patients more often (62.8%) chose anesthesia based on anesthesiologist recommendations, while in GA group prior experience influenced patients chose. Fear of seeing or hearing the procedure was a factor more often in the GA group (24.4% vs. 17.9%).

SA had shorter anesthesia times (135 vs. 150 minutes). Postoperative nausea (14.1% vs. 5.2%), back pain (14.1% vs. 0%), and urination difficulties (15.4% vs. 3.9%) were more frequent in SA. In contrast, throat discomfort (0% vs. 6.4%) and weakness (25.6% vs. 32%) were more common in GA.

Pain scores were lower in GA (2.97 vs. 3.79; $p = 0.02$), PNB used more in GA (39.7% vs. 25.6%).

Conclusions

The anesthesiologist's information and the patient's own experience are the primary factors influencing the choice of anesthesia. Pain intensity was lower in the GA group, likely due to more frequent PNB, but no method proved superior in patient satisfaction. Postoperative nausea, back pain, and urination difficulties were more common in the SA group, while postoperative weakness and throat pain were more frequent in the GA group.

Transversus Abdominis Plane (TAP) Block for Postoperative Analgesia in Patients after Iliac Artery Repair

Poster

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Objectives*

Open iliac artery repair often leads to significant postoperative pain and discomfort, particularly in the lower abdomen. While the gold standard for pain management remains combined spinal-epidural anesthesia (CSEA), it can be associated with some potential risks and side effects. TAP block might offer an alternative method for postoperative pain relief in iliac artery repair. The main aim of this study was to evaluate the analgesic effects of TAP block in patients after iliac artery repair and to compare the efficacy with CSEA.

Materials and Methods

A prospective, randomized single-center study. A total of 50 patients were allocated into two groups. The control group (n=26) received CSEA for postoperative pain relief, while the TAP group (n=24) received the single-puncture ultrasound-guided unilateral TAP block with 20 mL of 0.25% bupivacaine. All patients received equal postoperative multimodal intravenous analgesia after surgeries. The postoperative opioid and metamizole consumption, pain score (NRS), and hemodynamic instability were recorded and analyzed.

Results

There was no statistically significant difference between the two groups regarding NRS in the postoperative period (2nd, 4th, 6th, 12th, and 24th hours after surgery). According to the Mann-Whitney U test, the calculated p-values for each time period were between 0.14 and 0.92, and the results were not significant at $p < 0.05$. Also, no significant difference were observed in metamizole and morphine consumption in the postoperative period between the two groups.

Conclusions

The TAP block provides effective postoperative analgesia after iliac artery repair. Both CSEA and TAP block were equally effective.

**Internal Medicine
(Pulmonology,
Gastroenterology,
Rheumatology, etc.)**

Musculoskeletal Involvement in Patients with Hereditary Hemochromatosis

Poster

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Objectives*

Hereditary haemochromatosis (HH) is a common autosomal recessive disorder with a prevalence rate of 1 in 200-500 individuals. HH typically presents clinically between the 3rd and 5th decades as tissue iron concentrations accumulate to toxic levels. Haemochromatosis arthropathy is a form of secondary osteoarthritis (OA) and can be first and sole manifestation of the disease. The aim of this study was to investigate musculoskeletal involvement in patients with HH.

Materials and Methods

This retrospective study analyzed data from January 1, 2008 to December 31, 2023 in Riga East Clinical University Hospital (inpatient and outpatient medical records from two clinical centers) and outpatient clinic ORTO.

Results

Our study consisted of 69 patients with HH. The mean age of patients was 49.1 ± 14.4 years. Of these, 55.1% were female. Genetic testing revealed that 39.0% were C282Y homozygotes, 31.7% C282Y/H63D compound heterozygotes, 24.4% H63D homozygotes, and two patients (4.9%) had no characteristic mutations detected. At the time of diagnosis, 23.3% of the patients reported joint pain, 21.1% reported asthenia. 18.9% of cases, the diagnosis was made incidentally during routine or ancillary laboratory testing. Among the cohort, 18.3 % of patients were diagnosed with OA, 5.0% with osteoporosis and two patients had already undergone joint replacement surgeries. There were significant differences in the age of diagnosis ($P = 1,85 \times 10^{-2}$) and the age at onset of symptoms ($P = 3,05 \times 10^{-2}$) between male and female patients. There were also statistically significant differences in erythrocyte, hemoglobin, hematocrit, ferritin and alanine transaminase (ALT) levels between two groups.

Conclusions

Patients presenting with early OA or rapidly progressing joint degeneration should be evaluated for evidence of iron overload. Screening should include measurement of the transferrin saturation (TSAT) and serum ferritin levels. Early recognition and treatment of HH prevent end-organ dysfunction and mitigate joint damage caused by chronic iron overload.

Pneumomediastinum as COVID-19 Complication in Hospitalised Patients: Retrospective Study

Poster

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Objectives*

Study contributes to the growing body of evidence highlighting the clinical significance of pneumomediastinum as a complication of COVID-19.

Materials and Methods

The study included 21 adult patients, who were diagnosed with COVID-19 and pneumomediastinum and were hospitalized in the Riga East University Hospital from 2020 to 2024. Obtained data was analyzed with statistic methods in SPSS.

Results

Different factors and their association with outcome were analyzed. 14 (67%) patients in this study died. 4 patients had chronic lung disease, 3 (75%) of them died. 6 patients had diabetes mellitus, 4 (67 %) of them died. 10 patients had pneumothorax, 3 recovered (30%) and 7 died (70%). 13 patients had subcutaneous emphysema, 3 (23%) of them were discharged from hospital, but 10 (76,9%) died. IL6 was 2x higher in those patients who died (75 (11.69-170.5) pg/mL), then those who recovered (33 (0.164-190.5) pg/mL), (p= 0.456). At the moment when pneumomediastinum occurred 19 patients (90%) had a necessity for oxygen therapy. 13 (62%) patients had a need for intensification of oxygen therapy. All patients who received oxygen through nasal cannula or O2 mask recovered. However, only 1 out of 2 patients and 3 out of 15 patients from those who received NIV or IV recovered.

Conclusions

High mortality rate was evidenced by our analysis, with the number of patients who died significantly increasing when non-invasive (p=0,025) and invasive (p=0,013) ventilation were used. There was no statistically significant association between the intensification of oxygen therapy and the amount of time spent in the hospital (p= 0,8), in the intensive care unit (p= 0,79), or mortality (0,66). Factors such as chronic lung disease, diabetes mellitus, and the presence of pneumothorax or subcutaneous emphysema were associated with poorer outcomes. The correlation between elevated IL-6 levels and pneumomediastinum incidence highlights the potential utility of biomarkers in prognostication and risk stratification.

Interventional Cardiology

Aortic Adverse Event Risk Calculator: Latvian Innovation at Your Fingertips

Oral

***Dr. Ivars Brečs*¹, *Prof. Martins Kalejs*¹, *Prof. Peteris Stradins*¹**

1. Pauls Stradins Clinical University Hospital; Rīga Stradiņš University

Objectives*

Type A aortic dissection is a severe life-threatening condition. Current guidelines recommend intervention when the maximum ascending aorta diameter is ≥ 50 –55 mm in patients without elastopathy. Data from IRAD indicate that nearly 60% of patients with type A aortic dissections have a diameter < 55 mm, and 40% have a diameter < 50 mm.

Materials and Methods

Seventy-two patients treated at Pauls Stradins Clinical University Hospital (2019 - 2023) for type A aortic dissection were analyzed. The diameter and length of the ascending aorta were measured. Four indices were calculated based on available studies: $AHI = (\text{max AscAo diameter} + \text{AscAo length}) / \text{patient height}$, LHI, DHI, and ASI. The results were categorized into four classes with average yearly risks (4%, 7%, 12%, and 18%) of long-term aortic adverse events. Subsequently, we developed a modern, simple, and user-friendly mobile application, ‘Aortic Risk Calculator,’ based on AHI, LHI, DHI, and ASI.

Results

The diameter of the ascending aorta was less than 55 mm in 81% of patients, and less than 50 mm in 69% of patients. A length of the ascending aorta exceeding 11 cm was observed in 60% of patients; however, 50% of patients had an ascending aorta length greater than 11 cm while their aortic diameter was less than 55 mm. More than 50% of patients fell into the AHI, LHI, DHI, and ASI classes, with a yearly risk of 7% or higher for long-term aortic adverse events.

Conclusions

An ascending aortic elongation > 11 cm may be a criterion for elective intervention. Additionally, AHI, LHI, DHI, and ASI may be more predictive of long-term aortic adverse events than diameter alone. Our newly developed application serves as a powerful tool that provides clarity to patients regarding the likelihood of an adverse aortic event and offers additional data to the treating physician to assist in decision-making about potential intervention.

Metabolic and Endocrine Diseases

Alterations in Gastric Microbiota and Biochemical Markers in Autoimmune Atrophic Gastritis and Gastric Neuroendocrine Tumours

Oral

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Objectives*

This study aimed to examine the gastric microbiome composition in gastric fluid samples, determine selenium and neopterin concentrations in blood from patients with autoimmune atrophic gastritis (AAG), gastric neuroendocrine tumors (GNET), and healthy controls, and identify key changes in microbial communities and biochemical markers associated with these conditions.

Materials and Methods

A total of 25 participants were included, comprising nine AAG patients, nine GNET patients, and seven control patients. Patients underwent endoscopy during which gastric fluid was collected. Bacterial DNA was extracted from gastric fluid samples using the Qiagen PowerFecal Pro Kit. Sequencing was performed on an Illumina MiSeq platform. Biochemical markers, such as selenium and neopterin, were determined from blood samples.

Results

The study assessed microbial diversity and relative abundances across different groups, including AAG, GNET, and controls. Statistically significant changes were observed in four genera in the AAG group and six genera in the GNET group compared to controls. Median plasma selenium levels were 97.17 ± 21.84 µg/L for AAG patients, 105.29 ± 21.15 µg/L for GNET patients, and 103.31 ± 29.09 µg/L for the controls. Neopterin levels were 2.84 ± 0.48 ng/ml for AAG patients, 3.68 ± 1.58 ng/ml for GNET patients, and 2.95 ± 0.80 ng/ml for the controls. No differences were observed in selenium and neopterin levels between the AAG patients, GNET patients, and controls.

Conclusions

Our data show that the number of identified species was similar across the study groups; however, significant changes were observed in the evenness metric of the identified species. Furthermore, differential abundance testing revealed that the *Rothia* genus exhibited the highest increased abundance in both the AAG and GNET groups compared to healthy controls. No significant differences were found in biochemical markers between the groups. While this study provides initial findings, further research is essential to fully comprehend AAG and GNET.

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Chemotherapy-Induced Cardiac ¹⁸F-FDG Uptake in Lymphoma Patients: an Early Metabolic Indicator of Cardiotoxicity?

Oral

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1. ARS Nuclear Medicine Clinic; University of Latvia, 2. Riga East University Hospital; Rīga Stradiņš University

Objectives*

We used [¹⁸F]FDG PET/CT before, during, and after chemotherapy to investigate how chemotherapy affected the heart glucose metabolism of lymphoma patients. We hypothesize that this could be an early radiological sign of cardiotoxicity.

Materials and Methods

We retrospectively studied 235 lymphoma patients who underwent [¹⁸F]FDG PET/CT. We analyzed the uptake pattern, the heart-to-blood pool (aorta) ratio, and the heart-to-liver ratio in all the exams at all three time points. We correlated the metabolic changes with the received doxorubicin dose.

Results

The mean age was 47.5 ± 20.1 years, with 52% of the participants being female. We noted an elevation in left ventricular SUVmax from an average of 1.9 (baseline) to 2.8 (interim) and to 3.0 (post-therapy). More than 77% of the sample exhibited a percentage increase of 100% or greater in LV SUVmax. Between staging, interim, and end-of-treatment PET scans, there were differences in how the [¹⁸F]FDG myocardial uptake looked visually. The SUVmax and SUVmean were very different between the staging PET/CT and the interim PET/CT ($p < 0.001$) and also between the staging PET/CT and the end-of-treatment PET/CT ($p < 0.001$). We found a weak correlation between the Doxorubicin dose and the SUVmax and SUVmean values of EOT PET/CT.

Conclusions

The study observed a significant change in the metabolism of [¹⁸F]FDG in the left ventricle of lymphoma patients who had received 2 cycles of anthracycline chemotherapy. The glucose metabolism of cardiac muscle significantly changes and remains that way after treatment. To determine if a therapy is harmful to the heart, an early visual biomarker of cardiotoxicity could be the changes in metabolism and its pattern after the first two chemotherapy cycles.

HMG-CoA Reductase: From Statins till Energy Metabolism Pathways

Oral

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1. Rīga Stradiņš University; Latvian Institute of Organic Synthesis

Objectives*

HMG-CoA reductase (HMGCR) is a key enzyme in cholesterol and isoprenoid biosynthesis. Statins, cholesterol-lowering drugs, are competitive HMGCR inhibitors reported to impair mitochondrial function in patients. The mechanisms underlying statin-induced mitochondrial dysfunction remain unclear, but proposed causes include coenzyme Q10 deficiency, inhibition of respiratory chain complexes, and disrupted protein prenylation. Additionally, off-target effects of statins include certain kinase and calcium ATPase inhibition, while activating PPAR α , potentially contributing to side effects such as musculoskeletal symptoms and hepatic effects.

To investigate the metabolic consequences of HMGCR deficiency, we utilized a tamoxifen-inducible Hmgcr KO mouse model, employing multi-omics analysis and mitochondrial functional assessment. Severe phenotypic changes appeared shortly after gene KO in both sexes, with liver damage confirmed by histology and elevated ALAT levels in plasma. Metabolic analysis revealed significant disruptions in fatty acid and glucose metabolism, with hepatic triglyceride accumulation and systemic hypoglycemia. Multi-omics profiling indicated profound alterations in peroxisomal and mitochondrial pathways, accompanied by reduced organelle numbers and impaired function.

High levels of long-chain and hydroxyl-acylcarnitines suggested a deficiency in fatty acid β -oxidation. Mitochondrial dysfunction was the earliest detectable biochemical change, triggering acylcarnitine accumulation and progressive peroxisomal impairment, ultimately leading to liver failure. These findings underscore HMGCR's essential role in mitochondrial β -oxidation and suggest that its inhibition may contribute to metabolic dysfunction and adverse drug reactions.

Predisposing Factors and Treatment Challenges in Diabetic Ketoacidosis: Insights from a Single Centre Data

Oral

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Objectives*

Diabetic ketoacidosis (DKA) is an emergency that still accounts for hospitalizations and causes mortality. Although treatment principles are well known, the existing guidelines are contradictory, and clinically relevant questions remain unanswered. The mainstay of DKA therapy is insulin administration and usual treatment recommendations suggest continuous intravenous insulin infusion at 0.1 unit/kg body weight, which may be reduced in some clinical cases. This study aimed to investigate the incidence and predisposing factors of DKA and its consequences on treatment.

Materials and Methods

We analyzed data from 213 patients admitted to the intensive care unit with Diabetic Ketoacidosis (DKA), focusing on the underlying causes of DKA. Among these patients, close monitoring of laboratory parameters was performed on 143 individuals over 24 hours. This monitoring encompassed tracking the fluctuations in glucose and potassium levels, along with the administration rate of insulin infusion.

Results

Out of the 213 patients included in the study, 128 were male and 85 were female, with a mean age of 46.4 ± 1.4 years. Among them, 52.6% (n=112) were diagnosed with type 1 diabetes mellitus (DM), 32.9% (n=70) had type 2 DM, and 14.6% (n=31) had other types of DM. The leading causes of Diabetic Ketoacidosis (DKA) were poor adherence to treatment, accounting for 34.3% of cases, followed by newly diagnosed diabetes (23.9%), alcohol use (14.6%), infection (6.6%), intercurrent illness (4.7%), and a combination of multiple causes (16%). The mean serum glucose decrease of 143 patients was 27.5 mmol/L or 70.4% from the baseline in the first 24h after diagnosis; Additionally, 11% (n=16) of patients experienced hypoglycemic episodes.

Conclusions

Enhanced health literacy and restructured outpatient services could prevent up to 50% of Diabetic Ketoacidosis (DKA) hospitalizations. Adjustments in intravenous short-acting insulin dosages may be warranted, particularly for DKA patients with prolonged decompensation, low body mass, prolonged alcohol consumption, or pancreatogenic diabetes mellitus.

Shifted Energy Metabolism Towards Oxidation of Fatty Acids and Lower Physical Activity in Preclinical Model of HFpEF

Oral

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1. Rīga Stradiņš University; Latvian Institute of Organic Synthesis, 2. Latvian Institute of Organic Synthesis

Objectives*

Heart failure with preserved ejection fraction (HFpEF) presents a growing global challenge in cardiovascular medicine. Despite recent advances in the management of HFpEF, further detailed characterization of its pathological mechanisms in preclinical models could reveal novel drug targets and foster the development of new drugs. This study aimed to characterize the energy metabolism and physical function in an experimental model of HFpEF.

Materials and Methods

HFpEF was induced in male C57BL/6N mice through a combination of a high-fat diet (HFD) and the hypertension-inducing agent, L-NAME. Control group animals were fed a normal diet. After 16 weeks of treatment, the animals underwent a one-week assessment in a metabolic and behavioral phenotyping platform (Promethion Core Mouse Metabolic System), to assess measures of energy metabolism and physical performance. Additionally, ¹³C-labeled energy substrates were administered to measure glucose and fatty acid metabolism. The development of HFpEF was proven by characteristic changes in echocardiogram and of left ventricular (LV) diastolic pressure.

Results

HFpEF animals exhibited LV hypertrophy, increased relative wall thickness, elevated LV diastolic pressure, and preserved ejection fraction. Analysis of phenotyping system data revealed reduced metabolic flexibility in HFpEF animals, as indicated by respiratory exchange ratio (RER) values near 0.7 during both light and dark phases. Compared to control animals, ¹³C glucose administration indicated a slower glucose oxidation rate in HFpEF mice, likely reflecting insulin insensitivity. Furthermore, ¹³C palmitoylcarnitine administration resulted in a two times higher fatty acid oxidation rate in HFpEF animals compared to healthy mice. Physical activity assessments showed that HFpEF animals were less active, as evidenced by shorter voluntary distance run and time spent on provided running wheels.

Conclusions

Mice with HFD- and hypertension-induced HFpEF have low metabolic flexibility, decreased oxidative glucose metabolism, and enhanced fatty acid metabolism. In addition, HFpEF mice are physically less active than their healthy counterparts.

Abnormal Thyroid Function in Adult Latvian Population: Single Laboratory Data

Poster

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1. Rīga Stradiņš University; "Centrālā laboratorija" Ltd, 2. "Centrālā laboratorija" Ltd

Objectives*

To study age and gender distribution of TSH and fT4 in a large single-laboratory cohort.

Materials and Methods

248762 continuous adult samples, TSH and fT4 simultaneously tested ("Centrālā laboratorija", 2020-2024, Cobas Pro e801, ROCHE). M:E 5:1. Statistical analysis by IBM SPSSv27.

Results

Mean TSH in both genders was lowest at 30, followed by increase till 80+: 2.49 to 3.56mU/L in women and 2.46 to 3.46mU/L in men. Age differences highly significant (ANOVA $p < 0.001$), gender difference nonsignificant.

Between age 20 and 80+, rate of decreased TSH rose 5.7% to 9.8% in females and 2.8% to 8.1% in males ($p < 0.001$ for age, $p = 0.003$ for gender difference). Elevated TSH increased 10.5% to 20.8% in females and 10.6% to 23.2% in males ($p < 0.001$ for all). Normal TSH dropped 83.8% to 69.4% in females and 86.6% to 68.8% in males ($p < 0.001$ for all).

Mean fT4 rose in females 15.31 to 16.24pmol/L and decreased in males 16.48 to 15.63pmol/L ($p < 0.001$ for all). Decreased fT4 diminished in females 11.6% to 9.4% and rose in males 5.4% to 11.0% ($p < 0.001$ for all). Elevated fT4 increased 2.7% to 7.7% in females and 3.8% to 4.7% in males ($p < 0.001$ for age, $p = 0.018$ for gender). Normal fT4 decreased 85.7% to 82.8% in females (nonsignificant) and 90.8% to 84.4% in males ($p < 0.001$), gender difference $p < 0.001$.

Conclusions

The study data is obtained from large, though preselected cohort.

Frequency of both hypothyroid and hyperthyroid abnormalities, as defined by abnormal fT4 and TSH, significantly increases by age, with pronounced gender differences; in 80+ patients TSH and fT4 are normal together in only 61% samples. That high abnormality rate should be considered by laboratory diagnostic protocols.

In this study, age difference of mean TSH was 40%, that questions applicability of the existing reference ranges for the elderly.

Additional analysis of TSH and fT4 combinations is indicated.

Assessing Serum Acylcarnitine Profiles During Mixed Meal Test: Novel Approach for Diagnosis of Diabetes Mellitus and Prediabetes

Poster

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Objectives*

The standard diagnostic methods for diabetes mellitus (DM) and prediabetes have increasingly been recognized as sub-optimal. In addition to the assessment of carbohydrate metabolism, measurements of changes in intermediates of fatty acid metabolism – acylcarnitines (AcylCarn) during the mixed meal test (MMT) might provide additional information regarding the development of insulin insensitivity. This study aimed to compare AcylCarn profiles during MMT in patients with DM, prediabetes, and healthy volunteers.

Materials and Methods

Healthy volunteers (13; control group), previously diagnosed Type 2 DM patients (15), and prediabetes patients (17) were enrolled in the study (N=45, 31 females, 14 males). MMT meal included yogurt and a muesli bar. Plasma samples were collected for analysis of serum glucose, c-peptide, and AcylCarn profiles before the meal and repeated measurements after 30, 60, and 120 minutes. Inter-group differences were analyzed and statistical significance was determined with the Kruskal–Wallis test.

Results

The meal intake induced changes in AcylCarn concentrations in all study groups. After 60 minutes, the short-chain AcylCarn in control group samples decreased to 69.3% from the initial level (95%CI [60.2%, 78.4%]), which was significantly lower than in the prediabetes group (p=0.001) and the DM group (p=0.015). Similarly, levels of medium-chain AcylCarn decreased in the control group to 54.7% from the initial level (95%CI [48.8%, 60.6%]), which was significantly lower than in the prediabetes group (p = 0.001) and the DM group (p= 0.003). Long-chain AcylCarn in the control group decreased to 66% from the initial level (95%CI [57.2%, 74.8%]), which was significantly lower (p=0.004) than in the prediabetes group (90.2% (95%CI [73%, 107.6%]), but not the DM group (79.5%. 95%CI [74.3%, 84.8%]).

Conclusions

Our results suggest that measurements of AcylCarn concentrations in blood samples collected during the MMT could be a useful additional method for diagnosing DM and especially prediabetes. Further studies to determine specific cut-off values are needed.

Bioavailability and Distribution of Acetylcarnitine in Mice and Healthy Volunteers

Poster

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Objectives*

Acetylcarnitine, commonly used in food supplements as a source of carnitine and acetyl groups, is promoted as a food supplement for improving neurological disorders. This study aimed to investigate the bioavailability, distribution, metabolism, and elimination pathways of acetylcarnitine using both mouse models and healthy human volunteers.

Materials and Methods

In mice, [¹³C]-acetylcarnitine was administered intravenously and orally at doses of 20 and 200 mg/kg. In a clinical study, healthy volunteers received a single oral dose of 1500 mg acetylcarnitine. In both mice and human studies, blood and urine samples were collected at baseline and during the study period. Concentrations of acetylcarnitine and L-carnitine in the samples were analysed using ultrahigh-performance liquid chromatography-tandem mass spectrometry (UPLC-MS/MS).

Results

The oral bioavailability of acetylcarnitine in mice, after administration at a dose of 200 mg/kg, was only 8.6%. Administration of [¹³C]-acetylcarnitine caused the efflux of endogenous carnitine and acetylcarnitine from tissues, significantly increasing their plasma concentrations for 26% and 139%, respectively. Acetylcarnitine administration also enhanced urinary excretion of carnitine and acetylcarnitine, amounting to up to 50% of the administered dose. In response to acetylcarnitine administration, plasma levels of medium- and long-chain acylcarnitines were also elevated. In humans, intake of acetylcarnitine resulted in even lower bioavailability than in mice, and 25% part of the supplement were metabolized into trimethylamine N-oxide. Similar to results in mice, acetylcarnitine intake in humans stimulated urinary excretion of carnitine and its derivatives.

Conclusions

The oral bioavailability of acetylcarnitine in both mice and humans is very low. Supplementation triggers the release of endogenous carnitine, acetylcarnitine, and other acylcarnitines from tissues, and further excretion into urine. These findings provide new insights into the regulation of acetylcarnitine and carnitine turnover *in vivo*.

Miscellaneous

Analysis of Foreign Scientific Relations and Business Trips of Academic and Scientific Staff of Riga Medical Institute between 1950 and 1991

Poster

Mr. Kaspars Antonovics¹

1. Institute of the History of Medicine, Rīga Stradiņš University

Objectives*

For the study of RMI personnel's business trips for scientific and other purposes in the period from 1950 to 1991 inclusive, the Riga Stradins University (RSU) archive, the Latvian University Archives (LVU), and the Latvian State (LVA) archive.

Materials and Methods

Comparative historical research.

Results

The research included personnel records of the RMI staff and specifically biographical questionnaires for employees, which included facts about the trips abroad (outside the USSR). During the research was discovered that 391 persons related to RMI took part in foreign trips during the indicated above time. It is approximately 39% of the whole RMI staff. Within the "Khrushchev thaw" (1953-1964), the proportion between socialist block countries and the capitalist block was increased to benefit the last one (2).

Conclusions

The trips abroad were mostly given to specialists in the medical field with an ideologically correct biography and a desirable affiliation to the Communist Party and supportive political organizations (1).

The destinations of foreign business trips for RMI pedagogical and scientific personnel representatives were divided between 11 socialist and 17 capitalist world countries.

During Brezhnev's "stagnation period" (1964-1985), the number of trips abroad to directions friendly to the USSR Africa, Asia, and Latin America countries increased.

During Gorbachev's "Perestroika" (1985-1991) time, the foreign missions of RMI's pedagogical and scientific personnel became rare. At the same time, the amount of foreign private trips to the capitalist countries increased. The results of the research were summarized in the data base with 1005 records.

Ancient DNA Analysis of Archaeological Tooth Sample as an Opportunity to Examine Ancient Microbial Genomic Content

Poster

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1. Latvian Biomedical Research and Study Centre, 2. Institute of Latvian History, University of Latvia

Objectives*

Ancient DNA (aDNA) has been successfully retrieved from various archaeological sources including teeth and calcified dental plaque providing insights into the ancient microbiomes and revealing the evolution of human-associated microbial communities and pathogens. The aim of this study was to perform in-depth bacterial aDNA analysis in the archaeological tooth sample obtained from 8th–9th century male burial, Mežotne cemetery, Latvia.

Materials and Methods

DNA extraction was carried out from powder obtained by drilling dental cement. DNA libraries were constructed using the QIAseq Ultralow Input Kit and sequenced on DNBSEQ-G400 platform (MGI). Sequenced data were demultiplexed, merged and trimmed, and reads shorter than 33 bp were removed. Metagenomic analysis was performed using Kraken2 and Braken. *Rothia aeria* reads were selected, aligned against the genome reference and compared with publicly available data sets of modern *R. aeria* isolates. The phylogenetic tree was built from 631 SNP positions.

Results

In total, 89.2 million reads were subjected for metagenome analysis; of them, 4.17% were bacteria-assigned reads. Among 5917 bacterial species, several commensal and pathogenic oral microorganisms were detected. The most prevalent bacterial species were *Arachnia propionica*, which is part of the normal human oral flora (56.7% of all reads; genome coverage 93.73%), and oral microorganism *R. aeria*, which can cause various infections in human (11.7%; genome coverage 91.61%). The reads of both species exhibited authentic aDNA damage patterns. Molecular phylogenetic analysis revealed that *R. aeria* ancient genome was most closely related to the *R. aeria* strain NCTC10207 isolated in years 1900/1960, as well as to the strains obtained from human oral samples in Australia and Malaysia.

Conclusions

aDNA analysis of archaeological tooth samples provides a plausible opportunity to characterise oral microbiome of ancient populations of Latvia. This study was funded by the Latvian Council of Science grant No. lzp-2022/1-0059.

Boosting Simulation Programmes through Student Initiatives: Enhancing Medical Education through Active Student Engagement

Poster

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1. Medical Education Technology Centre, Rīga Stradiņš University

Objectives*

This work explores the impact of student-driven initiatives on the expansion and enhancement of simulation-based medical education (SBME) programs at Riga Stradiņš University Medical Education Technology centre. The aim is to evaluate how student participation in organizing simulation-based events contributes to the integration of new simulations into the curriculum and the professional development of faculty.

Materials and Methods

Over the past three years, the Simulation Centre at Riga Stradiņš University collaborated closely with student academic societies, offering resources and support to help organize educational events. These initiatives, which included hands-on workshops and simulations in various medical specialties, were designed to engage students in practical education and foster their involvement in curriculum development. Throughout this period, approximately 250 student events were organized by 50 student academic societies. These events engaged 4500 students and led to the involvement of 200 faculty members, many of whom had little prior experience with clinical simulation but gained valuable skills as mentors.

Results

The collaboration between students and the Simulation Centre resulted in the integration of several new simulation scenarios into the medical curriculum. Notably, new faculty members were gaining experience in clinical simulation as mentors, which is expected to improve their teaching methodologies. The success of these initiatives also helped raise the profile of the Simulation Centre, encouraging further academic participation and innovation in simulation-based education.

Conclusions

The integration of student initiatives into simulation-based medical education programs has proven to be a successful strategy for both expanding the scope of the curriculum and fostering professional development among faculty. By providing students with the support to organize events, the university not only enriched its educational offerings but also empowered students to contribute to the development of their future medical education. These initiatives offer valuable lessons for other institutions looking to enhance the quality and scope of their SBME programs.

From the Doctor’s Office to the Public Stage: Hypnosis in Soviet Latvia

Poster

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1. Rīga Stradiņš University

Objectives*

In the first half of the 20th century, hypnosis was a marginal medical practice in Latvia. However, in Soviet Latvia, it emerged as one of the scientifically recognized and ideologically accepted methods of psychotherapy, alongside rational psychotherapy and self-hypnosis (autogenic training). This study examines the introduction of hypnosis into Soviet Latvian medical practice, focusing on the individuals who implemented, practiced, and popularized it as a scientifically valid and effective therapeutic approach.

The analysis extends beyond the clinical setting to explore the practice of hypnosis and self-hypnosis in so-called psychohygiene clubs, which emerged in Latvia at the end of the 1960s. These clubs were initially conceived as spaces for education, therapy, and psychoprophylaxis, but they also became venues for entertainment and, for some visitors, even spiritual practice.

Drawing on historiographical sources, scientific publications by Soviet Latvian doctors (1960s–1980s), popular science articles, as well as materials such as 1970s educational films and personal memoirs, including the diaries of Kaspars Irbe (1906–1996), this study uses traditional historical research methods to trace how hypnosis evolved from a purely medical practice in doctors’ offices to a widely accessible public phenomenon in psychohygiene clubs.

The rise of hypnosis and self-hypnosis in Soviet Latvia, and their sudden decline as Latvia regained independence, illustrates how medical practices were deeply influenced by the political and social contexts of the time.

Neonatology

Minimally Invasive Diagnostic and Prognostic Biomarkers in Neonates with Necrotizing Enterocolitis: Case Series of Single Centre Experience

Oral

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Objectives*

Necrotizing enterocolitis (NEC) is a devastating gastrointestinal condition affecting preterm infants. While it is commonly identified through clinical examinations, imaging techniques, and blood tests, these conventional diagnostic may not always be sufficient. Consequently, there is a graving need for the development and validation of reliable, non-invasive biomarkers that can facilitate the early diagnosis of necrotizing enterocolitis and initiate personalised treatment.

Materials and Methods

This prospective cohort study, conducted from 2023 to 2024 at the Children's University Hospital Riga, examined stool and urine samples collected from 7 preterm infants diagnosed with NEC and 33 controls. The gut microbiome was analyzed using shotgun metagenomic sequencing, while urine and fecal biomarkers assessed using ELISA. Statistical analyses were performed (MSEXcel 365, IBM SPSS Statistics29.0.)

Results

This study evaluated 7 NEC preterm infants, five female, three male, mean gestational age 27w, mean birth weight 964grams. Common presenting symptoms across all cases in NEC included feeding intolerance, abdominal distension, and bile-stained vomiting. Four of the infants were fed donor breastmilk, one received formula and two breastmilk. PGE2 and LDH were significantly elevated in NEC patients during the early days of diagnosis ($p < 0.05$), while no significant differences were observed for I-FABP and SAA. Fecal biomarkers LDH and GDE were undetectable. The fecal microbiome composition analysis revealed significant dysbiosis, with Firmicutes dominating in four patients, Actinobacteria in one patient, Proteobacteria in one patient, and Ascomycota in one patient. Pathogenic species such as *E.faecalis*, *St.haemolyticus*, and *Klebsiella* were predominant. There is a slight decrease in alpha diversity metrics after the NEC diagnosis, including reductions in species richness (Chao1 index 21.00 vs 17.00) and diversity (Shannon 3.56 vs 3.43)

Conclusions

NEC appears linked to gut microbiome dysbiosis, with an abundance of pathogenic species and reduced diversity. Feeding type influenced the microbiome. Study identified potential PGE2 and LDH biomarkers for early NEC diagnosis and prognosis.

Neonatal Urinary Metabolomics in Sepsis

Poster

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Objectives*

Neonatal bacterial sepsis remains a leading cause of neonatal morbidity and mortality, with diagnostic challenges due to nonspecific clinical signs and limitations of current biomarkers. Establishing the diagnosis is a challenge to the clinician, as signs of sepsis are nonspecific and range from mild, e.g., body temperature instability, poor feeding, to severe, e.g., lethargy or shock. Blood sampling in very low birth weight infants is associated with significant iatrogenic blood loss, pain and impacts outcome. We aimed to identify urinary metabolites as potential noninvasive biomarkers for neonatal sepsis diagnosis and develop a predictive model based on metabolite concentrations.

Materials and Methods

We conducted a prospective study of 93 neonates, including 23 septic and 70 control infants. Urine samples were collected non-invasively, and 57 metabolites were quantified using a targeted LC-MS-based workflow. Confounding factors such as antibiotic use, chronological and postmenstrual age, and diet were assessed in the control group, and only metabolites unaffected by these factors were used in the analysis. A predictive model was constructed using logistic regression based on the most significantly altered metabolites.

Results

Significant decreases in normalized adenosine and hydroxylysine values were observed in septic neonates. These changes were independent of confounding factors. We developed a predictive model using absolute concentrations of three metabolites with an area under the curve (AUC) of 0.9115, achieving 91% sensitivity and 90% specificity.

Conclusions

We demonstrated the potential of urinary metabolomics to provide noninvasive biomarkers for neonatal sepsis. Importantly, these changes were shown to be independent of confounding factors such as antibiotic use, age, or diet. These findings pave the way for improved diagnostic tools for neonatal sepsis.

Neuroimaging

Enhancing Ischemic Stroke Diagnosis: Role of MRI in Acute Management

Oral

Prof. Arturs Balodis¹

1. Department of Radiology, Faculty of Medicine, Rīga Stradiņš University; Institute of Diagnostic Radiology, Pauls Stradins Clinical University Hospital

Objectives*

Ischemic stroke remains a significant global health challenge, leading to substantial mortality and disability. Timely and precise diagnostic imaging is vital, especially in the acute phase, to ensure effective therapeutic intervention. MRI plays a crucial role, employing both contrast-enhanced and non-contrast approaches to evaluate ischemic changes. It is particularly beneficial in cases such as posterior circulation strokes, small infarcts, or when distinguishing strokes from mimicking conditions.

Materials and Methods

This study assessed the application of MRI techniques, including diffusion-weighted imaging (DWI), perfusion-weighted imaging (PWI), fluid-attenuated inversion recovery (FLAIR), and advanced methods like arterial spin labeling (ASL). These methods were evaluated for their effectiveness in identifying ischemic areas, differentiating penumbra from the infarct core, and guiding therapeutic strategies. Several MRI mismatch techniques are utilized to assess salvageable brain tissue in acute infarction. Key methods include DWI/PWI mismatch to identify penumbra, DWI/FLAIR mismatch for estimating symptom onset time, and DWI/ASL or DWI/SWI mismatches to evaluate perfusion deficits and vascular occlusions, respectively, aiding in treatment decisions.

Results

DWI detects ischemic lesions early, while ADC maps confirm infarcted regions. FLAIR assists in estimating stroke onset time. The DWI-PWI combination provides detailed core-penumbra differentiation to guide recanalization. Contrast-based PWI maps cerebral blood flow, while ASL offers a non-contrast alternative for perfusion imaging. SWI identifies hemorrhagic changes, and MR-spectroscopy reveals metabolic alterations, such as increased lactate and reduced N-acetylaspartate, offering prognostic insights.

Conclusions

MRI, using both contrast and non-contrast modalities, is essential in acute ischemic stroke management. It is especially valuable in complex scenarios, such as posterior circulation involvement or small strokes, and when ruling out mimics. Comprehensive MRI protocols improve diagnostic precision and inform effective treatment decisions, enhancing patient outcomes. Techniques such as DWI/PWI, DWI/FLAIR, and DWI/ASL mismatches provide critical information about tissue viability, perfusion deficits, and timing, enabling personalized therapeutic approaches.

Parkinson’s Disease MRI Biomarkers: Quantifying Neuromelanin with High-Resolution Imaging

Oral

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Objectives*

Parkinson’s disease (PD) is a neurodegenerative disorder characterized by the progressive loss of dopaminergic neurons in the substantia nigra. Neuromelanin, a pigment found in these neurons, can serve as a biomarker for the integrity of this brain region (Frosini et al., 2017). High-resolution magnetic resonance imaging techniques, such as the T1-weighted neuromelanin sequence, have emerged as a non-invasive tool to quantify neuromelanin levels and detect early changes in Parkinson’s disease. The aim of this study was to quantify neuromelanin volume in patients compared to healthy controls.

Materials and Methods

Our study group included patients with PD (N=21) and age-matched healthy controls (N=21). All participants underwent high-resolution 3T MRI, including a T1-weighted neuromelanin-sensitive sequence. Mean mesencephalic intensity, multiplication factor and patient specific thresholds were used process automated neuromelanin volume quantification. 5 control group patients were used as a reference. JASpV0.18.3 was used for statistical analysis with $p < 0,05$ considered statistically. MANGOV.4.1 software was used for neuromelanin quantification

Results

Our study group median age comprised 54 years (IQR:47-64). Mean mesencephalic intensity 720,5 in healthy subjects vs 721,2. Calculated multiplication factor 1,8 was used from reference patients. PD patient group showed lower neuromelanin level in comparison to healthy subjects ($p=0,004$; mean $165,0\text{mm}^3$ vs $204,5\text{mm}^3$). There were no significant differences between neuromelanin volume in association with gender or age.

Conclusions

Our findings revealed lower neuromelanin volume in Parkinson’s disease patients, demonstrating potential use of high-resolution T1-weighted neuromelanin-sensitive imaging as a biomarker for Parkinson’s disease. Additionally, the use of a semi-automated quantification algorithm proved to be a reliable and efficient method for neuromelanin volume measurement. Future research should aim to validate these findings in larger cohorts and further refine semi-automated methods to enhance clinical applicability.

Predictors of Poor Long-Term Outcomes after Successful Thrombectomy in Large Vessel Acute Ischemic Stroke

Oral

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Objectives*

Despite advancements in modern endovascular treatment, the burden of poor outcomes in acute ischemic stroke patients remains high even after successful endovascular thrombectomy (EVT). In this study, we attempted to identify the potential predictors of such outcomes in hospitalized ischemic stroke patients.

Materials and Methods

404 ischemic stroke patients treated with EVT at Pauls Stradiņš Clinical University Hospital, Riga, from 2015 to August 2024 were selected based on successful EVT TICI scores (2b and 3). Long-term outcomes were assessed at 90 days after the procedure and identified as good (mRS 0-3) or poor (mRS 4-6).

Results

The following 11 factors were suggested for predictive univariate analysis of poor outcomes after EVT: time to needle, wake-up stroke, NIHSS at admission, EVT procedure duration, number of EVT passes, use of intravenous thrombolysis, as well as patient-specific factors such as age, gender, platelet count, presence of diabetes mellitus and hypertension.

Significant predictors identified in poor vs. good outcomes were:

- Time to needle (TTN) (median 280min [IQR 210-359] vs. 240min [IQR 192-300]; $p < 0.001$);
- NIHSS at admission (median 18 [IQR 14-20] vs. 14 [IQR 9-17]; $p < 0.001$);
- EVT procedure duration (median 40min [IQR 24-59] vs. 30min [IQR 20-45]; $p < 0.001$);
- Number of EVT passes (1 vs. > 3 ; $p < 0.001$);
- Age (median 75y vs. 72y; $p = 0.003$).

Most significant predictors of poor outcomes (Se 69.5%, Sp 72.4%, AUC 0.766):

- NIHSS at admission (OR=1.180 per point; $p < 0.001$, 95%CI 1.118-1.246)
- EVT procedure duration (OR=1.021 per minute; $p = 0.001$, 95%CI 1.009-1.033)
- Age (OR=1.033 per year; $p = 0.007$, 95%CI 1.009-1.057)

The logistic regression model achieved 71.0% classification accuracy, with a sensitivity of 69.5%, specificity of 72.4%, and an area under the curve (AUC) of 0.776.

Conclusions

Poor outcomes following EVT, despite successful recanalization, are independently associated with age, longer TTN and EVT procedure with more passes, higher NIHSS scores at admission. Recognizing these predictors can improve the patient management approach.

Challenges in Differentiating Stroke Mimics from Acute Ischemic Stroke: Case Analysis and Imaging-Based Diagnostic Approaches

Poster

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Objectives*

Stroke mimics (SM) are clinical conditions that resemble cerebral strokes but arise from different etiologies. Ischemic strokes represent 80% of cases, while hemorrhagic strokes account for 20%. SM constitutes 9-31% of suspected stroke cases and 2.8-17% of cases treated with intravenous thrombolysis (IV-tPA). Common causes of SM include seizures, particularly Todd's paralysis (17-21%), sepsis (13-17%), toxic or metabolic disturbances (11-13%), space-occupying lesions (9-15%), and syncope (9%). Advanced imaging techniques, including non-contrast CT, CT-angiography, and MRI, are essential for distinguishing ischemic strokes from stroke mimics.

Results

In a multicenter observational cohort study by Zinkstok, involving 5581 patients treated with IVT for acute ischemic stroke, stroke mimics occurred at a frequency of 1.8%, predominantly affecting younger, more often female patients with fewer risk factors except for smoking and prior stroke or TIA, and had a lower rate of symptomatic intracranial hemorrhage (1.0%) compared to ischemic strokes (7.9%).

At our clinic, we have encountered various cases of SM initially suspected as ischemic or hemorrhagic strokes. Seizures account for approximately 20% of these mimics, with most being brief, having a median duration of 3-minutes. Diffusion-weighted imaging-(DWI) with apparent diffusion coefficient (ADC) sequences aids in differentiating between remote strokes with seizures and recent ischemic strokes.

For example, a 45-year-old female with a history of alcohol abuse and focal epilepsy presented in severe condition after a generalized tonic-clonic seizure. Radiological findings revealed extensive cytotoxic edema in the left hemisphere and a smaller lesion in the right cerebellum, leading to a diagnosis of status epilepticus. Other notable cases include a patient with hypoglycemia, a 74-year-old female diagnosed with anaplastic oligodendroglioma (Grade-3), and a 49-year-old patient presenting with Wernicke encephalopathy.

Conclusions

The challenges of stroke mimics include diagnostic delays and inappropriate treatments. Efficient imaging workflows and radiologist awareness of stroke mimics are essential for ensuring accurate diagnoses and timely interventions.

Differential Diagnostic Challenges in Evaluation of Optic Nerve Glioblastoma with Extensive Spread to the Anterior Cranial Fossa

Poster

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Objectives*

Optic nerve glioblastoma is an uncommon and highly aggressive type of tumor that can arise from the optic nerve itself, the optic chiasm, or the optic tract. Due to its rarity and unusual location, the condition poses significant diagnostic challenges. Neuroimaging typically reveals findings that lack specificity, often overlapping with those of other optic nerve pathologies, which makes it difficult to establish a definitive diagnosis based solely on imaging studies. As a result, histopathological confirmation through a biopsy becomes a critical step in accurately identifying the disease. Early recognition and prompt initiation of treatment are essential because any delay in therapeutic intervention can lead to a rapid progression of the tumor and substantially poorer survival outcomes for affected patients.

Materials and Methods

This case report is based on the clinical presentation, diagnostic evaluation, treatment approach, and follow-up of a single patient diagnosed with optic nerve glioblastoma involving the optic chiasm. The patient's medical history, imaging studies, histopathological findings, and treatment outcomes were retrospectively reviewed and analyzed.

Results

A 68-year-old woman with no significant medical history presented with exophthalmos, progressive visual deterioration, and partial vision loss. Diagnosis of optic nerve glioblastoma, IDH-wildtype, with optic chiasm involvement was confirmed through radiological imaging and postoperative histopathological and histochemical evaluation.

Conclusions

Glioblastoma involving the optic nerve is a rare occurrence scarcely reported in the literature. This case report provides valuable insights into this uncommon manifestation, highlighting the diagnostic challenges posed by its atypical presentation, which often mimics other optic nerve disorders. It emphasizes the critical role of neuroradiology and histopathological evaluation in assessing progressively enlarging optic nerve lesions. By expanding the limited knowledge on prognosis and therapeutic strategies for optic nerve glioblastomas, this publication aims to guide future clinical efforts and improve patient care.

Neuroimmunology

Long-Term Evaluation of Laboratory Diagnosis in Lyme Neuroborreliosis: Antibody Index as a Key Marker of Intrathecal Antibody Synthesis in CSF and Serum Samples

Oral

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Objectives*

Neuroborreliosis, a neurological manifestation of Lyme borreliosis caused by *Borrelia* species, presents a significant diagnostic challenge due to the often nonspecific and overlapping clinical symptoms. Laboratory diagnostics with serological testing play a critical role in identifying neuroborreliosis.

A promising approach in the diagnosis of neuroborreliosis is the use of the Antibody Index (AI). The AI is a ratio that compares the concentration of antibodies against *Borrelia* in the cerebrospinal fluid (CSF) to that in the serum, which helps determine whether the antibodies are produced locally within the central nervous system (CNS) or are present due to systemic infection.

Materials and Methods

Between May 1, 2013, and May 1, 2024, serums and CSF samples from 5018 patients with various neurological symptoms, suspected neuroborreliosis were tested in National Microbiology Reference Laboratory, originating from different Latvian hospitals. Paired samples were tested with the chemiluminescence immunoassay the *Borrelia* IgG quantitative test according to the manufacturer's instructions.

To assess intrathecal antibody synthesis, the Reiber method was employed, and albumin levels as well as total immunoglobulin G (IgG) concentrations were measured in both CSF and serum.

Results

A positive result, indicating elevated levels of antibodies against *Borrelia*, was found in 500 (9,9%) of these paired samples, which were also analyzed for the *Borrelia* IgG Antibody Index. An Antibody Index value greater than 1.5 was interpreted as evidence of pathological synthesis of pathogen-specific antibodies in the CSF. Of the 500 positive serum and CSF samples, 259 (51,8%) showed a positive *Borrelia* IgG AI, with values ranging from 1.5 to 282.1.

Conclusions

These findings suggest a significant prevalence of intrathecal antibody synthesis in patients with suspected neuroborreliosis. The high number of positive *Borrelia* Antibody Index results indicates the value of this diagnostic tool in confirming CNS involvement and distinguishing neuroborreliosis from other neurological conditions. The data emphasize the importance of the Antibody Index as a reliable marker for intrathecal synthesis of *Borrelia*-specific antibodies, offering crucial insights for the accurate diagnosis of neuroborreliosis.

Studies of miRNAs in Patients with Demyelinating Pathologies: Insights and Challenges

Oral

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Objectives*

Demyelinating diseases are a group of pathologies characterized by damage to the myelin sheath and nerve cells. The myelin sheath plays a critical role in enhancing neural conduction velocity and conserving energy required for the propagation of action potentials. This category encompasses conditions such as multiple sclerosis, chronic inflammatory demyelinating polyneuropathy, and multifocal neuropathy. Researchers are putting significant effort into identifying biomarkers that would help diagnose diseases more accurately and monitor their progression. Based on recommendations from the authors of previous publications to investigate a larger sample size for data reproducibility, we selected two miRNAs (miR-338-5p, miR-219a-5p, miR-146a-5p, miR-31-5p), which had significant associations with the studied pathologies. MiRNAs are short, non-coding, single-stranded molecules primarily involved in regulating gene expression through the suppression of transcription and translation.

Materials and Methods

In this study, circulating miR-338-5p and miR-219a-5p were investigated in the blood of 20 MS patients, and miR-146a-5p and miR-31-5p were examined in 12 CIDP and 9 MMN patients. Blood samples were collected into special Tempus blood tubes. RNA was isolated from blood using mirVana™ miRNA Isolation Kit (ThermoFisher Scientific (TFS), USA) and the cDNR synthesis was performed using the TaqMan® Advanced miRNA cDNA Synthesis Kit (TFS, USA). MiRNA expression was detected by using qRT-PCR method and the results were analyzed with ThermoFisher Cloud platform.

Results

The expression of miR-146a-5p and miR-31-5p in the peripheral venous blood of patients with chronic inflammatory demyelinating polyneuropathy and multifocal motor neuropathy compared to controls, while a significant difference was seen in serum extracellular vesicles. The analysis of differences in miR-338-5p expression showed that miR-338-5p expression was significantly higher in patients that taking 2nd-line treatment compared to those switched from 1st-line to 2nd-line treatment ($p < 0.05$).

Conclusions

The results may assist in future studies aimed at evaluating the potential of these miRNA markers as diagnostic biomarkers for demyelinating diseases.

Antibody specific index (AI) in Inflammations of the Facial and Vestibulocochlear Nerve

Poster

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Objectives*

To evaluate the frequency of cerebrolocal antibody synthesis in patients with facial paresis and vestibular neuritis.

Materials and Methods

Analysis of neurochemical results of N = 221 patients from a monocentric hospital population of Lower Saxony, Germany. We determined antibody specific indices (AI) for Measles, Rubella, Varicella zoster, and Herpes simplex (“MRZH-Reaction”) both quantitated and qualitatively for both groups. Borrelia-IgG and -IgM antibodies were analyzed qualitatively. For both groups we calculated the frequency of oligoclonal band pattern (OCB) for facial paresis and vestibular neuritis groups.

The frequencies for the respective groups were compared with Chi-Square statistics.

Results

N = 118 with facial paresis (FP), N = 103 with vestibular neuritis (NV) were collected serially from 2015 to 2024. The frequencies of the respective OCB groups did not differ between FP and NV statistically. Approximately 5% of the total group showed positive, i.e. pathological OCB (type II or III).

Measles and Rubella AI were in mean higher in FP patients than in NV patients, this difference was not significant.

Borrelia-IgG and -IgM antibodies were only rarely positive in both disease entities.

Conclusions

Autopsy findings after cranial nerve affections suggest etiologically the re-activation of HSV, VZV or other viral agents.

The rare occurrence of AIs against HSV-, VZV- or Borrelia-antibodies in FP and NV, however, suggests rather primary autoimmune mechanisms than recent re-activation of the mentioned pathogens followed by post-infectious destruction of cranial nerve structures.

Immunological Profile in Patients with Chronic Autoimmune Neuropathies

Poster

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Objectives*

Chronic inflammatory demyelinating polyneuropathy (CIDP) and multifocal motor neuropathy (MMN) are rare immune-mediated neuropathies with unknown causes. This study aimed to evaluate the immunological profiles of patients with CIDP and MMN compared to healthy controls.

Materials and Methods

The study included 21 patients (13 CIDP, 8 MMN) and 20 healthy controls. Immunological analysis encompassed over twenty T and B cell subpopulations, immunoglobulin levels, cytokines (e.g., IFN- α , IFN- β , IFN- γ , IL-28A, IL-6, TNF- α), and anti-IFN- γ antibodies. Lymphocyte subsets were analyzed by flow cytometry, cytokines via xMAP technology, total immunoglobulins were measured by nephelometry and antibodies to IFN- γ using ELISA. Statistical analysis employed Kruskal-Wallis and Mann-Whitney U tests.

Results

Significant differences were observed in cytokine levels and T cell subpopulations. IL-6 levels were significantly higher in CIDP patients (median 9.17 pg/mL, IQR = 18.1) compared to controls (median 0.78 pg/mL, IQR = 8.93), with no significant differences in MMN. Additionally, IL-28A levels were elevated in CIDP patients (median 1.54 pg/mL, IQR = 2.27) compared to controls (median 0.09 pg/mL, IQR = 0.72). Conversely, IFN- γ levels were lower in MMN patients (median 7.27 pg/mL, IQR = 8.03) than in controls (median 10 pg/mL, IQR = 3.79). Immunophenotyping revealed increased EMRA CD8⁺ and EMRA CD4⁺ cells in CIDP, alongside reduced central and transitional memory CD8⁺ cells. B cell subpopulations (CD19⁺, IgD-CD27⁻, IgD+CD27⁺, IgD+CD27⁻, IgD-CD27⁺, IgD-IgM⁺, IgM-CD38⁺, CD21 low B cells) showed no significant differences across groups.

Conclusions

This study identifies distinct immunological profiles in CIDP and MMN patients. Elevated IL-6 and IL-28A in CIDP indicate heightened immune activation and inflammation, while reduced IFN- γ in MMN suggests altered immune regulation. Changes in T cell subpopulations, including increased EMRA CD8⁺ and CD4⁺ cells in CIDP, provide further insight into the immune mechanisms of the disease, highlighting potential diagnostic and therapeutic targets.

Neurology

Anxiety, Depression and Somatisation Disorder in Low Back Pain Patients. What to Expect from these Patients.

Poster

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Objectives*

Lower back pain (LBP) accounts for significant health services use. LBP covers a spectrum of different types of pain that frequently overlap. Patients with psychological disorders is expected to have nociplastic pain. Aim of the study was to evaluate do patients with psychological disorders suffer from more severe pain and do they burden the medical system more.

Materials and Methods

Of the LBP patients approached, 103 agreed to participate in this study. The survey was conducted during outpatient visits (from January to October in 2024).

Results

This study included 66 females, 37 males with the median age of 55 (47-64,5) years, duration of LBP 10 (5-15) years. Median pain intensity was 5 (3–5), stress level 6 (4.5–7) and sleep quality 5 (3–7) on 10-point scale. Overall, 27 patients (26,2%) reported psychological disorders and median mean pain intensity was higher at 5 (5–6) compared to 4 (3–5) for other patients ($p = 0,004$). Mean pain intensity was positively correlated with the number of patients reported psychological disorders ($R_s = 0,26$; 95% CI: (0,07; 0,44), $p = 0,008$). The number of psychological disorders also positively correlated with stress levels ($R_s = 0,27$; 95% CI: (0,08; 0,45), $p = 0,005$) and negatively with sleep quality ($R_s = -0,22$; 95% CI: (-0,4; -0,03), $p = 0,025$). Only 8 patients (29,6%) with psychological disorders and 10 patients (9,7%) of entire cohort consulted a psychotherapist or psychiatrist. Patients with psychological disorders did not significantly differ from others in the number of healthcare visits, diagnostic examinations, or seeking emergency medical help.

Conclusions

Patients with psychological disorders are at greater risk of reporting worse LBP and sleep quality but does not burden the medical system significantly more often. We detected very low attendance of psychotherapists or psychiatrists for chronic, possibly mixed pain with nociplastic features.

Chronic Low Back Pain: Recognising and Mitigating Management Challenges

Poster

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Objectives*

Chronic low back pain (CLBP) is a significant health issue, posing a major burden on professionals, the economy, and society. The aim of the study is to identify the main pitfalls in patient care.

Materials and Methods

A cross-sectional study was conducted on adults with non-specific CLBP and sciatica attending secondary health-care settings in Latvia. A custom questionnaire was used to collect data on demographics, risk factors, diagnosis, management strategies, and impact on CLBP.

Results

The study included 103 patients with CLBP (66 female, 37 male), with a median pain duration of 10 years (range 5-15). Overall, 174 MR spine scans were reported. Longer pain duration was associated with higher pain levels ($\rho = 0.25$, 95% CI: 0.06, 0.42, $p = 0.011$) and more MR scans ($\rho = 0.25$, 95% CI: 0.06, 0.43, $p = 0.011$). About 44.7% ($n = 46$) had a disability or occupational disease. A Wilcoxon test showed a significant difference in MR scans between the disability (median 2, IQR 1-3) and no disability groups (median 1, IQR 1-2), $p = 0.001$. Regarding psychosocial factors, 27.2% ($n = 28$) reported poor sleep quality, 69.9% ($n = 72$) medium daily stress, and 11.7% ($n = 12$) high stress level. Additionally, 64.1% ($n = 66$) had psychologically strenuous work, and only 7.8% ($n = 8$) attended psychological therapy. Regular physiotherapy significantly reduced pain compared to irregular exercise ($X^2 = 10.681$, $df = 1$, $p = 0.001$). Of patients, 26.2% ($n = 27$) did not follow the prescribed physiotherapy, and 23.3% ($n = 24$) did not adhere to pharmacological recommendations.

Conclusions

In conclusion, the main pitfalls include inadequate management of psychosocial aspects of CLBP, over-reliance on diagnostics rather than proactive management, and poor adherence to therapies. These findings highlight the need for a comprehensive, patient-centered approach that integrates physical and psychological interventions and improves treatment adherence.

Correlation of Neurodegenerative Biomarkers and Functional Outcome in Patients with Multiple Sclerosis

Poster

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Objectives*

Multiple sclerosis (MS) can manifest and progress with physical and cognitive symptoms, and we have various biomarkers to detect it. The aim of this study is to investigate biomarkers of neurodegenerative processes in patients with multiple sclerosis and assess their impact on the clinical course of the disease and functional outcome.

Materials and Methods

This cross-sectional study involved 45 patients with relapsing-remitting MS (RRMS) at Riga East University Hospital. Plasma neurofilament light chain levels (NfL) and magnetic resonance imaging (MRI) findings were analysed in relation to patient demographic characteristics, Expanded Disability Status Scale (EDSS) and cognitive performance measured using the Symbol Digit Modalities Test (SDMT) and the Brief Visuospatial Memory Test - Revised (BVMT-R).

Results

The median illness duration was 8 years; EDSS was 2.5 and the average age was 38 years, with 51% females and 49% males. Positive correlations were found between SDMT scores and total gray and white matter volumes ($p < 0.05$), as well as with various volumes of brain structures (all $p < 0.05$). Negative correlations were observed between SDMT scores and ventricular volumes (all $p < 0.05$). BVMT-R scores did not correlate with volumes of brain structure. Higher NfL levels were linked to more relapses in the first five years ($p < 0.05$) and correlated with third and fourth ventricular volumes ($p < 0.05$), but not with cognitive tests or EDSS score ($p > 0.05$). A significant positive correlation was found between EDSS score and disease relapses in the first five years ($p < 0.05$), while a negative correlation existed between EDSS and SDMT results ($p < 0.05$). EDSS scores negatively correlated with total gray matter, total white matter, and volumes of specific brain regions (all $p < 0.05$).

Conclusions

Our findings underscore the potential utility of combining volumetric MRI measurements and NfL analysis to monitor disease progression, cognitive function in RRMS patients. Future studies with larger cohorts can further validate the role of these biomarkers' in clinical practice.

Evaluating Changes in Initial Diagnosis and Treatment of Multiple Sclerosis with Updated Diagnostic Criteria: Retrospective Study

Poster

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Objectives*

The aim of this study was to investigate how the revised 2024 McDonald criteria, compared to the 2017 McDonald diagnostic criteria, particularly regarding visual diagnostics, might affect the early diagnosis, treatment, and prognostic outcomes in patients with suspected multiple sclerosis (MS).

Materials and Methods

A retrospective cohort study was conducted using data from the Pauls Stradins University Hospital database, including consensus decisions of MS specialists, initial magnetic resonance imaging (MRI) scans, lumbar puncture results, and clinical data of patients with suspected multiple sclerosis (MS) from 2020 to 2024. Diagnostic outcomes were compared using both the 2017 McDonald criteria and the proposed 2024 McDonald criteria. Statistical analyses were performed using IBM SPSS Statistics (version 29 for Windows, IBM Corp., Somers, NY, USA).

Results

Of the 79 patients evaluated for the treatment of probable multiple sclerosis, 15 did not meet the criteria for MS according to the 2017 McDonald criteria and, consequently, were not prescribed immunomodulatory treatment (IMT). Under the proposed 2024 McDonald criteria, 2 of these 15 patients (13%) could be diagnosed with MS and considered for early treatment. However, this change was not statistically significant ($p = 0.5$).

Conclusions

Our study suggests that approximately 13% of patients could benefit from the newly revised 2024 McDonald criteria, as they were not diagnosed with multiple sclerosis (MS) under the 2017 criteria. These findings highlight that the updated criteria may facilitate earlier and more timely initiation of immunomodulatory treatment, as well as the implementation of more aggressive treatment strategies for certain patients. While the proportion of newly diagnosed cases remains modest, this observation underscores the robustness of the previous criteria while demonstrating the potential for refinement to enhance early diagnostic accuracy and improve intervention strategies.

Migraine-Type Headache in Children at Children’s Clinical University Hospital

Poster

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Objectives*

Introduction. Primary headaches in a child’s age include migraine. Migraine is an acute headache syndrome. Division by clinical course: migraine without aura or ordinary migraine and migraine with aura(warning symptoms) or classical migraine.

Objectives. Characterize patients with migraine - type headaches in children (children under 18 years of age) at Children’s Clinical University Hospital. A retrospective study that analyzes patient data using the electronic documentation database “IS Saule” and “IS Andromeda”

Materials and Methods

The study includes patients with the final diagnosis migraine - type headache – ICD – 10, code G43.0 – G43.9. Patients from 01.01.2018 - 31.12.2023.

Results

A total amount of 933 children were marked with migraine - type headaches in the electronic register of “IS Saule” and “IS Andromeda”. The “IS Andromeda” registry had 63 patients and “IS Saule” 870 patients. Taking into account the total amount of available data information according to the statistical methodology, a representative sample of data for “IS Saule” patients was created and 435 patients were analyzed. A total of 498 patients were analysed, a total of 287 girls and 211 boys.

Conclusions

The results showed that girls with migraine headaches were more likely to register (58% girls and 42% boys). Registration of patients according to the type of service (inpatient, outpatient service) the total flow of patients increased every year from 2018. (48 patients) to 2023. (138 patients). Migraine with aura is the most common type of migraine headache in children. Migraine with visual aura is the most common type of aura in children. Nonsteroidal Anti-Inflammatory drugs were the most commonly recommended drug therapy and most commonly recommended prophylactic therapy was Topiramate.

Plasma Neurofilament Light Chain as a Biomarker of Disease Progression and Brain Atrophy in Relapsing-Remitting Multiple Sclerosis

Poster

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Objectives*

Neurofilament light chain (NfL) is a promising biomarker for neurodegenerative diseases, particularly MS, where it indicates axonal damage and neurodegeneration.

This study aims to evaluate the relationship between plasma NfL (pNfL) levels and functional status and brain atrophy in relapsing-remitting multiple sclerosis (RRMS) patients.

Materials and Methods

Conducted as a longitudinal study from 2018 to 2024 at Riga East University Hospital, the research involved patients with RRMS. Functional status was assessed using the Expanded Disability Status Scale (EDSS), along with demographic data, pNfL levels, and magnetic resonance imaging (MRI) data analyzed using "Icometrix" for changes in brain volume.

Results

The study included 50 MS patients (26 women; 24 men) with a mean age of 44.54 years. A statistically significant positive correlation ($p < 0.05$) was found between age and pNfL levels, and older patients showed higher levels. Over five years, EDSS progression was observed in 65% of women and 42% of men, with the average EDSS score increasing from 2.35 to 2.83. While the correlation between pNfL levels and increased EDSS over five years was positive but not statistically significant ($p = 0.35$), higher pNfL levels consistently aligned with elevated EDSS scores. There is a statistically significant correlation between pNfL and the number of MS relapses ($p < 0.05$), with patients with more relapses having higher pNfL levels. Analysis showed that higher pNfL levels were associated with reduced brain volume. Higher pNfL levels were linked to increasing juxtacortical lesions ($p = 0.11$), but no significant differences were found in patients with infratentorial ($p = 0.83$) or periventricular lesions ($p = 0.63$).

Conclusions

The findings suggest that elevated pNfL levels correlate with an increase in the number of juxtacortical lesions, higher EDSS scores, and reduced brain volume in patients with RRMS, indicating its potential role as a biomarker for the progression of RRMS. More studies with larger cohorts are needed to confirm its efficacy in monitoring disease progression.

Trigeminal Neuralgia in Multiple Sclerosis Patients: Short Case Series

Poster

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Objectives*

According to International Classification of Headache Disorders third edition (ICHD-3), trigeminal neuralgia (TN) attributed to multiple sclerosis occurs in 2-5% of patients with multiple sclerosis (MS). TN is severe facial pain due to malfunction of the 5th cranial nerve. MS is a chronic demyelinating disease of central nervous system. In some patients' neurovascular conflict (NVC) of the trigeminal nerve root coexist with pontine plaque at the root entry zone (REZ) determining condition as “double crush” phenomenon.

A 50- and 57-year-old females presented to the clinic with a 9- and 7-year history of right-side TN. Both patients were undergoing MRI scan and electrophysiological study – blink reflex. The first female presented with normal blink reflex, but the second case blink reflex indicated relatively longer R1 latency on the right side. In the 3D CISS thin-slice T2 series, a loop of the right superior cerebellar artery is observed compressing the nerve, but more pronounced in-patient No. 2. Additionally, both patients exhibit a lesion at the level of the pons in the FLAIR sequence, suggesting a possible “double crush” phenomenon.

Neurovascular conflict diagnosis requires an in-depth understanding of the clinical aspects of neuroanatomy, neurophysiology, and clinical aspects of cranial nerve dysfunction. Limited data on microvascular decompression for MS-related TN, new studies are needed. 3D FIESTA, CISS and MRI angiography sequences are the most sensitive tools available to radiologists today, allowing optimal detection of cranial nerve root entrance area of vascular compression. To increase the accuracy of diagnosis of neurovascular conflict, we need information from more advanced neuroimaging techniques, radiologists need to take a systematic approach to imaging and carefully apply the recommended criteria and to reduce false-negatives and false-positives reports.

Vitamin D and Newly Diagnosed Multiple Sclerosis

Poster

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Objectives*

Multiple sclerosis (MS) is a chronic, immune-mediated neurodegenerative disease, and vitamin D deficiency has been suggested as a potential modifiable factor influencing disease activity. This study aimed to explore the relationship between vitamin D levels and MS activity, as measured by brain magnetic resonance imaging (MRI findings), relapse frequency, and the Expanded Disability Status Scale (EDSS).

Materials and Methods

Data from ninety patients newly diagnosed with MS was analyzed in this study, focusing on serum vitamin D levels, the number of lesions on brain MRI, the frequency of relapses prior to MS diagnosis, and EDSS scores. Spearman's correlation coefficient was applied to examine the relationship between vitamin D levels and both clinical and radiological markers of MS activity.

Results

The mean serum vitamin D level among the participants was 26.96 ng/mL (SE = 1.37), with a median value of 25.2 ng/mL, spanning a range from 6.84 to 62.5 ng/mL, while in Latvian population average level of vitamin D is 32.8 ng/mL. The mean number of lesions observed on brain MRI was 23, with a median of 19.5. The average frequency of relapses prior to diagnosis was 2, with a median of 1. The mean EDSS score was 2.0, matching its median value.

No statistically significant correlations were identified between serum vitamin D levels and the following markers: the number of lesions on brain MRI ($r = 0.089$, $p = 0.414$); the frequency of relapses ($r = 0.057$, $p = 0.482$), or EDSS scores ($r = 0.016$, $p = 0.880$).

Conclusions

The study found no significant correlation between serum vitamin D levels and markers of MS activity, such as MRI lesion number, relapse frequency, or EDSS scores. This lack of statistical reliability may be attributed to several factors, including: small sample size, disease heterogeneity, confounding variables: factors such as prior vitamin D supplementation before diagnosis might influence serum vitamin D levels and complicate the interpretation of results.

To clarify the role of vitamin D in the pathogenesis and progression of MS, larger, longitudinal studies with a more comprehensive approach to controlling confounders are essential.

Nosocomial Infections

Healthcare-Associated Infections and Antimicrobial Resistance: Point Prevalence Study in a Tertiary Care Hospital

Oral

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Objectives*

Antimicrobial resistance (AMR) presents a global health threat, driven by inappropriate antibiotic use and healthcare-associated infections (HAIs). This study evaluates the prevalence of HAIs and antibiotic usage in a multidisciplinary tertiary care hospital, analyzes pathogen and AMR trends, assesses adherence to prescribing guidelines, and lays the groundwork for future recommendations for antimicrobial stewardship optimization.

Materials and Methods

A point prevalence survey was conducted on 874 hospitalized patients, using the European Centre for Disease Prevention and Control (ECDC) protocol tailored to local needs. Data included antibiotic prescriptions, usage indications, administration routes, and HAI types. Microbiological analyses identified pathogen profiles and resistance patterns, with results stratified by department and indication (e.g., community-acquired infections, HAIs, medical and surgical prophylaxis).

Results

HAIs were identified in 66 patients (7.55%), with surgical site infections (22.7%), urinary tract infections (21.5%), and pneumonia (15.2%) being most common. Of 874 patients, 357 (40.9%) received antibiotics, primarily administered intravenously (59.1%). Ceftriaxone (29.4%), metronidazole (16.0%), and sulfamethoxazole-trimethoprim (13.5%) were the most prescribed antibiotics. *Klebsiella pneumoniae* (21.2%) and *Enterococcus faecalis* (18.2%) were the most common pathogens. The most prominent resistance patterns included *Acinetobacter baumannii* resistance to carbapenems (31.8%) and *Klebsiella pneumoniae* resistance to third-generation cephalosporins (18.2%) and carbapenems (13.6%). Adherence to single-dose surgical prophylaxis was 47.8%, with unnecessary prolonged use in 50%.

Conclusions

This study underscores the significant burden of healthcare-associated infections (HAIs) and overuse of broad-spectrum antibiotics, non-adherence to prophylaxis guidelines, and multidrug-resistant pathogens. Implementing evidence-based stewardship strategies, optimizing prescribing practices, and enhancing diagnostic and surveillance capacities are essential to combat AMR effectively. This study was supported by the State Research Program project (VPP-VM-sabiedribas_veseliba-2023/5-0001).

Propagation of Acquired Virulence Traits by Multi-drug Resistant Carbapenemase-producing *Klebsiella pneumoniae* in the Hospital Network in Latvia

Oral

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Objectives*

The spread of multi-drug resistant (MDR) carbapenemase-producing *Klebsiella pneumoniae* with acquired pathogenicity-enhancing virulence determinants jeopardises healthcare. Aerobactin, responsible for iron acquisition, is considered to occur at low frequency amongst hospital-associated MDR clinical isolates whilst residing in hypervirulent, antimicrobial-susceptible *Klebsiella pneumoniae*. We evaluated the carbapenemase-producing MDR *Klebsiella pneumoniae* isolates submitted to the National Microbiology Reference Laboratory (NMRL) by hospitals from May 2022 to June 2024 for the presence of aerobactin and determined their genomic relatedness.

Materials and Methods

Genomic DNA was extracted with DNeasy Blood & Tissue Kit (Qiagen), prepared with DNAPrep (Illumina), and sequenced on NextSeq550/NovaSeq6000 (150PE), yielding an average of 10 million read-pairs per sample. Sequence type (ST), capsular antigen locus (KL), resistance and acquired virulence genes were detected by Kleborate (v2.2.0). MDR was defined as acquired resistance to ≥ 3 drug classes. Genomic relatedness was determined by cgMLST-Pasteur scheme (chewBBACA v3.1.2 and Ridom scheme v2023-05-05).

Results

Isolates from five central (n = 834) and 15 regional hospitals (n = 115) were analysed, with the in-flow sustained by mandatory submission of carbapenemase-producing Enterobacterales to the NMRL. 881/949 (93%) isolates were MDR. Of those, 93% (823/881) produced one or more carbapenemases. 47% (389/823) of carbapenemase-producing MDR isolates contained aerobactin. The majority (94%; 366/389) were ST147, KL64, with identical gene variants of the aerobactin operon (*iucA* 46; *iucB* 1; *iucC* 1; *iucD* 1; *iutA* 1) and closely related (345/366) within five allelic differences. Most of these isolates (74%; 252/345) contained resistance genes to aminoglycosides, fluoroquinolones, phenicols, rifamycin, sulfonamides and β -lactams. Furthermore, 37% (127/345) possessed the hypervirulent strain derived regulator for mucoid phenotype *rmpA2*.

Conclusions

This suggests a clonal spread and selection of pathogenicity-enhancing virulence and immune evasion traits mediated by MDR carbapenemase-producing *Klebsiella pneumoniae*. The results of this study call for empowered infection prevention, control and antimicrobial stewardship measures in the hospitals.

Oncology

BRCA1/2 Genetic Population Screening: Are we ready?

Oral

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Objectives*

Approximately 80% of *BRCA1/2* positive breast and ovarian cancers are diagnosed at stages II-IV. Despite the availability of modern treatments, the associated morbidity, mortality and costs remain significant. Therefore, the identification of *BRCA1/2* carriers in a presymptomatic stage is the ultimate goal to improve the prognosis for individuals at risk of HBOC. The aim of this pilot study was to evaluate the feasibility of the *BRCA1/2* population screening in Latvia.

Materials and Methods

The pilot study was conducted utilizing the digital participant engagement and consent management tool, “Longenesis Engage”. Women who consented to participate in breast cancer risk assessment projects on “skrinings.lv” were invited via email, as well as through an email campaign initiated by “Lindex”. Females (25-59y) without a personal cancer history and signed informed consent were included in the pilot. The saliva sample were collected and tested for SNV and CNV *in BRCA1/2*. Negative results were communicated digitally. In case of pathogenic variant detected, person was contacted by phone.

Results

A total of 3438 invitation emails were sent as part of the research initiative. Of the recipients, 49% opened the email, and within this group, 54% visited the project's digital platform to access project information. Of those who visited the platform, 79% provided informed consent, with the majority (86%) opting for a digital signature. Only 67% (490) saliva samples were received - an overall response rate of 14.26% for the initial phase of the project. To test direct approach response rate, three gynaecological practices were involved to offer participation in the pilot (49 opt in). In total 8/539 analysed cases *BRCA1/2* pathogenic variants were identified, leading to the variant detection rate 1.49%.

Conclusions

The pilot study results suggest that *BRCA1/2* population screening through digital communication channels is a viable approach. The results confirm high *BRCA1/2* frequency in the population of Latvia. However, refinement of screening methodology is needed. The study is supported by funding from RSU and by the private company “Lindex”. In-kind contributions generously provided by the “Longenesis” and “E. Gulbja Laboratory”.

Can we Make “Smarter” Chemotherapy Drug Combinations?

Oral

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Objectives*

Smarter combination chemotherapies represent a critical step forward in cancer treatment. They leverage scientific advances in tumor biology, genetics, and functional assays like BH3 profiling to design tailored, precise, and effective regimens. These approaches maximize cancer cell death while minimizing harm to the patient, ultimately improving the chances of durable remission and quality of life.

BH3 profiling identifies vulnerabilities in cancer cells' apoptotic pathways, allowing researchers to tailor drug regimens that synergistically target these weaknesses. This precision approach could enhance the efficacy of chemotherapy while minimizing toxic side effects.

Materials and Methods

Dynamic BH3 profiling (DBP) allows to evaluate how a brief drug treatment increases the priming for apoptosis – how close or far away the cell is to dying. Here, after drug treatment we add the synthetic peptides (pro- and anti-apoptotic), that causes primed mitochondria to release cytochrome c that can be measured by immunofluorescence.

Results

The protocol and workflow for high throughput DBP for kinetics of apoptotic priming were developed and fast and slow-acting drugs were determined on liposarcoma (LPS) cell lines. Some drugs, e.g., Navitoclax, induces apoptotic priming in one of LPS lines already in 1st h after addition. Priming kinetics patterns are cell- and drug-intrinsic as determined in LPS and breast cancer cell lines. Based on the mechanism of target/action of drug, LPS cells can change the anti-apoptotic dependency, allowing to identify vulnerability of these cells. In addition, knowing the peaks of drug-induced apoptotic priming time, the offset combination of 2 drugs showed better cell death efficiency than using simultaneous treatment.

Conclusions

Kinetics of drug induced apoptotic priming and drug induced anti-apoptotic dependencies varies based on target/mechanism of action. DBP captures the rapid activity of drugs across different classes. The apoptotic priming kinetics of these compounds can inform the timing of drug addition to result in additional cell killing.

Clinical Characteristics and Treatment of Gallbladder Cancer: 5-Year Retrospective Analysis from Tertiary Referral Hospital

Oral

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Objectives*

Gallbladder cancer (GBC), though rare, is an aggressive malignancy with a poor prognosis, comprising 80–95% of all hepatobiliary cancers. The aim of the study was to analyze the clinical and histopathological features of GBC treated at a tertiary referral hospital in Latvia.

Materials and Methods

A retrospective analysis of 26 patients treated at the Riga East University Hospital with histologically confirmed GBC between 2019 and 2024.

Results

The mean age at diagnosis was 69 years (range 63-77.5), with a male-to-female ratio of 1:3. Emergency admission was required in 9 (34.6%) patients. The most common initial presentation of tumor was RUQ pain (53.8%), followed by jaundice (26.9%), cholangitis (3.8%) and other nonspecific symptoms (23.1%). Radiological assessment showed gallbladder wall thickening and gallbladder mass in 4 (15.4%) and 12 (46.2%) patients, respectively. In addition, gallstone disease was identified in 13 (50%) patients. Stage IV disease was confirmed in 50%, and distant metastases were observed in 11 (42.3%) patients. Notably, GBC was not suspected in half of patients in the preoperative examination. Simple cholecystectomy was performed in 17 (65.4%) patients, of whom 13 (50%) had acute cholecystitis, while 4 (15.4%) underwent surgery for histological tumor verification. Nine patients (34.6%) underwent extended surgical resection. Moreover, 4 (15.4%) patients underwent additional re-resection following initial cholecystectomy. Negative surgical margins were achieved at 76.9%. The pathology analysis revealed adenocarcinoma in 24 (92.3%), squamous cell carcinoma in 1 (3.8%), and NET in 2 (3.8%) patients. 7.7% of all tumors were Grade I, 73.1% - Grade II, 19.2% - Grade III. Adjuvant chemotherapy was administered to 11 (42.3%) patients. Overall, 19 (73.1%) patients died during the study period.

Conclusions

GBC is a rare and aggressive malignancy often diagnosed at advanced stages. In our study half of GBC were incidentally diagnosed following cholecystectomy, highlighting the challenges of early disease detection.

Epidemiology of Hereditary Ovarian Cancer

Oral

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Objectives*

To investigate the prevalence of germline pathogenic and likely pathogenic *BRCA1/2* variants (hereditary ovarian cancer) in ovarian cancer patients.

To assess the differences in age at breast cancer diagnosis, histological subtypes, family cancer history, and the prevalence of various genetic variants, as well as their associations within the patient population.

Materials and Methods

Next generation sequencing (NGS) of *BRCA1/2* genes in blood samples was performed for a total of 180 patients previously diagnosed with ovarian cancer. Single nucleotide variants (SNVs) and copy number variation (CNV) were assessed and pathogenic/likely pathogenic (P/LP) variants were confirmed either with Sanger sequencing or MLPA. Tested patients had enrolled in the research program from 2005 until 2020 and had been diagnosed with ovarian cancer from 1982 until 2018. Each enrolled patient completed a survey detailing tumour histology, personal and family history of cancer. Retrospective data analysis was performed.

Results

Pathogenic/likely pathogenic *BRCA1/2* variants were identified in 39 patients (21,7%) - 31 in *BRCA1* gene, 7 in *BRCA2* gene and one patient was a double heterozygote. 11 different SNVs and 1 CNV were identified in *BRCA1* vs 6 SNVs and 1 CNV in *BRCA2*. There was no difference in mean age of diagnosis (P/LP *BRCA1/2* variants identified 57,7 years vs. 58,5 years no variants identified). More than half of cases in both groups were stage III/IV and had histology of epithelial origin. 8 (21,5%) patients with P/LP variants also had a diagnosis of breast cancer vs. 2 (2,1%) patients with no P/LP variants.

Conclusions

Hereditary ovarian cancer is rather common and should be suspected in all patients diagnosed with ovarian cancer.

Age at diagnosis, stage, histology type and family history of cancer did not differ between hereditary and sporadic cases whereas personal history of breast cancer was more common among hereditary cases associated with P/LP *BRCA1/2* variants.

Genotype / Phenotype Correlation in BRCA1 Founder Variants

Oral

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Objectives*

Previous research suggests, that primary breast cancer (PBC) and ovarian cancer (OC) risks can be modified by mutation location in *BRCA1* gene.

In this study we assessed and compared the risks of contralateral breast cancer (CBC) and OC after PBC in carriers of regionally frequent *BRCA1* founder pathogenic variants (PV) c.5266dup and c.4035del.

Materials and Methods

In the analysis of CBC and OC risk, 1364 cases with *BRCA1* PV and PBC were included. The control group consisted of 11350 consequent unselected and unscreened cases with PBC. Follow-up started at the time of PBC diagnosis and continued till the event of CBC or OC had occurred. The cumulative risks of CBC and OC were calculated using the Kaplan-Meier analysis. Age younger than 40 years at PBC was proposed as a risk factor for CBC/OC and was calculated using cox proportional hazards model.

Results

Cumulative 10 year risk of developing CBC and OC was 3.0% and 1.0% in control group, 20.1% and 10.8% in study group of *BRCA1* carriers (log-rank $p < 0.001$). Cumulative risk of CBC at 10,15 and 20 years was 25.0%, 37.0% and 51.4% in PV c.5266dup subgroup, as compared to 14.1%, 27.2% and 44.5% in PV c.4035del subgroup (log-rank $p = 0.045$). Age younger than 40 years at the time of PBC was risk factor for CBC (hazard ratio 2.06, $p < 0.001$), but not for OC (hazard ratio 1.03, $p = 0.23$).

Conclusions

The data of this study confirms that in cases of PBC the risk of CBC and OC is increased significantly for both *BRCA1* founder variant carriers in comparison to general unscreened population. Moreover, PV c.5266dup is associated with higher CBC risk in comparison to PV c.4035del. Age younger than 40 years at diagnosis of PBC is risk factor for CBC, but does not seem to alter the risk of OC.

Gut Microbiome Analysis in Breast Cancer Patients with Neo-Adjuvant Therapy

Oral

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Objectives*

Cancer is a leading cause of global mortality. Despite modern advancements in cancer treatment, many patients still face therapy resistance and severe side effects for which the underlying factors remain unclear. One important factor is the diversity of the gut microbiome, which influences chemotherapy response, side effects, and overall prognosis. The results could be a base for perspective biomarkers to identify potential predictive factors for personalized treatment strategies. This study aims to explore the dynamics of gut microbial diversity in breast cancer patients undergoing neoadjuvant chemotherapy (NAC) and to identify significant taxa abundance changes between the therapy outcomes.

Materials and Methods

Microbial DNA was isolated from stool samples taken at three time points: before, during and after treatment, and libraries were prepared for next-generation sequencing using the shotgun method. Taxonomical annotation and determination of the relative abundance (%) of taxa was done with MetaPhlan4.

Results

A total of 42 stool samples collected from 14 patients were analyzed. Five patients after the neoadjuvant therapy achieved pathological complete response (pCR). Comparison between response group and no response group (n = 9) showed differences in taxa abundances and changes in microbial diversity metrics (Chao1, Simpson and Shannon index) across different time points.

Conclusions

Distinct tendencies were observed in the dynamic changes of certain microbial taxa, as well as the overall diversity metrics, between different therapy outcomes. More research is needed in larger patient populations to verify the results.

Role of Breast MRI in Early Cancer Detection Among BRCA1/2 Mutation Carriers: Retrospective Cohort Analysis

Oral

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Objectives*

This study aimed to evaluate the role of breast MRI in the early detection of breast cancer in BRCA1/2 mutation carriers, focusing on its sensitivity in asymptomatic and symptomatic individuals.

Materials and Methods

300 participants underwent breast MRI screening, with or without prior symptoms, between 2019 and 2024. A retrospective cohort study data was divided into three groups:

- 1) known BRCA 1/2 positive patients with no clinical symptoms (asymptomatic);
- 2) known BRCA 1/2 positive patients with symptoms such as breast lumps, pain, nipple discharge or with a pathological finding on different radiological examinations such as US or MG;
- 3) patients undergoing sectoral resection due to breast cancer with positive BRCA 1/2 mutation detected post-operatively.

Suspicious findings on MRI were confirmed by biopsy or in surgery specimen. Data on age, tumour size, other characteristics of cancer spread, and cancer detection rates were analyzed. Patients who underwent neoadjuvant chemotherapy or did not undergo breast MRI were excluded from further analysis.

Results

The results will be presented at the conference.

Conclusions

MRI screening is a highly effective tool for the early detection of breast cancer in asymptomatic patients with BRCA 1/2 mutations. Incorporating annual MRI screening into standard guidelines for BRCA 1/2 mutation carriers in Latvia can lead to earlier detection, less invasive treatments, and improved survival rates. Healthcare systems should adopt MRI as the preferred screening modality for BRCA-positive patients, alongside genetic counseling and risk-reduction strategies. Further research is warranted to optimize screening intervals and reduce false-positive rates.

Statins as Adjuvant Therapy for Colorectal Cancer

Oral

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Objectives*

Statins, which inhibit HMGCR, a rate-limiting enzyme of cholesterol synthesis, are widely used to lower blood cholesterol levels. Cholesterol plays a key role in cancer cell proliferation by promoting membrane synthesis, cell signaling and vesicular trafficking. The aim of this study was to evaluate the potential of statins as a treatment for colorectal cancer - the third most common cancer worldwide and the second leading cause of cancer death - and to examine their effects on mitochondrial activity.

Materials and Methods

The study used CaCo2 and HCT116 colorectal cancer cell lines to evaluate the effects of six statins: cerivastatin, atorvastatin, simvastatin, fluvastatin, pravastatin and rosuvastatin. Experiments included viability assays, apoptosis analysis by flow cytometry, high-resolution respirometry, mitochondrial imaging by Mitotracker Red, and synergy calculations by Bliss' method. Furthermore, kinome profiling was conducted for simvastatin, atorvastatin, and cerivastatin, evaluating their effects on over 450 kinases, including wild-type and cancer-associated mutant variants.

Results

Statins reduce colorectal cancer cell viability at micromolar concentrations, with cerivastatin showing the strongest antitumor activity. Synergistic effects were observed with 5-fluorouracil (5-FU) when combined with atorvastatin, simvastatin, or fluvastatin. Cell death induced by statins occurs through apoptosis and necrosis. Statins also significantly impact mitochondria function by reducing oxidative phosphorylation (OXPHOS), particularly in complexes I, II, and IV, while increasing mitochondrial membrane potential. Moreover, they inhibit kinases such as CAMK1G and TSSK1B at micromolar concentrations *in vitro*.

Conclusions

The repurposing of statins as adjuvants in the treatment of colorectal cancer is feasible due to their synergy with chemotherapeutics such as 5-FU. Their effects include altered mitochondrial function, with cytotoxicity linked not only to HMGCR inhibition, but also to off-target effects on specific kinases.

COL1A1 and COL3A1 Genes Expression as Markers for Bone Metastasis Development in Prostate Cancer Patients

Poster

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Objectives*

The primary protein of the extracellular matrix is collagen. It has been established that collagen, along with changes in collagen presentation, density, and spatial organization, significantly influences tumor cell proliferation, migration, and invasion. **The aim:** To investigate the association between the expression levels of *COL1A1* and *COL3A1* at the mRNA and protein levels and the development of bone metastases in patients with prostate cancer (PCa).

Materials and Methods

The work is based on a retrospective analysis of the results of the examination and treatment of 45 patients with PCa at stages II–IV, who were treated at the National Cancer Institute (Kyiv, Ukraine) from 2015 to 2021. *COL1A1* and *COL3A1* gene expression at the mRNA level in PCa tissue was evaluated using RT-PCR. The expression of *COL1A1* and *COL3A1* proteins in PCa tissues was assessed using immunohistochemistry with specific monoclonal antibodies. The results were analyzed using the IHC Profiler plug-in for ImageJ software. Statistical analysis was performed using GraphPad Prism 8 software.

Results

The patients with prostate cancer were divided into two groups: those without bone metastases (Group 1, n=25) and those with bone metastases (Group 2, n=20). A heterogeneous pattern of *COL1A1* and *COL3A1* expression at both the mRNA and protein levels was observed in PCa tissues. Significantly higher expression levels of *COL1A1* (by 25%; $p<0.05$) and *COL3A1* (by 20%; $p<0.05$) were detected in tumor tissues from PCa patients with bone metastases compared to patients without metastases. No association was found between the mRNA levels of the studied genes and the development of bone metastases.

Conclusions

The identified relationship between the features of *COL1A1* and *COL3A1* expression in primary tumor tissues and the development of bone metastases underscores the need for further research in this area.

Different Trends of Expression Pattern of MRPS18-2 and KLF-4, -6 in Medulloblastoma Samples

Poster

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Objectives*

Mitochondrial ribosomal protein S18-2 (MRPS18-2, MRPS18B) is an oncoprotein that is overexpressed in breast, prostate, and endometrial tumors, hepatocellular carcinoma, lymphomas, and several types of gliomas. We have shown earlier that MRPS18-2 interacts with retinoblastoma-associated protein (RB) to repress genes, supporting differentiation of stem cells. We have found recently that a promotor region of the *MRPS18-2* gene has several binding sites for the transcription factors KLF-4 and -6, playing an important role in embryonic development and cancerogenesis.

Here we aimed to assess expression patterns of *MRPS18-2*, *RB*, *KLF-4* and *-6* genes at mRNA and protein levels in brain tumors, namely, medulloblastomas (MBs). Despite being a rare form of tumor, it is a life-threatening condition. It is of high importance, to propose the new molecular markers for the personalized treatment of MB patients.

Materials and Methods

The relative gene expression at mRNA levels in blood and tumor tissue was assessed by qPCR. The total RNA was isolated from samples obtained from 10 patients with MB. The data obtained by qPCR were statistically evaluated with a GraphPad Prism software. Protein levels were assessed in tumor tissue samples by a western-blot analysis and immunohistochemistry.

Results

Expression patterns of *MRPS18-2*, *KLF4* and *KLF6* differs between groups of children and young adults. The relative *MRPS18-2* expression levels were high in both groups, but significantly lower in tumor tissue of children. The mRNA levels of the *KLF4* gene were increased in the above-mentioned group, and *KLF6* – decreased. Moreover, the MRPS18-2 protein signal was dramatically elevated in medulloblastoma cells, compared with the conditionally healthy brain tissue.

Conclusions

The differential expression pattern of the *MRPS18-2*, *KLF4* and *KLF6* genes suggest that they might serve as putative tumor markers of MB. The present study should be expanded, and a larger cohort of MB patients should be evaluated.

Effect of Lectin on Proliferative Activity of Breast Cancer Cells in the in vitro System

Poster

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Objectives*

Despite advances in the treatment of breast cancer (BCa), existing therapeutic strategies often have limited effectiveness due to the development of resistance. Recent studies have shown that bacterial lectins not only have the ability to immunomodulate, but also have the potential to directly affect tumor cells, which opens up new prospects for the treatment of BCa.

Materials and Methods

Breast cancer (BCa) lines T47D, and MDA-MB-468 were cultured in complete Dulbecco's modified Eagle's medium containing 10% FBS at 37°C in a 5% CO₂ atmosphere. The bacterial lectin (B.subtilis IMV B-7724) was obtained from the fluid B. subtilis IMV B-7724 culture. To determine the action of the lectin, cells were cultured with the addition of the agent at IC₃₀ concentrations (230 µg/ml for T47D and 190 µg/ml for MDA-MB-468 cell line) within 24 hours. Protein expression was investigated by immunocytochemistry. The cell cycle was studied using propidium iodide. Apoptosis status was analyzed using AnnexinV assay.

Results

The cell cycle features analysis showed that cultivation of T47D and MDA-MB-468 cells with the addition of lectin to the medium led to a statistically significant increase in the proportion of cells in G₂/M phase by 1.97 and 1.84 times, respectively. It was found that lectin caused a significant increase in the proportion of MDA-MB-468 cells in the state of apoptosis (by 16.82%) and necrosis (by 9.49%). In addition, under the influence of lectin, a decrease in the expression of Ki-67 (14.8 and 5.6 times for T47D and MDA-MB-468 cells, respectively) and BCL-2 (2.6 and 80.4 times for T47D and MDA-MB-468 cells, respectively) was observed.

Conclusions

The results obtained indicate the ability of IMV B-7724 lectin to inhibit cell proliferation through G₂/M cell cycle arrest and induce apoptosis, which indicates the prospects of its use for the treatment of BCa. This study was supported by the research program №0121U113840.

Impact of Waiting Time until Surgery on Tumour Pathomorphosis in Rectal Cancer Following Neoadjuvant Chemoradiation Therapy

Poster

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Objectives*

Rectal cancer response to neoadjuvant chemoradiation therapy (nCRT) is time-dependent. Traditionally, the recommended interval between completion of nCRT to surgery is 6–12 weeks. An extended waiting time may be associated with improved tumor pathomorphosis and the possibility of achieving a complete pathological response. The optimal timing of surgical resection of rectal cancer after nCRT remains controversial and is studied in trials.

Materials and Methods

Patients with morphologically and radiologically verified stage II and III rectal adenocarcinoma who received neoadjuvant chemoradiation therapy (nCRT) followed by radical surgical treatment during the period from 2016 to 2021 at Pauls Stradiņš Clinical University Hospital (Riga, Latvia) were included. The post-treatment tumor pathomorphosis was evaluated in formalin-fixed, paraffin-embedded (FFPE) tissue samples according to the Dworak classification. The potential impact of the waiting time from the completion of nCRT to surgery on tumor pathomorphosis was evaluated. The statistical analysis was provided with MS Office Excel 2010 and EasyMedStat (version 3.38).

Results

A total of 82 patients were involved in the study. According to the Dworak classification (0-4): Dw0 (n=4), Dw1 (n=13), Dw2 (n=29), Dw3 (n=23), Dw4 (n=13). The overall time interval from nCRT until surgery ranged from 6 to 37 weeks. The mean waiting time in the Dworak groups was: 14.5 (IQR 3.75) in Dw0; 15.0 (IQR 6.0) in Dw1; 13.0 (IQR 4.0) in Dw2; 14.0 (IQR 5.0) in Dw3; 17.0 (IQR 5.0) in Dw4. Three study groups were established based on the duration of waiting time: Group 1 (6-11 weeks), Group 2 (12-16 weeks), Group 3 (>17 weeks). The association between Group and Dworak was tested with Fisher's exact test; however, no statistical significance was found (p=0.178).

Conclusions

In our study, no correlation was found between the waiting time from the completion of nCRT to surgery and tumor pathomorphosis.

Interactions between BRAF V600 and NRAS Mutations, Tissue Characteristics and Survival in Cutaneous Melanoma

Poster

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Objectives*

Objectives. This study investigates the relationships between BRAF V600 and NRAS mutations and their effects on the presence of multinucleated cells, lymphocyte infiltration, and mitotic index in cutaneous melanoma. Additionally, it evaluates the combined impact of these factors on patient survival.

Materials and Methods

Materials and Methods. Mutations at BRAF (V600) and two NRAS loci (codons 12 and 13 in exon 1, and codon Q61) were analysed in 100 retrospective melanoma cases using digital droplet PCR. Linear models were employed to assess correlations between phenotypes, while univariate associations between genetic variants and phenotypes were evaluated using the Cochran-Armitage trend test. Survival analyses were performed using either broad phenotype categories or logarithmic transformations. The joint additive effect of genetic mutations and phenotypes were further explored in survival models.

Results

Results. Linear models identified a significant relationship between the presence of multinucleated cells and mitotic index on a logarithmic scale ($p = 0.0224$); however, no other linear correlations were observed. Stratified analyses showed that relationships between phenotypes varied depending on the genetic mutation. Specifically, BRAF V600 influenced the connection between multinucleated cells and lymphocyte infiltration, whereas NRAS mutations affected the relationship between multinucleated cells and mitotic index.

Univariate tests revealed significant associations between BRAF V600 and mitotic index ($p = 0.0358$) and an additive effect of NRAS and BRAF mutations with lymphocyte infiltration ($p = 0.0019$). Survival analyses identified mitotic index as a critical predictor of poor outcomes (logrank $p = 3 \times 10^{-5}$). Neither BRAF V600 nor NRAS mutations independently influenced survival, but mitotic index consistently demonstrated strong associations with poor prognosis.

Conclusions

Conclusions. This study highlights the complex interplay between genetic mutations and phenotypes in cutaneous melanoma, with mitotic index emerging as a key determinant of survival. Further research into nonlinear and joint effects is essential to uncover the underlying mechanisms and their biological implications.

microRNA Profile of Rectal Cancer

Poster

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Objectives*

The deregulation of microRNAs (miRNAs) contributes to the initiation, progression, and dissemination of various types of human cancer, including rectal cancer. MiRNAs are likely to play a predictive role in disease progression and response to chemoradiotherapy.

Materials and Methods

Patients with morphologically and radiologically verified stage II and III rectal adenocarcinoma who received neoadjuvant chemoradiation therapy (nCRT) followed by radical surgical treatment during the period from 2016 to 2021 at Pauls Stradins Clinical University Hospital (Riga, Latvia) were included. The post-treatment tumour pathomorphosis was evaluated in formalin-fixed, paraffin-embedded (FFPE) tissue samples according to the Dworak classification. For further analysis, 10 µm sections from the tumour and the proximal resection line were obtained. Extraction of total RNA (including miRNA) from FFPE tissue samples was performed using the miRNeasy FFPE Kit protocol. Twelve cases were selected for further profiling of tumour miRNA – six with a good response (GR) to the nCRT (Dworak 3) and six cases with a bad response (BR) to the nCRT (Dworak 0). The reverse transcription reaction for generating complementary DNA was conducted using the miRCURY LNA RT Kit. Reverse transcription polymerase chain reaction for miRNA profiling (a total of 768 miRNAs) in the selected samples was performed using the miRCURY LNA miRNA miRNome PCR Panels. The data obtained were analyzed using the QIAGEN GeneGlobe online data analysis tool.

Results

From the 768 miRNAs, those that were upregulated or downregulated in tumour tissue by at least two times with a $p < 0.05$ were selected as clinically significant. Twenty-three miRNAs in the BR group and nineteen miRNAs in the GR group met these criteria. All selected miRNAs, except four, showed a relation with oncogenes.

Conclusions

MiRNAs may potentially serve as clinical biomarkers in the evaluation of response to nCRT.

Prognostic Value of TGF- β in Breast Cancer Patients

Poster

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Objectives*

TGF- β is a tumor microenvironment (TME) key regulator in breast cancer (BCa), which promotes stromal remodeling by activating the proliferation and migration of malignantly transformed cells. In the early stages of the tumor process, TGF- β suppresses tumor growth, but during the progression of malignant neoplasms, it stimulates invasion and metastasis. Despite the significant interest in the study of the value of TGF- β in tumor growth, the relationship of its indicators with the BCa degree of spread has not been definitively clarified.

Materials and Methods

The study used postoperative material from 39 patients with stage I-II BCa who didn't receive neoadjuvant therapy and were treated at the Kyiv Clinical Oncology Center. TGF- β expression was studied by immunohistochemistry. A quantitative comparison independent groups was performed using the Mann-Whitney U-test.

Results

Expression of TGF- β was recorded in 36(92.3%) of the BCa investigated cases. Significantly higher rates of expression of the studied growth factor (by 2.4 and 1.33 times, respectively) were recorded in the BCa tissue of T2 category patients and in the presence of metastatic lesions of regional lymph nodes ($p=0.035$ and $p=0.007$, respectively) compared to T1 and N0 category patients. It has been proven that a decrease in the BCa grade is associated with a decrease of 87.1% ($p=0.042$) in TGF- β expression indicators compared to samples with tumor grade 1 and 2. There is no significant relationship between TGF- β expression and the molecular subtype and the histological type of BCa was discovered.

Conclusions

The identified relationship of TGF- β expression levels with lymph nodes involvement, stage, neoplasms size, and a high grade indicates the involvement of this growth factor in the BCa progression. This study was supported by the research programs “Development and Validation of Complex Treatment Technology for Breast Cancer Patients of Young Age”(0122U201203) and “Stress-induced tumor microenvironment factors as risk drivers of breast cancer progression”(0124U000078).

Relationship between Collagen Matrix Remodelling Proteins and the Clinical Status of Breast Cancer Patients

Poster

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Objectives*

Lysyl oxidase (LOX) and Procollagen-lysine,2-oxoglutarate 5-dioxygenase (PLOD) play a key role in the breast cancer (BCa) stroma remodeling, determining clinical manifestations aggressiveness and heterogeneity. The analysis of these markers' expression will contribute to the understanding of the relationships between the tumor molecular characteristics and its biological properties.

Materials and Methods

The study used the tumor tissue of 44 patients with stage I-II BCa treated at the Kyiv Clinical Oncology Center. The expression of LOX and PLOD in BCa tissue was studied immunohistochemically. Two independent groups were quantitatively compared using the Mann—Whitney U-test. Correlation analysis was performed using the Spearman test.

Results

The expression of LOX and PLOD was recorded in 35(79.55%) and 40(90.91%) of the BCa patients, respectively. The highest indicators of LOX expression were determined in the tissue of poorly differentiated BCa ($p=0.015$) of the T2 category ($p=0.046$) with the lymph nodes metastatic lesions ($p=0.031$). Luminal B molecular subtype BCa tissue was characterized by a significant increase in LOX expression ($p=0.012$ and $p=0.010$) compared to HER2/neu-positive and triple-negative BCa, respectively. It was found that PLOD expression was inversely correlated with tumor size ($p=0.023$), grade ($p=0.021$), and regional lymph node lesion status ($p=0.038$). A significant decrease in PLOD expression was recorded in luminal B BCa tissue compared to HER2/neu positive ($p=0.048$) and triple negative ($p=0.048$) subtypes.

Conclusions

Identified changes in the ratio of LOX and PLOD in BCa tissue and the revealed relationship between the expression of tumor stroma remodeling proteins and such indicators of breast cancer malignancy as categories T and N, as well as the molecular subtype, indicate the feasibility of their further study as prognostic markers of tumor progression. This study was supported by the programs “Development and Validation of Complex Treatment Technology for Breast Cancer Patients of Young Age”(0122U201203) and “Stress-induced tumor microenvironment factors as risk drivers of breast cancer progression”(0124U000078).

TNBC in vitro: The Role of Physiologically Relevant Conditions

Poster

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Objectives*

Breast cancer is the most frequent malignancy in women worldwide. Among its various subtypes, triple-negative breast cancer (TNBC) is particularly notable for its aggressive and heterogeneous nature, limited treatment options, high recurrence rate, and strong resistance to treatment. A common cell survival mechanism across various cancers, including TNBC, is apoptotic resistance, which can occur through the downregulation or inhibition of pro-apoptotic proteins, or the upregulation of anti-apoptotic proteins. Another critical factor contributing to cell survival and tumour heterogeneity in TNBC is tumour hypoxia. It has been associated with increased invasiveness, malignant progression, and death evasion mechanisms that contribute to therapy resistance. Given that hypoxia is prevalent in solid tumours, understanding how oxygen deprivation affects cellular responses is crucial. Until recently, traditional cell culture media formulations and their effects on cancer cell metabolism were overlooked. Here, we explore the induction of apoptotic priming in TNBC cell lines under conditions that closely mimic human breast tissue physiology.

Materials and Methods

The assessment of apoptotic priming is performed using BH3 profiling which is a peptide-based assay used to detect if a cell has a particular reliance on one or multiple anti-apoptotic proteins for survival. Using the BH3 profiling method, we assessed the readiness of TNBC cell lines to undergo apoptosis and their specific dependence on anti-apoptotic proteins in traditional growth media versus human plasma-like media (Thermo Fisher Scientific) and in normoxia versus physoxia (8% O₂).

Results

Preliminary observations indicate that each TNBC cell line exhibits distinct dependencies on anti-apoptotic proteins, underlining the heterogeneity and highlighting the diverse survival strategies employed by TNBC cells.

Conclusions

Exploration of cell death mechanisms under various conditions may reveal specific vulnerabilities that could be used to improve existing approaches to cancer treatment or develop new combination therapies.

Ophthalmology

Cataract Lens Morphology Analysis in Patients with Exposure to Extremely Increased Doses of Radiation (Chernobyl Ex Clean-Up Workers) and its Comparison with Non-Exposed Individuals

Oral

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Objectives*

Exposure to dangerously increased doses of radiation can cause severe damage to human body and its tissues. It is suggested that exposure to extremely increased doses of radiation can cause migration of human lens fibers towards the posterior cortex of the lens and cause formation of posterior subcapsular cataract. This research was carried out to evaluate whether Chernobyl ex clean-up workers have a higher prevalence of posterior subcapsular cataract.

Materials and Methods

The research included 15 eyes of healthy individuals, 15 eyes of Chernobyl ex clean-up workers who worked only in the city and 15 eyes of Chernobyl ex clean-up workers who worked on the roof of the reactor. A one-way analysis of covariance (ANCOVA) was conducted to compare lens thickness, posterior cortex thickness, and the percentage of the posterior cortex occupying the whole lens across research groups. Age was included as a covariate to statistically control for its potential influence on the dependent variables. Following the ANCOVA, Tukey's Honestly Significant Difference (HSD) test was used for post-hoc comparisons among the research groups. All statistical analyses were performed using Jamovi statistical software (<https://www.jamovi.org>) with a significance level of $\alpha = 0.05$.

Results

Tukey's Honestly Significant Difference (HSD) test showed that there is a statistically significant difference in posterior lens cortex thickness and the percentage it occupies in the whole lens between all of the groups ($p < 0,001$). There was also a statistically significant difference in the actual lens thickness between the groups ($p = 0,008$).

Conclusions

Our research shows that there is a significant difference in lens morphology in patients with exposure to extremely increased doses of radiation when compared to healthy individuals and that these high dose radiation affected patients have an increased prevalence of posterior subcapsular cataract.

Effect of anti-VEGF Drug Therapy on Foveal Thickness in AMD Patients with Serous RPE Detachment

Oral

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Objectives*

Various ocular and systemic diseases can be associated with pigment epithelial detachment (PED) the most common of which is age-related macular degeneration (AMD). In response to metabolic disturbances in retina, the retinal pigment epithelium (RPE) and retina produce various factors, including vascular endothelial growth factor (VEGF). Anti-VEGF intravitreal injections are used to reduce neovascularization.

The aim of our study was to compare the retinal foveal thickness response in patients with AMD serous PED to two different anti-VEGF medications, within Pauls Stradiņš Clinical university hospital, Ophthalmology clinic.

Materials and Methods

In total 34 eyes with AMD undergoing anti-VEGF therapy were analyzed. The images obtained with Heidelberg Spectralis OCT using retinal thickness maps in fovea were surveyed. The data were processed by MS excel and analyzed by SPSS. The comparison samples included 21 patients who received intraocular injections of Bevacizumab (N20 group) and 13 patients Faricimab (N13 group). Patients also were divided in to age groups: younger than 75y. (N9), 75y. and older (N25).

Results

Retinal thickness reductions in foveal region were observed in all study groups.

Bevacizumab group N21 retinal thickness decrease mean=145 μm (-144%) and Faricimab N13 decrease mean=104μm, (-376%). Using the Wilcoxon Signed Rank nonparametric test, a statistically significant reduction was demonstrated before and after therapy within both medication groups N21(p<0.001) and N13(p<0.002). Mann-Whitney U Test sought to confirm the hypothesis that treatment with faricimab required fewer injections to achieve positive results, however, a irrefutable statistically significant relationship was not confirmed (p=0.07,>0.05)

Conclusions

Both anti-VEGF therapies in the given samples had a positive effect on reducing the retina foveal thickness, however, a greater percentage reduction of pathological thickness was observed in the Faricimab group. In further research, by increasing the study sample, it is possible that a better therapeutic effect could be demonstrated with a smaller number of faricimab injections.

Effective Timing and Surgical Approach: Optimising Outcomes in Bilateral Macular holes: Case Report

Oral

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Objectives*

Macular holes are full-thickness disruptions in the macula, causing significant visual impairment, particularly in individuals over 60. They are more common in women and often associated with age-related vitreomacular traction. Bilateral macular holes are rare, occurring in only 10% of cases. Surgical intervention can reduce distortion and improve visual acuity. This case report demonstrates that the appropriate treatment strategy leads to the best possible outcome.

A 60-year-old female presented in June 2024 with progressive visual distortion and decreased visual acuity in both eyes, more significant in the left eye since March 2024. The patient had a history of upper eyelid blepharoplasty 10 years prior and currently is being treated for hypothyroidism and dyslipidemia.

On examination, best-corrected visual acuity was 0.2 in the right eye and 0.05 in the left eye. Optical coherence tomography (OCT) revealed full-thickness macular holes (FTMH) in both eyes, with diameters of 113 µm in the right and 431 µm in the left eye. Intraocular pressure was 21 mmHg in both eyes.

In July 2024, the patient underwent phacovitrectomy with internal limiting membrane (ILM) peeling and gas tamponade on the right eye. One month later, the left eye was treated with the same procedure. Five weeks postoperatively, the visual acuity improved to 0.8 in the right eye, while the left eye remained at 0.05. OCT showed closure of the FTMH, though atrophy of the retinal pigment epithelium and photoreceptor layers was noted in the left eye's fovea.

Surgical treatment is recommended for stage 2 or higher full-thickness macular holes, as spontaneous closure is minimal once a full-thickness defect occurs. Visual prognosis depends on the timing of surgical intervention and the age of the macular hole. The outcome of early diagnosed holes and prompt surgery is typically better compared to older, larger holes with delayed intervention.

Evaluating the 3-Hydroxykynurenine / Kynurenic Acid Ratio as a Diagnostic Biomarker for Cataract Progression

Oral

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Objectives*

Kynurenines, which are produced when the kynurenine pathway is activated by Indoleamine 2,3-dioxygenase, have been linked to protein alterations linked to the aetiology of cataracts. Our objective was to determine the 3-Hydroxykynurenine/Kynurenic Acid (3-HK/KYNA) ratio's significance as a possible biomarker for the development of cataracts.

Materials and Methods

The study included 101 aqueous humour samples collected from patients who provided informed consent to participate. The cohort consisted of 32 males and 69 females, with an average age of 74.7 ± 9.09 years (range: 50 to 94 years). Patients were stratified into four groups based on the SPONCS cataract classification: SPONCS 2 (33.7%), SPONCS 3 (32.7%), SPONCS 4 (13.9%), and SPONCS 5 (19.8%). Ethical approval for the study was granted by the RSU Ethics Committee (Decision No. 2-PEK-4/307/2023). Liquid chromatography-mass spectrometry analysis was conducted on the collected samples.

Results

The 3-HK/KYNA ratio differed significantly across SPONCS groups ($\chi^2(3) = 8.46$, $p = 0.037$, $\mathcal{E}^2 = 0.0846$). Median values were as follows: SPONCS 2 (0.379, IQR: 0.205–0.664), SPONCS 3 (0.433, IQR: 0.267–1.038), SPONCS 4 (0.385, IQR: 0.286–0.720), and SPONCS 5 (0.893, IQR: 0.317–7.355). Post hoc analysis identified the largest difference between SPONCS 2 and SPONCS 5 ($p = 0.038$), while other group comparisons were not statistically significant. A small but statistically significant correlation was observed between the 3-HK/KYNA ratio and cataract severity as classified by SPONCS ($r_s = 0.262$, $n = 99$, $p = 0.008$).

Conclusions

The 3-HK/KYNA ratio varies with cataract severity, as classified by the SPONCS classification system. The observed correlation, though small, indicates that the 3-HK/KYNA ratio may serve as a potential biomarker for assessing cataract progression. These results support further investigation into the role of kynurenine pathway metabolites in cataractogenesis and their potential utility in diagnostic and therapeutic strategies.

Evaluating the Effect of Intravitreal Anti-VEGF Treatment on Radiation-Induced Maculopathy in Choroidal Melanoma Patients

Oral

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Objectives*

Choroidal melanoma, though rare, is the most common primary malignant tumor of the eye. The standard treatment modality is radiation therapy, particularly plaque brachytherapy utilizing ruthenium-106 (Ru-106). A notable complication of this therapy is radiation-induced maculopathy, with nonischemic macular edema being the earliest clinical manifestation. Intravitreal anti-VEGF injections, such as Bevacizumab, are commonly prescribed to manage maculopathy. The objective of this study was to assess macular thickness in patients who developed radiation maculopathy, both prior to and following intravitreal Bevacizumab treatment.

Materials and Methods

Seven patients with radiation-induced maculopathy were evaluated. Central macular thickness was measured using optical coherence tomography (OCT). Data analysis was conducted with MS Excel and IBM SPSS, and statistical comparisons were performed using the Wilcoxon test.

Results

A total of 5 men and 2 women were included in the analysis, with a mean age of 67.3 years. The mean central macular thickness prior to intravitreal treatment was 536.3 μm (IQR = 166), while the mean thickness after treatment was 382.9 μm (IQR = 69). A statistically significant difference in macular thickness was observed between pre- and post-treatment measurements ($Z = -2.366$; $p = 0.018$).

Conclusions

In conclusion, while radiation therapy remains a valuable treatment for uveal melanoma, it is associated with potential vision-threatening ocular complications. Effective management depends on early detection, timely intervention, and expert medical care. A comprehensive understanding of the pathogenesis, risk factors, and treatment strategies for radiation-induced complications enables collaboration between patients and health-care providers to optimize outcomes and preserve ocular function. Radiation maculopathy, often leading to secondary vision loss, is a significant complication of plaque radiotherapy for choroidal melanoma. Intravitreal anti-VEGF therapy effectively reduces radiation-induced macular edema.

Exploring the Role of Bioinformatics in Identifying Genetic Markers for Diabetic Retinopathy: Current Approaches and Prospects for Advancement

Oral

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Objectives*

This study reviews literature to identify genetic variants strongly linked to diabetic retinopathy (DR) susceptibility and progression, aiming to facilitate targeted therapies and personalized treatment approaches.

Materials and Methods

Literature from the past two decades was analyzed, with studies retrieved from PubMed, EMBASE, Web of Science, and Google Scholar.

Results

Over 65 genes have been linked to DR, though confirming these associations remains challenging. Key pathways involved in DR, such as inflammation, angiogenesis, and neurogenesis, have led to investigations of genes like AGE, RAGE, VEGF, and ALR2. RAGE (Receptor for Advanced Glycation End-products) accumulates more rapidly in diabetes, altering signaling pathways and contributing to DR. It is expressed on endothelial cells and vascular smooth muscle cells, where it enhances red blood cell adhesion to endothelial cells, increasing vascular permeability and inflammation. Polymorphisms in RAGE are associated with severe non-proliferative DR, and serum RAGE levels correlate with disease severity. ALR2 (aldose reductase) catalyzes glucose to sorbitol in the polyol pathway. Under hyperglycemia, excess sorbitol damages retinal cells, leading to early DR development. Meta-analyses show strong associations between ALR2 gene variations and DR. Vascular endothelial growth factor (VEGF), a key factor in vascular permeability, is critical in early DR progression. Genetic variations in the VEGF-A gene are linked to severe forms of DR.

Conclusions

Bioinformatics offers a powerful tool for investigating DR by identifying genetic markers and building predictive models for DR progression. This advancement supports the transition toward personalized medicine, significantly enhancing the prognosis and therapeutic management of diabetes patients.

Incidence of Pattern Dystrophy and Its Impact to Visual Acuity within Patients of “Latvijas Amerikas acu centrs”

Oral

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Objectives*

The aim of this study was to find out the incidence of pattern dystrophy diagnosis in “Latvijas Amerikas acu centrs” patients and if this dystrophy impacts patients best corrected visual acuity as well as changes in optical coherence tomography (OCT) images.

Materials and Methods

This was a retrospective study which included patients with complaints about visual acuity and had OCT images taken. OCT images were analyzed for changes of macular area - under the sensory retina and above the retinal pigment epithelium (RPE). 2 years later patients were asked to come for the checkup appointment to evaluate their best corrected visual acuity and OCT images. The incidence of pattern dystrophy was calculated. Data was analyzed using descriptive statistic methods and Microsoft Excel.

Results

Study contained 4200 patient visual acuity and OCT images. After analysis 28 patients and 56 eyes were diagnosed with varying stages of adult-onset macular vitelliform dystrophy and found with changes in RPE of macular area. The incidence of pattern dystrophy was 0,66%. Analyzing data with the sign test impact on visual acuity on both eyes was statistically significant $P < 0,05$. The mean age of female was $75,9 \pm 12,7$ (SD) years and male $71,9 \pm 13,1$ (SD). 39,2% of patients suffer a loss of 10% and 7,1% with a loss of 20% in best corrected visual acuity. The patients who suffered the greatest loss in visual acuity also developed negative changes in OCT images.

Conclusions

Pattern dystrophy is a rare disease (0,66%) which affects RPE of macular area and has important impact on patients' visual acuity. All patients with this dystrophy had complaints about decreased vision. The most common type of pattern dystrophy is adult-onset macular vitelliform dystrophy.

Multidisciplinary Approach for Treatment of Complicated Graves' Disease Orbitopathy: Case Report

Oral

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Objectives*

Objectives. Autoimmune orbitopathy is a rare autoimmune disease in which retrobulbar tissue is affected. It is observed in about 50% of Graves' disease (GD) patients. GD incidence is lower in men, they are 5 times less affected than women. Prognosis is worse in cases, where diagnosis is made in patients over 50 years. Treatment can be challenging and a multidisciplinary care is important.

Case description. A 70 year old man presented with discomfort, gritty sensation, excessive tearing, photophobia, pain with eye movement in the left eye (OS) for about 1,5 months. Gradual enlargement of the eye slits over the last 6 months, sleeping with the left eye opened was noticed. On admission visual acuity was VOD=0,3cc-2,00Dsph=0,8; VOS=hand movements. Biomicroscopy examination: OS - conjunctival chemosis, serous discharge, diffuse corneal epithelium and stromal defects, corneal edema (Dg.Acute bacterial keratitis), anterior chamber hypopyon. Eyelid retraction, exophthalmos (OS>OD) was seen, eyelids did not close spontaneously. Ultrasonography showed both eye moderate destruction of vitreous body, no retinal detachment. Patient was admitted in the department of ophthalmology for further evaluation and treatment. Laboratory tests showed lower TSH level, higher levels of thyroid hormones. Consultations by endocrinologist, otorhinolaryngologist were done. MRI with contrast was performed. Patient received treatment with local and intravenous antibiotics, glucocorticoids; lubricating eye drops, gel; intravenous anticoagulant; per oral thyrostatic medication. Septoplasty, orbital bilateral endonasal decompression, lateral left side canthotomy was performed. On discharge there were no changes in visual acuity. Further administration in the department of endocrinology was recommended. Regular endocrinologist visits with administration of intravenous Methylprednisonum were performed, then due to inefficiency, therapy was switched to Mycophenolate mofetil.

Conclusions. Multidisciplinary approach is necessary in patients with GD. Regular follow up is important to track progression and to evaluate if any modification of treatment is needed.

Redetachment Rates and Clinical Outcomes Following Pars Plana Vitrectomy for Retinal Detachment at Pauls Stradins Clinical University Hospital (2023–2024)

Oral

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Objectives*

Pars plana vitrectomy (PPV) is a critical surgical intervention for the management of retinal detachment. Existing literature provides data on the incidence of recurrent retinal detachment following the primary procedure. The objective of this study was to evaluate the redetachment rates among patients treated for retinal detachment at Pauls Stradins Clinical University Hospital in 2023-2024 and compare them with current literature.

Materials and Methods

This retrospective study analyzed 305 medical records of patients who underwent PPV for primary retinal detachment at PSKUS between January 2023 and November 2024. Demographic data, affected eye, detachment type, macular status, and presence of proliferative vitreoretinopathy (PVR) were collected preoperatively. Post-operative data included tamponade type and redetachment rates. C2F6 gas, silicone oil, and air were used as tamponades.

Results

The study comprised 165 males and 140 females, with a mean age of 62,6± 12,4 years (range 22-87). Among the cases, 56,7% involved the right eye, and 43,3% left eye. Most patients had rhegmatogenous retinal detachment (98,4%), with 1,6% (5 cases) having tractional detachment. Macula-on detachment was observed in 38,4% of patients, while 61,6% presented with macula-off detachment. Preoperatively, 93,8% had no PVR. Among 305 analyzed cases, successful retinal attachment was achieved in 286 patients (93,8%) following pars plana vitrectomy. The choice of tamponade included C2F6 gas in 196 cases (64,3%), silicone oil in 108 cases (35,4%), and air in 1 case (0,3%). However, 19 cases (6,2%) required repeat vitrectomy to achieve retinal reattachment. Of these, 12 cases used C2F6 gas as tamponade (6,1% of those treated with C2F6 gas), while 7 cases involved silicone oil (6,5% of those treated with silicone oil).

Conclusions

Retinal attachment rates following pars plana vitrectomy were notably high, exceeding those typically reported in the scientific literature. This outcome highlights the effectiveness of the surgical approach, emphasizing the success of current practices in achieving retinal reattachment.

Oral and Maxillofacial Surgery

Three-Dimensional Printing and Planning in Management of Acute Isolated Orbital Floor Fractures

Oral

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Objectives*

Operating orbital floor fractures is challenging due to complex anatomy and reduced visualization. Three-dimensional (3D) printing is widely used in managing cases of an isolated orbital floor fracture by creating anatomical models; however, there is a lack of evidence showing the effectiveness of their use on restoring orbital volume and post-surgical clinical outcomes. This study aimed to conduct an objective analysis of treatment outcomes in patients with isolated orbital floor fractures, who were treated at Pauls Stradins Clinical University Hospital (P.Stradins CUH) between 9th March 2022 and 30th September 2023, by quantitatively assessing orbital volumes pre- and post-operatively and establishing correlations with diplopia.

Materials and Methods

This single-center prospective clinical study was performed at the Centre of Oral and Maxillofacial Surgery at P.Stradins CUH in Riga, Latvia.

The 3D model printing and surgical planning were done in cooperation with BBCE, and the pre-bended titanium mesh was used for reconstruction. Orbital volume measurements pre- and postoperatively were done using the 3D slicer software program. Clinical diplopia evaluation was done one week, two months, and six months postoperatively.

Results

Orbital volume measurements were performed in 29 patients. After surgical intervention, the mean orbital volume on the affected side decreased significantly ($p < 0.0001$). The mean difference in volume between the affected orbits before and after surgery was 2365mm³ ($p < 0.05$). All patients underwent an ophthalmological examination. Pre-operative diplopia was reported in 22 patients, which decreased to 2 patients at the 2-month postoperative evaluation. No statistically significant correlation between orbital volume and diplopia was found.

Conclusions

3D-printed orbital models facilitated surgical planning for orbital floor reconstruction and improved the symmetry of orbital volumes. The methodology used for quantitative orbital volume measurement was objective and applicable within a clinical setting.

Two-Year Clinical Outcomes of Third Molar Autotransplantation: Clinical Trial of 52 Patients

Oral

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Objectives*

To evaluate the clinical outcomes of third molar autotransplantations in 52 patients over a two-year follow-up period

Materials and Methods

From August 2019 to September 2022, a total of 52 patients (aged 12–22 years; mean age 16.9 years) were included in this study. The study consisted of 18 males and 34 females with immature third molars classified as development stages 3–5 according to Moorrees.

Patients were selected based on the need for permanent molar extraction and the presence of at least one non-erupted third molar. All procedures were performed at the Institute of Stomatology, Riga Stradins University, Latvia.

Clinical outcomes were evaluated at 24 months and included assessments of tooth mobility, bleeding on probing, and periodontal pocket depth.

Controlled clinical trial registered ISRCTN13563091 <https://www.isrctn.com/ISRCTN13563091>

DATASET Clinical and Radiographic Evaluation Data of Autotransplantation using 3D Replicas <https://doi.org/10.5281/zenodo.13208598>

Effect of 3D printed replicas on the duration of third molar autotransplantation surgery: A controlled clinical trial <https://doi.org/10.1111/edt.12905>

Clinical Efficacy of CBCT and 3D-Printed Replicas in Molar Autotransplantation: A Controlled Clinical Trial <https://doi.org/10.1111/edt.13012>

Results

Of the 52 patients assigned to interventions, 57 teeth were evaluated. All teeth had 100% survival at 2 years. At 2 year, the percentages were as follows: mobility- 1 out of 57 teeth (1.75%), bleeding on probing- 2 out of 57 teeth (3.51%), periodontal pockets—3 out of 57 teeth (5.26%)

Conclusions

Third molar autotransplantation shows promising success over a two-year period with favorable clinical outcomes. Further research is recommended to optimize protocols and improve long-term success rates.

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Maxilla Tumor Pre-Operative Virtual Planning in Patients Undergoing Reconstructive Surgery with Microvascular Bone Flaps

Poster

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Objectives*

Benign or malignant maxilla tumors usually present with a bone destruction, collapse and invasion to maxillary sinus or soft tissue. Radical surgical excision of the tumor is still a gold standard within treatment guidelines. To maintain patient's functionality and aesthetic appearance bone and soft tissue defect reconstruction with free flaps is mandatory. Nowadays, pre-operative virtual planning is necessary to achieve excellent results.

Materials and Methods

From 2020 to 2024 seven patients underwent maxilla reconstruction with microvascular fibula osteocutaneous flaps. One patient had an additional iliac crest flap for orbital wall reconstruction. All patients underwent preoperative virtual planning with Materialize mimic program. Tumor resection and bone flap patient specific cutting guides were designed and printed for every patient.

Results

Squamous cell carcinoma presented in 3 cases, ameloblastoma in 3 cases and extramedullary plasmacytoma in 1 case. Mean age of the patients were 38. All surgeries were performed according to pre-operative virtual planning. Bone osteosynthesis was done with mini plates. All flaps survived. One revision surgery was done in the first 24 hours after main surgery with no additional work up on vessel anastomosis. Two patients underwent dental rehabilitation afterwards. All patient achieved excellent aesthetic results with intelligible speech and alimentation with no food or liquid passage into the nasal cavity. All patients were able to breath through tumor affected nasal cavity.

Conclusions

Maxilla reconstruction with a microvascular bone flap is a challenging surgery to achieve excellent results and even improve patients quality of life. Accurate pre-operative planning full fits all reconstructive options to restore oral cavity and facial skeleton anatomy providing dental rehabilitation afterwards.

Orthopedics and Trauma

Arthroscopic Treatment of Chronic Synovitis in Patients with Post-Traumatic Knee Osteoarthritis

Oral

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Objectives*

This study aims to evaluate the efficacy of arthroscopic treatment for chronic synovitis in patients with post-traumatic knee osteoarthritis (PTOA). Chronic synovitis, characterized by persistent inflammation of the synovial membrane, exacerbates cartilage degeneration and joint dysfunction in PTOA. The primary objective was to assess improvements in pain, joint function, and synovial inflammation following arthroscopic intervention.

Materials and Methods

A prospective cohort of 60 patients diagnosed with PTOA and chronic synovitis was included in the study. All patients underwent arthroscopic synovectomy combined with lavage and debridement. Preoperative and post-operative evaluations included pain assessment using the Visual Analog Scale (VAS), functional scores using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and radiographic grading of osteoarthritis severity. Synovial biopsy samples were analyzed histologically to confirm inflammation and to assess changes in synovial tissue following intervention. Patients were followed for a mean duration of 12 months, with assessments at 3, 6, and 12 months postoperatively.

Results

Arthroscopic treatment significantly reduced pain levels, with mean VAS scores decreasing from 7.8 ± 1.2 preoperatively to 3.4 ± 1.5 at 12 months postoperatively ($p < 0.001$). Functional scores improved, with mean WOMAC scores decreasing by 45% ($p < 0.001$). Histological analysis showed a marked reduction in synovial inflammation, with a 65% decrease in inflammatory markers. No major complications were reported, and patient satisfaction was high, with 85% rating the outcome as good or excellent.

Conclusions

Arthroscopic treatment is an effective modality for managing chronic synovitis in PTOA, offering significant pain relief, improved joint function, and reduced inflammation. These findings suggest that early arthroscopic intervention can mitigate disease progression and enhance the quality of life in this patient population. Further studies are warranted to determine long-term outcomes and optimal patient selection criteria.

Cefazolin Concentration in Synovial Fluid during Elective Knee Joint Arthroplasty: Evaluation of Standardised Antibiotic Prophylaxis and Influencing Factors

Oral

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Objectives*

This study aimed to evaluate the effectiveness of standardized antibiotic prophylaxis with cefazolin during elective knee joint arthroplasty by analyzing its concentration in synovial fluid and identifying factors influencing its levels.

Materials and Methods

A total of 64 patients undergoing primary knee joint arthroplasty were included in the study. Each patient received a 2-gram intravenous dose of cefazolin as standard antibiotic prophylaxis. Synovial fluid samples were collected during surgery, and cefazolin concentration was determined using high-performance liquid chromatography (HPLC-UV). The study examined the relationship between cefazolin concentration and factors such as antibiotic prophylaxis timing, patient age, gender, and body mass index (BMI).

Results

The average cefazolin concentration in synovial fluid was 61.5 µg/ml, exceeding the minimum inhibitory concentration (MIC) values for common pathogens (*S. aureus* and coagulase-negative staphylococci). No statistically significant correlation was found between cefazolin concentration and the timing of prophylaxis, patient age, gender, or BMI. All patients had a cefazolin concentration above the MIC required to combat these pathogens, and no early periprosthetic infections occurred within 4-14 months post-surgery.

Conclusions

Standardized antibiotic prophylaxis with 2 grams of cefazolin effectively achieves the required cefazolin concentration in synovial fluid for elective knee joint arthroplasty. The timing of prophylaxis, as well as patient demographics, does not significantly affect cefazolin concentration when administered within 30-60 minutes before surgery. This regimen can be recommended for general use in patients undergoing elective knee arthroplasty.

Challenges and Strategies in Managing Femoral Neck Fractures in Patients Over 40 Years of Age

Oral

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Objectives*

Arthroplasty is recommended for patients over 65 years old with femoral neck fractures, while osteosynthesis (OS) is preferred for younger patients. This study analyzed patients in the intermediate age group (40–65 years) where treatment indications are less clear, as well as the choice of prosthesis type (unipolar or total) for patients over 65.

Materials and Methods

This retrospective study analyzed data from patients aged 40–65 with femoral neck fractures treated at one medical center over a three-year period. Fractures were classified using the Garden and Pauwels systems, and surgical methods, implants, outcomes, hospital stays, complications, revision surgery rates, and fracture reduction quality were evaluated. Groups were matched for gender, BMI, and ASA grade.

Results

In the 40-65 age group total arthroplasty was performed on 73 patients and OS on 30 patients (19 dynamic hip screws, 10 intramedullary nails, 1 cannulated screw). Unstable, displaced fractures (Pauwels III, Garden IV) were more often treated with arthroplasty, while less displaced but unstable fractures (Garden II, Pauwels II/III) underwent OS. Arthroplasty patients had longer hospital stays compared to OS ($p < 0.001$), as well as higher intraoperative blood loss, longer operation times, and increased risks of intensive care admission and transfusion. Although for OS patients the risk of reoperations was 16.6%, it was not statistically significantly higher than the complication risk in patients who underwent arthroplasty. In the arthroplasty group, periprosthetic fractures were the main complication. After 65 years unipolar prostheses were used for older patients (mean age 87.6 years) with higher ASA grades, while total prostheses were used for ASA II/III patients.

Conclusions

In patients aged 40–65, OS achieves a high fracture consolidation rate (83.3%), with a 16.6% revision risk, similar to arthroplasty complication rates, which is a viable option. Treatment decisions should consider factors like fracture type, ASA grade, osteoarthritis severity, and individual patient conditions. Cemented femoral components and osteoporosis treatment can reduce complication rate in arthroplasty patients.

Comparative Efficacy of Twice-Yearly Versus Annual Zoledronic Acid Administration in Post-COVID Avascular Necrosis of the Hip

Oral

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Objectives*

This study aimed to evaluate the efficacy of zoledronic acid in the conservative treatment of avascular necrosis (AVN) of the hip, administered either twice or once annually, over a two-year follow-up period. Clinical and radiological outcomes were assessed to determine the optimal dosing strategy for patients at ARCO stages 1 and 2 of post-COVID AVN.

Materials and Methods

The study was conducted at Tashkent Medical Academy and included 121 patients diagnosed with AVN of the hip at ARCO stages 1 and 2 following COVID-19 infection. Participants were randomized into two groups: Group A received zoledronic acid twice per year, while Group B received the treatment once annually. Clinical outcomes were evaluated using the Harris Hip Score (HHS) and visual analog scale (VAS) for pain. MRI assessments were performed at baseline, 12 months, and 24 months to monitor progression or improvement in necrotic lesions, using volumetric analysis and assessment of the crescent sign. Data were analyzed using comparative statistical methods.

Results

At 24 months, both groups showed significant improvement in HHS and VAS scores compared to baseline ($p < 0.01$). Group A demonstrated greater improvement in HHS scores (mean increase of 22.5 vs. 18.3) and larger reductions in VAS pain scores (mean reduction of 4.2 vs. 3.1). MRI findings revealed a significant reduction in lesion size and improved bone density in Group A compared to Group B ($p < 0.05$). The progression to ARCO stage 3 was observed in 8% of Group A patients versus 18% in Group B.

Conclusions

Zoledronic acid administered twice annually appears more effective than once annually in improving clinical and radiological outcomes in post-COVID AVN of the hip at ARCO stages 1 and 2. Twice-yearly treatment may provide superior protection against disease progression and symptom relief over a two-year period. Further studies with larger cohorts are warranted to confirm these findings.

Comparison of the Results of Arthroscopic Treatment Methods for Anterior Shoulder Instability

Oral

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Objectives*

The risk of recurrent anterior dislocation of the shoulder joint in young and active patients reaches 70-90%. Anterior instability of the shoulder joint is not only due to soft tissue deficiency, bone is often damaged as well. Due to bone deficiency, the risk of recurrent dislocation increases. Dynamic stabilization of the shoulder joint and anterior labrum augmentation with the long tendon of the m. biceps brachii improves the functionality of the patient's shoulder.

Materials and Methods

The study is planned as a prospective longitudinal study, dividing patients into two groups. Patients will be divided into two groups, 30 people in each group. Patients in the “DPS” group will be operated on using the dynamic shoulder joint stabilization method. The results of the DPS operation will be compared with the results of patients from the “Bankart” operation, stabilizing the shoulder joint after Bankart refixation with / without remplisage.

Patients are clinically evaluated again after 1 month, 3 months, 6 months, 1 year, 2 years after the operation, and during each visit, clinical data will be filled in according to the Constant Shoulder scale, ASES scale, Oxford Shoulder Instability scale and VAS pain scale. The time of the operation (the longer the time, the greater the soft tissue edema, possibly more pain) and the administration of additional pain medications are also evaluated.

Results

Short-term results are very similar in both groups, but in long-term results, the DPS group has an advantage when analyzing both objective and subjective scales.

Conclusions

Anterior labral augmentation and dynamic stabilization with the long head of the biceps brachii tendon (DPS) reduces the risk of recurrence of shoulder instability; does not require additional surgical time or medication.

Comparisons of Physical Functional Performances between Older Adults with and Without Sacroplasty Surgery for Traumatic Lateral Mass Fractures of the Sacrum

Oral

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1. Rīga Stradiņš University

Objectives*

The patient's physical functionality is an objective indicator of the effectiveness of treatment. In the case of a lateral mass fracture of the sacrum, early activation of patients reduces the risk of complications, but activating elderly patients after an injury is often difficult. In the study, we compare the functional activity of two groups of patients: conservatively treated and surgically treated with sacroplasty operation. The aim is to find out in which group of patients and with which types of fracture of the lateral mass of the sacrum physical functionality is achieved faster.

Materials and Methods

The study data were obtained from physiotherapy records in the medical history, where the patients' physical functionality was only assessed daily during hospitalization. The study included 14 conservatively treated patients and 14 surgically treated patients.

Results

Sacroplasty patients spent an average of 11.9 days in the hospital, of which 7.3 days were spent before surgery. The average length of stay among conservatively treated patients was 7.9 days. Functional activity was similar in both groups initially after the injury, but the improvement increased by an average of 2 units in the postoperative period and amounted to 3.4 points in functional activity at the time of discharge. Compared to conservatively treated patients, who had a functional activity of 1.8 at the time of discharge.

Conclusions

- Conservatively treated patients have lower functional activity compared to surgically treated patients
- Functional activity after injury correlates with the patient's general condition and functional activity before injury.
- In the surgically treated group, there is no difference between the type of fracture and the increase in postoperative functional activity
- In the conservatively treated group, the increase in functional activity is faster in the case of a unilateral sacral fracture

Custom Cutting Guides in Oncological Orthopaedic Surgery: Our Experience

Oral

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Objectives*

Musculoskeletal tumors present a complex and challenging area of study and treatment. Recent advancements in diagnostic techniques have provided new insights into the biology and behavior of these tumors; however, medical treatments have not shown significant improvements, and adequate surgical management remains fundamental. In recent years, the development of computerized technologies integrated into the medical field has enabled the creation of new, more precise, and reliable surgical techniques to achieve adequate surgical margins while maximizing the preservation of function. In this context, new technologies allow for more precise resections using systems that guide the surgeon during the procedure, such as custom-made cutting guides. The purpose of this study is to describe our experience with custom-made cutting guides in oncological orthopedic surgery. We present our experience about the use of custom-made prostheses in Orthopaedic Oncology.

Materials and Methods

From January 2016 to May 2024, 30 patients underwent surgical resection using custom-made cutting guides. Average follow-up was 20 months (range 2-57 months). Resection sites were: pelvis in 12 cases, tibia in 9, femur in 4, humerus in 3, and scapula in 2. Reconstruction was performed with custom-made implants for pelvis and scapula resections, and with shaped allografts using cutting guides for femur and tibia resections, (2 cases associated with vascularized fibula). Humerus resections were reconstructed in one case with a custom-made heterologous bone substitute, and in another case with allograft and vascularized fibula. In one case of iliac wing resection no reconstruction was performed.

Results

The surgical margins in oncological resections were wide in 28 out of 29 oncological patients and marginal in one patient. At the last oncological follow-up, 22 patients were continuously disease-free, one was alive with disease, and 5 had died from the disease.

Conclusions

Innovative intraoperative guidance systems have shown to be effectivefull in terms of surgical margins and function preservation.

Development and Validation of a Prognostic Risk Scale for Predicting Compartment Syndrome in Tibial Fracture Patients

Oral

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Objectives*

This study aims to develop a comprehensive prognostic risk scale for predicting compartment syndrome (CS) in patients with tibial fractures. By integrating clinical and demographic factors for early diagnosis and timely intervention, it will address the limitations of current diagnostic methods.

Materials and Methods

A total of 422 patients with 450 tibial fractures were evaluated using a newly developed risk scale incorporating 16 clinical and demographic factors. Data were collected upon admission, including medical histories, fracture classifications via radiography and computed tomography, and intracompartmental pressure measurements using the Stryker monitoring system. Patients were stratified into low-, medium-, and high-risk groups based on their risk scale scores. Logistic regression and receiver operating characteristic (ROC) analyses assessed the predictive accuracy of the scale, with p-values < 0.05 considered statistically significant.

Results

Of the 422 patients, 9% developed CS. High-energy trauma caused 67% of fractures, and 33% were associated with polytrauma. In the high-risk group, 82% developed CS, necessitating fasciotomy, compared to 25% in the medium-risk group. None of the low-risk patients developed CS. The risk scale achieved excellent predictive accuracy (AUC=0.89), with variables such as intracompartmental pressure >25 mmHg, severe disproportionate pain, and anticoagulant use showing strong correlations with CS development (p<0.01).

Conclusions

The prognostic risk scale provides an effective tool for stratifying CS risk, significantly improving early diagnosis and targeted intervention. Its integration into clinical practice could prevent severe outcomes, enhancing patient care. Further validation in broader clinical settings is recommended to optimize its utility.

Diagnosis and Treatment Gap of Osteoporosis in Patients with Proximal Femur Fragility Fracture

Oral

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Objectives*

Fragility fractures of the proximal femur significantly increase the risk of death, disability, economic costs, and re-fracture, especially within the first two years after the fracture. Fracture Liaison Service (FLS) systems have been implemented in many countries worldwide to improve the diagnosis and treatment of osteoporosis after typical fragility fractures. There is no such system in Latvia. Hypothesis: In patients with a fragility fracture of the proximal femur, osteoporosis is not diagnosed in time or properly treated, and secondary fracture prevention is not implemented.

Materials and Methods

The retrospective study includes patients with proximal femur fragility fractures treated in the (NKRH) traumatology department from 01.01.2020.-31.12.2021. according to SSK-10 classification S72.0 and S72.1. Exclusion criteria: 1) patient younger than 50 years. 2) the patient died within the first 2 years after the fracture. 3) The patient is already taking antiresorptive therapy before the fracture. Data were collected from patient's medical records, eveseliba.gov.lv, www.datamed.lv system, and telephone interviews of patients or their relatives

Results

Of 166 initially included patients, 76 patients met the study criteria. One patient started treatment with antiresorptive medication within two years after fracture. 5% of patients had osteodensitometry within two years after a fracture, and 7% of patients after two years. 42% of patients monitor their vitamin D levels. 84% of patients didn't get proper recommendations about vitamin D and Ca supplementation and/or osteodensitometry from the treating surgeon.

Conclusions

In patients with proximal femur fragility fracture, osteoporosis is not diagnosed and treated appropriately and secondary fracture prevention is not implemented.

Evaluating Acetabular Orientation and Leg Length Discrepancy Correction in Total Hip Arthroplasty for Severe Hip Dysplasia

Oral

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Objectives*

This study focused on assessing acetabular inclination and anteversion angles in patients with severely dysplastic hips (Crowe III-IV developmental dysplasia of the hip (DDH)) following total hip arthroplasty (THA). Accurate cup orientation is essential for restoring proper hip function, maintaining joint stability, and preventing complications.

Materials and Methods

This retrospective study was conducted at Tashkent Medical Academy and included 45 patients (49 hips) who underwent THA for DDH at Crowe III-IV stages between January 2021 and December 2023. Standardized preoperative and postoperative radiographic assessments, including pelvic radiographs and computed tomography scans, were performed to determine acetabular cup inclination and anteversion. All surgeries were performed using a modified Hardinge approach, and functional outcome was measured with Harris Hip Score.

Results

The average acetabular inclination angle achieved was 48° (range: 38°–53°), with a mean anteversion angle of 20° (range: 15°–25°), aligning well with established safe zones. Functional outcomes, measured using the Harris Hip Score (HHS), showed substantial improvement, with a mean postoperative score of 86 ± 6 at 12 months. Leg length discrepancy (LLD) was significantly reduced, with postoperative discrepancies averaging 7 mm (preoperative range: 4–23 mm). Over three years of follow-up, all cups demonstrated excellent stability, with no cases of aseptic loosening. The dislocation rate was minimal at 2% (one patient). Radiographic findings confirmed stable integration of the implants throughout the follow-up period, underscoring the success of the individualized approach.

Conclusions

THA for patients with severe DDH (Crowe III-IV) demands careful surgical planning to achieve proper cup orientation and address leg length discrepancies. The three-year follow-up findings emphasize the importance of precise cup placement and effective correction of LLD in ensuring reliable, long-term results. Further research should explore advanced imaging and its role in optimizing outcomes for complex cases.

Long-Term Results of Total Hip Arthroplasty in DDH Patients with Secondary Osteoarthritis

Oral

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Objectives*

The aim of this study was to evaluate the long-term results of total hip arthroplasty (THA) in DDH patients (pts) with placement of acetabular component of endoprostheses in the primary and secondary socket.

Materials and Methods

84 patients (70 females, 14 males) with Crowe I-IV DDH underwent 103 THA with cementless endoprostheses between November 2008 and December 2011. During the follow-up period (10,5-12,6 years after operation) 4 patients (4 hips) were lost, but 80 patients (99 hips) were evaluated. 70 patients with 89 unrevised hips were divided in two groups due to the placement of acetabular component of endoprosthesis in the primary acetabular socket (group A) or in the secondary socket (group B). The average age at the time of last follow-up was 54.4 years.

Results

During the last follow-up the mean Merle d'Aubigné and Postel score in group A patients increased from 9.63 ± 2.17 preoperatively to 15.48 ± 2.26 , in group B – from 8.71 ± 2.21 preoperatively to 15.36 ± 1.78 at final follow-up. Kaplan-Meier implant survival at final follow-up was 91.1% for the group A, 95.8% – for the group B. 10 patients were revised at the time of last follow-up. The causes for revision for hips with acetabular component placed in the primary socket were: 5 aseptic loosening, 1 polyethylene liner wear, 1 infection, 2 periprosthetic fractures of the femur. One (1) revision was done for the hip with acetabular component placed in the secondary socket due to aseptic loosening n=1.

Conclusions

Functional outcome improvement was observed in long-term follow-up in both groups similarly, showing good functional results. Both groups showed good survival rate. In the secondary socket group endoprosthesis survivorship at 10th year follow-up was higher in our study but without significant difference.

MODIC Type Endplate Changes as a Modifier for Cephazolin Penetration into the Intervertebral Disc

Oral

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Objectives*

Surgical site infections occur in 3.1% of patients following spine surgery, with open instrumented procedures carrying a higher risk due to prolonged surgery time and larger wounds, emphasizing the importance of effective antibiotic prophylaxis in this setting. This study aimed to investigate the levels of cephazolin in the intervertebral disc during 1-level open interbody fusion surgery, and examine how changes to the intervertebral disc endplates affect antibiotic penetration into the disc.

Materials and Methods

Between November 2021 and June 2023, 94 patients were included in the study, and received 2 g intravenous cephazolin before 1-level open lumbar interbody fusion. Venous blood and intervertebral disc tissue samples were collected and analyzed using high-performance liquid chromatography to measure cephazolin concentrations. Intervertebral disc endplate changes were assessed on MRI images using the Modic grading system.

Results

Thirty minutes after administration, plasma cephazolin concentration reached 110.9 ± 31.2 mg/L. Mean disc concentration measured 12.1 ± 7.2 mg/g, with a range of 2.7–43.1 mg/g. Modic changes were observed in 49.6% of patients, with type II changes being the most common (44.9%). Disc concentrations were significantly higher in patients with Modic type II changes compared to those without or type I changes (14.6 ± 9.2 mg/g vs. 10.2 ± 4.5 mg/g and 9.2 ± 4.1 mg/g; $P = 0.01$).

Conclusions

Cephazolin concentrations in intervertebral discs are significantly affected by the presence and type of Modic changes. This study highlights the importance of considering the state of the endplate in patients undergoing spine surgery, as antibacterial prophylaxis may need to be adjusted.

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Nanofractured Autologous Matrix-Induced Chondrogenesis (N-AMIC) Technique for Focal Knee Cartilage Defects: Clinical Case Report

Oral

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Objectives*

Keywords: Nanofractures; Chondro-Gide; Cartilage defects

Introduction.

N-AMIC is a novel arthroscopic/arthrotomic technique used for focal cartilage defects, including those in the knee joint. Compared to microfracture treatment, its advantages include enhanced cartilage regeneration, shorter rehabilitation time, reduced risk of subchondral impression fractures, and a standardized procedure. This report aims to present clinical cases showcasing N-AMIC as both a primary treatment method and a revision approach following microfracture therapy.

Case description.

1. A 42-year-old woman presented with complaints of pain, stiffness, and limited range of motion in the left knee. MRI revealed chondral damage in the medial femoral condyle. Following unsuccessful conservative management, she underwent arthroscopic microfracture surgery. However, three months postoperatively, she continued to experience knee pain, and MRI showed an osteochondral defect. Two months later, she underwent a revision procedure with N-AMIC, followed by a partial weight-bearing rehabilitation protocol. At the one-year follow-up, the patient reported no complaints and had resumed an active lifestyle. Functional assessments using the IKDC and KSS scores demonstrated significant improvement in function and pain levels.

2. A 36-year-old male athlete presented with similar complaints in the right knee. MRI revealed a lateral femoral chondral defect. After unsuccessful conservative treatment, he was treated with N-AMIC. A partial weight-bearing rehabilitation protocol was initiated postoperatively. At the three-month follow-up, the patient reported no complaints, was walking without crutches, and showed significant improvements in IKDC and KSS scores.

Summary.

Two patients were treated with the N-AMIC technique: one as a revision following an unsuccessful microfracture treatment and the other as a primary intervention after conservative therapy. Both cases demonstrated functional and radiological improvement of the cartilage defects.

Conclusions.

N-AMIC is a reliable and safe technique for managing focal cartilage defects. These results highlight the potential of this treatment, but further research is needed.

Prevalence of Asymptomatic Rotator Cuff Tears in Individuals Aged 40–70

Oral

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Objectives*

To identify pathological changes in the shoulder joint, more specifically, the rotator cuff tears, that do not cause active complaints and/or symptoms. As well as to calculate the prevalence of these tears in the society of individuals aged 40-70 years.

Materials and Methods

A cross-sectional study was designed to assess asymptomatic shoulder (approximately 250+ shoulders in total) pathologies in the age group of 40-70 years (without previous shoulder injuries, complaints of pain, performed surgeries or limitation in the range of motion in the shoulder joint).

After receiving the informed consent, the participant underwent a subjective assessment using the ASES form (*American Shoulder and Elbow Surgeons Standardized Shoulder Form*) and the CSS (*Constant Murley/Shoulder score*) to quantify the shoulder function.

Range of motion was objectively measured with goniometer, assessing the participant's shoulder abduction, flexion, internal and external rotation angles. Muscle strength was examined using the *Kendall* muscle grading system.

Following these assessments, the participant underwent shoulder joint ultrasound.

Results

The rotator cuff tears accounted for 8,9% of all the pathologies. Full-thickness tears had lower occurrence (1,5%) than partial-thickness tears (7,4%), but the most common pathologies were tendinopathies (20,7%) and calcific tendinitis (15,5%).

Ultrasound findings revealed pathologies in 45,1% of the participants (250+ shoulders), despite their asymptomatic status. The prevalence of pathologies increased with age, especially 60-70 years, showing higher incidence of joint degeneration ($p < 0,05$). None of the shoulder joint tears showed clinical signs of acute or chronic injury.

Conclusions

Asymptomatic rotator cuff tears are common in individuals aged 40-70, with prevalence increasing significantly with age. The results underline the importance of interpreting ultrasound imaging, as tears may not always correlate with the clinical symptoms, emphasizing the need of a holistic approach, when assessing the patient's shoulder/s.

Reconstruction of Metacarpal Bones with Free Deep Circumflex Iliac Artery (DCIA) Microvascular Bone Flap

Oral

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Objectives*

Introduction. Over the last 10 years military conflicts have involved Latvian medical care, creating an opportunity to treat patients with gunshot and explosion injuries. The number of these patients is increasing. Treatment requires multidisciplinary approach and non-standard tissue reconstruction. There are described metacarpal bones reconstruction variants (with ilium bone, ribs, distal part of radius, olecranon, fibula) in the medical literature. This case report is about defect of the three metacarpal bones, and there is no described possibilities of such type reconstruction in available information sources.

Case description. A 46 year old soldier sustained a dredging and blast injury to his left hand during the war. Treatment started in Ukraine : damage control, debridement operations, closure of soft tissue defect. For further treatment, patient was sent to Latvia, where man received surgical treatment of radial nerve and osteomyelitis. After 4 months, multiple metacarpal bone reconstruction was performed with free deep circumflex iliac artery (DCIA) microvascular bone flap.

Summary. Postoperative wounds are healed and rehabilitation process is continuing. In the future is planned a stage reconstruction of tendons.

Conclusions. Treatment of upper extremity blast injuries requires an individualized approach to the patient. The size, variety and complications of damaged structures extend the healing time and increase the number of necessary reconstructive stage surgeries.

Salvage Procedures in Most Common Carpal Problems. Experience and Results of the Microsurgery Centre of Latvia

Oral

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Objectives*

The most common carpal pathologies which require surgical interventions are scapholunate ligament disruptions, scaphoid fractures and nonunions as well as aseptic necroses of the carpal bones like Kienbock or Preiser diseases. These problems mostly occur in young and active adults. In cases with delayed primary treatment where reconstructive surgeries are impossible, different salvage procedures are advised to prevent pain and preserve limited functionality of the wrist joint

Materials and Methods

This was retrospective study, including patients with 4 corner fusion (4CF) and Proximal Row Carpectomy (PRC) surgeries in the single specialized hand surgery centre. All surgeries were performed by senior certified hand surgeons. Patients operated from January 1st 2016 to December 31st 2022 included. Patients with problems of both wrists were excluded. We got 43 patients in PRC group and 50 patients in 4CF group. Both groups were almost equal in terms of gender, age and blue/white collar distribution. Most common diagnoses were Scaphoid Nonunion Advanced Collapse (SNAC) and Scapho-Lunate Advanced Collapse (SLAC) wrists

Results

Results were collected on site using Patient Related Wrist Evaluation Score (PRWE), Lyon Wrist Score (LWS), including records of Range of Motion (ROM), subjective evaluation and Grip strength. Statistically significant differences between groups were found in PRWE scores and Grip measurements in favour of PRC group. The complication rate was comparatively low - 2 complications in PRC group and 7 in 4CF group. Seventeen of 4CF procedures were followed by the additional K-wire removal under the fluoroscope in operating room. Fourteen patients with PRC surgeries required K-wire removal in outpatient department

Conclusions

In our hands both methods are good if carried out under the right indications. We advise to choose PRC surgery, if possible (faster, shorter immobilization, cheaper). Manual workers, if pain free, have better subjective results like white collars. LWS is optimal for scoring.

Surgical Treatment Methods and Outcomes of Periprosthetic Shoulder Infection

Oral

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Objectives*

The complication of shoulder replacement surgery - periprosthetic joint infection- (PJI) is a relatively rare, but catastrophic complication. Management of this complication is challenging. The aim of the study is evaluation of clinical, radiological and surgical results in patients with periprosthetic shoulder infection.

Materials and Methods

In this retrospective cohort study patients were selected by shoulder periprosthetic infection and surgical treatment, admitted in the hospital between 2009 and 2024. Clinical, radiological, laboratory examination and performed surgery were evaluated. Functional outcomes were evaluated using QuickDASH score.

Results

We included in the study 19 patients, 57.9 % (n =11) were women, 42.1% (n = 8) were men. The age range was between 44 and 81 years. *Staphylococcus aureus* was found in 31.5 % (n = 6), *Propionibacterium acnes* – in 26.3% (n = 5), coagulase - negative *Staphylococcus* –in 21.1% (n = 4), *Staphylococcus intermedius* – 10.5% (n = 2), *Pseudomonas aeruginosa* – 5.3 % (n = 1), *Enterococcus faecalis* – 5.3 % (n = 1). Eighteen patients had 2-stage revision. Average QuickDASH score – 32.75. One patient had 1-stage revision.

Conclusions

The most common microorganisms, which caused PJI, were *Staphylococcus aureus*, *Propionibacterium acnes* and coagulase - negative *Staphylococcus*. The most appropriate surgical treatment for patients with PJI was a 2-stage revision. QuickDASH results are satisfactory.

Surgical Treatment of Severe Hallux valgus: Mid-Term Outcome

Oral

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Objectives*

Severe hallux valgus (HV) is common foot pathology. Many methods are described for surgical treatment. The aim of the study was to evaluate mid-term outcome of patients after surgical treatment with severe HV deformity.

Materials and Methods

A retrospective study of patients who underwent surgery for severe HV, admitted in the hospital from January 2017 to December 2022, was conducted.

A total of 229 cases (302 feet) with surgically treated HV—8 feet HV grade 0, 113 feet HV grade 1, 97 feet HV grade 2 and 84 feet HV grade 3. Pre-operative and postoperative radiographs were analyzed, and each case was categorized using HV classification. Mid-term postoperative radiological examination and functional results, using American Orthopedic Foot and Ankle Society (AOFAS) scale, were evaluated.

Results

Mid-term outcome was evaluated in 22 female patients (24 feet), mean age 55.5 (45-71) years, 84-24 (mean 54) months after the surgery. Fifteen patients (17 feet) had first tarsometatarsal joint (TMTJ) fusion with two screws, 1 patient (1 foot) had scarf osteotomy, 2 patients (2 feet) had chevron osteotomy, 2 patients (2 feet) had I metatarsal proximal osteotomy and osteosynthesis with plate.

Pre-operative mean hallux valgus angle (HVA) was 40°, intermetatarsal angle (IMA) 19°, distal metatarsal articular angle (DMAA) 36°; postoperative mean HVA was 13°, IMA 16°, DMAA 16°.

Mid-term mean HVA was 30°, IMA 17°, DMAA 36°. Mean grade of the medial sesamoid position pre-operatively was 3, postoperatively and in mid-term—2. Mid-term mean AOFAS score was 73.03.

Conclusions

Severe hallux valgus patients who underwent surgery demonstrated improvement of HVA, IMA, DMAA, medial sesamoid position and had good mid-term functional results.

Finite Element Method Applied in the Biomechanical Assessment of the Acromio-Clavicular Joint

Poster

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Objectives*

The biomechanical assessment of the acromio-clavicular joint (ACJ), comprising the acromio-clavicular ligament (ACL) and coraco-clavicular ligament (CCL), using a real-life experimental method and the finite element method (FEM). The FEM involves the division of a continuous domain into small interconnected elements (FE-finite elements).

Materials and Methods

Different models were analyzed to determine the physical properties of the ACL and CCL, using an experimental method and virtual simulation (VS) through the FEM (three models were created for each method). The relative error was calculated: $\epsilon = \frac{|E - S|}{E} \cdot 100\%$ where ϵ -relative error, E-experimentally measured force, S-measured force in VS. The resistance condition was verified: $\sigma_{\max} \leq \sigma_r$ (Pa). The stress state was evaluated using von Mises equivalent stresses: $(2^{-1/2}) \cdot \sqrt{(\sigma_1 - \sigma_2)^2 + (\sigma_2 - \sigma_3)^2 + (\sigma_3 - \sigma_1)^2}$, (where $\sigma_{1,2,3}$ -principal stresses at the calculated point in the structure). The factor of safety (FOS) was applied: $\sigma_{\text{vonMises}} / \sigma_{\text{Limit}} < 1$.

Results

The mechanical resistance of the ACJ was assessed using experimental method on six cadaveric blocks, determining the mean breaking force under axial traction. The intact capsuloligamentous complex revealed a higher resistance ($F \approx 972\text{N}$) compared to partial ligament sectioning ($\approx 398\text{N}$ for the capsule without the CCL and $\approx 501\text{N}$ for the CCL by itself). The ACJ is stabilized by the capsule (44.3%) and the coraco-clavicular ligament (55.7%). Using FEM-based virtual simulations, models incorporating the scapula and clavicle, were divided into FE ranging from 14000-32000, and comprising 25000-50000 nodes. From the three cases, the following data was recorded: $\sigma_{1,\max} = 4.6\text{ MPa}$, $\text{FOS}_1 = 25.71$; $\sigma_{2,\max} = 10.2\text{ MPa}$, $\text{FOS}_2 = 11.08$; $\sigma_{3,\max} = 11.2\text{ MPa}$, $\text{FOS}_3 = 6.23$, and the forces $F_1 \approx 1000\text{N}$, $F_2 \approx 400\text{N}$, $F_3 \approx 500\text{N}$; values were comparable to the experimental data, presenting the relative errors $\epsilon_1 = 2.88\%$, $\epsilon_2 = 0.401\%$, $\epsilon_3 = 0.279\%$, recording deviations due to geometrical and computational differences.

Conclusions

FEM is a crucial technique that allow the assessment of the biomechanical properties and functional response of the ACJ, providing a wide range of advantages such as objectivity, precision and economical benefits.

Impact of Preoperative Preparation on Treatment Outcomes of Proximal Femoral Fractures in Elderly Patients

Poster

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Objectives*

To evaluate the impact of preoperative preparation, including a functional activation program, on the outcomes of proximal femoral fracture treatment in elderly patients, focusing on reducing complications, lowering hospital mortality, and accelerating rehabilitation.

Materials and Methods

Data were analyzed for 155 patients (96 women, 59 men, mean age 78 years) hospitalized with hip fractures. Key preoperative interventions included:

- Correction of anemia (34%): Transfusion of erythrocyte mass.
- Electrolyte balance restoration (28%): Normalizing potassium and sodium levels.
- Anticoagulant therapy (89%): Administering prophylactic medications.
- Management of comorbid conditions: Hypertension (62%) and diabetes (21%).

Surgeries (92%) were performed on average three days post-admission, employing dynamic fixation (62%) and endoprosthetics (38%).

Functional Activation Program:

A tailored preoperative regimen implemented for 60 patients consisted of:

1. Breathing exercises to prevent hypoxia.
2. Limb physical therapy to stimulate circulation.
3. Nutritional optimization, emphasizing high protein intake (1.5 g/kg body weight) and micronutrients like zinc, magnesium, vitamin D, and omega-3s.
4. Early mobilization to maintain minimal physical activity.

This approach reduced complications to 5% (vs. 10% in the control group) and shortened the average hospital stay from 12 to 10 days.

Results

Postoperative complications occurred in only 8% of patients, significantly lower than those without comprehensive preparation. Hospital mortality was 2%, and the 1-year mortality rate was 9%, underscoring the effectiveness of timely and thorough preoperative care. The functional activation program notably expedited recovery, reducing hospitalization duration and improving early rehabilitation outcomes.

Conclusions

Comprehensive preoperative preparation significantly reduces complications and mortality among hip fracture patients. The functional activation program demonstrated high efficacy and incorporated into standard preparation protocols. Standardizing preoperative measures will enhance treatment outcomes, particularly in elderly patients, promoting better rehabilitation and lowering complication risks.

Mental Health and Cognitive Function among Patients with Symptomatic Hand or Large Joint Osteoarthritis

Poster

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Objectives*

We aim to assess and evaluate the functional status, pain, cognitive function, and symptoms of depression and anxiety in patients with osteoarthritis (OA) with or without comorbidities.

Materials and Methods

This observational cross-sectional study was conducted in Riga East University Hospital from March to December 2024. Data was collected using both inpatient and outpatient groups. The data was collected using questionnaires and consisted of demographic data, diagnosis, functional status and pain intensity determined using Visual Analogue Scale (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Functional Index for Hand Osteoarthritis (FIHOA), the levels of depression, anxiety and cognitive function determined using Patient Health Questionnaire-9 (PHQ-9), General Anxiety Disorder-7 (GAD-7) and Montreal Cognitive Assessment (MoCA) test.

Results

The study comprised 47 patients with a mean age of 63±8 years and a mean pain intensity of 5±2 on the VAS scale, reflecting a moderate pain level. The median MoCA score was 23.7 (95% CI 22.6–24.8), corresponding to mild cognitive impairment. The median GAD-7 score was 5.6 (95% CI 4.2–7.0), indicating mild anxiety. The median PHQ-9 score was 6.2 (95% CI 4.6–7.7), indicating mild depression. We found a positive correlation between PHQ-9 score and body mass index ($p=0.015$), FIHOA score ($p=0.012$) and female sex ($p=0.010$), respectively. Twenty-three patients had OA with no comorbidities, while twenty-four patients had OA and comorbidities, but no statistically significant difference was found in MoCA, GAD-7 or PHQ-9 score between the two groups.

Conclusions

This study revealed that patients with osteoarthritis experience mild cognitive impairment, mild depression and anxiety regardless of whether they have other comorbidities or not. Additionally, female sex, elevated body mass index, and FIHOA score may correlate with an increased level of depression. It also underscores the importance of considering mental health in the comprehensive care of OA patients.

Optimisation of Surgical Treatment for Patients with Long Bone Fractures of the Lower Limb in Cases of Multiple Injuries

Poster

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Objectives*

To optimize the surgical treatment of patients with long bone fractures of the lower limb through the development of a specialized rod apparatus.

Materials and Methods

From July 2016 to June 2023, we observed 32 patients with femoral and tibial fractures with multiple and combined injuries in the Emergency Trauma Department of the Multidisciplinary Clinic of Tashkent Medical Academy. Among them, 7 were female (21.9%) and 25 were male (78.1%), with an average age of 43.4 years (ranging from 19 to 68 years). There were 9 cases of open fractures (28.1%) and 23 cases of closed fractures (71.9%). Based on the mechanism of injury, 22 cases were due to road traffic accidents (68.75%), 8 cases to domestic injuries (25%), and 2 cases to street injuries (6.25%). Treatment outcomes were monitored over a period ranging from 12 to 26 months. The average duration of fixation using an external fixation device depended on the appearance of signs of consolidation and the type of fracture.

Results

We developed an external fixation rod apparatus (Patent FAP 00737). The advantages of the surgical method using our proposed rod apparatus include minimizing surgical trauma, creating optimal conditions for reparative regeneration, the need for specialized tools, and enabling early mobilization of patients. For type “A” fractures according to the AO/ASIF classification, fixation periods were 12–14 weeks, while for types “B” and “C,” fixation periods were 14–16 weeks. Complete fracture union was observed in 29 cases (90.6%). In one case (3.1%), involving a patient with fractures of both lower leg bones, consolidation was not achieved, and the patient is still under observation. In two cases (6.3%), early removal of the apparatus led to improper fracture union. Soft tissue inflammation around the rods was observed in 3 cases (9.4%) and was managed through local antibiotic injections around the rods and regular dressing changes.

Conclusions

The use of the developed rod apparatus for trans osseous osteosynthesis of long bones can be considered a preferred method. Applying this rod apparatus in patients with multiple injuries allows for overall stabilization and enables early mobilization, facilitating joint movement in adjacent areas.

Peculiarities of Biomechanical Properties of the Femoral Head at Osteoarthritis and Avascular Necrosis

Poster

***Prof. Pēteris Studers*¹, *Dr. Andris Džeriņš*¹, *Dr. Dārta Jakovicka*², *Prof. Iveta Ozolanta*³, *Prof. Vladimirs Kasjanovs*³**

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Objectives*

Osteoarthritis (OA) and avascular necrosis (AVN) are prevalent skeletal diseases in the ageing population. The mechanisms behind these conditions in the femoral head are not fully understood. Consequently, the biomechanical properties of the femoral head warrant investigation to elucidate the factors that can initiate these conditions. This study evaluates the biomechanical properties of femoral bone tissue affected by OA and AVN. OA and AVN were diagnosed after a preoperative x-ray of the hip joint in two projections, computed tomography, and visual inspection of the femoral head during surgery.

Materials and Methods

For this study, seventy-four femoral heads were acquired after surgical removal from age and sex-matched cohorts of patients, comprising 38 individuals with OA and 36 with AVN. Rectangular samples were extracted from the subchondral bone plate in the middle zone, following a three-point bending test to analyze the biomechanical properties of the bone tissue. The biomechanical parameters assessed included ultimate stress, ultimate strain, and flexural elastic modulus.

Results

The findings revealed that the ultimate stress of the samples from the OA group did not exhibit a statistically significant difference compared to the breaking points of the AVN group ($p = 0.27$). Similarly, the ultimate strain of the samples from the OA group was not statistically different from that of the samples from the AVN group ($p = 0.11$). However, there was a statistically significant difference in the flexural elastic modulus, indicating that the modulus for the OA group was higher than that of the AVN group ($p = 0.03$).

Conclusions

This study found no significant differences in maximum stress and ultimate strain between the OA and AVN groups. However, the OA group showed a higher flexural modulus of elasticity. These findings could guide future research on the differences between OA and AVN and aid in developing targeted therapies.

Paediatric Infectious Diseases

A Novel Diagnostic Method (NS1-IgG-ELISA) for Differentiation of Tick-borne Encephalitis Infections Caused by Different Virus Subtypes

Oral

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Objectives*

Since the introduction of sequencing of viral genomes, it has been recognized that TBEV can be divided into at least five subtypes (TBEV-Eu, TBEV-Sib, TBEV-FE, TBEV-Baikal, TBEV-Himal). To date, it has not been possible to ascertain TBEV subtype-specific information in a clinical setting from serum samples drawn from patients with TBE infection. As it is thought that different subtype infections exhibit varying clinical courses and outcomes, serological differentiation of the virus subtypes is clearly important, especially in European TBE-endemic countries, where more than one virus subtype is in circulation.

Materials and Methods

An ELISA format was developed based on TBEV NS1 antigen against the European, Siberian and Far-Eastern subtypes. The three NS1 antigens were biotechnologically produced in a human cell line and used for ELISA coating. Sera from German (European subtype) and Russian (Siberian and/or Far Eastern subtypes) TBE patients with positive TBEV IgG were used to test the reactivity and sensitivity against these three NS1 antigens.

Results

Our new NS1-IgG ELISA against all three subtypes showed an overall sensitivity of 91%. However, based on conventional (whole virus) IgM ELISA results, five serum samples may have been taken too early during the symptomatic course of TBE illness to react positive. Testing of 23 German and 32 Russian TBEV IgG-positive sera showed that the ELISA could differentiate between TBEV European subtype and TBEV Siberian and Far Eastern subtype infections.

Conclusions

In geographical areas where two or more TBEV subtype infections can occur, the NS1-IgG ELISA developed here constitutes an important diagnostic tool to differentiate between European subtype infections and Siberian/Far Eastern subtype infections and to use the new assay for clinical and epidemiological studies to clarify the importance of particular subtype infections in an area. Furthermore, this assay may help to better describe and anticipate the clinical courses and outcomes of particular TBEV subtype infections.

Rīga Stradiņš University (RSU) Active Surveillance Activities Demonstrate the Effectiveness of Tick-Borne encephalitis Vaccination in Latvia, 2018–2023

Oral

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Objectives*

Tick-borne encephalitis (TBE) is endemic in Latvia, which has one of the highest TBE incidence in Europe. TBE vaccines are recommended for all and government-provided for children in the highest incidence areas in Latvia. Acknowledging the important TBE disease burden in children, the Latvian National Immunization Technical Advisory Group recommended in 2023 that the government provide vaccine for all children residing in Latvia. We evaluated the effectiveness of TBE vaccines for the prevention of TBE, including in children.

Materials and Methods

Study staff at Rīga Stradiņš University (RSU) conducted active surveillance for TBE cases from 2018–2023. Serum and cerebrospinal fluid were ELISA-tested for TBEV-specific IgG and IgM antibodies. Vaccination history was collected by interview and medical record review. Ipsos conducted online household surveys of the general population in 2019–2023 to monitor TBE vaccine uptake. Utilizing data from surveillance and population surveys, we estimated TBE vaccine effectiveness (with 95% confidence interval [CI]), by age groups, using the screening method.

Results

There were 1,207 TBE cases from 2018–2023; 49 (4.0%) in children 1-15 years-of-age. Of the 1,207 TBE cases, 1,186 (98.3%) were unvaccinated, 11 partially-vaccinated (received at least one TBE vaccine dose but not in accordance with the schedule), and 6 fully-vaccinated (received the three-dose primary vaccine series and appropriately timed boosters). TBE vaccine history was ascertained from 91.7% (31,661/34,54) of respondents from the general population: 38.7% (12,239) were unvaccinated. Of 4,728 people with known last vaccination date, 64.3% (3,038) were partially-vaccinated, and 35.7% (1,690) were fully-vaccinated. TBE vaccine effectiveness was 99.1% (95% CI 98.0–99.6) against TBE; 94.6% (95% CI 77.8–98.7), 99.2% (95% CI 97.8–99.7), and 100% (95% CI undefined) among 1–15, 16–59, and ≥60 years-of-age, respectively.

Conclusions

RSU studies demonstrate that TBE vaccines are highly effective in preventing TBE in Latvia, including in children. To prevent life-threatening TBE, TBE vaccine uptake should be increased in Latvia.

Tick-Borne Encephalitis Vaccine Breakthroughs – New Insights in the Role of Antibodies in TBE Infection

Oral

Prof. Gerhard Dobler¹

1. Bundeswehr Institute of Microbiology, Munich

Objectives*

Tick-borne encephalitis is the most important viral encephalitis in Europe and causes thousands of human cases of severe meningitis and encephalitis every year, some of them with fatal outcome. There are two registered and highly effective vaccines available. However, also in some fully vaccinated persons severe vaccine failure infections may occur. The mechanisms of these breakthrough infections have not been understood as studies showed that all these patients exhibit a serological reaction of the secondary type (like a booster reaction), means these patients immunologically reacted against TBE vaccination. Comprehensive studies on the virus genetics indicate that the reason for this breakthrough is not due to virus escape mutants. Further studies detecting antibodies against the viral protein NS1 now show that in protected vaccinees viral replication is already stopped at an early stage of infection (probably in already in the primary dendritic skin cells) while in vaccine breakthroughs viral replication continues in the target organs of the reticuloendothelial organ system and TBE virus finally can invade the CNS and cause disease. Comprehensive vaccine studies using neutralization assays against different TBE virus strains show that each individual reacts in a specific manner against any particular virus strain. Data show that the production of neutralizing antibodies is crucial to overcome TBE infection in an early stage and seems to have individual genetic determinants. Viral breakthrough infections might therefore be a coinciding event of non-fitting virus strain and individual immune reaction. Our data also show that applying different brands of TBE vaccines may reduce TBE breakthrough infections by inducing a higher and more focused immunity against a wider range of naturally occurring TBE virus strains including also Siberian subtype strains of the Baltic lineage.

Viruses – Only Bad Guys?

Oral

Prof. Gerhard Dobler¹

1. Bundeswehr Institute of Microbiology, Munich

Objectives*

When we talk about viruses, we implicate this with disease and principally with a bad experience. Besides causing numerous diseases, e.g. inflammatory bowel disease (IBD), Crohn’s disease, and neurodegenerative disorders, the virome however also maintains a beneficial role in immunological processes, it may prevent psychiatric disorders and also various forms of cancer.

However, the importance of viruses goes much beyond individual health and disease. Even only few biologists are aware that viruses are the driving forces for many processes in nature. The evolution of placental mammals started by the integration of retroviral elements into the genome of early mammals expressing proteins (syncytins) which are essential for the formation of placentae. Therefore, Placentaria can be seen as product of an endogenous viral infection of cells. The most important function of viruses on a global scale is to regulate the basic nutrient cycles on our earth. Marine viruses bind and release many times more carbon dioxide as humans emit. Viruses are also involved in the global oxygen cycles, the nitrogen cycles, the phosphate cycles, the sulfur cycles. In our anthropocentric view we mainly think of direct nano-ecological effects of other organisms (among them viruses) on humans (that is what we call epidemiology) and we do not realize that most of the main processes and therefore also human life in our world driven and regulated by viruses.

Adenoid Microbiota: Comparing Healthy and Otitis Media-Affected Middle Ears in Children Using 16S rRNA Sequencing

Poster

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1. Rīga Stradiņš University

Objectives*

To compare the adenoid surface microbiota of children with otitis media with effusion (OME) and healthy controls using 16S rRNA gene sequencing, and to identify key differences in bacterial diversity and composition.

Materials and Methods

Adenoid surface swabs were collected from 40 pediatric patients (20 with OME, 20 controls). Microbial DNA was extracted, and the V3-V4 region of the 16S rRNA gene was amplified. Sequencing was conducted on an Illumina MiSeq platform, and the resulting data were analyzed using QIIME2 for taxonomic classification and diversity assessment. Statistical analyses, including PERMANOVA and differential abundance testing, were performed to identify significant intergroup differences.

Results

In this study, we analyzed 40 adenoid surface swab samples from children, evenly split between those with and without otitis media with effusion (OME). Alpha diversity, assessed using the Inverse Simpson, Shannon, and Pielou's evenness indices, revealed no significant differences between the groups, except for Pielou's evenness index, which was lower in the OME group ($p = 0.036$), indicating a less even bacterial distribution. Beta diversity analysis showed no significant differences in microbial composition between the groups (PERMANOVA, $p = 0.46$). Taxonomic analysis identified Proteobacteria as the dominant phylum, with Haemophilus and Fusobacterium as the most prevalent genera. Differential abundance analysis highlighted six genera, including Bordetella and Alloprevotella, as key drivers of microbiome differences between the groups.

Conclusions

By comparing adenoid bacterial colonies in children with healthy middle ears and those with otitis media with effusion (OME), we observed significant differences in alpha diversity using Pielou's index, with healthier ears showing greater evenness. Beta diversity analysis revealed greater microbial variability in the OME group. Common genera included Haemophilus, Fusobacterium, Streptococcus, Moraxella, and Peptostreptococcus. Notably, the OME group had higher levels of Alloprevotella, Peptostreptococcus, Porphyromonas, Johnsonella, Parvimonas, and Bordetella.

Bordetella pertussis Outbreak in Latvia, 2024

Poster

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Objectives*

Whooping cough is a bacterial respiratory infection caused by *Bordetella pertussis*. It is characterized as mild fever, runny nose and cough, which in typical cases gradually develops into a hacking cough. Whooping cough is still a widespread disease in the whole and it is very contagious. The longer are interval between the outbreaks the more severe they are. In Latvia last outbreaks were identified in years of 2012, 2016 and 2019, and now in 2024. Direct and indirect tests are available in diagnostic of *B.pertussis*.

Materials and Methods

Between January 1, 2024 and October 31, 2024 663 samples were tested by Real time PCR (*Bordetella pertussis* and *Bordetella parapertussis* DNA test) and 951 IgA, IgG samples by ELISA (*Bordetella pertussis* toxin IgG/IgA). Epidemiological bulletins 2010-2024 from Centre for Disease Prevention and Control (CDCL) were used for statistic.

Results

279/663 (42%) samples were positive for *B.pertussis* DNA. Positive cases ratio per month: 01.2024-5/20 (25%); 02.2024-0/3; 03.2024-5/13 (38%); 04.2024-5/15 (33%); 05.2024-7/29 (24%); 06.2024-43/75 (57%); 07.2024-61/128 (48%); 08.2024-104/200 (52%); 09.2024-29/116 (25%); 10.2024-20/64 (31%). 83/516 (16%) samples were positive for *Bordetella pertussis* toxin IgG; 51/435 (12%) were positive for *Bordetella pertussis* toxin IgA. CDCL data showed that until October of 31, 2024 3123 cases were notified. Last highest peak was in 2019, when there were 720 new registered cases.

Conclusions

In 2024 *B.pertussis* outbreak was registered in Latvia. From the beginning of June tests performed for *B.pertussis* DNA were rapidly increasing reaching its peak at August until gradually decreasing. Real time PCR test of *B.pertussis* DNA has high specificity and high sensitivity, apart from that it takes less than a day to identify the result. ELISA *B.pertussis* toxin IgG/IgA detection method takes a lot more time to detect antibodies and retesting of antibodies titres is needed during the convalescent stage.

Cerebrovascular Manifestations of Lyme Neuroborreliosis in Paediatric Patients from 2014–2024: Single Centre Experience

Poster

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Objectives*

Lyme disease is an infectious, tick-borne illness primarily caused by *Borrelia burgdorferi*. Around 10% patients develop Lyme neuroborreliosis (LNB). Most common symptoms in children are facial nerve palsy and meningitis. Rarely, LNB causes cerebral vasculitis, leading to arterial ischemic stroke (AIS). Aim of the study was to summarise clinical, biological and radiological characteristics and treatment of LNB vasculitis in paediatric patients.

Materials and Methods

A retrospective study of the patients' data was done using local database in Children's Clinical University Hospital, Riga.

Results

Three patients were included in this study with median age of 8.3(6.5-11.5) years. Majority of patients were female (n=2). Only one patient had a history of tick-bite. Two patients presented to the Emergency Department with acute paresis on the right side and after MRI of the brain were diagnosed with AIS. One patient presented with history of nocturnal headache and vomiting for two weeks and had no structural lesions on MRI. LNB vasculitis affected anterior circulation in majority of cases (n=2), and posterior circulation in 1 case. Cerebrospinal fluid (CSF) analysis showed lymphocytic pleocytosis in all patients with mean leukocyte count 145.3(106.5-203.0)/mm³. CSF protein was elevated in majority cases (n=2). All patients underwent two-step serological work-up with ELISA, then Western Blot. CSF IgG antibody index was positive in all patients. All patients were treated with intravenous ceftriaxone. Mean antibacterial therapy duration was 26.0(25.0-28.0) days. All patients received glucocorticoids and antithrombotic medication. Follow-up MRI showed improvement in vascular abnormalities (n=2) or stability (n=1). Two patients with AIS had mild neurological sequelae at discharge and have not had recurring cerebrovascular events.

Conclusions

We report 3 paediatric patients with LNB-associated cerebral vasculitis. LNB is a rare cause of AIS in children, but should be considered, especially in endemic regions. Diagnosis relies on appropriate serum and CSF testing. Antibacterial therapy is mainstay treatment for LNB vasculitis while antithrombotic should be considered for AIS prevention.

Preliminary Data of Immune Modulator Assessment in Children with Long COVID-19

Poster

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Objectives*

While SARS-CoV-2 generally induces mild symptoms in pediatric population, emerging evidence indicates that persistent immunopathological alterations may contribute to the development of long COVID. Despite ongoing inquiries into the clinical manifestations and progression of long COVID, there remains a significant gap in mechanistic understanding. Recent investigations within pediatric cohorts have highlighted the involvement of the interferon pathway in immunopathological changes occurring 3 to 6 months post-recovery from symptomatic SARS-CoV-2 infection.

Materials and Methods

This cross-sectional study encompasses a pediatric population where an online diagnostic tool is utilized following laboratory-confirmed SARS-CoV-2 infection to conduct an initial screening for long COVID. Participants meeting the established criteria for long COVID undergo further evaluation in person using the validated International Severe Acute Respiratory and Emerging Infection Consortium tool. Children who have fully recovered from acute COVID-19 infection serve as the control group. Multiplex analysis of serum inflammatory mediators, including IL-29, IFN- α 2, IFN- β , IFN-28 β , and IFN- γ , is conducted.

Results

Utilizing the online screening tool, a total of 220 children under 18 years have been identified experiencing long COVID. Laboratory data from 14 patients in the control group and 19 patients with long COVID were analyzed. Preliminary findings from immune modulator assessment indicate that concentrations of IFN- α 2 and IFN- γ are elevated in the long COVID cohort compared to controls, with IFN- α 2 levels measuring 38.76 pg/ml in the long COVID group versus 20.12 pg/ml in the control group, and IFN- β levels at 30.31 pg/ml in the long COVID group compared to 27.67 pg/ml in the control group.

Conclusions

Preliminary data of the comparative analysis of laboratory data reveals that children experiencing long COVID exhibit elevated concentrations of immune modulators, IFN- α 2 and IFN- γ , when contrasted with a control group of fully recovered patients. These findings suggest a potential role of the IFN pathway in the pathophysiology of long COVID in pediatric populations.

Prevalence of Purulent Complications of Acute Upper Respiratory Tract Infections before and after COVID-19 Restrictions / Impact of the COVID-19 Pandemic on the Prevalence of Deep Throat Infections at the Children’s Clinical University Hospital

Poster

Dr. Estere Jansone¹, Dr. Kristaps Dambergs¹

1. Rīga Stradiņš University

Objectives*

This summary provides a concise overview of the key objectives related to the study of deep throat infections at Children’s Clinical University Hospital with a focus on the effects of the COVID-19 pandemic. It covers prevalence before, during, and after the COVID-19 pandemic restrictions at Children’s Clinical University Hospital, diagnostic methods, treatment patterns, and post-pandemic clinical outcomes

Materials and Methods

The study is retrospective. It will examine medical data for patients discharged from the Children’s Clinical University Hospital with diagnoses of peritonsillar, parapharyngeal, and retro-pharyngeal abscesses, from January 2017 to December 2023. The study analyzes the incidence of deep throat infections during different time periods.

All patient data will be anonymized in the study. Personal data of patients will not be published or analyzed.

Results

The data from this study showed that during the COVID-19 pandemic, the number of patients with deep throat infections at the Children’s Clinical University Hospital decreased compared to the period before the pandemic. However, after the lifting of restrictions, the number of cases increased and was even higher in the first two years than it had been before COVID-19. Additionally, surgical treatment was used more frequently during this post-pandemic period.

Conclusions

In conclusion, this study highlights significant shifts in the prevalence of deep throat infections at the Children’s Clinical University Hospital during and after the COVID-19 pandemic. While the number of cases decreased during the pandemic, a marked increase in cases was observed after the lifting of restrictions, surpassing pre-pandemic levels. Additionally, surgical interventions, such as abscess drainage and tonsillectomy, were used more frequently in the post-pandemic period. These findings emphasize the lasting impact of the pandemic on healthcare patterns and underline the need for ongoing monitoring and adaptation of treatment strategies in the pediatric population

Seroprevalence of Tick-borne encephalitis in Latvia, 2019–2022, Indicates a High Disease Risk

Poster

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Objectives*

Despite its importance, the burden of Tick-borne encephalitis in Latvia remains poorly understood in many regions, particularly regarding the proportion of the population that has been infected with TBEV. Seroprevalence studies and true infection rates have been challenging to access and remained unknown for decades. By studying the frequency and distribution of TBEV antibodies in Latvia, we aimed to provide valuable insights into population's immunological status against TBEV, epidemiology, the proportion of asymptomatic or undiagnosed TBEV infections, and vaccine effectiveness.

Materials and Methods

We conducted a cross-sectional seroprevalence study for antibodies against TBEV in the Latvian population during 2019-2022. A total of 1020 residents living in different regions of Latvia were included. Blood samples were tested using an ELISA (VIDITEST) for detection of TBEV-specific IgM and IgG antibodies (against whole virus) and a recently introduced new immunoassay to detect anti-TBEV NS1 IgG ELISA. The prevalence of anti-TBEV IgG antibodies was calculated in different groups: vaccinated and non-vaccinated individuals, age groups (<18; 18-39; 40-64; 65+ years), and different regions.

Results

The overall TBEV seroprevalence among 1020 residents in Latvia was 39.7%, detected by (whole virus) ELISA. 33.4% of the enrolled population were vaccinated against TBE with at least one dose of TBE vaccine. Among the unvaccinated population, 16.3% had positive TBEV-specific IgG antibodies - in children 15.8% and adults 16.4%. Preliminary results show that 2.2% of the study population had positive TBEV-specific NS1 antibodies detected by NS1 IgG ELISA, indicating past TBEV infection.

Conclusions

In conclusion, this population-based study in Latvia shows that approximately 40% of residents in Latvia have specific antibodies against TBEV either after receiving a vaccine dose or after a past natural infection. In the unvaccinated population, 16.3% have positive TBEV-specific antibodies, which might indicate past TBE infection and an overall very high TBE risk in Latvia.

Paediatrics

Two-Year Outcomes of Multisystem Inflammatory Syndrome in Children (Mis-C): Findings from Tertiary Level Children’s Hospital in Latvia

Oral

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Objectives*

To determine the long-term recovery among MIS-c patients 24 months post-admission, using validated tools and functional tests.

Materials and Methods

This was a prospective longitudinal cohort study. All children diagnosed with MIS-c and admitted to Children’s Clinical University Hospital in Riga were enrolled. The outpatient follow-up consisted of repeated visits at 3 months, 6 months, 12 months and 24 months after the acute phase of MIS-c. Besides initial interview and physical examination, patients were asked to complete two validated tools (Karolinska Sleep Questionnaire (KSQ), Chalder Fatigue Questionnaire (CFQ-11)) and to do two functional tests (orthostatic intolerance tests (OIT), 6-minute walking tests (6MWT)).

Results

21 patients with confirmed MIS-c were enrolled. The median age of the study group was 6 years (IQR, 5.0–10.0 years; range, 1–16 years). KSQ showed that sleep quality, non-restorative sleep and bothersome day time sleepiness were more likely associated with 1–3-month time frame rather than long-term sequelae ($p < 0.05$). According to CFQ, at 1–3-month follow-up all children (N-21, 100%) were physically and psychologically fatigued (Bi-modal score ≥ 4). The 6-month visit was a significant turning point- none of the patients were considered fatigue (Bi-modal score < 3). When performing OIT, no cases of orthostatic intolerance, orthostatic hypotension or POTS were detected. The heart rate and blood pressure changes were mild, without any provoked subjective complaints. Finally, 6MWT showed significant improvement in walked distance. At first follow-up visit, 61.1% of children walked at or above the 50th percentile for the age and gender, while at the 24-month visit, 100% of patients surpassed the 50th percentile.

Conclusions

Conclusions: Our data show that the most significant improvement in sleep quality, reduction in fatigue, as well as orthostatic compensation and aerobic capacity was observed within the first six months after acute MIS-c with no long-term sequelae.

Acute Appendicitis in Paediatric Patients with SARS-CoV-2 Delta and Omicron Variants

Poster

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Objectives*

To analyze the clinical characteristics of pediatric patients with acute appendicitis (AA) and concurrent SARS-CoV-2 infection, focusing on differences between the Delta (B.1.617.2) and Omicron (B.1.1.529) variants.

Materials and Methods

A retrospective case series study was conducted at a tertiary hospital. Sixteen pediatric patients admitted with suspected acute appendicitis and confirmed COVID-19 infection were included. Clinical data, including symptoms and laboratory findings, were compared between patients infected with Delta and Omicron variants. Statistical analysis was used to evaluate significant differences in clinical presentations.

Results

Children with AA and the Omicron variant were more likely to present with fever ($p=0.04$) and migration of pain to the right lower quadrant (RLQ) ($p=0.02$) compared to those with the Delta variant. Other clinical features showed no significant differences between the two groups.

Conclusions

This study highlights notable differences in clinical presentation of acute appendicitis in children with Delta and Omicron variants of SARS-CoV-2, with fever and RLQ pain migration more common in Omicron cases. These findings underscore the need for further research to optimize the management of pediatric patients with acute appendicitis and concurrent COVID-19.

Child-centered Therapy Method Approach to Reduce Behavioural Signs in Children with Attention Deficit Hyperactivity Disorder: Systematic Literature Review

Poster

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Objectives*

Collect and analyze studies conducted over the past 10 years on the efficacy of a child-centered play therapy method on behavioral interferences in children with attention deficit and hyperactivity syndrome.

Materials and Methods

Study design: a systematic literature review. Study includes randomized controlled trials of the use of a child-centered play therapy method to reduce behavioral signs (impulsivity, attention deficit, and hyperactivity) in children with attention deficit and hyperactivity syndrome. The research process was structured in two stages – in the first part, a literature selection was conducted on the prevalence of attention deficit hyperactivity disorder, pathogenesis, risk factors, treatment and rehabilitation, pharmacological and non-pharmacological interventions, and the child-centered play therapy method. In the second part, studies on the effectiveness of child-centered play therapy on behavioral signs in children with attention deficit hyperactivity disorder were systematically selected and analyzed. The research was sought in databases such as *ScienceDirect*, *Researchgate*, *PubMed*, *EBSCO* using keywords: *Child-Centered Play Therapy (CCPT)*, *Attention-deficit/hyperactivity disorder (ADHD)*, *Behavior*, *Inattention*, *Hyperactivity*, *Impulsivity*. PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) was used for data selection. Initially, 1097 studies were selected from evidence-based scientific databases - Ebsco, Researchgate, ScienceDirect, PubMed. Three studies were selected for the systematic literature review that met all study inclusion criteria and matched the PICOS eligibility template.

Results

In the *Abbasi R., Saghi F., 2023*, *Hoomanian D., et al., 2016* and *Teimourian S., et al., 2020* the results of the intervention differed statistically significantly ($P \leq 0.05$) from those of the control group, suggesting the efficacy of the CCPT method on reducing behavioral expressions of ADHD behaviour.

Conclusions

Using the CCPT method, it is possible to improve expressions of behavioral symptoms - nervousness and depression, aggression and social incompatibility, hyperactivity and impulsivity, social problems, rule-breaking and aggressive behavior.

Effect of Dynamic Neuromuscular Stabilisation on Muscle Activity in Palliative Care Children: Study Protocol

Poster

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Objectives*

The aim of the study to investigate the electrical activity and passive mechanical properties of the muscles of palliative care children during different positions.

Materials and Methods

The research sample was 5 children (1 - 6 years, average 4.2 years; GMFCS IV-V level). The research was conducted in October - November 2024. Three evaluations were performed in the study: gross motor function measure (*GMFM-88*), electromiography (*Biometrics DataLITE Pioneer*), myotometry (*MyotonPro*). Physiotherapy sessions were held every working day of the week, in the first half of the day. Each session lasted from 15 minutes to 2 hours, depending on the physical and emotional state of the child.

We performed measurements on children in different positions (lying prone, support/independent sitting, frame abduction standing), examining the left and right rectus abdominis, erector spinae, upper and lower trapezius, gluteus medius, quadriceps femoris lateralis, biceps femoris, tibialis anterior and the lateral head of the gastrocnemius muscle.

Results

There is a lack not only of ongoing research, but also of publications of high scientific validity. Electromyography and myotonometry, as one of the assessment instruments used for muscle activity, is not yet widely used in the clinical practice of palliative care children, but it is increasingly described in the scientific literature and provides accurate information about muscle activity. The method of dynamic neuromuscular stabilization is widely used in clinical practice to develop trunk control function in adults, but there is still a lack of scientific publications proving the benefits of this method in children with cerebral palsy (Son et al., 2017). The myotonometry method is used in scientific practice to assess the functional state of muscles, which allows accurate and objective digital palpation of superficial skeletal muscles (Feng et al., 2018). In children with spasticity, this research method is more reliable than the Ashworth or Tardieu scales, which are subjective and have less scientific reliability (Aarrestad et al., 2004). EMG helps to plan and implement treatment program for children with cerebral palsy. Due to educational system and technological barriers, it is not yet widely used in clinical practice (Cappellini et al., 2020).

Conclusions

There is lack of scientific research into assessment of motoric changes and physiotherapy methods in palliative care children. The results of the study will provide new knowledge about the muscle activity and passive mechanical properties of palliative children during different positions.

Evaluation of Antibiotic Regimens for Non-Complicated Acute Appendicitis in Children

Poster

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Objectives*

This study evaluates the efficacy of two antibiotic regimens for the conservative management of children with non-complicated acute appendicitis.

Materials and Methods

A prospective randomized trial was conducted at a tertiary care hospital, involving children aged 7 to 18 years diagnosed with non-complicated acute appendicitis. Participants were randomized into two treatment groups: one receiving intravenous ceftazidime and metronidazole, and the other receiving intravenous ampicillin and metronidazole, both for 3 days. Inflammatory markers, including leukocyte count (Leu), C-reactive protein (CRP), interleukin-6 (IL-6), interleukin-8 (IL-8), and monocyte chemoattractant protein-1 (MCP-1), were measured every 24 hours during hospitalization. Statistical analysis was performed using the Student t-test.

Results

Data from the study revealed no significant differences in inflammatory marker levels between the two treatment groups over the observation period ($p > 0.05$ for all markers). Both regimens appeared to have similar effectiveness in managing inflammation.

Conclusions

Findings suggest no significant differences in inflammation marker responses between the two antibiotic regimens. This indicates that both treatments may be equally effective in managing non-complicated acute appendicitis in children. Further investigation is needed to confirm these results and assess long-term outcomes such as recurrence rates, treatment safety, and patient quality of life.

Evaluation of the Use of Platelet-Rich Fibrin Membrane for Myringoplasty in Paediatric Patients

Poster

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Objectives*

Conventional myringoplasty (CM) for repairing tympanic membrane perforation by cartilage or temporal fascia grafts lasts approximately 1-1.5 hours and is more successful in adults than children. Alternative methods, including platelet-rich fibrin (PRF) membranes, may reduce the duration of the surgery and postoperative recovery. However, the effectiveness of PRF membranes in the pediatric population was not sufficiently assessed. This study evaluated perforation closure rates 1, 3, and 6 months after PRF membrane placement in outpatients.

Materials and Methods

The inclusion criteria were at least 12 weeks of tympanic membrane perforation and more than 3 months without otorrhea. Patients with cleft palate, Down syndrome, and active allergic rhinitis were excluded. A perforation size was obtained by otoendoscopic photography using a 4 mm 0° endoscope and graded according to the SALIBA's classification. PRF membrane was performed right before the surgery. One otologist performed the myringoplasty with a transcanal approach under general anesthesia.

Results

41 pediatric patients aged from 4 to 16 years were included in the study, and 54 surgical procedures were performed because of contralateral ear disease in 13 patients. The median operative time was 10 min, and the median time before discharge was 3 h 24 min. The perforation closure rate at 1, 3, and 6 months was 28%, 52%, and 66%, respectively. Contralateral ear disease, chronic otitis media duration, and duration and size of perforation were not associated with closure rate, while the effect of previous adenectomy ($p = 0.065$) should be further specified.

Conclusions

The use of RPF membrane for myringoplasty is a minimally invasive procedure with a short operation, discharge time, postoperative recovery, which provides a gradual increase in perforation closure rate during six months under the mentioned inclusion criteria.

Factors Affecting Metabolic Control of Type 1 Diabetes in Children One Year After Diagnosis

Poster

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Objectives*

With increasing incidence of type 1 diabetes (T1D) in children, it is important to detect factors that influence control of the disease to decrease the rate of complications in early life. The aim of this study was to analyze control of T1D one year after diagnosis and factors influencing it.

Materials and Methods

Patients aged 1 to 18 years were included prospectively from August 2022 till November 2023 at the time of initial manifestation of T1D. Factors assessed one year after diagnosis were: severity of initial manifestation, HbA1c level, time in range (TIR), frequency of diabetic ketoacidosis (DKA) and hypoglycemia, depression signs (PHQ-9 questionnaire), eating disorders (DEPS-R questionnaire), physical activity. Patients were divided in 2 groups: good metabolic control (HbA1c level <7%, group 1), unsatisfactory control (HbA1c level ≥7%, group 2).

Results

T1D control was analyzed in 86 patients (55.8% boys). In one year, mean age of group 1 (n=46, 53.5%) was 9.6 (±4.4) years and 9.5 (±4.4) years in group 2. Diabetes control parameters in group 1 versus group 2 were: median HbA1c 6.38% (6.14-6.70) versus 8.26% (7.63-9.91), mean TIR 69.4% (±15.4) versus 35.4% (±20.1), median 2 (0-8) versus 1 (0-4) symptomatic hypoglycemia episodes per month, 1 DKA versus 7 cases (12.5% patients) with DKA per year. Depression signs were identified in 4 (23.5% from tested patients) versus 9 (75%) patients, eating disorders in 4 (8.7%) versus 3 (7.5%) patients. Patients from group 1 had significantly lower prevalence of DKA as initial manifestation: 47.8% versus 70% in group 2 (p=0.04). Patients from group 1 were engaging in sports significantly more frequently (median 5 (4-6.8) and high intensity sports (median 3.5 (2-5) times per week), than group 2, p<0.05.

Conclusions

Severity of initial manifestation and frequency of physical activity may influence T1D control 1 year after diagnosis. More data is necessary to analyze other factors.

Phage Therapy

First Steps Towards the Latvian *Klebsiella* spp. Bacteriophage Biobank

Oral

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Objectives*

Bacterial genus *Klebsiella* representatives are often implicated in healthcare-associated infections of otherwise compromised patients. While drug-resistant *K. pneumoniae* strains are widely regarded as the main *Klebsiella* spp. isolates of concern, the genus also hosts other species of relevance, such as *K. oxytoca*. Deliberate use of bacteriophages to treat bacterial infections - phage therapy seems a prospective alternative strategy to treat extensively drug-resistant bacteria and is experiencing a renaissance (either as a standalone treatment or in combination with antibiotics). To increase the possibility of phage therapy application in Latvia, our team attempts to accumulate a collection of strictly lytic bacteriophages infecting epidemiologically relevant *Klebsiella* spp. strains prevalent in Latvia.

Materials and Methods

Bacterial strains isolated from patients infected by drug-resistant *Klebsiella* spp., as well as “healthcare-environment” strains from hospital sewage are used as the isolation hosts to obtain novel tailed bacteriophages. These bacteriophages get propagated and subjected to whole-genome sequencing. Strictly lytic bacteriophages not encoding any known proteins that would preclude their practical use (e.g., virulence factors, AMR genes) get characterized in terms of their host range and lifecycle characteristics, and proceed to long-term storage as potential candidates for therapeutic use.

Results

The “sequencing first” workflow using randomly requested drug-resistant bacterial strains has resulted in a frequent recovery of very similar bacteriophages with little value added regarding the effective phage diversity of our emergent collection. This has prompted a greater focus on the informed diversification of the isolation host panel (selecting relevant isolation strains based on their WGS data, e.g., different ST and KL types).

Conclusions

Shifting our focus on the *Klebsiella* spp. strains most prevalent locally (e.g., *K. pneumoniae* sequence types 147, 512, 215, 219) has resulted in the isolation of a wider diversity of relevant bacteriophages. Characterization of target bacterial pathogen diversity is as important as the characterization of novel phage candidates for phage therapy.

From Superbugs to Super Solutions: Testing Susceptibility of *E. coli* against Bacteriophage Cocktails: Preliminary Results

Oral

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Objectives*

Urinary tract infections (UTIs) are common bacterial infections, with *Escherichia coli* (*E. coli*) being the leading causative agent. *E. coli* is known for its ability to form biofilms and to have a great capacity to accumulate virulence and resistance genes. With challenges such as biofilm formation and widespread antimicrobial resistance to commonly used antibiotics have led to an emerging need for alternative strategies. Studies have shown that bacteriophages can be used as an alternative to antibiotics. In this study, we evaluated the efficacy of antibiotics and phages on *E. coli* isolated from UTI patients

Materials and Methods

For our research, we have used *E. coli* samples isolated from patients with UTIs in Pauls Stradiņš Clinical University Hospital. All samples were screened by VITEK and phylogenetic groups were determined. Ability to form biofilm was tested using Crystal Violet assay, only biofilm producing bacteria were included. Antibiotic susceptibility of the samples was determined using disk diffusion test according to the EUCAST standards. Bacteriophage susceptibility was performed for each sample using plaque assay.

Results

For our study we used 149 of *E. coli* biofilm producing samples. 29.5% (n=44) of the samples were multidrug resistant, however, all samples tested were susceptible to carbapenems. 8.1% (n=12) of samples tested were resistant to all phage cocktails tested. Multi-drug resistant bacteria were more likely to also be resistant to 2 of the tested phage cocktails. However, this correlation was not found when compared to the other phage cocktails. More virulent strains are less resistant to most of the bacteriophages, with the exception of one phage cocktail.

Conclusions

Taken together, our study shows that phage cocktails have promising effects against biofilm-producing *E. coli* in vitro.

Hydroxyapatite Modification with Zinc and Bacteriophages for the Development of Novel Antibacterial Biomaterials

Oral

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Objectives*

Fighting antimicrobial resistance envisages the development of new antimicrobial methods. Consequently, alternative antimicrobials such as metal ions (Ag, Zn, Ga, etc.) and bacteriophages are being sought. However, the phages are limited by their low stability and high environmental sensitivity. They can be protected, and their release can be controlled for long-term therapeutic effects by combining them with biomaterials. Hydroxyapatite (HAp) can be used for this purpose. In addition, combining phages with antibacterial metal ions could provide a synergistic effect in the fight against bacterial infections. Our study aimed to synthesize zinc-substituted HAp (ZnHAp) nanoparticles and evaluate the possibilities of combining them with bacteriophages.

Materials and Methods

ZnHAp powders were synthesized using wet chemical precipitation. The influence of Zn concentration on the physicochemical properties, *i.e.*, chemical, phase, molecular composition, and morphology, was evaluated. The impact of the Zn concentration on the antibacterial activity of HAp against *S. aureus* and *P. aeruginosa* bacteria and on the lytic activity of *S. aureus* and *P. aeruginosa* bacteriophages were assessed.

Results

A phase-pure, low crystallinity HAp with needle-like particle morphology was obtained regardless of the Zn concentration (up to 0.8 wt%). Increasing the Zn concentration reduced the HAp crystallinity. The powders did not show antibacterial activity against *P. aeruginosa* but showed time- and concentration-dependent antibacterial activity against *S. aureus*. The impact of the HAp and ZnHAp nanoparticles on the phages depended on their origin, showing a more pronounced reduction in the case of *S. aureus* phages.

Conclusions

Adding Zn provides the antibacterial activity of the HAp nanoparticles against *S. aureus*. The phages retained their lytic activity in the presence of HAp and ZnHAp nanoparticles, making them suitable for developing novel nanoparticle-bacteriophage systems.

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Isolation and Characterisation of Bacteriophages Targeting Fish-Pathogenic *Aeromonas* spp.

Oral

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Objectives*

The fish farming sector is experiencing significant growth due to increasing demand for fish products, making it a significant component of the global economy, including in Latvia. However, this growth faces substantial challenges, particularly from bacterial infections that threaten fish health and industry sustainability. Antibiotics are commonly used to control these infections, but their overuse has led to the emergence of antibiotic-resistant bacteria, posing risks to the environment and human health. Among the most concerning pathogens in aquaculture are *Aeromonas* species, such as *A. hydrophila*, *A. salmonicida*, and *A. veronii*, which cause severe hemorrhagic ulcers and tissue damage in fish, and can infect humans in specific cases. Phage-based biocontrol, using bacteriophages—viruses that specifically target bacteria—emerges as a promising alternative, offering a precise and self-limiting treatment strategy.

Materials and Methods

Nineteen pathogenic *Aeromonas* isolates, identified through 16S rRNA and *gyrB* gene sequencing, were selectively chosen for phage isolation from wastewater samples collected across Latvia. Phage genomes were sequenced using Illumina high-throughput technology, followed by annotation and comparison with related phages. Virion dimensions, plaque morphologies, and host range were analyzed, and the infection and lysis dynamics of selected phages were evaluated to better understand their interactions with *Aeromonas* hosts.

Results

In this study, 30 bacteriophage isolates capable of infecting up to eight *Aeromonas* species were obtained. Genomic analysis classified these phages into six families within the class Caudoviricetes, representing seven established genera and five potentially novel ones. The collection displayed diverse virion and plaque morphologies, with host ranges varying from highly specific to broad, along with differences in lytic efficiency.

Conclusions

The bacteriophages isolated from fish-pathogenic *Aeromonas* spp. exhibit significant diversity in genome structure, virion and plaque morphology, and lifestyle. Detailed characterization of these features, especially host range and lytic efficiency, forms the basis for developing highly effective, targeted phage-based strategies to combat *Aeromonas* infections in aquaculture.

Titanium Plate Modifications and Biopolymer Matrices: Innovative Strategies Towards Preservation of Bacteriophage Stability and Release Profile

Oral

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Objectives*

Implantable medical devices enhance the quality of patient life and are crucial across the spectrum of health-care, including diagnosis, prevention, and treatment. However, device-related infections due to challenges with antimicrobial resistance (AMR) and biofilm formation highlight the critical need for a novel anti-infective approach. Current scientific evidence strongly suggests that bacteriophage (phage) practical application is a promising and hopeful approach for managing AMR. Our research aimed to evaluate the impact of laser-induced periodic surface structures on titanium (Ti) plates and the potential of clinically recognized biopolymers in addressing the challenges related to maintaining the stability and sustained release of bacteriophages.

Materials and Methods

The experiments on phage stability in the presence of Ti plates involved reference *E. coli* bacteriophage T4 (ATCC 11303-B4), host strain *E. coli* (ATCC 11303), and two Ti plates – T16 and Tref. To address the potential local delivery of phages, the following materials were used: Pyo Bacteriophage cocktail and Staphylococcal Bacteriophage cocktail, host reference strain *S. aureus* (ATCC 25923), and biopolymers - chitosan, Na-alginate, and Ca-alginate. Executing the plaque assay determined the performance of phage stability, release, and antibacterial efficacy at different time points.

Results

Phage stability in the presence of Ti plates remained consistent in all chosen incubation periods. Moreover, all study samples showed a minor rise in phage titer over 36 hours of incubation time. Regarding phage/ biopolymer mixtures, no significant phage titer reduction was determined in the Na-alginate solution and Ca-alginate hydrogel.

Conclusions

The results of our study provide a reasonable foundation for future research into possible antibacterial interactions when combining phages with Ti plates and/or biopolymers, i.e., additive, synergistic, or antagonistic. Furthermore, considering the biofilm's significant contribution to the pathogenesis of bacterial infections, particularly infections caused by multi-drug-resistant pathogens, future experiments on the antibiofilm effect of phage-based antimicrobial coatings and modified Ti plates are paramount and urgent.

Pharmaceutical Science

Chemometrics Combined with Data Fusion – a Tool for Comprehensive Phytochemical Characterisation of Anthocyanin-Rich Fruit Extracts

Oral

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Objectives*

Anthocyanin-rich fruit extracts are notoriously hard to analyze due to the complex phytochemical composition and similarity between phytochemical profiles. The analytical techniques used for their analysis produce large amounts of data that require complex statistical analysis to interpret the data correctly. The aim of this study was to obtain phytochemical fingerprints of anthocyanin-rich fruit extracts using four different analytical techniques and explore the relationships and similarities of the chemical compositions by applying chemometric data analysis combined with data fusion approaches.

Materials and Methods

A total of 17 highbush blueberry and 9 bilberry extracts were obtained by the maceration method with subsequent freeze-drying. HPLC-UV (280 nm, 360 nm, and 520 nm), HPLC-MS/MS, UV/VIS, and FTIR analysis were applied to obtain phytochemical fingerprints of said extracts. Data processing with additional data normalization, baseline optimization, and extraction of specific fingerprint regions was applied. Principal component analysis (PCA), hierarchical cluster analysis (HCA), and partial least squares discriminant analysis (PLS-DA) were used to analyze the relationships between the chemical composition of these extracts. Data similarity was assessed using Pearson correlation coefficients (PCC). Data fusion was applied to merge the datasets from different analytical methods into combined models.

Results

Anthocyanin profiles and chlorogenic acid content were determined to be the most influential factors impacting the clustering of data based on the plant origin. PCA clusters separate highbush blueberry and bilberry samples using all analytical techniques, however, more compact clusters form using normalized data. HPLC-UV data from 280 nm and 520 nm are clustered together after data fusion, due to anthocyanins having two characteristic absorption wavelength regions instead of one. The PCC of FTIR data comparing highbush blueberry and bilberry extracts is higher than 0.97.

Conclusions

Data fusion combined with chemometrics allows to compress big data into concise models that allow to determine the identify and phytochemical composition of anthocyanin-rich fruit extracts.

Development of Hypoallergenic Cream Based on Natural Oils and Hydrogenated Phosphatidylcholine

Oral

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Objectives*

Patients with various skin disorders have dry skin that needs to be moisturised. Often used emulsifiers such as cetyl and stearyl alcohols are known to cause contact allergy in some patients. Widespread use of these emulsifiers narrows treatment availability for sensitive patients. Aim of this work is to develop hypoallergenic cream with alternative emulsifier - hydrogenated phosphatidylcholine.

Materials and Methods

Cream preparations with varying concentrations of almond oil (6.5%, 10%, 15%, 20%, 30%), shea butter (1.5%, 5%), xanthan gum (0.1%, 0.5%), hydrogenated phosphatidylcholine as an emulsifier (1.5%, 3%, 6%) and medium-chain triglycerides as a co-emulsifier (1.5%, 3% and 6%) were produced. Formulations were analysed for organoleptic characteristics, microscopic appearance, colloidal stability, cream type, pH, globule size, spreadability and rheological characteristics.

Results

10 cream formulations were produced and tested. Formulations with 6% of hydrogenated phosphatidylcholine and 6% of medium-chain triglycerides showed appropriate colloidal stability and pH. Based on microscopic appearance and organoleptic analysis 3 formulations (H, I, J) were chosen for further rheological and spreadability analysis. Samples with differences in almond oil (H, I – 10%; J – 6.5%), shea butter (H, I – 0.5%; J – 1%) and xanthan gum (H, J – 0.1%; I – 0.5%) concentrations have differences in rheological characteristics (Flow point: H 55.66 ± 6.58 Pa; I 21.92 ± 0.29 Pa; J 44.44 ± 7.44 Pa; G' value: H 3300 ± 30 Pa; I 539 ± 19 Pa; J 3603 ± 121 Pa;) and spreadability (H 5.97 ± 0.35 cm; I 6.47 ± 0.15 cm; J 5.23 ± 0.87 cm).

Conclusions

Hydrogenated phosphatidylcholine can be used as a main emulsifier for development of a hypoallergenic cream based on natural oils. Almond oil, shea butter and xanthan gum concentrations have effect on cream organoleptic properties, rheological characteristics and spreadability, that can be used to adjust cream characteristics for the individual patient needs.

New Light-Activated Styrylpyridinium Compounds for Cancer Treatment Using Photodynamic Therapy

Oral

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Objectives*

Cancer is among the leading causes of death worldwide. Unfortunately, chemotherapy often comes with severe side effects, forcing patients to discontinue treatment. Photodynamic-therapy-(PDT) is a promising alternative, offering a selective tumor treatment with minimal systemic toxicity.

PDT works using light-activated compounds to generate cytotoxic reactive-oxygen-species-(ROS) at the irradiation site triggering cancer cell death.

It is important for PDT compounds to function in the near-infrared-(NIR) region, as this improves light penetration through biological membranes.

However, typical NIR compounds aggregate in hydrophilic environments, reducing fluorescence-intensity and ROS-production, limiting their applications *in vivo*. Therefore, it is crucial to develop aggregation-induced-emission-(AIE) compounds with ability to form liposome nanoparticles, increased fluorescence-intensity and production of ROS upon irradiation.

The aim of the study was to optimize styrylpyridinium molecules to exhibit AIE properties in NIR and evaluate their cytotoxicity and liposome formation ability as potential PDT compounds.

Materials and Methods

Styrylpyridinium derivatives were synthesized from aldehydes and picolinium salts using Knoevenagel condensation reactions. Liposome formation was analyzed using dynamic-light-scattering measurements. Fluorescence spectra were recorded in dissolved and liposome solutions. Cytotoxicity *in vitro* was assessed using the MTT assay, with and without appropriate wavelength light exposure on cancer and normal cell lines. ROS release was confirmed using colorimetric reagent.

Results

The compounds formed homogeneous liposomes (polydispersity-index 0.19-0.32) with an average diameter of 156-225nm. A sevenfold fluorescence-intensity increase in liposome solutions confirmed their AIE properties.

The compounds exhibited emission at 810 nm reaching the NIR region.

Before light irradiation, the compounds show low toxicity to cancer and normal cells. After irradiation, their toxicity dramatically increases in cancer cells due to ROS release, highlighting their potential for PDT.

Conclusions

This approach offers efficient cancer treatment with minimal side effects by using light to activate compounds and precisely control the site of action. Combining liposome formation, NIR fluorescence, and AIE properties significantly improves compounds' potential for PDT.

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Phenolic Compound and Antioxidant Activity Evaluation for Air-Dried *Monarda Didyma* L. leaves Using Two Extraction Methods and Solvents

Oral

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Objectives*

Monarda didyma L. is an aromatic herb from the *Lamiaceae* family renowned for its medicinal properties, with the leaves and flowers primarily used for various health benefits. *Monarda* contains both non-volatile and volatile compounds. Various methods and solvents are utilized to extract phenolic compounds, but there is a growing need to optimize extraction. Ultrasound-assisted extraction (UAE) has shown great promise in improving the yield of various chemical components in extracts.

Materials and Methods

The research aims to analyze two extraction methods and the effects of solvents on the phenolic compounds (total phenolics, phenolic acids, flavonoids, and tannins), antioxidant properties (using DPPH assay), and antidiabetic activity of air-dried *Monarda didyma* L. using spectrophotometric methods. Both ultrasound-assisted extraction (UAE) (conducted for 10 minutes at temperatures of 20°C, 25°C, and 30°C) and mixing at room temperature (for durations of 30, 45, and 60 minutes) were compared, utilizing ethanol-water solvent (ratios of 80:20, 70:30, and 50:50) and methanol-water solvent (with the same ratios).

Results

Total phenolic compounds range from 173.87 to 507.96 mg/g of dried sample. The lowest total phenolic acid content was determined in 80:20 ethanol extract with 60 min room temperature mixing, while the highest was obtained in UAE at 30°C with 50:50 ethanol solvent. Total flavonoid content in *Monarda didyma* extracts increases using UAE with higher temperatures, while decreases using long-time mixing in room temperatures. The highest tannin content and antioxidant activity were determined using UAE with both solvents. The antidiabetic activity, measured through α -amylase inhibition, ranged from 9.3% to 41.9% across all prepared extracts.

Conclusions

Based on spectrophotometric analysis of *Monarda* extracts, the most suitable extraction method, and yield of phenolics with greater antioxidant activity were determined in ethanol-water extracts with a UAE method. A similar tendency was observed in methanol-water extracts, but further application for these extracts would be limited. Extraction temperature in some cases improves the extraction, while longer extraction time reduces the yield of phenolics. Further investigations into individual phenolics, essential oils, and antibacterial activity are imperative.

Ultrasound-Assisted Extracting of Phenolic Compounds from *Sorbus aucuparia* Berry Pomaces

Oral

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Objectives*

Phenolics can be extracted using conventional methods, such as maceration and solvent extraction. However, the extraction process can be enhanced using techniques like heat, microwaves, ultrasound, and CO₂. Various parameters can be adjusted in the ultrasonic bath, including temperature (T), time, and pulsation. Based on the literature, different parameters and their combinations were tested to optimize the extraction yield of phenolic compounds and antioxidants from *S. aucuparia* using ultrasound.

Materials and Methods

Four *Sorbus aucuparia* cultivars (wild-growing, “Granatnaja,” “Moravica,” and “Burka”) were analyzed. After juicing the berries, the pomaces were collected and frozen at -30 °C. For extraction, 3 g of pomace was mixed with 30 mL of a 50% ethanol/water solution. Ultrasonication was performed under various conditions: at 20 °C for 10 and 20 minutes, and at 40 °C for 10 and 20 minutes, with 40% pulsation. For comparison, maceration was conducted at room temperature for 24 hours. The total phenolic content (TPC), total tannin content (TTC), and antiradical activity (DPPH) were measured. Data analysis was performed using Microsoft Excel.

Results

Both TPC and TTC in the extracts varied across cultivars and extraction methods. The highest phenolic content was found in “Burka” (4.6–11.4 mg/g gallic acid equivalents (GAE)), while the lowest TPC was observed in “Moravica” extracts (2.3–6.2 mg/g GAE). Macerated extracts exhibited the highest TPC (5.1–11.4 mg/g GAE), whereas ultrasonification with longer extraction times and higher temperatures proved more effective for phenolic compound extraction. Furthermore, the highest antiradical activities were recorded in “Burka” and in extracts obtained through simple maceration (IC₅₀ 2.6–13.2 mg/mL) and longer ultrasonication times (IC₅₀ 4.1–16.5 mg/mL).

Conclusions

Although literature suggests that ultrasound enhances the extraction of phenolic compounds, this effect was not observed under the conditions used in our study. Further testing with a different set of parameters is recommended.

Drug Release Individualisation from FDM 3D-Printed Oral Dosage Form of Prednisolone

Poster

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Objectives*

The aim of this work was to 3D-print a drug-loaded polymer filament of various geometries (printlets), and then show the difference between the various geometries of the printlets regarding their drug release, and the ability of individualisation of prednisolone oral dosage form via Fusion Deposition Modelling (FDM) 3D-printing. A secondary aim was to study the effect of the printing (nozzle) temperature on the printability and the connection between the printability and the properties of the drug-loaded filament.

Materials and Methods

Polyvinyl alcohol was used as the polymer filament and Prednisolone was used as the drug. The filament was drug-loaded after hot-melt extrusion. The printlets were printed with an Original Prusa i3 MK3S+ 3D printer. The printability of the drug-loaded polymer filament was investigated via optical microscopy, x-ray micro-computed tomography, powder x-ray diffraction, thermogravimetric analysis, differential scanning calorimetry, rheology, and dissolution testing.

Results

It was shown that the geometry of the printlets had a significant influence on the drug release with the most influential factor being the contact surface area to volume ratio in contrast to other parameters such as the total surface area, the infill (%), and the shell number, which had little to no effect. Furthermore, it was shown that the presence of the drug has altered the physico-chemical properties of the filament, such as the glass transition temperature, and the viscosity of the molten filament which was found to be a major factor regarding the printability.

Conclusions

This work shows the ability of FDM 3D-printing within the pharmaceutical industry and the possibility to control the quality of printlets by understanding the physico-chemical properties of drug-loaded polymer filaments.

Formulation and Evaluation of Orally Disintegrating Tablets (ODTs) of Poorly Soluble API Celecoxib Using Amorphous Solid Dispersion (ASD) Techniques

Poster

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Objectives*

To develop new ODT formulations of celecoxib using amorphous solid dispersion (ASD) technology to enhance solubility and bioavailability.

To evaluate the physicochemical properties, stability and release profiles of formulated ODTs.

Materials and Methods

Materials: Celecoxib, polymer PVPVA 64, excipients for ODT formulation: mannitol, aspartame, sodium croscarmellose, HPMC, pectin.

Preparation of ASDs: Celecoxib was mixed with polymer in a specific ratio using hot-melt method in MeltPrep VCM to create ASDs.

Formulation and preparing of ODTs: The ASDs were blended with excipients and compressed into tablets using a direct compression method.

Characterization: The tablets were characterized for hardness, disintegration time, dissolution profile, and stability studies.

In Vitro Release Studies: Conducted using different dissolution methods to evaluate the release kinetics of celecoxib from the ODTs.

Results

The developed orally disintegrating tablets (ODTs) meet the requirements of the European Pharmacopoeia monograph. Ongoing stability studies have confirmed that the ASDs have retained their amorphous state over time, with minimal recrystallization observed so far (3 months in various temperature and humidity chambers). Additionally, no crystallization of the API was noted during dissolution.

Conclusions

Given that the cardiovascular risk of celecoxib increases with higher doses, ODTs can deliver the drug directly through the oral mucosa, bypassing first-pass metabolism and potentially enhancing therapeutic effects. The comparison of pH levels in the stomach and oral cavity indicates that celecoxib is more efficiently absorbed in the oral cavity. This presents an opportunity to reduce therapeutic doses and associated side effects. The formulation of ODTs using amorphous solid dispersion techniques significantly improved celecoxib's solubility characteristics. Gradual dissolution in oral cavity may prevent crystallization of the amorphous active substance during release. This research underscores the potential of ODTs to optimize ASD formulations, leading to improved bioavailability and therapeutic efficacy for patients. Further studies are recommended to investigate clinical implications and refine formulation strategies.

Patients' Opinions on Pharmacy Staff Consultation Quality in the Community Pharmacy

Poster

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Objectives*

In many parts of the world, community pharmacies are becoming increasingly recognized as the go-to place for professional medical advice and have become a source of primary health care (Ibrahim et al., 2018). Responsible pharmaceutical care is aimed at achieving results that positively affect the patient's quality of life. The main goal of pharmaceutical care is to provide responsible drug therapy and to improve patients' well-being and lives (Rijcken, 2019). Self-medication is caused by low-quality consultation in the pharmacy (Melku et al., 2021). In recent years no published studies have explored Latvian patient opinion on consultation quality in the pharmacy, which would benefit the pharmaceutical care and allow it to develop faster and successfully. This study analyzes patients opinions on consultation quality of pharmacy staff in the community pharmacy.

Materials and Methods

The interview questions were based on compiled literature and 15 community pharmacy patient interviews were conducted in Liepāja district during 2024 from March to May. Interviews were recorded and then transcribed. Data were analyzed using content analysis.

Results

Most of participants received information about directions how to use medicine but only one received consultation about adverse effects and interactions. Patients were satisfied with provided information because pharmacists were accommodating, used simple terms and gave useful advice, and gave alternative options. Those who were dissatisfied noted lack of interest from staff, no information about adverse effects unless specifically asked, rushing to make decisions and lacking ethical behavior such as talking loudly about patient problems, lacking emotional intelligence. Respondents return because of location and less - staff.

Conclusions

Patients satisfaction with pharmacy staff consultation is good because patients appreciated soft skills of pharmacists, but noted that pharmacists lack knowledge beyond basic medicine use instructions.

Preliminary Screening of Antibacterial Activity of Berry Juice of *Sorbus aucuparia* Cultivars Growing in Latvia

Poster

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Objectives*

To screen and compare for antibacterial activity of fresh and freeze-dried berries and juice from various cultivars of *Sorbus aucuparia*.

Materials and Methods

Berries were collected in September of 2024 in Alūksne, Latvia. Berries were frozen at -20 °C to achieve frost state as they are used in this way in traditional medicine. Juice was expressed using home juicer. Berries were juiced three times and all juice and pomaces collected separately. One portion of juice was freeze-dried (lyophilization) at -80 °C for 48h. Before analysis juice was filtered through Millipore filter (pore size 20). Antibacterial activity was determined against *Staphylococcus aureus* and *Escherichia coli* reference cultures and two methods were used: disk diffusion test and the plate-hole diffusion assay. In the both methods Mueller-Hinton plates and 50 µl of sample were used.

For all analysis were used undiluted fresh juice, also juice and the freeze-dried juice samples, that were dissolved in dimethyl sulfoxide (DMSO) in proportion 1:1, 1:2, 1:5, 1:10.

Results

Four *Sorbus aucuparia* cultivars (wild-growing, “Granatnaja,” “Moravica,” and “Burka”) were analyzed. Only zones over 7mm in diameter were considered as antibacterial activity. Most of tested samples did not showed antibacterial activity.

Only the undiluted juice and the not-dissolved freeze-dried juice power of wild-growing *Sorbus aucuparia* showed low antibacterial activity (8 mm) against gram-positive bacteria *Staphylococcus aureus*.

Conclusions

At analyzed concentrations none of the *S. aucuparia* berry juice samples had significant antibacterial activity. Different concentrations of juice or berry parts and extraction methods should be tested.

Predialysis Program

Implications of Early Contrasted with Planned Initiation of Peritoneal Dialysis

Poster

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Objectives*

The aim of the study was to compare the outcome between patients with early and planned start of peritoneal dialysis (PD).

Materials and Methods

Retrospective study. All incident PD patients who started peritoneal dialysis from January 2012 to April 2019 in Pauls Stradins University Hospital were included and divided into two groups according to PD initiation - early start (less than 14 days) or planned start (more than 14 days after PD catheter implantation). Pre-dialysis follow-up, reasons for dialysis initiation, biochemical characteristics, the incidence of early (3 months after dialysis initiation) complications, the length of hospitalization, and mortality rate were analyzed.

Results

197 patients started PD, mean age was 57,1 years, 56% were men. 40.2% of patients had early start of PD. 64.5% of study group patients were followed by nephrologist before the PD initiation; mean follow-up period was 2.2 years. Patients in the early-start PD group had higher creatinine 750 $\mu\text{mol/l}$ (+/- 388 SD) vs 554 $\mu\text{mol/l}$ (+/- 256 SD) ($p < 0,001$) and lower GFR 8.03 (+/- 3,88 SD) ml/min/1,73m^2 vs GFR – 10.24 (+/- 3,94 SD) ml/min/1,73m^2 ($p < 0,001$) comparing to the planned-start PD group. Early complications were observed in 37.9% patients in the early-start PD group vs 28.8% in the planned-start group ($p = 0,178$). The length of hospitalization was longer in the early-start PD group - 34.9 vs 23.8 days ($p < 0,001$), mortality was higher - 35.4% vs 24.6% ($p = 0,017$).

Conclusions

Patients who started PD early had worse kidney function, longer hospital stay, higher mortality rate than planned-start PD group. Rates of infectious and mechanical complications were not significantly different between two groups.

Pregnancy and Delivery Care

Childbirth Experience Among Primiparas and Multiparas with Spontaneous Vaginal Delivery

Oral

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Objectives*

Introduction: Preparing women for childbirth, supporting the mother during labour, and thoughtful care during labour contribute to a positive birth experience. Listening to women’s voices is essential to developing quality maternity.

Objectives. To assess childbirth experience aspects with focus on supportive communication, respectful treatment and share-decision making between primiparous and multiparous.

Materials and Methods

Online anonymous survey (from the time of September 2023 to September 2024) of women who gave birth in 2023 and 2024 data were analysed. The questionnaire was developed based on the standards of the World Health Organization (WHO) and the evaluation criteria of childbirth experience (IMAgiNE EURO).

Results

Although not statistically significant differences but slightly higher proportions an average by 2 percent points were observed in multiparas than primiparas: always fully involved in the process of choosing the care/treatment received 87.0% (n=248) to 85.2% (n=236); always feel treated with dignity 87.7% (n=250) to 85.6% (n=237) and by 3.5 percent points rated higher that healthcare providers always establish effective and clear communication – 91.2% (n=260) to 87.7% (n=243). Practically the same rates for both groups were observed for these aspects: always received immediate attention from healthcare providers to be assisted when is needed - an average 94%; always feel emotionally supported – 90%; relatives or other support person were always allowed to stay with you for as long as you felt the need – 88%. The existing results show that multipara also slightly higher rate overall birth experience as very positive but not statistically significant – 74.7% (n=213) to 70.0% (n=194).

Conclusions

Although no statistically significant differences were found, but data showed that primiparas evaluate the birth experience slightly more negatively than multipara. To improve women’s birth experiences in healthcare facilities, their psychosocial and communication needs must be met. Positive communication and emotional support improve women’s experience of childbirth care.

Childbirth Experience among Primiparous Women in Latvia Undergoing Labour Induction: Insights from the Short Quality from Patient’s Perspective-Intrapartal (s-QPP-I) Questionnaire

Oral

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Objectives*

The study aimed to evaluate the quality of intrapartum care from the perspective of women undergoing induction of labour (IOL) at Riga Maternity Hospital (RMH) using the short version of the Quality from Patient’s Perspective-Intrapartal (s-QPP-I) questionnaire.

Materials and Methods

This study included 133 primiparous women who underwent IOL at RMH from June 2022 to February 2024 and filled out the s-QPP-I on discharge. The “Identity-oriented approach” and the “Socio-cultural atmosphere” dimensions were evaluated. The format for responses was a 4-point Likert scale ranging from 1 (totally agree), 2 (mostly agree), 3 (mostly disagree) to 4 (totally disagree). Statistical analysis was done using IBM SPSS 27.0.

Results

The mean scores on all questions were above 3 points. The mean score in the “Identity-oriented approach” was 3.61 (SD 0.46), and in the “Socio-cultural atmosphere” 3.55 (SD 0.52). No statistically significant differences were observed based on the type of delivery, the use of oxytocin augmentation, the occurrence of tears or episiotomy during labour, or the amount of blood loss. Patients with STAN monitoring reported significantly higher scores on the “Socio-cultural atmosphere” scale ($p=0.02$).

Conclusions

Overall, the care provided was rated positively across both dimensions of the s-QPP-I. Patients with STAN monitoring reported significantly higher scores on the “Socio-cultural atmosphere” scale. The use of STAN might provide reassurance to patients, contributing to a more positive perception of the healthcare environment. However, this finding should be interpreted cautiously due to the small sample size.

Acknowledgements

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Comparative Analysis of After-Birth Associated Factors in Quality of Maternal Care in Healthcare Facilities in Italy, Latvia, Lithuania and Poland

Oral

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Objectives*

The aim of the study was to compare postnatal practices, including skin-to-skin contact, breastfeeding initiation and support, rooming-in and staying with the baby, information from healthcare professionals (HCP) on maternal and child alarm signals and information on seeking help after discharge in Latvia, Lithuania, Poland and Italy, to provide insights into improving perinatal care.

Materials and Methods

Women aged 18+ who gave birth in healthcare facilities in Italy, Latvia, Lithuania and Poland between January 2022 and December 2023 participated via a validated questionnaire, capturing aspects related to quality of maternal and newborn care as part of IMAGiNE EURO study. Comparative analysis was performed.

Results

A total of 21 221 responses were analysed (18190 Italy, 889 Latvia, 850 Lithuania and 1292 Poland). Skin-to-skin Contact immediately after birth differed significantly between countries - in Latvia 83.2% and in Poland 62.8%. The percentage of breastfeeding initiation within the first hour after birth differed statistically significantly between countries -in Latvia 83.4 %, while breastfeeding initiation and appropriate breastfeeding support were the least frequent in Italy (65.7%;56.8%). Rooming in and staying with the baby as long as the woman needed were most frequently reported in Latvia (89.1%;96.4%), but was least frequently confirmed in Italy (72%),and staying with the child as long as they wanted in Lithuania (91.8%). In all countries, less than half of the women confirmed that HCP had fully informed them about possible clinical alarm symptoms (Poland-39%), and even less about symptoms concerning the child (Latvia-30%). Unfortunately, responses to all 8 after-birth associated factors indicating adequate care were reported by only 13-15.2% of respondents.

Conclusions

The results indicate disparities in postnatal practices in health care facilities in neighbouring and EU countries. These results highlight the need to improve the quality of perinatal care emphasising the importance of improving appropriate information to the woman, and lactation promotion and support.

Comparative Analysis of Birth Rights Associated Factors in Quality of Maternal Care in Healthcare Facilities in Italy, Latvia, Lithuania and Poland

Oral

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Objectives*

The role of birth rights in the human rights-based approach of healthcare and maternal care services is becoming more topical and it is important to conduct research in medical services and health systems in healthcare facilities to identify areas for improvement. The aim of this work is to compare birth rights associated factors in quality of maternal care in healthcare facilities in Italy, Latvia, Lithuania and Poland.

Materials and Methods

This study presents a comparative analysis of birth rights associated factors influencing the quality of maternal care across healthcare facilities in Italy, Latvia, Lithuania, and Poland. This research is part of the IMAGINE EURO study, focusing on women's experiences during childbirth. A total of 21,221 responses (18,190 from Italy, 889-Latvia, 850-Lithuania, and 1,292-Poland) were captured through a validated questionnaire and analyzed from women aged 18 and older who gave birth between January 2022 and December 2023.

Results

The results highlight statistically significant differences in maternal care experiences across the four countries. For instance, 77.1% of respondents from Latvia and 78.2% from Lithuania reported always receiving immediate attention, compared to 60.5% from Italy. Communication effectiveness was rated highest in Latvia (72.7%) and lowest in Italy (59.2%) ($p < 0.001$). 86.1% in Latvia and 86.5% in Lithuania felt their companion of choice was allowed to stay with them, whilst only 45.3% in Italy ($p < 0.001$). The emotional support varied minimally among the countries, with Latvia at 69.6% and Italy-67.0% ($p = 0.014$). Treatment with dignity was reported by 68.1% in Italy to 80.5% in Lithuania. Women indicating any form of abuse during childbirth were highest in Italy and Latvia with rate of 3.3%.

Conclusions

Our findings highlight the necessity for comprehensive policy interventions to standardize maternal care practices. By improving immediate care responsiveness, communication, and the treatment of women during childbirth, healthcare systems can enhance the quality of maternal care and uphold the birth rights of all women.

Comparative Analysis of Childbirth Associated Factors in Quality of Maternal Care in Healthcare Facilities in Italy, Latvia, Lithuania and Poland

Oral

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Objectives*

Evaluating maternal care quality and adhering to WHO standards, such as optimal Cesarean rates, appropriate episiotomy use, pain relief, and avoiding outdated practices like Kristeller maneuver, prevents complications and improves maternal outcomes. This study compares delivery practices, informed consent, and pain management across Latvia, Lithuania, Poland, and Italy to enhance maternity care.

Materials and Methods

Women aged 18+ who gave birth in healthcare facilities in Italy, Latvia, Lithuania, and Poland between January 2022 and December 2023 participated via validated questionnaire, assessing maternal and newborn care as part of the IMAGiNE EURO study. Comparative analysis was conducted.

Results

A total of 21,221 responses were analyzed (18,190-Italy, 889- Latvia, 850-Lithuania, and 1,292- Poland). Vaginal delivery rates ranged from 57.7% to 79.3% depending on the country. Freedom of position was reported by 63.1% in Italy and 24.2% in Lithuania. Episiotomy rates varied, with 16.6% in Latvia and 48.0% in Lithuania. Kristeller maneuver use in vaginal deliveries ranged from 14.0% to 25.6%. Informed consent for instrumental delivery was reported by 30.0% in Lithuania and 48.7% in Poland. Cesarean section (CS) rates varied. Pain relief during emergency CS was provided in 78.7% in Italy and 94.7% in Lithuania, while for planned CS, it was 81.2% in Italy and 95.2% in Lithuania. Mothers were informed about their newborns after surgery in 36.8% in Lithuania and 74.9% in Poland.

Conclusions

Discrepancies in childbirth and delivery practices in neighboring countries and Italy highlight the need for improvements in patient-centered maternity care, emphasizing the importance of informed consent, access to pain relief, and promoting childbirth without unnecessary interventions.

Comparative Analysis of Mental Health-Related Factors in Maternal Care in Italy, Latvia, Lithuania, and Poland

Oral

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Objectives*

The mental health of pregnant and postpartum women has gained attention due to increasing number of cases of depression and anxiety in these groups. Screening, providing support, and evaluating the impact of maternal care on psychological well-being are crucial for mothers and children. This study assessed whether healthcare professionals (HCPs) addressed mental well-being and offered further in Italy, Latvia, Lithuania, and Poland.

Materials and Methods

Women aged 18+ who gave birth in healthcare facilities in Italy, Latvia, Lithuania, and Poland between January 2022 and December 2023 participated in the IMAGINE EURO study via a validated questionnaire. The study examined maternal and newborn care quality, including whether HCPs screened for mental well-being and whether birth experiences affected psychological health.

Results

From 21,221 responses (18,190 Italy, 889 Latvia, 850 Lithuania, 1,292 Poland), emotional challenges during childbirth were least reported in Lithuania (2.2%) and most in Latvia (5.4%), Poland (5.3%), and Italy (3.7%). Positive birth experiences were highest in Latvia (51.3%) and lowest in Poland (41.7%).

In Poland only 28.3% reported absence of mental health screening, while in Italy (49.8%), Latvia (60.0%), and Lithuania (64.0%) women weren't screened. Alarmingly, 39.1% of women in Latvia, 38.0% in Lithuania, and 35.2% in Poland reported symptoms of depression or anxiety and didn't receive adequate support during pregnancy or postpartum.

Conclusions

The study reveals disparities in maternal mental health care. Poland leads in proactive psychological support, while Latvia and Lithuania lag in screening and follow-up. These findings emphasize the urgency of standardizing maternal mental health practices to ensure equitable care across Europe. Addressing these gaps is essential for improving maternal and child well-being.

Evaluating Clinical Predictors of Pregnancy and Obstetric Outcomes in Singleton Pregnancies with Cervical Insufficiency Undergoing Cervical Cerclage and Expectant Treatment

Oral

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Objectives*

Cervical insufficiency significantly increases the risk of pregnancy loss and preterm birth. Cervical cerclage is a common intervention, but its effectiveness and indications remain debated. This study analyzed singleton pregnancies with cervical insufficiency at Riga Maternity Hospital (2019–2024) to evaluate the impact of cerclage on pregnancy and obstetric outcomes. The study compared cerclage and expectant management, further analyzing outcomes based on cerclage indication (ultrasound-indicated and symptom-based).

Materials and Methods

This retrospective cohort study analyzed singleton pregnancies diagnosed with cervical insufficiency between September 1, 2019, and November 30, 2024, at Riga Maternity Hospital. Participants were divided into cerclage (n=107) and expectant management (n=57) groups. Subgroups were defined by cerclage indication. Data were analyzed using descriptive statistics, group comparisons, and logistic regression on the overall dataset and stratified subgroups.

Results

Cervical cerclage significantly improved outcomes in cervical insufficiency cases. Compared to expectant management, the cerclage group had lower rates of preterm delivery, PPROM, and neonatal death. Women undergoing cerclage presented shorter cervical lengths at diagnosis. Subgroup analysis showed ultrasound-indicated cerclage achieved the best outcomes, with the highest rates of term delivery and the lowest complication rates, including PPROM and chorioamnionitis. Symptom-based cerclage reduced risks in critical cases but was associated with higher complication and neonatal death rates. Adjunctive therapies, such as antibiotics and tocolytics, further enhanced outcomes in the cerclage group.

Conclusions

This study highlights the efficacy of cervical cerclage in improving pregnancy and obstetric outcomes in singleton pregnancies with cervical insufficiency. While symptomatic cerclage is vital in critical cases, ultrasound-indicated interventions yield superior outcomes. Clinical predictors such as cervical length, dilation, and prior obstetric history should guide individualized management strategies. Future prospective studies are needed to refine cerclage indications and optimize patient selection.

Pregnancy Outcomes in Kidney Transplant Recipients

Oral

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Objectives*

Kidney transplantation restores fertility in women with end-stage renal disease, enabling successful pregnancies. However, these pregnancies are high-risk due to immunosuppressive therapy and concerns about graft function. This study examines maternal and neonatal outcomes in kidney transplant recipients at our centre.

Materials and Methods

A retrospective cohort study was conducted, including nine female kidney transplant recipients who became pregnant between 2001 and 2023. Data on demographics, transplant characteristics, graft function, immunosuppressive regimens, maternal complications, and neonatal outcomes were collected and analyzed.

Results

Among the nine recipients, four had received transplants from living donors. The mean maternal age at conception was 33 years, with a median time from transplantation to pregnancy of 3.6 years. Of the 12 pregnancies, 9 (75%) resulted in live births, including 5 baby boys and 5 baby girls (2 of whom were twins). The mean gestation age was 30 weeks and 3 days. Maternal complications included preeclampsia in 5 patients (56%) and no cases of gestational diabetes. Graft function remained stable in 10 out of 12 cases (83%), with continuous declines in eGFR noted in the remaining cases. In all successful pregnancies, immunosuppression consisted of tacrolimus, prednisolone, and azathioprine, except for one case in 2001 where the regimen included cyclosporine, prednisolone, and azathioprine. No cases of acute rejection were detected.

Conclusions

Pregnancy in kidney transplant recipients is feasible with close monitoring and multidisciplinary care. While maternal and neonatal complications remain prevalent, outcomes are improving, emphasizing the importance of individualized counseling and management.

Understanding the Structure of Preterm Births in Latvia: National Register-Based Study of Trends, Contributing Factors, and Public Health Implications

Oral

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Objectives*

In Latvia, as in other Baltic and Nordic countries, a consistently low preterm birth (PTB) rate has been maintained over many years. Understanding which PTB risk factors affect low and stable PTB rates is essential for shaping future policy. This study analyses PTB trends over the last 23 years in Latvia and compares them with data from Riga Maternity Hospital (RMH).

Materials and Methods

This retrospective study analyzed summaries of term and PTBs 2000-2020 at 5-year intervals and for 2023 based on 32 parameters, using data from the Disease Prevention and Control Centre's Health Statistics database in conjunction with the National Birth Centre Reporting System.

Results

RMH accounted for a third of all births in the reporting years. The overall PTB rate in Latvia maintains a consistent rate of 5.5% over the reporting years. Spontaneous extremely PTB rates decreased significantly from 8.5% in 2000 to 5.2% in 2023 (by 1.9% every five years, $p=0.016$), and from 26.2% to 19.5% for very preterm PTB in Latvia. The same trends were observed in RMH – numbers dropped 6.3-4.9% ($p=0.013$) for extremely PTB and 26.7-15.0% ($p=0.001$) for very preterm PTB. The total indicated PTB rate increased by 3.5% every 5 years – from 12.5% in 2000 to 29.2% in 2023 in Latvia and from 18.7% to 42.1% in RMH ($p=0.006$), mostly at the expense of late PTB. A statistically significant trend of decreased smoking and decreased proportion of low educational levels among PTB mothers and increasing PTB risk factors such as maternal age, primiparity, previous cesarean section, intrauterine growth restriction, and gestational hypertension was found.

Conclusions

The low PTB rates in Latvia may be associated with public health interventions, access to quality antenatal care, and targeted measures to mitigate specific risks. However, other factors such as genetics, environment, and national characteristics may play a significant role.

Analysis of Incidence of Histologically Confirmed Chorioamnionitis in Preterm Deliveries before 34 Weeks of Gestation at Riga Maternity Hospital in 2023

Poster

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Objectives*

To determine the frequency of histologically confirmed chorioamnionitis (HCCA) in placental samples from early preterm birth cases before 34 weeks of gestation (GW) in Riga Maternity Hospital (RMH) in 2023.

Materials and Methods

A retrospective cross-sectional study was performed, analyzing medical records of patients who delivered before 34 GW in RMH in 2023. Statistical analysis was performed with Jamovi v2.6 software.

Results

47 patients were included in the study, mean age 31.4 years (SD±5.08), mean BMI 25.0 (SD±5.08). 85.1% (n=40) singleton pregnancies, 14.9% (n=7) multiple gestation.

Median gestational age at time of delivery was 31.0 weeks [Q28.5-32.0], mean hospital admission time before delivery 1 day [Q0.5-4.50].

Delivery mode in 46.8% (n=22) cases - cesarean section, 44.7% (n=21) - spontaneous vaginal delivery, and 8.5% (n=4) - induced vaginal delivery.

68.1% (n=32) of preterm deliveries had HCCA, only one case had clinical signs of chorioamnionitis. Preterm prelabour rupture of membranes (PPROM) at any time of hospital stay was diagnosed in 42.6% (n=20).

Median time from rupture of membranes to delivery in women with HCCA (with and without PPRM) was 8.00 hours [Q0.129-110.84], while in women without HCCA it was 0.00 hours [Q0.00-2.34] showing a statistically significant difference (p=0.003). Cases with HCCA displayed tendency (p=0.059) towards increased maternal age.

17.0% (n=8) had been diagnosed with cervical insufficiency in 2nd trimester, and it was associated with HCCA (p=0.042), all patients with cervical insufficiency (n=8) had HCCA.

Conclusions

Intrauterine infection and inflammation are a common cause of early preterm delivery. Most observed cases of preterm delivery before 34 GW had HCCA, and only rarely had clinical symptoms of chorioamnionitis. Diagnosis of cervical insufficiency during second trimester was associated with HCCA in case of preterm delivery. Increased maternal age is a factor with tendency to be associated with HCCA. Further studies are needed with larger populations.

Assessing Placental and Fetal Well-Being in Pregnancies Complicated by Umbilical Cord Abnormalities through US Imaging Techniques

Poster

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1. Nicolae Testemițanu State University of Medicine and Pharmacy

Objectives*

Umbilical cord (UC) conditions can reduce the supply of oxygen and nutrients in the fetal and placental circulation. Ecography is essential in detecting UC pathology and fetal well-being. Aim of the study was to analyze the imaging patterns of the placental complex and fetus in the context of UC pathology.

Materials and Methods

Two groups were assessed: 95 patients with UC pathology (L1), and 95 patients without UC pathology (L0), admitted to Tertiary Perinatal Center. US exam identified UC abnormalities. The arithmetic mean, Chi-square distribution, p-value were established.

Results

The majority of women were aged 20-34 y.o.: 79/83.1% in L1 and 88/92.7% in L0 ($p > 0.05$). Primiparous women represented the larger part in L1 (49/51.6%), whereas multiparous women were more common in L0 (67/70.5%) ($\chi^2_{2df} = 10.2928, p = 0.005$). Polyhydramnios was determined in 11/11.6% in L1 vs. one case (1.0%) in L0 ($\chi^2_{1df} = 8.8951, p = 0.002$). Oligohydramnios in 3/3.2% in L1 vs. one case (1.0%) in L0 ($\chi^2_{1df} = 1.0215, p = 0.3$). Left lateral insertion and placenta previa, contribute to the development of UC pathology ($\chi^2_{24df} = 10.0200, p = 0.04$). Placenta with calcifications was found twice as often in L1 10/10.5% compared to L0 6/6.3% ($p > 0.05$). In both groups, placental maturity grades II-III were the most prevalent ($p > 0.05$). UC abnormalities were detected in 55/57.9% ($\chi^2_{1df} = 26.9855, p < 0.0001$), and UC loops around different parts of the fetal body 37/38.9%, marginal and velamentous UC insertions – 20/21.1%, and true UC knots 2/2.1%. Placental circulatory insufficiency were established in 10/10.5% in L1 vs. none in L0 ($\chi^2_{1df} = 10.5556, p = 0.001$), associated with: velamentous insertion ($p = 0.04$), single umbilical artery ($p = 0.0004$), varicosities ($p = 0.0004$), thin UC due to a lack of Wharton's jelly ($p = 0.02$), thickened UC ($p = 0.0005$), and torsioned UC ($p = 0.0009$). IUGR was reported in 6/6.32% ($\chi^2_{1df} = 5.1351, p = 0.02$).

Conclusions

US imaging provides a non-invasive and highly objective method for monitoring the placental complex and fetal condition in high-risk pregnancies, allowing for the early detection of UC anomalies.

Challenges in the Diagnosis of Placenta percreta, Complicated with Rupture of the Uterus: Case Report

Poster

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Objectives*

Placenta percreta, a complicated and rare form of pathological placental insertion, is characterized by the invasion through the uterine wall and into adjacent organs, frequently the bladder. Attested in 0.01-0.04% of pregnancies, it can be complicated with uterine rupture, being the main cause of hysterectomy.

Case Presentation

The 39-year-old patient, 17 weeks of gestation, presents with diffuse abdominal pain and lumbar radiation, nausea and repeated episodes of bilious vomiting. She reports severe fatigue and no bowel movements for the past 3 days after ingesting smoked fish and watermelon. Patient is hospitalized with the diagnosis of acute pancreatitis, and conservative treatment is initiated. Despite treatment, the patient's condition worsens; signs of acute abdomen with hypovolemic shock and threatened abortion are exhibited. The obstetric history includes 4 pregnancies; 3 cesarean sections and one miscarriage. Diagnostic imaging reveals respiratory failure with compromised cardiac function, intra-abdominal fluid accumulation, and possible uterine rupture.

Given the worsening condition of the patient, an emergency curative and diagnostic laparoscopy, with conversion to laparotomy, were performed. Intraoperative findings confirmed a massive hemoperitoneum (3500 ml), caused by the uterine rupture in the projection of the scar, with the invasion of the placenta up to the serosa, the bladder wall and the perforation of the bladder. The scope of the intervention included total hysterectomy, cystotomy and placement of an epicystotomy.

Conclusion

The presented case highlights the diagnostic challenges associated with a sonographically undiagnosed placenta percreta. Uterine rupture associated with signs of hypovolemic shock should be considered as a differential diagnosis for acute abdominal pain at any gestational age, even in the absence of vaginal bleeding. Adequate urgent surgical management allows for the minimization of maternal and/or fetal mortality and morbidity.

Comparison of Spontaneous Singleton Labour and Induced Singleton Labour

Poster

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Objectives*

Induction of labour is commonly used obstetric procedure. Multiple indications may serve as reason to induce labour, including different medical or obstetrical complications, non-medical or social reasons, or just a woman's request.

Materials and Methods

This retrospective cohort study was conducted in Riga Maternity Hospital. It included 9833 pregnant women data from December 2020 till December 2023 with a singleton cephalic pregnancy. Women were divided in two main groups which included 5521 women with spontaneous onset of the labour and 4312 women with induced labours. SPSS statistics performed descriptive and analytical statistics; level of significance was set at $p < 0.05$.

Results

Use of oxytocin among women in the induced singleton group was 2452 (56,9%) meanwhile in the group with spontaneous onset of labour it was 1415 (25.7%). Acute caesarean section rate among women in the induced singleton group was 661 (15.0%) vs spontaneous onset of singleton birth 343 (6.2%). The incidence of uterine disfunction was higher in the induced singleton group vs group with spontaneous onset of labour, 178 (4.1%) vs 57 (1.0%). The newborn transportation to the intensive care union showed no statistically significant difference between induced and spontaneous group (151, 3.5% vs 196, 3.5%).

Conclusions

Labour induction is associated with often use of oxytocin and slightly increase caesarean section incidence. Singleton cephalic labour induction does not worsen perinatal outcome.

Impact of Interventions During Labour on Women’s Perception of Childbirth Experience Evaluated by the Childbirth Experience Questionnaire

Poster

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Objectives*

Perception of first childbirth experience can have long-lasting impact on a woman’s wellbeing and shape her long-term attitude towards maternity care and childbearing. Our aim was to analyse different interventions during labour and their impact on women’s childbirth experience in primiparas with spontaneous labour onset.

Materials and Methods

39 primiparous women with singleton term pregnancy and spontaneous onset of labour received the Childbirth experience questionnaire (CEQ) four weeks post-partum. The CEQ is a four-point 22 item questionnaire, previously validated in Latvian language. Data collection was carried out in Riga Maternity hospital from May 2023 to March 2024. Data were analysed by IBM SPSS-29.0.

Results

CEQ was voluntarily filled by 29 participants (74,4% response rate). Responses were analysed in four scales – Own capacity (8 items), Participation (3 items), Professional support (5 items), Perceived safety (6 items). A statistically significant difference was found in “Professional support” in women who underwent spontaneous vaginal delivery vs. instrumental vaginal delivery vs. caesarean section (4 (IQR:3.8-4) vs 3.5 (IQR:3.2-4) vs 3 (IQR:3-3.5); p=0.046). “Professional support” showed statistically significant differences in women who had perineal tear suturing vs. no tearing (3.4 (IQR:3-4) vs 4 (IQR:3.725-4); p=0.046), in use of ST segment analysis monitoring (STAN) vs. not used (3 (IQR:3-3) vs 4 (IQR:3.5-4); p=0.016), and umbilical cord blood gas sampling vs. no sampling (3.3 (IQR:3-3.575) vs 4 (IQR:3.9-4); p=0.001). “Own capacity” perception was lower in women who had protracted second stage of labour vs. no protraction (2 (IQR:1.25-2) vs 2.625 (IQR:2.25-3.12); p=0.018). No analysed interventions showed differences in evaluation of “Participation” and “Perceived safety”.

Conclusions

“Professional support” perception was negatively impacted by several obstetric interventions while negative “Own capacity” perception was associated with protracted second stage of labour. CEQ is a useful tool for assessing the quality of care, the results of which can be used to base improvements in obstetric care.

Ovarian Torsion in Second Trimester of Pregnancy

Poster

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Objectives*

At 20+3 weeks of pregnancy, the patient notices severe acute pain in the lower right abdomen and vomiting. The pain started suddenly. Coitus or physical exertion before the onset of pain is denied. During the first trimester screening, the doctor diagnosed bilateral ovarian cysts, right ovarian cyst size was approximately 7x4cm, cysts looks like endometriomas. In the hospital, blood tests showed mildly elevated inflammation indicators. The body temperature was 36,4C. Positive symptoms of irritation of the peritoneum were observed. Initial differential diagnosis was acute appendicitis. Ultrasound report: irregular formed mass along the right side of enlarged uterus with clear fluid, smooth thin walls, no loculations or septae, anechogenicity. The size of the mass was about 8x5cm.

Painkillers do not cure pain. Pain increases dynamically, vomiting becomes more frequent. Doctors makes a decision to perform a diagnostic laparoscopy. During the operation, a torsed right ovarian with a cystic formation was visualized. The right ovary was cyanotic, twice rotated around the axis. Right adnexectomy was performed. The ovary with the fallopian tube was evacuated from the abdominal cavity with a laparoscopic bag without complications. Cyst contents mucinous, light, odorless fluid. Post-operative period without complications. Further pregnancy proceeded without complications.

Approximately 10–20% of adnexal torsions occur during pregnancy. Ovarian cyst torsion is more often at weeks 10 to 17 of pregnancy because the growing uterus pushes ovarian out of the pelvis, where is more space for movement. Hormonal changes during pregnancy increase the risk of torsion. Estrogen and progesterone stimulate the growth of the ovaries and the corpus luteum, relaxin and hCG relax the smooth muscle of the pelvic organs and ligaments, which can reduce the support of the adnexa and allow them to twist more easily. Diameter of the ovarian cyst >5 cm increases the risk of torsion.

Role of Umbilical Cord Pathology in Perinatal Outcomes in Term Deliveries

Poster

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Objectives*

Early assessment of umbilical cord (UC) pathologies is significant, because it can increase the perinatal morbidity and mortality indices. The aim was to establish the influence of UC pathology on perinatal outcomes in term birth.

Materials and Methods

The management of 190 babies born alive and stillborn were studied; from 95 women with UC pathology (L1) and 95 patients without UC pathology (L0), aged ≥ 18 years old; at 37-41 weeks of gestation. The pregnant women were admitted at the Tertiary Perinatal Center. UC and fetal conditions were assessed by ultrasound examination. Newborn status was appreciated by Apgar score; clinical and paraclinical examination were performed. Patients delivered vaginally in 71 (74.7%) in L1 and in 81 (85.3%) in L0.

Results

In the L1 group, 92 (96.8%) newborns were alive and 3 (3.2%) were stillborn, the mortality index being associated with UC pathology such as: long UC ($p < 0.0001$), vascular anomalies ($p < 0.0001$), coarctation of Wharton's capsule ($p = 0.01$) and UC torsion ($p = 0.02$). Acute fetal hypoxia was more frequently determined in L1 30 (32.3%) vs. one case (1.1%) in L0 ($p < 0.0001$). The Apgar score at the first minute was 0-3 points in 4 (4.2%), 4-5 points in 2 (2.1%), 6-7 in 23 (24.2%), and 8-10 in 66 (69.5%) in L1, compared with 4 (4.2%) 5-7 points and 91 (95.8%) 8-10 points newborns in L0. The tendency were the same in L1 compared to L0 at the 5th minute; all newborns had 8-10 points ($p < 0.0001$). Neonatal conditions were more frequent in L1 – 58 (61.1%) vs. 21 (22.1%) in L0 ($p < 0.0001$), requiring admission in NICU in 26 (28.3%) in L1 vs. 7 (7.4%) in L0.

Conclusions

Significant differences were found between groups ($p < 0.05$), highlighting the association between UC pathology and perinatal outcomes, which required additional postnatal care ($p < 0.05$).

Psychiatry

Arts-Based Interventions Incorporating Myths for Adolescents: Scoping Review

Oral

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Objectives*

Recent studies highlight myths as a significant resource in arts therapies (*Holmwood et al., 2022; Kowalsky et al., 2022*), while a meta-analysis emphasises the importance of arts-based interventions in adolescent therapy (*Morison et al., 2022*). Therefore, this review aimed to identify arts-based interventions that incorporate myths.

Materials and Methods

Data were collected from peer-reviewed publications in arts therapies journals for professionals (n=23), including quantitative, qualitative, and mixed-method studies. The selection of studies was carried out following the PRISMA 2020 guidance (*Page et al., 2021*) and included the following steps: 1) identification, 2) screening, and 3) inclusion of the study, with data triangulation performed at all three stages. To obtain the broadest possible range of data sources, the scoping review did not include a specific time frame. Only myth-based interventions for adolescents were included.

Results

Based on the scoping review, seven arts-based interventions that incorporate myths for therapeutic work with adolescents were identified. These interventions aim to help adolescents connect with their emotions consciously, integrate past experiences, promote the processing of traumatic experiences, self-reliance, and self-confidence. The interventions integrate mythic themes, which are relatable to adolescents, with therapeutic goals that emphasise less direct verbal expression. A methodological material was developed based on the results, outlining the practical use. Further details on its content and application will be presented at the conference.

Conclusions

Arts-based interventions that target myths offer an innovative framework for addressing collective and personal challenges in adolescents. The methodological material will be useful for professionals working with adolescents and can be incorporated into practice. However, further research is needed to integrate evidence-based interventions into adolescent therapy, enhancing their effectiveness in health promotion.

Assessment of Mental Health Service Utilisation during Peripartum Period in Riga Maternity Hospital and National Mental Health Centre: 12-Month Overview

Oral

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Objectives*

The aim of this study is to have an overview of the received mental health services in the form of psychiatric consultations, psychologist consultations and day centre admissions for women during the perinatal period in Riga Maternity Hospital and National Mental Health Centre.

Materials and Methods

The amount of psychiatric consultations in Riga Maternity Hospital and National Mental Health Centre, as well as psychologist consultations and day centre visits at National Mental Health Centre were recorded during September 2023 till August 2024. The amount of psychologist consultations received both inpatient and outpatient in Riga Maternity Hospital was recorded from January till October 2024.

Results

Altogether 29 consultations were had in inpatient wards in Riga Maternity Hospital from September 2023 till August 2024. During the same time period 124 consultations were had in the National Mental Health Centre with the patient receiving the diagnosis F53 Mental and behavioural disorders associated with the puerperium, not elsewhere classified, Z33 Pregnant state, incidental or Z35 Supervision of high-risk pregnancy. Of those 8 were psychologist consults and 8 from the day centre. There were 179 psychologist consultations received both inpatient and outpatient in Riga Maternity Hospital from January till October 2024.

Conclusions

Overall it is known that about 20% of women experience mental health disorders during the perinatal period (Anderson et al, 2017). Riga Maternity Hospital in 2023 had more than 4000 deliveries. The recorded rates of mental health services provided in the biggest maternity and mental health centres in Latvia for women during pregnancy and postpartum period are low. While there could be several reasons for this like services being obtained elsewhere or records not showing the full received services, this data could be an indication of those affected not receiving the appropriate health services.

Association between Psychosocial Factors and Generalised Anxiety Symptoms in Women during the First Postpartum Year

Oral

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Objectives*

Keywords: generalized anxiety disorder, postpartum, psychosocial factors

Generalized anxiety disorder (GAD) in postpartum women significantly affects both maternal mental health and child well-being. This study aims to identify psychosocial factors associated with GAD and examine their relationship with GAD symptoms in women during the first postpartum year.

Materials and Methods

The quantitative cross-sectional web-based study was conducted from February to May 2024. A sample of 402 women aged 20–46 in their first postpartum year was analyzed. Psychosocial factors, including age, number of previous pregnancies, relationship satisfaction, history of mental illness, and postnatal concerns, were assessed through a self-reported questionnaire. GAD symptoms were assessed using the Generalized Anxiety disorder-7 (GAD-7) scale (cut-off score: 10). Logistic regression was used for statistical analysis. Data were analysed using *jamovi* (Version 2.5).

Results

The prevalence of clinically significant GAD symptoms among participants was 32.8% (n=132). Each additional previous pregnancy was associated with a 28.1% increase in the odds of experiencing anxiety (p = 0.039). Women without a history of mental illness before pregnancy were 67% less likely to experience anxiety compared to those with such a history (p < 0.001). Women expressing concerns about being a good mother had twice the likelihood of experiencing GAD symptoms (p = 0.021). A low support network tripled the risk of GAD (p < 0.001). Women concerned about their ability to handle tasks effectively were 2.3 times more likely to experience anxiety (p = 0.002), while concerns about postpartum body changes increased the odds of anxiety by 82.8% (p = 0.019).

Conclusions

These findings indicate that a lack of a supportive network, concerns related to self-efficacy, postpartum body-image and being a good mother, as well as history of mental illness, and the number of previous pregnancies significantly influence the likelihood of anxiety. Implementing interventions to address these factors could reduce anxiety in postpartum women.

Bullying as a Risk Factor for Suicidal Behaviour in Latvian Adolescents: Population-Based Study

Oral

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Objectives*

This study aims to investigate the association between bullying victimisation and suicidal behaviours, including non-suicidal self-injury (NSSI), suicidal ideation, and suicide attempts, among adolescents aged 13-16 years in Latvia.

Materials and Methods

As a part of an international study, a school-based cross-sectional study was conducted among adolescents from Riga, Jurmala and Daugavpils. Self-reported data were collected using surveys that assessed bullying experiences, suicidal behaviours, and emotional well-being. Statistical analysis was performed using IBM SPSS v.29. Binary logistic regression models were used to explore the relationship between bullying victimisation and suicidal outcomes, adjusting for gender, age, socioeconomic status and emotional difficulties as measured by the Strengths and Difficulties Questionnaire (SDQ).

Results

The sample consisted of 886 participants (median age - 14.00 years), comprising 49.4% girls, 47.5% boys and 3% identifying as other genders. In the past six months, 40.3% of participants reported experiencing bullying, with 4.9% experiencing it more than once a week and 3.3% most days. Additionally, 19.3% reported experiencing cyberbullying. Adolescents exposed to bullying were significantly more likely to engage in NSSI (OR 2.67; 95% CI 1.714–4.156; $p < 0.001$), have suicidal ideation (OR 2.89; 95% CI 1.850–4.511; $p < 0.001$), and suicide attempts (OR 2.40; 95% CI 1.338–4.312; $p = 0.003$) even after adjustment for confounders.

Conclusions

Bullying during adolescence is a significant risk factor for suicidal behaviours. These findings highlight the urgent need for effective anti-bullying strategies. School-based programs that focus on reducing victimisation and providing psychological support to affected adolescents are essential.

Correlation between Generalised Anxiety Symptoms and Adverse Childhood Experiences among Pregnant Women in Latvia

Oral

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Objectives*

Adverse Childhood Experiences (ACEs) are significant predictors of mental health challenges, including generalized anxiety disorder (GAD), which can profoundly impact maternal and fetal health. This study aimed to assess the prevalence of ACEs and the severity of GAD symptoms among pregnant women in Latvia, with a focus on how anxiety patterns vary across different trimesters.

Materials and Methods

A quantitative cross-sectional web-based study was conducted from February to May 2024. 245 pregnant women from Latvia participated in this study. The median age was 31 years (19–42). Participants were distributed across pregnancy trimesters: 1st trimester (35; 14.29%), 2nd trimester (97; 39.59%), and 3rd trimester (113; 46.12%). GAD symptoms were assessed using the Generalized Anxiety disorder-7 (GAD-7) questionnaire (cut-off score: 10). The Adverse Childhood Experiences (ACE-10) questionnaire was used to assess adverse childhood experiences. Statistical analysis was performed using IBM SPSS Statistics 29.0 and Spearman's correlation.

Results

Among the 245 participants, 101 (41.22%) reported no anxiety; 87 (35.51%) - mild anxiety; 38 (15.51%) - moderate anxiety; 19 (7.76%) - severe generalized anxiety symptoms. Regarding ACE prevalence, 30 (12.24%) - no ACEs, 59 (24.08%) - 1 ACE; 54 (22.04%) - 2 ACEs; 38 (15.51%) - 3 ACEs; 64 (26.12%) reported 4 or more ACEs. The median GAD symptom severity scores were highest in the 1st trimester - 8.2, followed by the 3rd trimester - 6.84, and then the 2nd trimester - 5.65. A weak positive, statistically significant correlation between ACE scores and GAD symptom severity was identified ($\rho(243) = 0.245$, $p < 0.001$).

Conclusions

This study shows that higher ACE scores are associated with increased GAD symptom severity in pregnant women, particularly during the first trimester. It is essential to identify ACEs during pregnancy to determine which women are at greater risk and may require intervention. Further longitudinal studies are needed to explore causal mechanisms and identify effective preventive measures.

Depressive Symptoms in Postpartum Women Receiving Outpatient Care: Prevalence, Severity, and Associated Clinical Characteristics in a Six-Month Analysis

Oral

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Objectives*

Postpartum depression (PPD) significantly affects the well-being of both mothers and their children. Exploring how clinical characteristics relate to depressive symptom severity can aid in refining screening strategies. The aim of this study was to evaluate the severity and prevalence of depressive symptoms, along with the clinical characteristics of women attending postpartum outpatient care.

Materials and Methods

All women older than 18 years who attended the outpatient unit at Riga Maternity Hospital 4–6 weeks after delivery were screened using the Patient Health Questionnaire-9 (PHQ-9). Respondents with scores of ≥ 5 were classified into two groups for analysis: mild depressive symptoms (scores 5-9) and moderate-to-severe symptoms (scores ≥ 10). Clinical data were retrieved from medical records. Differences in PHQ-9 score distributions across clinical factors were analysed using chi-square tests.

Results

Data from 144 women aged 20–49 years (30.56 ± 5.68) were collected over half a year. Among participants, PHQ-9 scores revealed 26.4% with mild and 11.8% with moderate-to-severe symptoms. The type of delivery showed a trend toward statistical significance ($p=0.159$), with a higher frequency of severe depressive symptoms in women who underwent emergency caesarean sections (13.2% in 5-9 group vs. 35.3% in ≥ 10 group). Breastfeeding status exhibited no significant differences ($p=0.864$), with similar distributions between groups. Women with ≥ 3 pregnancies and ≥ 2 abortions in their medical history more frequently experienced severe symptoms of depression (41.2% and 23.5%, respectively), though results were not significant ($p=0.614$; $p=0.195$). Differences in the number of deliveries between the groups also lacked statistical significance ($p=0.482$).

Conclusions

Despite this study revealed no statistically significant associations between clinical characteristics and depressive symptom severity, trends like higher symptom severity in women with emergency caesarean sections or a history of ≥ 3 pregnancies and ≥ 2 abortions warrant further research. Larger studies are needed to refine postpartum depression screening and intervention strategies.

Emotional and Behavioural Difficulties and Perception of Threat in Latvian Adolescents: Population-Based Study

Oral

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Objectives*

Global crises, including the COVID-19 pandemic, military conflicts, and climate change, can adversely affect the mental health of children and adolescents. This study examines the relationship between adolescents' perception of threats and their emotional and behavioural difficulties, as measured by the internalising and externalising scales of the Strengths and Difficulties Questionnaire (SDQ).

Materials and Methods

As part of an international study, a school-based cross-sectional survey was conducted among adolescents aged 13–16 years. The survey included questions on perceived threats (pandemics, war, natural disasters, and climate change). The SDQ was used to assess internalising and externalising behaviours. Data analysis was performed using IBM SPSS v.29, with binary logistic regression models applied to explore associations between threat perception and SDQ scores, adjusting for gender, age, and socioeconomic status.

Results

A total of 886 adolescents participated (49.4% girls, 47.5% boys; median age 14.00). Among respondents, 30.1% were very or extremely worried about war, 20.9% about climate change, 19.4% about natural disasters, and 6.9% about pandemics. Overall, 31.9% of adolescents in the population had significant internalising difficulties (borderline/abnormal SDQ score), and 13.7% - externalising difficulties. Adolescents with higher general threat perception had significantly increased odds of internalising difficulties (OR 1.94; 95% CI 1.285–2.917; $p=0.002$). Only higher pandemic threat perception was specifically linked to externalising difficulties (OR 2.36; 95% CI 1.250–4.444; $p=0.008$).

Conclusions

Adolescents with elevated threat perceptions are more likely to experience significant emotional difficulties. The findings highlight the importance of integrating threat perception into mental health assessments and developing targeted interventions.

Internet-Based Cognitive Behavioural Therapy for Adolescents and Young Adults with Depression and Anxiety: Study Protocol for an Implementation Study

Oral

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Objectives*

This study aims to evaluate the introduction of a semi-automated internet-based cognitive behavioural therapy (iCBT) service tailored for adolescents and young adults in Latvia. The project addresses the high prevalence of depression and anxiety in this population, focusing on enhancing mental health service accessibility, particularly in regions with limited specialist availability, and involves the transcultural adaptation and introduction of an iCBT program developed by Helsinki University Hospital (HUS) for use in Latvia.

Materials and Methods

The study is based on a pilot project funded by the National Health Service’s “Health Care Service Models Development Laboratory.” It is implemented in collaboration between the Children’s Clinical University Hospital, the National Centre for Mental Health, the Child and Adolescent Resource Centre and HUS. The iCBT intervention, developed by HUS and adapted to Latvian, targets depression, generalised anxiety, and social anxiety among adolescents (ages 12–17) and young adults (ages 18–25). Key outcome measures include changes in symptom severity assessed via validated psychometric scales, intervention adherence rates, and qualitative feedback from participants and providers.

Results

Preliminary data from the adaptation process and feasibility assessments will be presented. The study is planned to assess the transcultural implementation process of the iCBT protocols, study the factors influencing patient adherence, the effects of patient/provider expectations and patient satisfaction, as well as the cost-effectiveness of iCBT in Latvia.

Conclusions

This study is expected to demonstrate the feasibility and preliminary effectiveness of iCBT for treating depression and anxiety in adolescents and young adults in Latvia. It may inform broader implementation strategies and contribute to addressing mental health service gaps in underserved regions.

New Postpartum Mental Health Care Model in Latvia: Qualitative Evaluation by the Postpartum Women

Oral

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Objectives*

Globally nearly 50% of women with postpartum depression (PPD) and postpartum anxiety (PPA) remain undiagnosed and untreated. Currently, Latvia lacks a unified system for diagnosing and treating postpartum mental health problems. To address these challenges, a new postpartum mental health care model was developed. In this study, postpartum women evaluate the model's acceptability and the key needs of women to be considered in model development.

Materials and Methods

To address the research questions (*How do postpartum women evaluate the acceptability of the new model? What needs of women should be considered when developing the model?*) an approach of qualitative comparison groups within a qualitative research framework was employed. Semi-structured interviews were conducted with postpartum women with (n=5) and without (n=5) PPD or PPA. Data were analyzed using a seven-stage acceptability framework and deductive thematic analysis.

Results

Interviewed women from both groups highlighted the family doctor's role as coordinator and the “green corridor” principle as key strengths of the new model. Mentioned barriers to implementation included limited childcare, family doctor overload, short consultations, and logistical issues. Suggested improvements included child-friendly psychiatric support or remote consultations. Women in Latvia are entitled to a state-funded gynecologist visit six weeks postpartum. It would be beneficial also to offer a free appointment with a psychological support provider. Expanding training for both family doctors and paediatricians was also considered essential. Women with a diagnosis exhibited lower self-efficacy and greater concerns about the model's burden due to limited social support.

Conclusions

In general, the postpartum women approve of the overall acceptability of the new model. This research underscores the critical need for innovative postpartum mental health care models, ensuring that logistical and systemic barriers do not impede access to mental health care services.

Postpartum Anxiety and Sociodemographic Factors: Preliminary Results from a 6-Month Cross-Sectional Study in Latvia

Oral

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Objectives*

Anxiety in postpartum women is a critical mental health concern, as it can adversely affect maternal well-being, infant development, and the overall family dynamic. We assessed the prevalence and severity of anxiety symptoms among postpartum women during the second month after delivery and analyzed the associations between anxiety levels and sociodemographic characteristics.

Materials and Methods

A 6-month period cross-sectional preliminary analysis was conducted as part of a larger postpartum depression study for women (n=144) attending the outpatient clinic at Riga Maternity Hospital. Participants aged 18 and older were screened 4-6 weeks after childbirth using Generalized Anxiety Disorder – 7 (GAD-7) scale. Participants (mean age: 31.02 ± 5.58 years) were categorized into mild (scores 5-9, n=39) and moderate-to-severe anxiety groups (scores ≥10, n=18). Sociodemographic data, including age, education, residence, maternal and paternal employment, income, financial satisfaction, reproductive history, were collected and analyzed using chi-square tests.

Results

Age was significantly associated with anxiety severity, with 44.44% of women aged >35 years in the moderate-to-severe anxiety group compared to 5.13% in the mild group. Higher education prevailed across both groups. No significant associations were found between the severity of anxiety and other sociodemographic factors, including BMI, residence, ethnicity, or reproductive factors. Financial dissatisfaction was more prevalent in the GAD-7 ≥10 group (18.75%) compared to the mild group (4.35%), suggesting a potential association.

Conclusions

The findings suggest that older mothers may be at higher risk for moderate-to-severe anxiety symptoms. These initial results emphasize the importance of incorporating anxiety screening alongside depression assessment in postpartum care. Given the global trend toward delayed childbearing and the observed age-related anxiety patterns, further research with a larger sample size is necessary to confirm these preliminary findings, particularly examining the relationship between anxiety symptoms and financial stressors. The marginally significant trend in financial satisfaction suggests this area may warrant particular attention in future studies.

Recent Advances in the Development of Screening Instruments for Early Recognition of Mental, Behavioural and Neurodevelopmental Disorders in Latvian Children and Adolescents

Oral

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Objectives*

This talk focuses on the recent advances in the development and standardisation of innovative digitalised screening instruments for the early recognition of mental, behavioural, and neurodevelopmental disorders in Latvian children and adolescents.

Materials and Methods

The Early Childhood Development Screening Toolkit (e-BAASIK) system, developed in collaboration between the University of Latvia, Riga Stradins University (RSU) and Liepaja University, is a comprehensive set of screening tools that evaluates child development (age 1 to 6,5 years) across 11 neurodevelopmental domains aligned with ICD-11 categories, integrating data from parents, preschool teachers, and doctors, alongside the children's abilities and skills test.

The new Computer-Assisted Assessment Tool (CAAT) is a tool being developed in collaboration between RSU and Riga Technical University for mental health screening in adolescents aged 13–19. The CAAT combines traditional self-report measures with psychophysiological parameters such as reaction time and response pressure and is designed to capture not only psychopathological symptoms but also personality traits.

Results

Both screening instruments underwent iterative development and extensive content validation.

The e-BAASIK has been empirically tested in clinical and general population samples and standardised for children aged 1 to 6,5 years. The results of the standardisation study show that 20% of 5-6 y.o. children in Latvia have high developmental risks in 3 or more domains.

The CAAT constructs, scales and individual items have been formulated, assessed by experts, and piloted in the target population. The instrument is being prepared for clinical validation and standardisation in the general population sample.

Conclusions

The e-BAASIK and CAAT tools offer significant advancements in the early identification and monitoring of developmental and mental health risks. Their integration into healthcare and educational systems could provide practical, evidence-based methods for supporting at-risk children and adolescents. However, the practical and ethical aspects of introducing universal mental health screening in Latvia have to be further discussed.

Six-Month Findings on Prevalence and Severity of Depressive Symptoms and their Associations with Sociodemographic Characteristics in Postpartum Women Attending Outpatient Clinic

Oral

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Objectives*

Postpartum depression (PPD) is a common condition affecting maternal well-being and child development. This study aimed to assess the prevalence and severity of depressive symptoms, along with sociodemographic characteristics in women receiving outpatient care postpartum. Such understanding is crucial for optimizing screening strategies and improving interventions for PPD.

Materials and Methods

Women aged ≥ 18 years attending the outpatient unit at Riga Maternity Hospital 4–6 weeks postpartum were screened using the Patient Health Questionnaire-9 (PHQ-9). Participants scoring ≥ 5 were analysed and categorized into two groups: mild depressive symptoms (scores 5–9) and moderate-to-severe symptoms (scores ≥ 10). Sociodemographic data were collected through self-reported questionnaires. Chi-square tests evaluated differences between groups across various factors.

Results

Over six months, data from 144 women aged 20–49 years (mean age 30.56 ± 5.68) were collected. Of these, 26.4% reported mild depressive symptoms, and 11.8% exhibited moderate-to-severe symptoms. Age showed a significant association with PPD symptom severity ($p=0.002$); women aged 31–35 were overrepresented in the severe depressive symptoms group (41.2%) compared to the mild group (29%), while no severe cases occurred among women aged 26–30. Geographic distribution showed most participants resided in Riga, with no significant difference between severity groups ($p=0.557$). Marital status displayed borderline significance ($p=0.051$), with severe depressive symptoms more prevalent among married women living with spouses (84.6%). Employment trends were similar across groups, with salaried work predominating (75.7% vs. 76.5%). Emotional distress related to breastfeeding difficulties varied among severe cases but lacked statistical significance ($p=0.762$).

Conclusions

Age demonstrated statistical significance, and marital status showed borderline significance, indicating potential associations with postpartum depression severity. In contrast, education, ethnicity, and income showed no significant impact, highlighting the multifaceted nature of PPD. Further large-scale studies are essential to validate these findings and guide targeted interventions for vulnerable populations.

Association between Self-esteem, Relationship Satisfaction, and Work-life Conflict among Radiology Assistants and Radiographers

Poster

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Objectives*

Higher self-esteem and relationship satisfaction are key predictors of well-being across various life domains. This study aims to assess the association between self-esteem, relationship satisfaction, monthly workload, and work-life conflict among radiology assistants and radiographers.

Materials and Methods

A quantitative cross-sectional web-based study was conducted in March-September 2024 among radiology assistants and radiographers, sample size-100 participants. Self-esteem was assessed using the Rosenberg Self-Esteem Scale. The work-life conflict was assessed using the Copenhagen Psychosocial Questionnaire. Participants were asked about their monthly workload, family relationship status, and satisfaction with it. Data were analyzed using SPSS 29.0 - Chi-Square, Spearman's correlation.

Results

Among the participants of this study 89%(n=89) were women, 51%(n=51) were radiology assistants, and 49%(n=49) were radiographers. Out of all participants, 48%(n=48) were married, 22%(n=22) were unmarried with a partner, and 30%(n=30) were single. The level of self-esteem was obtained: 13%(n=13) had low, 35%(n=35) - moderate, and 52%(n=52) - high self-esteem. Participants with moderate self-esteem were more frequently dissatisfied with their relationships than participants with low and high self-esteem ($p=0.007$). Participants with low self-esteem (69.2%) were more likely to report work-life conflict, although this difference was not statistically significant ($p>0.05$). A low, positive correlation ($r=0.274$, $p=0.006$) was found between monthly workload and work-life conflict, suggesting that work-life conflict tends to increase as the monthly workload increases. A low, negative correlation ($r=-0.236$, $p=0.02$) was found between monthly workload and relationship satisfaction, suggesting that lower working hours are associated with increased relationship satisfaction.

Conclusions

Moderate self-esteem was associated with higher relationship dissatisfaction. Although a trend was observed, lower self-esteem did not correlate statistically with higher work-life conflict. These findings suggest that longer work hours contribute to increased work-life imbalance and lower working hours may lead to greater relationship satisfaction.

Changes in Scores of Alexithymia before and after Treatment in Inpatient Psychotherapeutic Programme (Minnesota) in Patients with Substance Use Disorder

Poster

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Objectives*

It is known that disturbances of emotional regulation play a role in the development of addiction. Alexithymia (inability to recognize, name and express emotions) is more common among people with addiction than in general public. The aim of this study is to determine the effect of a 28-day long in-patient psychotherapeutic group (of 10 people) therapy (Minnesota) programme on alexithymia in patients with substance use disorder.

Materials and Methods

This is an ongoing longitudinal prospective cohort study, started in June, 2024. Adult patients of Minnesota programme at hospital "Ģintermuiža" with diagnosis of substance use disorder, that are not acute, understand Latvian and have agreed to participate were given a questionnaire at the beginning of the treatment that included Toronto Alexithymia Scale (TAS-20) adapted for Latvia (done by S. Gaide in 2004) and filled the scale again at the end of the programme. The data were analysed on IBM SPSS Statistics with Related-Samples Wilcoxon Signed Rank Test (statistical significance $p < 0,05$) and Cohen's r was calculated to determine the effect size of the intervention.

Results

So far 55 patients have participated in the study, but after review of the questionnaires, only 26 were eligible for further analysis. Most of them (81%) were male with mean age of 40 (SD +/- 10,1), most were addicted to alcohol (92%) and 61% had tobacco addiction. There was a statistically significant difference between TAS-20 scores before and after treatment ($p=0,005$) with median score before of 57,5 (Q1-Q3: 44,5-70,0) and after of 46,0 (Q1-Q3: 37,75-55,25). The median score of overall change was -5,0 (Q1-Q3: -14-2) and the effect size of the intervention in this study was medium ($r= -0,388$).

Conclusions

Data collection must be and is continued. The data that have been collected so far show that Minnesota programme can aid in decreasing alexithymia in patients with psychoactive substance use disorder.

Clozapine Use in Paediatric Population: Clinical Case Report and New Guidelines at Children’s Clinical University Hospital, Latvia

Poster

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Objectives*

Although clozapine is the gold standard in treatment-resistant schizophrenia, its use in pediatric populations is rare due to its potentially serious side effects and limited supporting literature. In Latvia, clozapine is considered a treatment of “last-resort”, with minimal use in children, and no materials available to guide its initiation and management in this population. This study describes the successful use of clozapine in 16-year-old female with paranoid schizophrenia and introduces newly developed guidelines at Children’s Clinical University Hospital.

Results

The patient experienced her first psychotic episode at age 15, characterized by visual and auditory hallucinations, delusions, and disturbed thoughts. Treatment with haloperidol (7.5 mg/day) and olanzapine (5 mg/day) improved her condition. However, due to persistent negative symptoms, her diagnosis was revised to paranoid schizophrenia 10 months later. Due to weight gain, therapy was switched to aripiprazole (15 mg/day). At age 16, the patient experienced a second psychotic episode, and treatment with haloperidol and olanzapine was ineffective. Clozapine was considered and initiated at 25 mg/day after pre-clozapine blood investigations. The dose was gradually titrated to 150 mg/day, leading to significant improvement in all psychotic symptoms. Weekly monitoring was conducted, with no adverse effects noted. After one year, the patient reported no psychotic symptoms on clozapine 75 mg/day, although residual negative symptoms, such as apathy and emotional blunting, persisted. This case required specific guidelines for the initiation, titration, and monitoring of clozapine, which were developed and issued at Children’s Clinical University Hospital in 2024.

Conclusions

Use of clozapine in patients under the age of 18 years is rare and requires strict monitoring. This case demonstrates the successful use of clozapine in 16-year-old patient and highlights the importance of guidelines for the safe initiation, titration, and monitoring of clozapine in pediatric populations, as developed at Children’s Clinical University Hospital in 2024.

Correlation between Anxiety and Depression Symptoms and Perceived Stress and Burnout in the Population of Latvian Radiographers and Radiology Assistants

Poster

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Objectives*

Individuals experiencing elevated stress levels are more vulnerable to mental health issues like anxiety and depression, which can impair their ability to cope with work-related demands and increase the risk of burnout. This study aims to examine how symptoms of anxiety and depression correlate with employees' perceived stress and burnout indicators among Latvian radiographers and radiology assistants.

Materials and Methods

A quantitative cross-sectional study was conducted between March and September 2024. The study population consisted of 100 Latvian radiographers and radiology assistants who voluntarily completed an anonymous electronic self-report questionnaire. The questionnaire included questions on demographic data, the PHQ-9 depression scale, the GAD-7 anxiety scale, and the Copenhagen Psychosocial Questionnaire II (medium version). Correlations between anxiety symptoms, depression symptoms and perceived stress and burnout were assessed. Statistical analysis (Spearman's correlation) was performed using IBM SPSS 29.0.

Results

Among the participants of this study 89%(n=89) were women, 51%(n=51) were radiology assistants, and 49%(n=49) were radiographers. 75%(n=75) of respondents had considerable burnout symptoms and 63% (n=63) had high perceived level of stress. 37%(n=37) of respondents presented with mild, 21%(n=21) with moderate and 10%(n=10) with severe symptoms of generalized anxiety. Statistically significant strong positive correlations were found between burnout symptoms ($\rho=0.64$, $p<0.001$), perceived stress ($\rho=0.72$, $p<0.001$) and symptoms of anxiety. 27%(n=27) of respondents presented with moderate, 12%(n=12) - moderately severe, and 5%(n=5) with severe symptoms of depression. Statistically significant strong positive correlations were found between burnout symptoms ($\rho=0.71$, $p<0.001$), perceived stress ($\rho=0.73$, $p<0.001$) and symptoms of depression.

Conclusions

The findings of this study support the hypothesis that perceived stress and burnout are positively correlated with symptoms of anxiety and depression. These results highlight the importance of addressing stress and burnout as critical factors in the prevention and management of mental health conditions.

Correlation between Depression, Anxiety and Somatic Symptoms Among Radiographers and Radiology Assistants in Latvia

Poster

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Objectives*

The aim of this study was to assess the prevalence of somatic symptoms and examine their correlation with depression and anxiety symptoms among radiographers and radiology assistants in Latvia.

Materials and Methods

This quantitative cross-sectional study was conducted between March and September 2024. The participants, radiographers and radiology assistants employed in both public hospitals and private healthcare centers in Latvia, were invited to complete a comprehensive web-based self-report questionnaire, that included items on the frequency of somatic symptoms experienced over the past four weeks, as well as the Generalized Anxiety Disorder (GAD-7) and the Patient Health Questionnaire (PHQ-9). Statistical analysis was performed using IBM SPSS Statistics 29.0 - Spearman's correlation.

Results

The study included 100 participants, 89% of whom were female; 51% were radiology assistants, 49% - radiographers. The mean age of participants was 44.6±15.1 years. Frequently reported somatic symptoms included muscle tension (49%), back pain (50%), and headaches (32%).

Higher depression scores showed a positive, moderate, statistically significant correlation with such somatic symptoms as muscle tension ($\rho(98)=0.471$, $p<0.001$), shortness of breath ($\rho(98)=0.485$, $p<0.001$), heart palpitations ($\rho(98)=0.436$, $p<0.001$), abdominal pain/discomfort ($\rho(98)=0.476$, $p<0.001$), chest tightness/pain ($\rho(98)=0.429$, $p<0.001$). Similarly, higher anxiety levels were significantly associated with headaches ($\rho(98)=0.403$, $p<0.001$), abdominal pain/discomfort ($\rho(98)=0.466$, $p<0.001$), chest tightness/pain ($\rho(98)=0.475$, $p<0.001$), heart palpitations ($\rho(98)=0.459$, $p<0.001$) and shortness of breath ($\rho(98)=0.456$, $p<0.001$).

Conclusions

The findings suggest that healthcare professionals in high-stress environments such as radiology, experience a higher prevalence of physical symptoms which are closely linked to mental health conditions, but additional research would be useful in order to further explore this topic. Addressing mental health support and stress management in this group may improve both their psychological and physical well-being, potentially reducing the negative impact of these symptoms on their professional performance and quality of life.

Correlation Between Depression, Anxiety Symptoms, and Self-Esteem Among Radiology Assistants and Radiographers in Latvia

Poster

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Objectives*

Radiology assistants and radiographers often face demanding workloads, which can lead to mental health problems. Self-esteem is regarded as a protective factor against these issues. The aim of the study is to assess the correlation between self-esteem and symptoms of depression and anxiety among radiology assistants and radiographers in Latvia.

Materials and Methods

A quantitative, cross-sectional, web-based study was conducted from March to September 2024 among radiology assistants and radiographers in Latvia, with a sample size of 100 participants. Depression symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9), anxiety symptoms were assessed using the Generalized Anxiety Disorder (GAD-7) scale, and self-esteem was measured using the Rosenberg Self-Esteem Scale. Data were analyzed using SPSS 29.0, with Spearman's correlation coefficient applied.

Results

Among the participants in this study 89% (n=89) were women, 51%(n=51) were radiology assistants, and 49%(n=49) were radiographers. The level of self-esteem was low in 13% (n=13), medium in 35% (n=35) and high in 52% (n=52) of participants.

27 (27%) radiology assistants and radiographers had moderate, 12(12%)- moderately severe and 5 (5%) - severe depression symptoms. 21 (21%) participants had moderate and 10 (10%) - severe anxiety symptoms.

A positive, strong and statistically significant negative correlation was found between anxiety and depression symptom severity levels ($\rho(98) = 0.701$; $p < 0.001$).

A weak but statistically significant negative correlation was observed between self-esteem scores and anxiety symptom severity ($\rho(98) = -0.259$; $p = 0.009$), as well as between self-esteem scores and depression symptom severity ($\rho(98) = -0.289$; $p = 0.004$).

Conclusions

The results reveal important relationships between mental health variables among the participants - individuals with higher anxiety symptoms are likely to experience greater severity of depression symptoms, and vice versa and lower self-esteem is associated with higher levels of anxiety and depression. Further larger population cohort study is needed to assess causality.

Correlation between Depression, Anxiety Symptoms, and Work-Life Conflict among Radiology Assistants and Radiographers

Poster

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Objectives*

Anxiety, depression, and work-life conflict are closely connected. Work-life conflict causes stress, which can lead to anxiety and depression. In turn, mental health struggles make it harder to manage work and personal life, worsening the conflict. This study aims to assess the associations between symptoms of depression, anxiety, and work-life conflict among radiology assistants and radiographers.

Materials and Methods

A quantitative cross-sectional web-based study was conducted in March-September 2024 among radiology assistants and radiographers, sample size-100 participants. The work-life conflict was assessed using the Copenhagen Psychosocial Questionnaire. Symptoms of depression were assessed using the Patient Health Questionnaire-9, and symptoms of anxiety were assessed using the Generalized Anxiety Disorder-7 scale. Data were analyzed using SPSS 29.0 - Spearman's correlation.

Results

Among the participants of this study 89%(n=89) were women, 51%(n=51) were radiology assistants, and 49%(n=49) were radiographers. Clinically significant symptoms of depression were found in 44% (n=44) participants - 27% (n=27) presented with moderate, 12% (n=12) - moderately severe, and 5% (n=5) with severe symptoms of depression. A moderate, positive correlation ($r=0.437$, $p<0.001$) was found between symptoms of depression and work-life conflict. Clinically significant symptoms of anxiety were found in 31%(n=31) participants - 21%(n=21) presented with moderate and 10%(n=10) with severe symptoms of generalized anxiety. A moderate, positive correlation ($r=0.435$, $p<0.001$) was found between symptoms of anxiety and work-life conflict, which suggests that as symptoms of anxiety increase, the perception or experience of work-life conflict increases.

Conclusions

These findings suggest that higher levels of depression were associated with a greater perception or experience of work-life conflict. Similarly, individuals facing anxiety are more likely to experience challenges in balancing their professional and personal lives.

Correlation between Depression, Anxiety Symptoms, Self-Esteem, and Different Coping Strategies among Radiology Assistants and Radiographers in Latvia

Poster

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Objectives*

Radiology assistants and radiographers frequently work in high-stress environments, which can lead to mental health issues like depression and anxiety. Key factors such as self-esteem and coping mechanisms play an essential role in shaping mental health outcomes. This study aimed to assess correlations between symptoms of depression, anxiety, self-esteem and coping strategies among radiology assistants and radiographers in Latvia.

Materials and Methods

A quantitative, cross-sectional, web-based study was conducted from March to September 2024 with radiology assistants and radiographers. Depression and anxiety symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9) and General Anxiety Disorder-7 (GAD-7) scales. Self-esteem was assessed using the Rosenberg Self-Esteem Scale, and coping strategies were measured using the Coping Inventory Scale. Data were analyzed using SPSS 29.0 - Spearman's correlation.

Results

Among 100 participants, 89% (n=89) were female, 51% (n=51) radiology assistants, and 49% (n=49) were radiographers.

A moderate positive correlation was found between higher PHQ-9 score and "Overeating" ($\rho(98)=0.473$, $p<0.001$); a weak positive correlation with "Use of psychotropic drugs" ($\rho(98)=0.365$, $p<0.001$), "Smoking" ($\rho(98)=0.262$, $p=0.008$), "Psychotherapy" ($\rho(98)=0.319$, $p=0.001$) and a weak negative correlation with "Hobbies" ($\rho(98)=-0.349$, $p<0.001$).

A moderate positive correlation was found between higher GAD-7 score and "Overeating" ($\rho(98)=0.511$, $p<0.001$), weak positive correlation - with "Use of psychotropic drugs" ($\rho(98)=0.280$, $p=0.005$) and "Psychotherapy" ($\rho(98)=0.267$, $p=0.007$).

A weak positive correlation was found between high self-esteem and "Eating healthy" ($\rho(98)=0.323$, $p=0.001$), "Hobbies" ($\rho(98)=0.280$, $p=0.005$).

Conclusions

These results suggest that mental health symptoms, self-esteem and coping strategies are interrelated, but further research and analysis is necessary in order to substantiate the findings.

Factors Influencing Depression Incidence in Latvian Family Medicine Doctors, during COVID-19 Pandemic from January to March 2022

Poster

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Objectives*

According to the World Health Organization, the prevalence of depression in the general world population increased by 25% during the Covid-19 pandemic. There's data on how the COVID-19 pandemic influenced the mental health of medical professionals in 2020, but no further data about the impact later on.

Materials and Methods

A cross-sectional study was conducted from January to March, 2022, by a digital survey and a total of 80 respondents (certified and 3rd year residents of family medicine). The PHQ-9 (The Patient Health Questionnaire -9) was used in order to screen for and evaluate the severity of depression. IBM SPSS Statistics version 25.0 was used for statistical data processing.

Results

Mild depression was found in 25% (n=20), moderate in 26.25% (n=21), moderately severe in 21.25% (n=17), and severe depression in 21.25% (n=17) of cases. There was a statistically significant difference ($P\chi < 0.05$) in groups based on severity of depression on whether COVID-19 had an impact on mental health with higher regard to it in severe depression group. There was statistically significant difference ($P\chi = 0.05$) between moderately severe depression and severe depression group in having children (58,82% vs 70,59% respectively). The prevalence of moderately severe and severe depression (61,54%) was higher in group where only the doctor did telephone consultations ($P\chi < 0.05$). There was a statistically significant difference ($P\chi = 0.05$) between groups based on depression severity whether respondents sought medical help with higher percentage in subclinical depression (60%) than in moderately severe or severe depression (24%).

Conclusions

Overall, severe or moderately severe depression was found in almost half of the respondents, and there was an alarmingly low rates of seeking for medical help. The data show that there could be an association between thinking that COVID-19 has had an impact on mental health, having children and doctors being the only ones doing telephone consultations and higher scores of PHQ9.

Practical Application of Sherborne Developmental Movement in Professional Practice: Insights from Practitioners in Latvia, the Netherlands, and the UK

Poster

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Objectives*

This study explored the practical application of Sherborne Developmental Movement (SDM) in the Netherlands and the UK, gathering reflections from Latvian practitioners to understand its evolving use across varied settings. It highlights parent-child interactions as central to SDM, offering implications for therapy and practice.

Materials and Methods

A qualitative design involved five SDM practitioners from the Netherlands (3) and the UK (2) selected for expertise, plus a focus group of four Latvian dance therapists and four students. Semi-structured interviews and focus group discussions, guided by 26–30 open-ended questions, were analyzed using reflexive thematic analysis¹ with NVivo software. Validity was supported through triangulation and iterative refinement.

Results

Parent-child interaction emerged as a significant theme in the practical application of the SDM Approach, emphasizing the importance of early relational experiences and collaboration tailored to children's developmental stages. Similar findings in prior studies(2, 3) highlight that parental involvement can significantly enhance therapy outcomes. Relational advantages include strengthened emotional bonds, trust, and shared experiences through collaborative activities. Furthermore, the ability of the therapist to adapt their approach to improve the parent's understanding of the therapeutic objectives and to promote active participation can shape the therapeutic process. Cultural and social contexts, such as parenting styles and social norms, seem to influence the perception and implementation of therapy, highlighting the importance of cross-cultural research to study differences in parental participation and access.

Conclusions

While these findings provide valuable insights, they also reveal critical gaps in current knowledge. The role of cultural factors, therapist adaptability, and parental involvement in shaping SDM outcomes remains underexplored. Future research should prioritize quantitative studies to measure the impact of these factors on child development outcomes and examine regional variations in engagement and access. Addressing these gaps could provide a deeper understanding of SDM's therapeutic potential and inform strategies for its effective application across diverse cultural and social settings.

Rare Disease Case Reports

Acute v. renalis Thrombosis as Nutcracker Syndrome Complication

Oral

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Objectives*

Introduction. The Nutcracker syndrome refers to the compression of the left renal vein, most commonly occurring between the aorta and the superior mesenteric artery. This compression impairs blood outflow and is often accompanied by distention of the vein's distal portion.

Case description. A 23-year-old female patient was admitted to Rezekne Hospital in early December, reporting flank pain that had persisted for one day. A CT scan using intravenous contrast, conducted at Balvu Hospital, showed no enhancement of contrast in the left kidney and no contrast excretion observed in the later phases. Following a multidisciplinary consultation with a urologist and an interventional radiologist, the patient was hospitalized in the ICU for thrombolytic therapy with Actilyse and i/v heparin. After receiving the medication, the patient began to experience menstrual bleeding that continued for five days and required a blood transfusion.

A follow-up CT scan conducted two days later at Rezekne Hospital showed left renal vein thrombosis and an absence of excretion during the late phase of the scan. The patient had been taking hormonal contraceptives prior hospitalisation to help manage painful menstrual symptoms.

A follow-up CT scan a week later showed improvement, with a reduction in the size of the left renal vein thrombus and decreased contrast excretion from the left kidney. In total the patient spent three days in the ICU and was discharged on the tenth day to continue rivaroxaban therapy at home.

Summary. Hormonal contraceptives are known to increase the risk of thromboembolism. Additionally, compression of the left renal vein led to slower blood flow, further elevating the risk of thrombosis.

Conclusions. The patient's anatomy and use of hormonal contraceptives contributed to the development of acute left renal vein thrombosis with secondary kidney damage. Thrombolytic therapy played a key role in restoring kidney function.

AL Amyloidosis with Peritoneal Involvement and Refractory Ascites: Case Report

Oral

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Objectives*

A 51-year-old female presented to an amyloidosis referral center with a 6-month history of progressive pretibial edema and subsequent abdominal distension. Examination revealed ascites, nephrotic syndrome, hypoalbuminemia (28 g/L), and hepatomegaly. Fibroscan (75 kPa) indicated cirrhosis-like parenchymal disease, despite no history of alcohol abuse. Coagulation was normal, with alkaline phosphatase elevated at 532 U/L, mild transaminase elevation, and normal bilirubin.

A liver biopsy identified amyloid deposits. Serum protein electrophoresis detected 0.4 g/L paraprotein, with 0.2 g/L in urine. The kappa/lambda free light chain (FLC) ratio was 0.07. Immunohistochemistry confirmed AL amyloidosis with IgG lambda restriction. Bone marrow biopsy revealed 15–20% monoclonal plasma cells (lambda predominance). NT-proBNP was 163 pg/mL, and troponin was normal. Echocardiography indicated early cardiac involvement with interventricular septal thickness increasing from 8–9 mm to 11–13 mm within a year.

Systemic AL amyloidosis involving the liver, kidneys, and mild cardiac involvement was diagnosed (Mayo2004/European stage I). Dara-CyBorD therapy (daratumumab, cyclophosphamide, bortezomib, dexamethasone) was initiated. Despite diuretic therapy, refractory ascites required repeated drainage. Initial puncture removed 10 liters but was complicated by *Klebsiella pneumoniae* bacteremia, treated successfully with ciprofloxacin. Adjusted diuretic regimens caused hypokalemic metabolic alkalosis and did not halt the ascitic fluid collection, requiring four additional drainages.

Following Dara-CyBorD, the patient achieved complete hematological response within one cycle, with normalization of FLC ratios. Diuretic-refractory ascites subsided after three months, and diuretics were discontinued by nine months. Six months in treatment, there was no ascites recurrence.

The patient’s diuretic-refractory ascites, responsive to Dara-CyBorD therapy, likely stemmed from peritoneal amyloidosis, as there were no signs of significant portal hypertension or severe renal impairment. This case highlights the successful management of massive ascites in AL amyloidosis via combined daratumumab-based therapy and supportive measures, emphasizing peritoneal involvement as a contributing factor.

Azithromycin and Mycoplasma Pneumonia: Unusual Stevens–Johnson Syndrome Case

Oral

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Objectives*

Stevens-Johnson syndrome is a severe type IVc hypersensitivity to medication with epidermal detachment and necrosis. The annual incidence is 1-7/1000000. Early recognition is crucial to prevent its further progression and complications.

A 31-year-old female presented with mucocutaneous symptoms consistent with Stevens-Johnson syndrome following azithromycin treatment for cough and fever, amidst a nationwide outbreak of Mycoplasma pneumoniae. Approximately 35 hours after initiation of azithromycin the patient reported itchiness in the mouth. The following morning, she noticed painful oral ulcers and swelling of the upper lip. She self-managed with home remedies, but continued azithromycin unaware of its role in the reaction. With progressing symptoms, she was hospitalized. On admission - fever of 39.5°C, bullous oro-labial mucosal ulceration with positive Nikolsky's sign, facial angioedema, conjunctival injection with discharge, genital edema and pruritus. On the next day - macular rash on the sternum with semi-positive Nikolsky's sign. Laboratory tests showed slight leukocytosis with a left shift, elevated CRP and TNF- α and Mycoplasma pneumoniae IgM, consistent with recent infection. Azithromycin was replaced by levofloxacin. Treatment with systemic dexamethasone 12mg was initiated. Supportive care included bilastine and paracetamol. Over the next seven days angioedema subsided, and mucosal and cutaneous lesions gradually re-epithelialized, leaving depigmented areas.

1. Dexamethasone therapy was enough to stop the progression of the disease.
2. Patients should be educated about early signs of Stevens-Johnson syndrome, potentially mitigating the severity of the reaction and consequent complications.
3. The concurrence of Mycoplasma pneumoniae infection and macrolide hypersensitivity are possible dual-triggers for Stevens-Johnson syndrome. Initial presentation was atypical with isolated mucosal involvement and concurrent respiratory symptoms.
4. On follow-up patch testing confirmed the strongest reaction with azithromycin(++) at 48 hours, reducing to(+) at 72 hours, confirming it as the primary trigger. Mild and resolving reactions to clarithromycin and erythromycin suggest partial cross-reactivity within the macrolide class.

Case Report of Invasive Aspergillosis and Brain Toxoplasmosis in Patient with Immune Suppression

Oral

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Objectives*

Keywords. Disseminated aspergillosis; toxoplasmosis; immune suppression; radiological findings

Introduction.

Invasive aspergillosis is a rare condition, usually presented in patients with immune suppression with severe complications. Diagnosis can be complicated due to various and rare findings, manifestations and morphology of lesions. Bronchoscopy and biopsy being most common diagnostic tools.

Case Description.

We present adult male with B-lymphoma induced immune suppression, brain toxoplasmosis and associated invasive aspergillosis infection in myocardium, lungs, thyroid, subcutaneous soft tissue.

Consequent CT after month showed few new findings: multiple small, similar subcutaneous lesions. Multiple hypodense oblong lesions on left ventricle and interventricular septum. Multiple hypodense lesions in thyroid. Some nodules with cavities in lung lower lobe.

The thyroid ultrasound revealed a multitude of thick walled avascular cystic hypoechoic lesions.

Echocardiogram showed hypoechoic lesions in myocardium.

The patient is clinically stable and is in relatively well feeling, so bronchial wash could be performed, which showed positive for Aspergillus.

Positive Aspergillus also for blood and subcutaneous lesions biopsy.

Although no specific tests were made to diagnose cardiac and thyroid lesions, imaging findings are identical to findings in literature.

Within the same week, the patient was admitted to an MRI which revealed toxoplasmosis abscesses in both occipital lobes. This revealed toxoplasmosis abscesses in both occipital lobes.

Additional corticosteroid therapy was indicated.

Latest CT scan, after 6 months showed little reduction of subcutaneous lesions, thyroid, lung and myocardial lesions were gone. Latest head MRI showed reduction of toxoplasmosis abscess reduction.

Summary. We describe an adult male with chronic immune suppression and invasive aspergillosis and brain toxoplasmosis.

Conclusions. Invasive aspergillosis is a rare condition and diagnosis could be misleading.

Therefore, it is important to have a histopathological examination to confirm the diagnosis and rule out other disorders.

Chronic Osteomyelitis in a Patient with Congenital Insensitivity to Pain with Anhidrosis

Oral

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Objectives*

Introduction. NTRK1 gene-related congenital insensitivity to pain with anhidrosis (CIPA) is a rare autosomal recessive disorder. Orthopedic complications are characteristic and one of the most serious problems caused by the syndrome.

Case report. A 3-year-old female patient with CIPA syndrome is hospitalized due to an acute exacerbation of chronic osteomyelitis in her left thigh. She has a wound on the lateral surface of the left thigh, the knee joint is deformed. The diagnostic tests show extensive changes from the distal third of the thigh to the distal third of the lower leg. The inflammatory process passes through the distal femoral and proximal tibial growth zones, causing extensive destruction and ossification. The patient has a history of osteomyelitis of the tibial diaphysis and repeated surgeries, including pseudarthrosis plasty with a vascularized graft in October 2023. In December 2023, the patient re-injured her lower leg, developed septic symptoms, and was stationed in a hospital in Dublin, where repeated surgeries were performed. The council of doctors discusses the patient's condition and changes, deciding that reconstructive surgery is not feasible, and amputation is recommended.

Discussion. The therapeutic approach to CIPA syndrome is evolving and controversial, with no definitive management agreement. Treatment options focus on symptoms and protection from self-mutilation, fractures, and wound infections, which may lead to amputation.

Conclusions. Early diagnosis of this rare disease is crucial for the prevention of complications and the timely initiation of treatment because pathogenetic treatment is not yet possible and surgical treatment is very challenging, not always achieving the desired results.

Keywords. Pediatric surgery; Osteomyelitis; Congenital insensitivity to pain with anhidrosis; CIPA;

Neuroendocrine Tumour of the Liver?

Oral

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Objectives*

An 80-year old woman complained of abdominal discomfort, fatigue.

CT revealed a large, pathological formation, possibly originating from the liver parenchyma; hypervascular formation in the right lobe of the liver, at the border of the V and VI segments. Focal nodular hyperplasia (FNH), suspicious adenoma.

Her medical history was not significant, except for hypertension. Physical examination and all biochemical laboratory results were within the normal limits, including tests for liver function and tumor markers (alpha-fetoprotein and CEA and CA 19-9). Biopsy of liver pathological formation - well differentiated grade 1 NET, IHC - CD56+, Synaptophysin +, CK19 -, CK7 -, Ki67 2-3%.

Upper endoscopy - duodenal diverticulum with communication (anastomosis? fistula?). Colonoscopy - negative. A multi-disciplinary team (MDT) decided to plan liver surgery. The surgery was performed - liver S5, S6 resection (upon opening the abdominal cavity, a formation around 20x20 cm in size was found from the exit of the liver S5.6 segments, which extended to the pelvis).

Pathological report - moderately differentiated (Grade 2) neuroendocrine tumor of the liver- CD56 positive, synaptophysin positive, Ki-67 3-5%. pT1B N0 M0 L- V- Pn -.

MDT decided for medical oncologist consultation who referred the patient to symptomatic therapy. At this point the patient was no longer in follow-up.

A year after MRI was performed - extensive metastatic process in the liver. Specific process progression.

The diagnosis of primary hepatic NET is extremely rare. The diagnosis requires differentiation of primary hepatic NETs and other hepatic masses and exclusion of occult primary neuroendocrine tumor. In Latvia this scenario is not feasible due to lack of targeted imaging techniques - Gallium-68 somatostatin receptor PET. This clinical case shows the importance of referring the patient to a NET specialist for a more accurate plan.

Paroxysmal Nonkinesigenic Dyskinesia in a Paediatric Patient: Case Report

Oral

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Objectives*

Paroxysmal non-kinesigenic dyskinesia (PNKD) is a form of paroxysmal dyskinesia characterized by attacks of dystonic or choreoathetotic movements precipitated by stress, fatigue, coffee or alcohol intake, or menstruation, lasting for a few seconds. Consciousness is preserved. The prevalence is 1–9 per 1,000,000 worldwide. The age of onset is variable, ranging from 1 to 77 years. The PRRT2 (proline-rich transmembrane protein 2) gene (16p11.2) is believed to be one of the causative genes. It usually responds excellently to carbamazepine.

A 3-year-old male patient was admitted to the hospital with complaints of paroxysmal episodes 2–3 times a day, during which he raised his hand, had a fixed eye gaze, and did not react for about 30 seconds. His EEG, MRI, echocardiography (EhoKG), and blood tests were normal. He was discharged without a specific diagnosis.

After 1 month, he returned with the same complaints, but the frequency of paroxysmal episodes had increased, with the addition of forced turning of the head to the left. The boy was visibly in discomfort during the episodes. As ADCY5 gene-related paroxysmal dystonia was clinically suspected, therapy with caffeine (35 mg, three times a day) was started, and genetic testing was performed to analyse dystonia-causing genes.

After a week, at a follow-up visit, the dynamics of the episodes had not improved. As carbamazepine-responsive dystonias are described in the literature, therapy with carbamazepine was started (10 mg/kg/day), and genetic results were awaited for possible changes in the PRRT2 gene. Three months later, the boy had experienced only one episode of dystonia.

We presented a pediatric patient with paroxysmal non-kinesigenic dyskinesia. This case showed that carbamazepine was an effective treatment for this patient and led to a favourable outcome.

Takotsubo Cardiomyopathy Induced Heart Septum Rupture: Case Report

Oral

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Objectives*

Introduction. Takotsubo syndrome is a cardiac disorder that can cause transient wall motion abnormalities, and hypokinesia/dyskinesia/akinesia of segments of the heart. (Napp and Bauersachs 2020.). Takotsubo syndrome is usually reversible; nevertheless, during the acute stage, a substantial number of patients develop severe complications such as arrhythmias, heart failure including pulmonary edema and cardiogenic shock, thromboembolism, cardiac arrest, and rupture (Hassan et al. 2017).

Case Description. We present a case of 83 year old women who underwent elective surgery for right knee endoprosthesis revision in Hospital of Traumatology and Orthopaedics. During the surgery patient experienced asystole, CPR was initiated and was successful. After the surgery, the patient was transferred intubated with vasopressor support to the ICU. The next day the patient was extubated and presented with electrocardiographic changes and elevated high sensitivity troponin. The diagnosis of acute coronary syndrome was made. The patient was transported to Pauls Stradins Clinical University Hospital ICU for cardiac catheterization which showed no occlusion in arteries. To investigate further echocardiogram was made, it showed preserved ejection fraction, overload of the right parts of the heart and hypokinesia but most importantly it showed septal rupture. After that the patient was diagnosed with Takotsubo cardiomyopathy. The patient was consulted by a cardiac surgeon and expectant management was recommended.

Conclusions. Takotsubo is an emotional, noncardiac or post-traumatic stressful event that triggers myocardial injury, the possible etiology of which is the release of an endothelial neurotransmitter caused by stress. Physicians should be aware of this as even patients without previous cardiac pathologies when exposed to stressors can develop symptoms like myocardial infarction.

Rare Diseases in Adults

10-Year Experience of the Riga East Clinical University Hospital in the Treatment of Gastric Lymphoma

Oral

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Objectives*

Non-Hodgkin lymphoma's incidence has been increasing over the past 20-30 years. This increase has been observed in extranodal forms. Gastric lymphoma is the most common extranodal location, accounting for 55–65% of cases.

Retrospective analysis of 50 newly diagnosed gastric lymphoma patients at Riga East Clinical University Hospital (Riga, Latvia) at period from 2012 to 2022.

Materials and Methods

The retrospective study was conducted in Riga East Hospital. Medical documents of patients with primary gastric lymphoma diagnosed between 2012 and 2022 were reviewed. The analysis included patient demographics, symptoms, diagnostic methods, histological findings, and treatments. Data were analyzed using descriptive statistics.

Results

The study included 50 patients, male to female ratio 1.3:1 and the mean age 61.6 years. Abdominal pain and new-onset dyspepsia were the commonly observed presenting symptoms. Diffuse large B-cell lymphoma (DLBCL) was the most frequent histological subtype, seen in 60% of cases, followed by mucosa-associated lymphoid tissue (MALT) lymphoma (32%), mantle cell lymphoma (4%), follicular lymphoma (2%), and peripheral T-cell lymphoma (2%).

Helicobacter pylori infection was identified in 36%. Stage IVB was the most common at diagnosis, occurring in 32% of cases, while only 4% were diagnosed at stage I.

Diagnosis was made by fibrogastroscopy – in 73 %.

Complete remission after first-line treatment was achieved in 78% of patients, while 10% experienced disease progression or relapse.

Conclusions

Gastric lymphoma is a rare disease, but the most common extranodal location of lymphoma. Diagnosis is often made at an advanced stage, despite on minimally invasive diagnostics. First-line chemotherapy is effective, even in late-stage presentations.

Systemic Amyloidosis in Latvia 2020–2024

Oral

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Objectives*

This study aimed to evaluate trends in the incidence, types, stages, and organ involvement of amyloidosis in Latvia.

Materials and Methods

The Latvian Amyloidosis Patient Registry, an ongoing nationwide observational cohort study, was established in January 2020. It includes patients referred to Pauls Stradiņš Clinical University Hospital with confirmed systemic or localized amyloidosis based on tissue biopsy or a positive cardiac 99mTc-PYP scan for transthyretin (ATTR) amyloidosis. Informed consent was required for inclusion.

Results

By December 2024, 69 amyloidosis patients (57% male; mean age 64 ± 13 years) had been enrolled. Of these, 28 (41%) had died during follow-up. Light-chain (AL) amyloidosis accounted for 40 cases (58%), including 31 systemic and 9 localized. ATTR amyloidosis was diagnosed in 14 patients (20%), while AA amyloidosis occurred in 10 cases (15%). There was one case each of lysozyme and AApoCII amyloidosis, with three cases unspecified. Mortality did not significantly differ between types. The kidneys (61%) and the heart (57%) were the most commonly affected organs, followed by polyneuropathy (39%), autonomic dysfunction (29%), and carpal tunnel syndrome (20%). Annual enrollment stabilized at 14–16 patients from 2021 onward. Diagnoses of ATTR amyloidosis increased from 0–1 cases annually in 2020–2022 to 5–7 cases in 2023–2024. Most systemic AL patients (55%, $n=17$) were diagnosed at advanced stages (stage III Mayo2004/European staging system), with 13 patients at the most severe stage IIIb. The highest incidence of AL amyloidosis occurred in 2022 (12 cases).

Conclusions

The distribution of amyloidosis types in Latvia mirrors that of European and U.S. centers, though overall prevalence and incidence remain lower. AL amyloidosis is the most commonly diagnosed systemic type, with most cases identified at late stages. ATTR amyloidosis cases have increased but remain underdiagnosed. Continued efforts are needed to improve early diagnosis and management.

Two-Year Follow-Up Study of Myasthenia Gravis Patients: a single center experience

Oral

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Objectives*

We sought to evaluate changes in clinical data, patients' quality of life, functional condition and fatigue in myasthenia gravis (MG) patients in a two year follow-up study.

Materials and Methods

MG patients were recruited and evaluated during outpatient visits from 11/2022 to 11/2024. Follow up visits were organised every one to three months, for this study we compared patients' outcomes in 1st and 6th visit. Disease severity was evaluated by Myasthenia Gravis Foundation of America (MGFA) classification. Quality of life, patients' functional condition and fatigue were assessed by 15-item Myasthenia Gravis Quality of Life Questionnaire (MGQOL15), Myasthenia Gravis Activities of Daily Living scale (MGADL) and Fatigue Severity Score (FSS). To evaluate changes in scales over time, Wilcoxon test was performed. To evaluate changes in MGFA and clinical fatigue, Pearson Chi-square test was used.

Results

A cohort of 37 patients with myasthenia gravis (35% male, mean age 58.9 ± 15.4 years) was evaluated. The median disease duration at the first visit was 66 months (IQR 105). Antibody status was as follows: anti-AChR in 87%, anti-MuSK in 2%, and seronegative in 11%. MGFA classification grades improved significantly between the first and sixth outpatient visits ($p=0.007$), with patients in pharmacological remission increasing from 30% to 46%, one patient achieved complete remission. Median scores for MGADL (3.0[IQR 4.0] to 0.0 [IQR 3.0]; $p = 0.004$) showed significant improvement. However, no significant changes were observed in FSS ($p = 0.059$) or quality MGQOL15 ($p = 0.121$). Notably, clinically significant fatigue increased from 24% to 43% by the sixth visit, but it was not clinically relevant ($p = 0.101$).

Conclusions

This is the first MG follow-up study in Latvia, which shows the importance of regular outpatient follow-up for MG patients. These results highlight substantial improvement in disease severity and functional condition over time but highlight the need to address persistent fatigue and quality of life concerns.

Retrospective Analysis of Motor Neuron Disease: Single-Center Study on Diagnosis, Classification, and Genetic Insights

Poster

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Objectives*

Motor neuron disease (MND) is a group of neurodegenerative disorders that causes the progressive dysfunction of either upper or lower or both motoneurons. Amyotrophic lateral sclerosis (ALS) is the most common form of MND. According to the available data, the prevalence of ALS is approximately 6 cases per 100,000. To this day modern medicine is deficient in etiological treatment and reliable diagnostic markers. Our study aimed to summarize a five-year experience with MND, highlighting the challenges in diagnosis, management, and evolving needs of patients.

Materials and Methods

This retrospective study included 117 patients diagnosed with MND between 2020 and 2024. Data for cohort evaluation were collected from the outpatient and inpatient departments of Pauls Stradiņš Clinical University Hospital. Diagnostic tools such as brain magnetic resonance imaging, nerve conduction studies, electromyography, and lumbar puncture findings were analyzed in combination with available clinical records. Descriptive statistics were used to evaluate the data.

Results

76.1% (n=83) of the 109 patients diagnosed with MND were classified as ALS patients. 3.7% (n=4) were diagnosed with primary lateral sclerosis (PLS), and 2.8% (n=3) were classified as progressive muscular atrophy (PMA) patients. Among the 83 ALS patients, 10% underwent genetic testing, with 1 identified as having a SOD1 gene mutation. Mean time from symptom onset to diagnosis was 15.94 ± 17.28 months. Mean disease duration among patients was 35.99 ± 25.73 months. Additionally, 12 patients were diagnosed with spinal muscular atrophy, and 7 with bulbo-spinal muscular atrophy.

Conclusions

Our study highlights the critical need to reduce the time from symptom onset to diagnosis to optimize patient outcomes, especially with the availability of new treatments for both genetic and non-genetic forms. Additionally, expanding the availability and accessibility of genetic testing is paramount as it aids in precise disease classification and enhances the potential to implement targeted, disease-modifying therapies in the future.

Serum Metabolomic Profiling in Systemic Sclerosis Uncovers Potential Biomarkers

Poster

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Objectives*

Systemic sclerosis (SSc) is a rare autoimmune connective tissue disease characterized by vascular insult, autoimmunity, and tissue fibrosis. Understanding the metabolomic alterations in SSc has the potential to uncover novel biomarkers, providing opportunities for improved management and outcomes.

Materials and Methods

Patients with SSc ($n = 62$) and healthy control (HC) group ($n = 72$) were recruited consecutively at the two university hospitals in Latvia. After peripheral blood collection, plasma separation was performed and frozen until metabolite analysis. Targeted quantitative metabolite analysis was conducted using HILIC-based liquid chromatography and mass spectrometric detection employing an Orbitrap Exploris 120 system. Metabolomics data was analyzed with MetaboAnalyst 6.0 and GraphPad Prism 9.0.

Results

SSc patients were predominantly females (82%), with mean age 61 year, and the mean SSc disease duration 13.6 years. 89% of patients had Raynaud's phenomenon. Mean modified Rodnan skin score was 7.1.

We compared 33 plasma metabolites of all SSc patients to HC. The greatest differences with fold changes > 2 were observed for aspartic acid, glutamic acid, valine, and citrulline. All of which were decreased, except for glutamine (fold change > 1.5). We used significantly changed metabolites to build a disease prediction model based on multiple logistic regression. Ending up with the combination of four metabolites: aspartic acid, glutamic acid, glutamine and carnitine. The model was able to separate patients from controls with an AUC of 0.9355.

Conclusions

Analysing the results of our study and comparing them with previous studies in the field of SSc, we conclude that our metabolite profile is quite similar to other studies, with greatest differences for aspartic acid, glutamic acid, valine, citrulline and glutamine, with possible associations of macrophage polarisation changes with fibrotic process stimulation and mitochondrial dysfunction with oxidative stress-induced damage. As potential biomarkers for SSc, we found significantly changed aspartic acid, glutamic acid, glutamine and carnitine.

Rare Diseases in Pediatrics

Comprehensive Evaluation of Sleep-Disordered Breathing in Paediatric Neuromuscular Diseases: Insights from a Retrospective Cohort Study

Oral

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1. Rīga Stradiņš University

Objectives*

Patients with neuromuscular diseases (NMD), such as Duchenne muscular dystrophy (DMD) and spinal muscular atrophy (SMA), are at high risk for sleep-disordered breathing (SDB), which can lead to premature mortality and cognitive decline. This study aimed to evaluate the usage and efficacy of spirometry and respiratory polygraphy combined with transcutaneous capnography (PG + trCO₂) in diagnosing respiratory dysfunction in children with DMD and SMA.

Materials and Methods

This retrospective cohort study analyzed 72 pediatric patients with DMD and SMA. Data on pulmonary function tests (PFT), including spirometry and peak expiratory flow (PEF), and PG + trCO₂ assessments were collected. Outcomes assessed included the detection of respiratory abnormalities and the progression of sleep-related respiratory disturbances over time.

Results

Among the 72 patients, only 36% underwent PG + trCO₂, and 77% of those exhibited significant respiratory abnormalities during sleep. PFTs were performed on 63% of the patients, with results indicating that 38% had normal spirometry, 47% showed restrictive patterns, and 15% were unable to complete the tests due to lack of cooperation. PG + trCO₂ detected significant respiratory dysfunction in three cases despite normal PFT results, leading to the initiation of non-invasive ventilation therapy. Longitudinal sleep studies in 11% of patients demonstrated progression in sleep-related respiratory disturbances, with some cases showing significant night-time respiratory changes (e.g., sleep apnea and hypoventilation) despite normal PFT outcomes.

Conclusions

This study highlights the critical importance of comprehensive respiratory evaluations in NMD patients. PG + trCO₂ proved valuable in identifying SDB, particularly in cases where PFT results were normal, underscoring its role in the early detection and management of respiratory dysfunction in this vulnerable population.

Implementation and Results of Severe Combined Immunodeficiency Screening in Latvia: April 2023–September 2024

Oral

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Objectives*

Severe combined immunodeficiency (SCID) screening was implemented in Latvia on April 1st, 2023, aiming to identify life-threatening immunodeficiencies in newborns. This study analyzes screening results from April 1st 2023, to September 30th 2024.

Materials and Methods

Newborn screening for SCID based on quantitative measurement of T-cell receptor excision circles (TREC), and kappa-deleting recombination excision circles (KREC). TRECs serve as markers of thymic function, reflecting thymic output, while KRECs indicate new B-cell production.

TREC and KREC levels were measured in dried blood spot (DBS) samples from 20,660 newborns. Results were categorized. Infants with persistent abnormal results were referred for clinical investigation to immunologist and later geneticist.

Results

Of the 20,660 newborns screened, 20,431 (98.9%) had negative results for both TREC and KREC, while 229 (1.1%) required further testing. After the first DBS test, 62 newborns were recalled for TREC and 104 for KREC abnormalities, 5 for both markers, and 58 (25.3%) had inconclusive results.

Following the second test, 35 newborns required a third sample. Two newborns did not provide a second sample. 4 infants with positive TREC or KREC were referred to immunologist.

After the third test, 12 infants remained positive for TREC/KREC abnormalities. Six of these were referred for clinical evaluation, and others needed to provide another DBS. Of these, three received negative results, two did not provide samples, and one passed away.

Overall, 10 newborns were referred to immunologists for further evaluation (referral rate of 0.05%). Of these, four had significant changes in immunophenotyping and were referred to geneticist. Two of these were later confirmed healthy, and one was diagnosed with DiGeorge syndrome and one with Jacobsen syndrome.

Conclusions

In Latvia, SCID screening effectively detected newborns in need of additional clinical evaluation and immune system assessment. This illustrates the importance of SCID screening and emphasizes the necessity for ongoing improvement of follow-up procedures.

Paediatric Hypertrophic Cardiomyopathy in Latvia and Sarcomeric Cardiomyopathy as the Most Common Cause of Primary Hypertrophic Cardiomyopathy: 12-Year Review

Oral

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Objectives*

The prevalence of childhood Hypertrophic Cardiomyopathy (HCM) is estimated to be ~3 in 100,000 live births with an annual incidence between 0.24 and 0.47/100,000 (Norish G., et al, 2021). HCM in children is genetically heterogeneous and can encompass syndromic, metabolic, and neuromuscular causes in addition to primary cardiomyopathies caused by mutations in disease-causing variant in a sarcomere protein genes. All pediatric patients in Latvia with HCM are treated, examined and followed up in the Children's University Hospital (CCUH) in Riga.

Aim of the Study was to analyse the results of genetic testing of all HCM, sarcomeric gene mutation caused HCM, positive family history, risk stratification, ICD implantation, mortality during the study period in all patients with HCM.

Materials and Methods

All patients with diagnosis of HCMP during years 2012-2023 form CCUH clinical database were eligible and analysed if the diagnosis was made before age 18.

Results

There were 25 patients with HCM: 8(32%) had disease-causing variant in a sarcomere protein (MYH7, MYBPC3, TPM1, TNNT2), 3 Danone disease, 1 Sengers syndrome, 1 infantile Pompe disease (patient died 4y.o.), 1 X-linked hypophosphatemia, ALG12 mutation, 1 Noonan syndrome, 1 FLNC mutation, 3 patients had no data of genetic testing (12%). During study period 4 patients got ICD implanted (2-Danone, 1-Sengers, 1- sarcomeric HCM). 2 more patients died soon after reaching adulthood (1 Sengers syndrome and 1MYH7 sarcomeric gene mutation). 3 form 8 patients with sarcomeric HCM had positive family history(37.5%).

Conclusions

Sarcomeric HCM is identified in approximately one third of HCM manifesting during childhood. Despite survival up to adulthood is relatively good, patients with sarcomeric HCM are in need of careful repeated sudden cardiac death (SCD) risk reassessment and monitored transit to adult cardiologist to prevent life threatening arrhythmia. Further multi centre collaborative studies are needed to better prognose the risks of concrete genotypic variants of sarcomeric HCM.

Results of Newborn Screening for Biotinidase Deficiency Over a 5-year Period: Genotype and Phenotype, Therapy, and Challenges

Oral

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Objectives*

Biotinidase deficiency (BD) is a rare, autosomal recessively inherited disease causing a defect in the biotin-releasing enzyme, leading to biotin shortage. BD newborn screening (NBS) allows early diagnosis, treatment and providing of excellent prognosis.

Materials and Methods

We analyzed NBS data from the Laboratory of the Children's Clinical University Hospital in Riga (01.07.2019–01.07.2024). DBS samples were collected 48–72 h after birth. If the biotinidase level was <100 nmol/min/dl, a second and, if needed, a third sample was tested. Persistent low levels initiated a physical examination and molecular testing of the *BTD* gene. And we analyzed the correlation of biotinidase activity levels with genotype.

Results

A total of 81022 initial screenings were performed, of which 6618 (8,16%) were outside the reference range. After recall there were 107 samples below the cut-off value. Molecular *BTD* gene testing totally was made in 27 patients due to repeatedly [IM1] reduced biotinidase activity levels. The most common variant found in molecular testing was c.1270G>C, p.(Asp424His). 16 out of 25 patients (64%) were homozygous and one patient heterozygous for this variant. This is a well known hypomorphic variant of *BTD* gene, which in homozygous state provides the residual serum biotinidase activity level around 45-50% of normal, which does not require therapy. A molecularly confirmed diagnosis of partial biotinidase deficiency was found in 5 newborns and 2 of their asymptomatic siblings. None of the newborns were symptomatic

Conclusions

After five years of experience, no diagnosis of profound biotinidase deficiency has been confirmed. Initiation of biotin therapy may prevent the development of symptoms, as well as improve the clinical condition of symptomatic patients. There is still an unclear question about whether to start treatment for partial biotinidase deficiency and how to start it, considering that symptoms can appear at a later age only as a result of stress on the body.

Teduglutide – A New Option for Management in Children with Short Bowel Syndrome

Oral

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Objectives*

Due to advances in the medical field in parenteral nutrition, patients have had prolonged survival following massive resection of the small intestines. Although parenteral feeding reduces the risk of mortality after surgical treatment, there is a high risk of complications in the long term, such as difficult vascular access, mechanical damage to a long-functioning catheter, and catheter-related infections.

An essential objective in treatment is to promote enteral autonomy by reducing the risk of complications from parenteral feeding, improving daily quality of life, and reducing the need for and cost of medical care services. Teduglutide, an analogue to glucagon-like peptide 2, stimulates gut mucosal growth (growth of crypt cells, inhibition of enterocyte apoptosis), reducing dependence on parenteral nutrition, risk of complications, and facilitating enteral autonomy. The European Medicines Agency approved using this medicine in adults in 2012 and children in 2016.

This medicine has also been available in Latvia since 2023; currently, two children with short bowel syndrome receive it. For the first patient, teduglutide was started in November 2023. Parenteral support was needed for the patient at the start of treatment at 8,519 ml per week initially, down by 71.56% over the year. For the second patient, treatment was initiated in September 2024, and parenteral support decreased by 21.1% from Week 8. This medicine has not yet been used in adults in Latvia.

Conclusions

Conclusions. Teduglutide is a potentially significant medicine in the treatment of short bowel syndrome. It could be one of the first-line treatment options in the future, stabilizing a patient's condition after surgical treatment.

ANTI-LGI1 Encephalitis in Paediatric Patients: Case Report

Poster

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Objectives*

Anti-leucine-rich-glioma-inactivated 1 (LGI1) encephalitis is a rare autoimmune limbic encephalitis. Faciobrachial dystonic seizures (FBS) – considered a pathognomonic feature of anti-LGI1 encephalitis is extremely rare in children. Typical presentation includes focal seizures and neuropsychiatric symptoms, which are generally responsive to immunotherapy. To our knowledge, this is the first case of anti-LGI1 encephalitis in paediatric patient in Latvia.

An otherwise healthy 7-year-old boy presented to the Emergency Department with frequent focal motor to bilateral tonic-clonic seizures in sleep since 2 days. The patient's first seizure had occurred 1 month prior and he was evaluated in a regional hospital. Antiseizure medications (ASMs) with valproate (VPA) and carbamazepine were initiated, after which patient's relatives noted insomnia, behaviour changes and frequent falls. Electroencephalography (EEG) revealed bilateral focal epileptiform activity and slow waves over temporal, parietal leads. MRI showed left medial dorsal hippocampal sclerosis. Cerebrospinal fluid (CSF) studies were normal. Patient was started on intravenous immunoglobulin with suspicion of autoimmune encephalitis. Despite therapy, seizure frequency increased and the patient was transferred to the intensive care unit for third-line ASMs. Sleep EEG showed slow background activity. Anti-LGI1 antibodies were positive in serum, negative in CSF. High dose methylprednisolone was initiated. Screening for tumors was negative. Seizure control, sleep and behaviour improved. Patient was discharged with VPA, levetiracetam and prednisolone tapering. 2 months after discharge, EEG was repeated and showed normal background activity and decrease in epileptiform activity. At last follow-up, the patient was seizure free for more than 1 year, but profound behaviour changes remain.

Anti-LGI1 encephalitis is an autoimmune, limbic encephalitis, that has rarely been reported in paediatric population. While FBS are uncommon in children, focal seizures are frequent and in combination with neuropsychiatric symptoms should raise suspicion for limbic encephalitis. Early recognition of immune-related seizures and subsequent initiation of immunosuppressive treatment may favour better outcomes.

Congenital LQTS – Clinical Practice in Children’s Clinical University Hospital of Latvia

Poster

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Objectives*

Long QT Syndrome (LQTS) is a congenital cardiac channelopathy with a broad spectrum of manifestations, ranging from asymptomatic cases to syncope, life-threatening ventricular arrhythmias, and sudden cardiac death.

This study highlights the prevalence of LQTS, genetic variants, family history, clinical test results and the therapies administered in the pediatric population of Latvia

Materials and Methods

From January 2010 to November 20, 2024, cases with a genetic or clinical diagnosis of LQTS were reviewed. The analysis included demographic and clinical data, family history, electrocardiographic (ECG) and echocardiographic findings, and treatment modalities.

Results

In our centre 31 cases with proven LQTS mutation, 4 more patients with high suspicion and clinical diagnosis of LQTS, waiting for genetical testing results were selected to this study.

Demographic data: 12 (34.3 %) females, 23 (65.7%) males. Median age at the first cardiologist visit was 10 years (SD 4.7).

Genetical testing showed 62.9 % (N – 22) patients has LQTS type 1, 8.6 % (N- 3) diagnosed with type 2 LQTS, 1 – with type 3. Also more rarer types : 5 and 6 were found – 1 patient of each. 2 patients refused of genetical testing, 1 got VUS.

Median longest registered QTc was 490 ms (SD 36.1 ms) with interval 447 – 600 ms.

40 % (14) patients presented with cardiac symptoms: syncope (9), sudden cardiac death (4).

Almost everyone receive beta blocker treatment, except for those who refuses of any kind therapy.

Conclusions

Although LQTS is a rare disease, in the Latvian population, which includes only 356,000 children, these patients are identified, recognized, and successfully treated. Importantly, we also encounter very rare types, described in the literature as occurring in < 1% of cases. Over recent years, diagnostics for these patients have improved, with more cases being identified annually

Glutaric Acidemia Type I: Atypical Presentation with Visual Disturbances after Mild Head Trauma in a Paediatric Patient

Poster

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Objectives*

Glutaric Acidemia Type I (GA1) is a rare autosomal recessive metabolic disorder caused by mutations in the GCDH gene, which encodes glutaryl-CoA dehydrogenase, an enzyme essential for the breakdown of lysine and tryptophan. Enzyme deficiency leads to the accumulation of neurotoxic metabolites, glutaric acid and 3-hydroxyglutaric acid, which can cause significant neurological impairment. While GA1 typically presents in early childhood, late-onset cases may occur beyond six years of age or even in adolescence, with some patients remaining asymptomatic.

We describe the case of a previously healthy 9-year-old girl who presented to the Emergency Department with subjective visual disturbances for 10 days in her right eye following a mild head trauma during a judo practice. Neurological and Ophthalmological evaluation revealed homonymous hemianopsia on the right side and macrocephaly (head circumference >99th percentile, +3.3 Standard Deviations). While a history of suspected macrocephaly during infancy was noted, no detailed investigations were conducted at that time. After hospitalisation, on the next day visual disturbances self-resolved and patient had no complaints. Brain MRI with spectroscopy was performed and revealed extensive white matter demyelination in the periventricular and subcortical regions of the frontal, parietal, and occipital lobes. Additional findings included polymicrogyria and arachnoid cysts in the temporal lobes bilaterally. Metabolic testing showed markedly elevated levels of glutaric acid, 3-hydroxyglutaric acid, 2-hydroxyglutaric acid, and alpha-ketoglutaric acid in urine. Genetic testing confirmed two pathogenic GCDH gene variants, establishing the diagnosis of GA1. The patient was recommended dietary restriction of lysine-containing products.

We presented an atypical case of Glutaric Acidemia Type I (GA1) in a pediatric patient who presented with transient visual disturbances following minor head trauma. This case highlights the diverse clinical manifestations of metabolic disorders. Accurate diagnosis is crucial, as it enables implementation of targeted dietary approach, possibly reducing the risk of further neurological deterioration.

Rehabilitation

Physical Performance, Daily Physical Activity, Autonomy and Participation in Head and Neck Cancer Survivors Living with Tracheostomy Tube

Oral

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Objectives*

To investigate physical performance, daily physical activity, perceived limitations in autonomy and participation and to analyse their interactions in tracheostomized patients with head and neck cancer survivors.

Materials and Methods

To investigate physical performance, daily physical activity, perceived limitations in autonomy and participation and to analyse their interactions in tracheostomized patients with head and neck cancer survivors.

Results

The results showed significant impairment in exercise capacity, associated with inefficient breathing and inadequate arterial blood pressure response to exercise. The results of the study on active range of motion at the shoulder joints, cervical spine and upper thoracic level indicated coexisting limitations at several joints and planes of motion, which may suggest shortening of myofascial structures as a cause. The daily physical activity of the participants was characterised by a high proportion of sedentary time, as well as long continuous periods of sedentary time (> 1.5 h) combined with insufficient moderate-vigorous intensity physical activity (i.e. < 150 min/week). The results highlight that the experience of participation is unique to each person, while adaptation to the challenges of the disease, its treatment and the need for an independent tracheostoma, can be successful. However, most often the participants in the study perceived a limitation of their possibilities in activities outside the home and in the fulfilment of their roles in the family and household. At the same time, the results showed that engaging in moderate-vigorous intensity physical activity can be a helpful tool to overcome challenges.

Remote Assessment of Upper Extremity Functions: Solution for Military Rehabilitation Professionals in Ukraine

Oral

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Objectives*

There has been increased need for remote rehabilitation approach during the war in Ukraine. It is crucial to establish reliability of conducting remote assessments for musculoskeletal conditions un upper extremity. This research determined the intra-rater reliability of Modified Mayo Wrist Score (MMWS) and Mayo Elbow Performance Score (MEPS) assessed remotely (in Zoom platform) and obtained during physical examination.

Materials and Methods

Assessment was done with total of 52 male patients from Lithuania (n= 27, mean age 39.33 years SD= 8.85) and Ukraine (n = 25, mean age 37.83 years, SD = 6.97). In each country remote (R-MMWS, R-MEPS) and physical (on-site) assessments were done by two experienced physical therapists independently. Intra(remote vs. physical assessment) reliability were examined for both instruments using Intraclass correlation coefficient (ICC). The ICC values were considered good (>0.75) or excellent (>0.90).

Results

The average scores for MMWS and R-MMWS were the same in both countries with small differences of SDs in Lithuania: 58.33 (SD = 9.12) in Ukraine, and 63.33 (SD = 17.63 and SD_R= 17.91) in Lithuania. The average scores for MEPS and R-MEPS in Ukraine were 67.08 (SD=.13.39) and 66.25 (SD= 13.36), respectively; in Lithuania were 57.86 (SD= 24.11) and 57.62 (SD =25.47), respectively. In both countries examiners had excellent reliability in MEPS outcomes (ICC_{LT} = .992 and ICC_{UA} = .995), and MMWS (ICC_{LT} = .998 and ICC_{UA} = .999).

Conclusions

Remote assessment of elbow (R-MEPS) and wrist (R-MMWS) functions is a reliable technique, however, experience level of physiotherapists might impact the accuracy of measurement.

This study is financed by the Central Project Management Agency of Lithuania as part of the project “Remote Functional Assessment: Innovative solution for rehabilitation of war victims in Ukraine” (nr. 2023-K-063).

Effect of Slow Controlled Breathing Before Myofascial Release Using a Self-Massage Roller on Muscle Length and Pressure Pain Threshold

Poster

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Objectives*

To investigate the short-term effect of slow controlled breathing before myofascial relaxation using a self-massage roller on hamstring muscle length and pressure pain threshold.

Materials and Methods

In this quantitative, randomized controlled trial 24 participants (mean age: 24.1 ± 2.7 years) were randomly allocated to one of two groups. Group I (n=11) performed myofascial release with a self-massage roller for three minutes, while Group II (n=11) performed slow controlled breathing for five minutes followed by myofascial release for three minutes. Hamstring muscle length was assessed using the Passive Straight Leg Raise test (PSLR), and pressure pain threshold (PPT) was measured with a calibrated algometer (AlgoMed FPIX S/N 117). Statistical analysis included the Mann-Whitney U test for between-group comparisons and the Wilcoxon signed-rank test for within-group comparisons.

Results

Within-group analysis revealed statistically significant improvements in hamstring muscle length (degrees; M (IQR)) for both groups. Group I demonstrated an increase from 89 (4) to 90 (2) degrees ($p=0.007$), while Group II changed from 92 (9) to 92 (18) degrees ($p=0.015$). Between-group comparisons demonstrated no statistically significant differences.

Regarding pain pressure threshold (PPT) (kg; M (IQR)), Group I showed a slight decrease from 19.5 (6.4) to 17.1 (4.4) ($p=0.091$), suggesting a non-significant reduction in pain tolerance. Group II experienced a minimal increase from 17.9 (8.9) to 18.2 (7.7) ($p=0.504$). Despite a slight trend toward improvement in Group II, between-group comparisons showed no significant differences ($p=0.076$).

Conclusions

Single session myofascial release using a self-massage roller, both alone and in combination with slow controlled breathing, statistically significantly improves hamstring muscle length in active young adults in the short term. However, the findings do not provide conclusive evidence for the additional benefits of slow controlled breathing on hamstring muscle length or pressure pain threshold. Further research is warranted to explore effects of prolonged application.

Importance of Early Aerobic Intervention for Improving Functional Capacity in Patients after Cardiac Surgery in the Acute Phase

Poster

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1. Rīga Stradiņš University

Objectives*

Early mobilization could accelerate the achievement of patient functional goals after heart surgery. Functional status could improve if aerobic exercise intervention is involved in the early postoperative phase.

Materials and Methods

A randomized controlled experimental quantitative study. The place and time: PSCUH, Cardiac Surgery Center, during the period from February 19 to March 31, 2024, on working days. The additional early aerobic intervention after heart surgery was the foot and hand pedal trainer. The duration was gradually increased by 2 min each time, starting with 3 min and not exceeding 10 min in any patient. Instruments: *TUG* test, portable spirometer, hydraulic hand dynamometer, Borg scale, *Clinical Frailty Scale*, pulse oximeter and foot pedal mobile trainer "THERA-Trainer Bemo".

Results

20 participants took part (n=10 in the research group, n=10 in the control group). The average differences between the 1st measurement and the 7th postoperative day were as follows: in the *TUG* test, the result for the study group was 3,9sec, for the control was 6,9sec; vital capacity for the research group was 1,3liters, for the control group was 1,1liters; grip strength of the right hand for the research group was 4,5kg, for the control group was 5,7 kg and of the left hand for the research group was 6,4kg and for the control group was 5,5 kg.

Conclusions

The mean values of functional capacity (*TUG* test, VC, grip strength) tended to deteriorate statistically significantly in the second measurement. The tendency of the average measurements differences analyze in functional capacity in the research group, which received early aerobic exercise in addition to conventional physiotherapy, was better than in control group, but the data of changes differed statistically insignificantly between group in patients aged 60 to 70 years after heart surgery in the acute phase.

Prevalence and Risk Factors of pedes plani Deformity in Preschool Children

Poster

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Objectives*

The main objective of our research was to detect the occurrence of pedes plani in preschool children and to reveal the factors influencing this condition using research findings.

Materials and Methods

The research was carried out on a sample of 170 children between the ages of 3 and 6, attending kindergarten Š. Moyzes, Kindergarten Riadok and Kindergarten Bystrická cesta in Ružomberok. We investigated the prevalence of pedes plani in children by looking at standing posture, using Napoleon Wolanský's methodology. In this examination, we used a plantogram, created by using colored prints of individual children's feet on paper. Afterwards, we evaluated the prints visually according to Napoleon Wolanský's methodology. Part of the research was also a questionnaire addressed to the parents of the examined children, which we used for an objective evaluation of risk factors affecting the occurrence of pedes plani deformity. We analyzed the significance of the dependence of variables using the Chi-square test.

Results

From the results of the research on a sample of 170 children of preschool age, it follows that pedes plani deformity was detected in 57.65% of children. The incidence rate of deformity was lower in children wearing orthopedic shoes, as well as in children with daily physical activity exceeding 2 hours. At the same time, research has shown a lower incidence of pedes plani in children who regularly practice health exercises with their parents, even at home. The highest rate of occurrence of pedes plani in combination with another postural deformity was found in forward shoulder posture, which was found in up to 86.41% of children diagnosed with flat feet.

Conclusions

The results of our research prove that appropriate preventive measures effectively prevent flat foot deformity in preschool children.

Scar as a Possible Cause of Reduced Mobility

Poster

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Objectives*

A physiologically well-healed scar does not interfere with the movement of soft tissues. An active scar is a source of nociception, which reflexively affects the body's reaction and this is reflected in the function of the musculoskeletal system. An active scar needs to be treated, thereby preventing the formation of adhesions. The aim of the work is to point out the importance of an active scar and methods of its treatment. The method of the work is a case study of a 68-year-old patient after a shoulder joint fracture. The patient felt pain and burning in the operated area with all movements, which caused a limitation in the range of motion. Sensitivity was reduced in the scar area. After a physiotherapeutic examination using a diagnostic stick, diagnostic-therapeutic ball, discriminator and tuning fork, we identified active areas, which we treated with crosstap. The patient had the crosstap applied for 5 days. While the patient practiced isometric exercise, postisometric relaxation, reciprocal inhibition in the 3rd month position as part of kinesiotherapy. The patient completed physiotherapy treatment for one month. After diagnosing the active scar sites and subsequent treatment, the range of motion in the shoulder joint increased, sensitivity returned, and the scar healed. In physiotherapy practice, it is necessary to think about possible adhesions and their consequences that arise in an untreated scar.

Subjective Aspects in Assessment of Patient Self-Correction S-Shaped Idiopathic Scoliosis Patients

Poster

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Objectives*

Idiopathic scoliosis estimated to be around 2-3%. Despite the apparently obvious visual posture defects of this disease, the diagnosis of scoliosis can be established late, as well as its conservative treatment with the aim of reducing the deformation, often does not achieve the set goals regarding posture correction. The aim of this study is to find out the possibilities of subjective proprioceptive sensation evaluation during the treatment of patients in their self-assessment of their posture with and without external correction of posture

Materials and Methods

The research involves girls - idiopathic juvenile scoliosis patients aged 12-18 years, who have X-ray proven idiopathic S-shaped scoliosis with a Cobb angle of more than 20°, have started Shrota therapy, have not received operative treatment.

In the course of the study, the patients were asked subjectively - based on their feelings (deep feeling), using a special visual scale, to evaluate their posture in the aspect of scoliotic spinal deformity. The visual scale represents the spine in different degrees of deformation as an S-shaped line according to Cobb's angles from -50° to +50.

Posture will be assessed in two positions

- Standing freely
- While standing, if the physiotherapist performs manual correction of the spine

At the same time an objective evaluation of the spinal deformation will be performed by measuring the Cobb angle using a body surface 3D scanning device.

Results

11 girls and teenagers participated in the study, the results show that the patients are able to assess the degree of scoliotic deformation of the spine based on their sense of depth, but the subjective evaluation of the degree of deformation does not reflect the objective situation based on 3D sounding.

Conclusions

Subjective assessment of body self-correction of scoliosis patients requires further research and improvement of the used visual scale.

Transcutaneous Electrical Nerve Stimulation (TENS) Application for Spasticity Reduction in Lower Extremity Muscles in Individuals with Spinal Cord Injury

Poster

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Objectives*

An effective method for reducing spasticity is transcutaneous electrical nerve stimulation (TENS). The optimal stimulation parameters for achieving maximum effectiveness in reducing spasticity in individuals with spinal cord injury remain unclear.

Objective of the study is to determine the modes (parameters) of TENS application for reducing spasticity in lower extremity muscles in individuals with spinal cord injury.

Materials and Methods

A randomized, controlled, experimental study was conducted. Twenty study participants were recruited and randomly assigned to two groups. Initial spasticity assessment using the Tardieu scale was performed on selected patients, followed by ten TENS procedures. Subsequently, a repeated assessment of selected patients was conducted using the Tardieu scale.

Results

In the first group of study participants (receiving TENS intervention with parameters: 15mA, 100Hz, 100 ms, application time 30 minutes), a reduction in spasticity by 0.5 points on the Tardieu scale and an increase in joint reaction angle by 6.9 degrees were observed in the right leg, while improvements in spasticity assessment by 0.3 points and in joint reaction angle by 15.1 degrees were observed in the left leg. In the second group (receiving TENS intervention with parameters: 15mA, 100Hz, 200 ms, application time 30 minutes), improvements in spasticity assessment by 0.5 points and in joint reaction angle by 15.1 degrees were observed in the right leg, and improvements in spasticity assessment by 0.4 points and in joint reaction angle by 7.5 degrees were observed in the left leg. There was no statistically significant differences in spasticity changes ($p=0.089$) and joint reaction angle ($p=0.218$) in the both study groups.

Conclusions

Applying at least 10 TENS interventions with parameters of 15mA, 100 Hz, 100 ms, and 15 mA, 100 Hz, 200 ms, using four electrodes, application time 30 minutes, once daily, in combination with conventional physiotherapy, can achieve equal effectiveness.

Renal Replacement Therapy (Hemodialysis, Peritoneal Dialysis, Kidney Transplantation)

Diabetes Mellitus and Peritoneal Dialysis Associated Peritonitis Impact on Patients' Five-Year Survival

Poster

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Objectives*

A significant proportion of people with diabetes mellitus (DM) and kidney failure are on peritoneal dialysis (PD) worldwide¹. One of the most common complications of PD is peritoneal dialysis-associated peritonitis. This study aims to analyse the influence of clinical parameters and PD-associated peritonitis on patients' five-year survival.

Materials and Methods

This retrospective cohort study included patients who started PD from 1st January 2019 till 31st December 2023. Data were collected from the PD patient registry and the survival of PD as a method was analysed using Kaplan-Meier method. The Log-rank test was used to compare survival rates across different clinical parameters, utilizing IBM SPSS Statistics.

Results

The Kaplan Meier analysis included 201 patients (112 males), with a median age 56 years (age range 20-87). Among this patients, 42 (20.9%) had DM, while 159 (79.1 %) did not. The mean survival time for patients without DM was 42 months, compared to 27 months for patients with DM. The log-rank test indicated a significant association between survival and the presence of DM ($\chi^2 (1) = 6.87, p = 0.009$). Additionally, factors such as the type of PD (continuous or an automated intermittent dialysis), patient sex, and the number of peritonitis episodes did not significantly affect patients five- year survival rates.

Conclusions

Patients without diabetes mellitus on peritoneal dialysis have significantly longer survival compared to those with diabetes mellitus. These findings highlight the importance of underlying health conditions in influencing outcomes for patients with chronic kidney disease.

Sport Medicine

Balance Performance Influencing Factors and Their Trainability in Athletes

Oral

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Objectives*

Assessment of the main factors influencing static and dynamic balance performance and their trainability in young male football players.

Materials and Methods

Participants were 14.8 ± 0.6 years old male adolescent football players. The static and dynamic balance characteristics and the feet joints' kinesthetic sense acuity were measured using the ProKin 252 stabilimeter platform (TechnoBody, Dalmine, Italy). Feet' plantar and dorsal flexor muscles, and ankle invertor, evertor muscle' peak isometric forces were determined by a handheld dynamometer. Active and passive ranges of movements (ROM) were measured in the feet' plantar and dorsal flexion, ankle inversion, and eversion using a goniometer. The measurements were performed before and after the execution of football-specific balance and leg muscle strength endurance exercises for eight weeks twice a week for 30 minutes.

Results

The intervention enhanced the static balance characteristics (area, perimeter, and deviation speed in the medial-lateral and anterior-posterior directions of the body pressure center motions (COP) reduction only in non-dominant (N) leg stance ($p < 0.036$); and dynamic balance (trunk deviation angle of COP decreased, in the dominant (D) and N leg stance ($p < 0.04$). Both legs' absolute and relative peak torques increased in the feet' dor-siflexor, ankle invertor, and evertor muscles ($p < 0.019$). Active ROM increased in the plantar flexion of the D and decreased in the ankle inversion in the N leg. Passive ROM decreased in plantar flexion of the D and N leg ($p < 0.008$). The foot's kinesthetic sense acuity test time was shortened in both feet ($p < 0.046$).

Conclusions

Enhancement of balance performance characteristics is determined after eight weeks of the exercise intervention. Balance-affecting factors are improved: shin muscle strength increased, passive plantar flexion ROM reduced (due to connective tissue stiffness growth), kinesthetic test performance time with the N leg decreased (because the N leg of footballers provides body stability task when the D leg is passing etc. the ball).

Effects of Acute Exercise on IL-6, M-CSF, IL-27, MIG/CXCL9, EGF, and sCD40L Biomarker Profile in Breast Cancer Patients

Oral

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Objectives*

Breast cancer (BC) is the most common cancer affecting women, with around 2.3 million new cases reported globally each year. Physical activity can modulate circulating immunological biomarkers and play a vital role in the recovery process. This study aimed to evaluate the profiles of mediators of the immune system in BC patients as a response to acute exercise.

Materials and Methods

Thirteen BC patients (age 35-64) completed VO₂ peak test before and after therapy. Blood samples were collected before and straight after each VO₂ peak test. For each sample IL-6, M-CSF, IL-27, MIG/CXCL9, EGF, and sCD40L level was measured by MILLIPLEX Human Cytokine/Chemokine/Growth Factor Panel Magnetic Bead Panel, HCYTA-60K (Millipore, Billerica, MA, USA) on a Magpix analyzer (Austin, TX, USA). After checking normality Friedman's test was used for data analysis.

Results

When considering all patients as a homogenous group, no significant differences were observed in either of the measured biomarkers ($p > 0.05$). However, contrary trends (positive and negative) and magnitude of change in response to acute exercise in each individual patient were observed. For example, the range of IL-6 post-/pre-exercise ratio varied from 0.3 to 3.9.

Conclusions

These findings highlight the variability in individual responses to exercise in BC patients. Further investigation is needed to understand the underlying factors contributing to these differences and their importance in the recovery process of BC patients.

Evaluating Efficacy of Systematic Screening in Master Basketball Players: Insights into Cardiovascular Risk Detection and Overall Health Improvements

Oral

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Objectives*

Assess the effectiveness of systematic cardiovascular health screenings in master basketball players for identifying underlying cardiovascular morbidities which untreated can lead to severe cardiovascular events and death.

Materials and Methods

Master basketball players in Latvia underwent cardiopulmonary stress test. Participants with Electrocardiographic (ECG) deviations from normal health parameters were recommended to do a coronary artery computer tomography. A follow-up with the participants was done to assess their cardiovascular health. All data were collected and analyzed using SPSS Statistics.

Results

A cohort of 61 master basketball players with a medium age of 64 years (SD 7.8 years) were screened March 2024 – September 2024. During the cardiopulmonary stress test five cases showed a pathological ECG condition requiring further investigation. Four cases during maximal exertion showed myocardial ischemia including one case with a newly diagnosed atrial fibrillation and one of the participants had profound bradycardia with chronotropic incompetence. None of these participants had subjective complaints. On follow-up all the participants with a positive cardiopulmonary stress test had done computer tomography for coronary arteries. In two of the five cases hemodynamically significant coronary artery stenosis was found including a case of incidental finding of lung cancer. Altogether from the cohort 3 (4.9%) of participants were diagnosed with a potentially life-threatening condition if left untreated.

Conclusions

Systematic cardiovascular screenings identified potentially life threatening conditions if left untreated for 4.9% of asymptomatic players. The pathologies included coronary artery disease, atrial fibrillation. These findings highlight the importance of proactive cardiovascular health assessments in aging athletes to prevent severe cardiovascular events and improve overall health outcomes.

Project funding: National Research Programme “Sport”: Innovations, methodologies and recommendations for the development and management of the sport sector in Latvia. (VPP-IZM-Sports-2023/1-0001)

Muscle Strength and Range of Motion in Youth Athletes: Implications for Injury Prevention

Oral

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Objectives*

Sports participation in childhood and adolescence have many health benefits. However, 1-10 sports injuries per 1000h are recorded in youth sports, depending on the level and sport, 40% are overload injuries and 20% are recurrences. The aim of this study was to investigate sports injury risks in youth athletes in lower extremities.

Materials and Methods

Participants were 165 youth athletes (girls n=83, boys n=82) engaged in more than eight different sports (basketball, volleyball, handball, football, athletics, skeleton, luge, skiing, etc.) mean age 15.94 years (SD =1,4), range 13-18 years, average sport participation of 6,8 years (SD =2,9). Data was collected during pre-season. Active range of motion (AROM) in hip joint was tested with electronic goniometer (Meloq Easy Angle), and isometric strength (IS) of isolated hip muscle groups (hamstrings (H), quadriceps (Q), adductors (AD) and abductors (AB) was tested with electronic dynamometer (Meloq, Easy Force)

Results

Results presented H tightness, average AROM for girls right (R) side 86.75° (SD=13.19), left (L) 86.77 (SD=14.63) boys had R 79.87° (SD=13.08) and L 79.59 (SD=13.04). Muscle IS ratio H: Q was 0.53 (SD=0.2) for R leg and 0.51 (SD=0.2) for L for girls, and 0.54 and 0.53 (SD=0.33) respectively for boys. AD: AB for girls 1.33 (SD=0.61)R leg and 1.35 (SD=0.67) in L leg. For boys 1.31 (SD=0.65) and 1.24 (SD=0.6), respectively.

Conclusions

Conclusions: This study highlights the necessity of preseason testing for youth athletes who are involved in high level sports activities. Additionally, preseason physical conditioning programs should be targeting AROM and muscle strength imbalances. Further research is needed to refine adequate testing protocol with objective and subjective health indicators.

This study is part of the National Research Program “Sports” project titled “Innovations, Methodologies, and Recommendations for the Development and Management of the Sports Sector in Latvia” (IMRSportsLV; No. VPP-IZM-Sports-2023/1-0001).

Effect of Schultz’s Autogenic Training to Reduce Fatigue in Basketball Players

Poster

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Objectives*

The aim of the study was to determinate if autogenic training decreased basketball player’s fatigue.

Materials and Methods

Subject of study were players of Slovak highest basketball competitions in senior and junior categories, players of European competitions. Respondents were chosen in clubs of the highest Slovak basketball competitions and in clubs of European competitions (under the heading of FIBA – FIBA EuroCup, FIBA EuroCup Women, Champions League, Alpe Adria Cup, or players of highest junior competition in Slovakia and Europe under the heading of FIBA – EYBL, EWBL). Condition to participate was consent to the processing of personal data and goodwill to perform autogenic training for 3 months. Autogenic training took 10-20 minutes. Data collection was done by uniform questionnaire and 3 standardised questionnaires. For statistical evaluation of the assumptions, we used the t-test. Significance: 0.05.

Results

Research pointed on influence of regular practice of autogenic training on professional athlete’s performance. Respondents are basketball players with no age restrictions. The youngest respondent who joined the research was 15 years old and the oldest one was 31 years old player. Overall, n=103 respondents joined the research, men n=51, women n=52. Respondents were divided into 4 age groups, younger than 20, 21-25 years, 26-30 years, older than 30. The most numerous group was group of 26-30 years. That group represents 37,9%. On traced sample we saw 9,4 points improvement at the end of experiment. To verify significance of this change we formulated hypothesis - Autogenic training has influence on changes in evaluation of FT. Value of t-stat ($P(T < t - 2,33E-23)$) is bigger than t-crit (1,65993).

Conclusions

Autogenic training has proven to be an opportunity to reduce fatigue and thus improve game performance, reduce injury, etc. Of the 103 respondents, fatigue decreased in 100% of cases. Each respondent had a different extent of reduction in fatigue.

Meldonium – Old Drug as a Novel Challenge for Sport Medicine

Poster

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Objectives*

Doping phenomenon, a crucial issue in the sports world, compromises the credibility of performance and violates ethics rules. Metabolic modulators, by the rational use of energy resources, improve athletic performance. Meldonium, used since late 1970s as a cardioprotective and anti-ischemic remedy with beneficial effects in car-diovascular, neurological and metabolic diseases, sparked recently the attention due to its controversial use as a performance-enhancing substance in competitive sports.

Our research objectives were to highlight the bioethical and medical aspects of meldonium use in sport medicine.

Materials and Methods

By applying mixed research methods within the Moldovan-Turkish bilateral project „Common Actions in Anti-Doping Research through Piloting of Innovative Interventions in Education (CAROLINE stage 2)” the scientific articles, published between 2016-2024 in PubMed and Google Scholar databases, and the official reports of National Anti-Doping Agency and Therapeutic Use Exemption Committee of Republic of Moldova were analyzed in order to define the medical conditions and realities of meldonium use in sport medicine.

Results

Meldonium is a competitive inhibitor of γ -butyrobetaine hydroxylase (BBOX) involved in the final step of L-carnitine biosynthesis, a carrier of activated long-chain fatty acids from cytosol into mitochondria. By inhibiting BBOX, meldonium lowers L-carnitine levels and mitochondrial β -oxidation of fatty acids, redirects the oxidation of fatty acids toward peroxisomes, activates glycolysis, reduces lactate production and oxidative stress. The abovementioned metabolic effects underlying its adaptogenic potential in physical and mental overloads, forced WADA to include meldonium since 2016 in WADA Prohibited List, class S4 – Hormone and Metabolic Modulators.

Conclusions

Nowadays the line between medicine and doping is very thin. Due to its metabolic, adaptogenic, antianginal, cardioprotective and antihypoxic properties, meldonium became a challenge for sports medicine. The lack of systematic data proving the doping effects of meldonium impose WADA to monitor its use constantly.

Sport Science

Assessment of Correlation between Dynamic Balance, Flexibility of Ankle Joints, and Shin Muscles Peak Isometric Strength in Adolescent Football Players

Oral

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1. RSU Latvian Academy of Sport Education

Objectives*

Football requires a combination of diverse movements such as jumping, acceleration, and change of direction, and technical skills like shooting and passing, all of which demand flexibility, strength, and stability. This study investigated the relationship between dynamic balance, ankle flexibility, and strength in young football players.

Materials and Methods

Twenty-two adolescents (mean age: 14.8 ± 0.6 years, body mass of 63.1 ± 10.6 kg, height of 174.5 ± 6.5 cm, BMI of 20.6 ± 2.8 kg/m², training volume of 7.5 ± 1.5 hours per week, and experience 8.2 ± 1.4 years) were assessed. Dynamic balance was assessed using the total stability index (TSI) measured during the 30s one leg stance with eyes open on the ProKin 252 stabilometric platform. The active range of motions in the plantar flexion (PF) and dorsal flexion (DF), inversion (IV), and eversion (EV) were measured using a goniometer. Peak isometric strength of the shin muscles was assessed in all directions of PF, DF, IV, and EV using a handheld dynamometer. All measurements were taken for dominant (D) and Non-dominant leg (ND).

Results

Statistically significant negative correlations were observed between TSI and PF D/ND ($r=-0.53,-0.48$, $p=0.01, 0.02$) and DF D/ND($r=-0.68,-0.64,p=0.001$). However, no significant correlation was detected between TSI and IV, EV in either leg. A significant correlation was found between TSI and ankle strength in all measured directions.

Conclusions

Ankle joints' flexibility and shin muscle strength are significant predictors of dynamic balance. Low dynamic balance scores were associated with better ankle performance. Therefore, involving resistance exercises like a combination of balance and plyometrics in regular training is highly recommended to improve balance, ankle flexibility, and strength.

Keywords: Balance, range of motions, talocrural joint, shin muscle strength, football

Assessment of Lower Limb Biomechanics Using Wearable Sensors in Youth Football Players Executing Single Leg Squat

Oral

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Objectives*

Background: The Single Leg Squat (SLS) is a widely used functional test to assess lower extremity biomechanics, offering insights into movement patterns and injury risks. In youth football players, these tasks are critical for identifying deficits that predispose them to lower limb injury. Traditional biomechanical analysis methods can be resource-intensive, limiting their applicability in sports environments. Wearable technologies, such as IMU, EMG sensors, and smart textile socks, provide an efficient alternative for field-based monitoring.

Aim: This study examines the biomechanical relationships during SLS in youth football players, focusing on biomechanical parameters - joint movements, foot pressure dynamics, and muscle activation - measured by wearable sensors.

Materials and Methods

Thirty-two youth football players (aged 14–15; 16 males, 16 females) performed SLS, while wearing DAid® smart socks, NOTCH® inertial sensors, and PLUX muscleBAN sensors. Data on joint angles, center of pressure (COP) shifts, and muscle activity were captured. Correlation analyses were conducted to evaluate the relationships between biomechanical parameters.

Results

For SLS_B, significant correlations were found between COP2X and *m.gluteus medius* ($r = 0.53$, $p < 0.01$), and hip joint adduction and COP2X ($r = 0.712$, $p < 0.001$). COP1W negatively correlated with *m.gluteus maximus* ($r = -0.529$, $p < 0.01$). In SLS_F, COP2W showed a strong negative correlation with *m.gluteus maximus* ($r = -0.612$, $p < 0.001$), while COP2X positively correlated with *m.gluteus medius* ($r = 0.481$, $p < 0.01$). For SLS_M, COP2X positively correlated with *m.gluteus medius* ($r = 0.527$, $p < 0.01$), while COP2W negatively correlated with *m.gluteus maximus* ($r = -0.717$, $p < 0.001$).

Conclusions

This study demonstrates the correlation between lower extremity biomechanical parameters measured by wearable sensors in youth football players. Significant correlations emphasize the utility of wearable sensors for field-ready biomechanical assessments, aiding injury prevention and athletic performance development.

Assessment of Physical Fitness in Children with Disabilities in Latvia

Oral

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Objectives*

In the framework of the state research project (nr. VPP-IZM-Sports-2023/1-0001) the EUROFIT outcomes of children with different disabilities (mild intellectual (ID), visual impairment (VD), physical (PD)) and control group (without disability (CG)) was investigated. This study aimed to determine the physical fitness level across the three disability groups and compare it with typically developing children.

Materials and Methods

Results are based on the fitness measurement data from EUROFIT of 109 children with disability (93 with ID, 15 with VI, 15 with PD with average age: 14.20 years [SD = 2.27]) and 49 children without disability (CG) with average age 13.65 years [SD = 1.37]).

Results

Based on the results, children with disability demonstrated similar scores to CG in several physical fitness sub-tests. For example, 20 m shuttle run test results did not present significant differences across the four sub-groups, ID and VI group demonstrated similar level of handgrip strength, and upper body strength as CG, while ID group had similar results to CG in bent arm hang test ($p > .05$). ID group exceeded other disability groups in body strength and endurance tests ($P < .05$). The VI subgroup was superior in upper body speed test ($p < .05$). The CG significantly disability groups in 10 x 5 m agility shuttle run test ($p < .05$).

Conclusions

Children with PD had the lowest fitness results. The most significant differences were found in upper body speed and strength test across the four groups. However, there are several factors (e.g., gender, age) that might affect results and will be analysed more detailed in the presentation. Compared to few studies investigating physical fitness of children with disability, participants in this study had higher scores in upper body strength and agility tests (Kalbli et al., 2021).

Finances: “Innovations, methodologies and recommendations for the development and management of the sports sector in Latvia”, VPP-IZM-Sports-2023/1-0001

Athletic Career Transition Strategies in Football

Oral

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1. RSU Latvian Academy of Sport Education

Objectives*

The aim of this study was to analyse athletic career transition strategies in football and its indicators by means of a systematic review.

Materials and Methods

The systematic review was conducted using the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) guidelines. The literature review of the review articles was based on a consideration of database Science Direct from 1980 to 2024.

Results

The study results showed that athletes in transition face challenges in both sporting and nonsporting areas. Studies on transition approaches have used and adopted different terminology with similar content. The newer terminology is usually based on old experiences and previous findings, but the principles are the same (holistic approach). The theory of transition (stages of a sports career, motivation development, talent development) through a sports career has been mentioned by many authors: frequently, the model consists of 4 stages, which are necessary not only for fitness or skill development but also for motivation, the role of the social environment (parents, coaches, peers, sports club policy).

Conclusions

A successful transition to the next career stage depends on early preparation, applying transferable skills such as leadership, teamwork, discipline, and cultivating strong network connections. The transition of young football players to the elite level is a critical phase in their development, requiring physical, mental, technical, and social adaptations

Football players can use their unique backgrounds to perform in various fields, ensuring ongoing achievement and personal fulfillment beyond their playing days.

Bibliometric Analysis of Peer-reviewed Literature of Sport Impact on the Economy

Oral

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1. University of Latvia

Objectives*

The aim of the study is to address the lack of bibliometric research on the impact of sports on the economy by making an empirical contribution to the analysis of research, uncovering trends in scientific literature about the economic impact of sports, identifying the most productive researchers, institutions, countries, journals, as well as determining the bibliometric system that includes networks between researchers.

Materials and Methods

The object of the analysis is the scientific publications indexed in the Scopus database under the scientific direction of the impact of sports on the economy. The analysis was performed using bibliometric analysis tools – the R Studio® Bibliometrix package and the VOSviewer software.

Results

The results of the study concluded that, according to Scopus database data, 801 authors worldwide study the impact of sports on the economy. In total, 299 scientific articles were published during the study period in various international journals, which the authors believe is relatively few and indicates insufficient attention from researchers to issues concerning the importance of the sports sector. Influential journals and research institutions have been identified.

Conclusions

The most active researchers are from the USA, the United Kingdom, and China. In certain research directions (such as the economic impact of major sports events and the effect of new sports infrastructure on regional economic growth), there are disagreements among authors' opinions. There is a noticeable trend to developing a universal model that would enable the determination of not only qualitative but also quantitative impact of sports on countries, host regions, and individual economic sectors.

Branding Model of the Latvian Higher Football League Based on Customers' Wishes

Oral

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Objectives*

This research integrates brand architecture and brand association theories to examine the role of the league brand in fostering fan support for individual teams. As this paper will demonstrate, professional sports leagues, initially created to entertain spectators, now market their product to four distinct groups: fans, associations, communities, and corporations.

Materials and Methods

The primary objective of this research is to enhance the brand of the Latvian Football League. To achieve this, a mixed-methods approach was employed, combining theoretical analysis of sports organisation branding models with empirical research. A quantitative cross-sectional study, using non-probabilistic sampling, was conducted to test the hypothesis that strengthening the link between the league brand and individual club brands would lead to increased interest and value in the league brand.

A self-completed online questionnaire was administered to 114 Latvian football fans. Descriptive statistics, including frequencies, percentages, means, medians, and standard deviations, were calculated. Cronbach's alpha was used to assess the reliability of the measurement scales. Data analysis was conducted using SPSS statistical software.

Results

This research contributes to the existing literature by empirically demonstrating the influence of league brand characteristics on fan behaviour. While the literature on sports branding often focuses on macro-level analysis, this study highlights the importance of a more nuanced understanding of how league brands impact individual team support.

Conclusions

The findings suggest that a comprehensive sports brand-building model should consider a wider range of factors than those typically examined in the existing literature. By addressing these limitations, future research can provide more practical insights for sports organisations (Aquilina, Chadwick, Chappelet and Hamil, 2012).

Cardiopulmonary Exercise Test Outcomes of Athletes with Disability in Latvia

Oral

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Objectives*

This study summarizes the cardiopulmonary exercise test (CPET) outcomes of male adults with disabilities who participate in different sports in Latvia.

Materials and Methods

Participants performed an incremental CPET using either a veloergometer or an arm crank ergometer; selected by individual physical capabilities. Thirty participants (mean age 40.41 years [SD=12.00]) representing eight sports were divided into two subgroups according to CPET performance: (1) veloergometry (n=12); (2) arm crank ergometry (n=18). Values for heart rate (HR), oxygen uptake ($\dot{V}O_2$), $\dot{V}O_{2peak}$, carbon dioxide production ($\dot{V}CO_2$), blood pressure (BP), respiratory exchange ratio (RER), and other standard CPET parameters were obtained.

Results

The average $\dot{V}O_{2peak}$, HR_{max} and RER at peak exercise during incremental veloergometry test were 30.03 (ml/kg/min), 169.75 beats/min and 1.1, respectively. During arm crank ergometry, the average outcomes were 19.26 (ml/kg/min), 143.56 beats/min and 1.13, respectively. Physical working capacity at a heart rate of 170 beats/min (PWC_{170}) was 2.04 W/kg for the veloergometry group and 1.11 W/kg for the arm crank group. Statistically significant differences were observed in maximal physical work capacity (PWC_{max}), PWC_{170} , HR_{max} , and HR recovery at 2-, 4-, and 6-minutes post-exercise ($p<.05$). Additionally, $\dot{V}O_{2peak}$, $\dot{V}O_2$ and $\dot{V}CO_2$ exhibited significant differences at rest, at maximal load, and at 6 minutes into recovery ($p<.01$). Resting HR, RER, resting BP, and BP during recovery, however, did not differ significantly.

Conclusions

Those who used the veloergometer demonstrated higher peak and submaximal work capacities, along with more pronounced cardiorespiratory responses, indicating that the arm crank group faced greater functional limitations. Choosing a testing modality should therefore consider each individual's capabilities, and exercise regimens must be tailored to levels of disability to allow for accurate assessment and effective training strategies.

This study was done within project “Innovations, methodologies and recommendations for the development and management of the sports sector in Latvia” (nr. VPP-IZM-Sports-2023/1-0001)

Cardiorespiratory Fitness and Body Mass Index Predicts Variation of Metabolic Syndrome Criteria in Schoolchildren (PACH study)

Oral

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Objectives*

Metabolic syndrome (MetS) has become an alarming health problem worldwide in younger population. Despite the increasing prevalence of MetS, there are no united guidelines for MetS criteria in children. To avoid future physical and mental health problems effective, simple and cost-efficient screening methods applied in schools for early recognition of MetS are needed. The aim of this study was to estimate cardiorespiratory fitness (CRF) and body mass index (BMI) as indicators for early detection and prevention of MetS.

Materials and Methods

Prospective longitudinal study investigated the prevalence of MetS criteria in 8–10-year-old schoolchildren (46 boys and 60 girls) over 3 consecutive years. Anthropometric measurements (waist (WC), height), blood pressure (BP) and CRF level were determined. Fasting blood glucose and lipid profile was analysed by E.Gulbis laboratory. General Linear Mixed Model (GLMM) was used to assess effect of CRF and BMI on various parameters of MetS determined by Principal Component Analysis (PCA).

Results

Prevalence of MetS remained at 2% from 2017 till 2019 but increased significantly to 7.7% in 2020. The most frequent combination of MetS criteria in children included elevated WC, BP and triglycerides. PCA identified 5 principal components which explained 69% of the variability of cardiometabolic health parameters (lipid profile, glucose homeostasis, BP). CRF proved to be excellent predictor of variance of glucose homeostasis, meanwhile BMI of the variance of lipid profile and BP.

Conclusions

The prevalence of MetS in children progresses with age. CRF and BMI were identified as significant predictors of variation in MetS criteria. CRF and BMI, as accessible, simple, non-invasive, and cost-effective tools, should be officially recognized and implemented as reliable screening methods for MetS in children to promote early detection and intervention.

Children’s Rights in Sport

Oral

Prof. Susanna Hedenborg¹

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Objectives*

With a starting point in the United Nations Convention on the Rights of the Child, Hedenborg will present research and problematize children’s rights in sports. Children’s rights cover all activities that affect children, such as education policy, migration policy, culture policy and social services policy. Hedenborg will discuss how sport organizations can work with safeguarding the rights and interests of children and young people in spor

Comparative Analysis of Psychological Skills: Athlete and Psychologist Perspectives across Different Performance Levels

Oral

Dr. Katrīna Volgēmute¹, Dr. Gundega Ulme², Dr. Viktorija Perepjolkina², Dr. Renārs Līcis¹, Prof. Agita Abele¹, Mr. Rodrigo Lavins¹, Dr. Alina Klonova³

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Objectives*

The study aimed to evaluate and compare the psychological skills of athletes across three achievement levels (elite, pre-elite, and amateur) and to examine the alignment between psychological skill assessments of elite level athletes as conducted by athletes themselves and by sports psychologists.

Materials and Methods

A total of 444 Latvian athletes (aged 18–33 years, $M=21.32$; $SD=6.52$) completed the Psychological Skills Inventory for Sport in Latvian language (PSIS-R5-L) to measure their psychological skills. Additionally, five psychologists practicing in the Latvian sports field participated by assessing the psychological skills of elite level athletes using the same inventory, thus creating an ideal profile of an elite level athlete.

Results

Significant differences ($p<0.05$) were identified in psychological skills across athlete groups, particularly in self-confidence and motivation factors. Comparisons between psychologists' evaluations and elite athletes' self-assessments revealed alignment in most psychological skills, except for self-confidence, where statistically significant differences ($p<0.05$) were observed.

Conclusions

Psychological skills vary significantly across achievement levels. Discrepancies in self-confidence assessments suggest potential biases or differing perspectives between self-evaluations and external evaluations by sports psychologists. These findings highlight the importance of multi-source assessments in understanding and enhancing athletes' psychological preparedness.

Effect of Acute Exercise on Serum Myokine Levels in Breast Cancer Survivors

Oral

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Objectives*

Physical activity exerts anti-carcinogenic effects (ACE) through mechanisms such as reduced cancer cell proliferation, decreased inflammation, and modulation of systemic risk factors. These effects may be mediated by exercise-induced changes in biomarker expression. This pilot study examined the effect of acute exercise on serum myokine levels in breast cancer (BC) survivors. The focus was on markers associated with cancer progression, immune response, and metabolism, including cytokines.

Materials and Methods

Seven women (age 45±7 years, BMI 27±4.8), 6-12 months after BC treatment, completed three high intensity (85 to 95% heart rate reserve), but different modality (interval vs continuous vs incremental) exercise protocols. Blood samples were collected before and immediately after each exercise session. For each sample IL-6, oncostatin M, IL-15, fibroblast growth factor 21, osteonectin, and neurotrophic factors (BDNF) were measured by Human Myokine Magnetic Bead Panel, HMYOMAG-56K (Millipore, Billerica, MA, USA) on a Magpix analyzer (Austin, TX, USA). After checking normality Friedman's test was used for data analysis.

Results

When analyzing all patients as a single, uniform group, no significant changes between the exercise interventions or time points were detected in any of the evaluated biomarkers ($p > 0.05$). Conversely, each individual patient exhibited varying responses to acute exercise, with differing trends (positive or negative) and magnitudes of change. For example, BDNF post/pre-exercise ratio ranged from 0.5 to 2.8, and osteonectin post/pre-exercise ratio ranged from 0.7 to 1.9.

Conclusions

No significant differences in biomarker expression were observed when comparing the effects of the three exercise types. However, individual responses to training should be considered as a potential factor influencing biomarker variability and thus could be a target for personalized medical therapy.

Effect of Acute Ultra Endurance Exercise on Serum FGF-18 Levels

Oral

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Objectives*

The aim of the study was to assess the effect of ultra endurance exercise on serum FGF-18 levels.

Materials and Methods

Data from participants (n=44; age: 38.8 ±8.4 years) who finished self-planned ultra distance cycling event (average 341.1±7.8 km) under 24 hours were analyzed using one-way repeated measures ANOVA or Friedman test, while correlation analysis was performed using Pearson or Spearman test. Anthropometric data including body composition were analyzed at baseline using bioimpedance. Blood samples were collected 1 -2 hours before and right after the finish of the race, as well as after ~ 20 hours in recovery.

Results

Baseline FGF-18 levels before the race were 31.25 pg/ml (7.82-62.22 pg/ml) and there was a significant increase (p<0.01) right after the finish 37.71 pg/ml (7.82-79.38 pg/ml). Furthermore, ~ 20-hours in recovery the FGF-18 levels decreased significantly 19.23 pg/ml (7.82-52.23 pg/ml) and showed statistical difference from the FGF-18 levels before the race (p<0.01). The baseline FGF-18 values showed statistically significant correlation with body mass, body fat mass and lean body mass (p<0.05).

Conclusions

FGF-18 levels increased during acute ultra endurance exercise and decreased below baseline values in recovery. FGF-18 baseline levels are related to body composition. To establish FGF-18 role in sports physiology further research must be conducted.

Effect of Outdoor Activities on Stress Levels and Emotional Well-Being on Young People

Oral

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1. Rīga Stradiņš University

Objectives*

This study aims to investigate the impact of an outdoor activities program during a 5-day camp on young people aged 20-30 regarding reducing stress levels and improving emotional well-being.

Materials and Methods

Participants. A sample of International participants (n = 23) aged 20 to 30 from various countries participated in the 5-daycamp. *Outdoor activities.* During the camp, different activities were performed, such as yoga, body movement, walking to the sea, dancing, meditation, breathing, walking in the forest, drawing, and debating. *Procedure.* On the first day, all participants were familiarized with the Gas Discharge Visualization (GDV) camera and completed the Perceived Stress Scale (PSS) to measure their general stress levels. From day two to day five, the participants did selected outdoor activities. Every day, in the morning before and the evening after the activities, the stress levels and emotional well-being were measured with the GDV camera and a 5-criteria emotional rating scale. *Statistical analysis.* The analyses were conducted using Microsoft Office Excel and JASP version 0.18.3. The data was analysed using a paired sample T-test, Wilcoxon test, and ANOVA.

Results

Days 2 and 4 showed statistically significant reductions in stress levels, $W = 245.000$, $z = 3.254$, $p = 0.001$, and $t(22) = 2.194$, $p = 0.039$ as $p < 0.05$, respectively. In contrast, Day 3 demonstrated a counterintuitive considerable increase in stress ($t(22) = -2.524$, $p = 0.019$ $p < 0.05$), and Day 5 showed a non-significant ($p > 0.05$). The results of the repeated measures ANOVA revealed a significant main effect of time on emotional well-being, $F(8, 176) = 14.435$, $p < 0.001$.

Conclusions

These findings suggest that incorporating yoga, body movement, walking to the sea, and meditation into stress management programs is beneficial. Activities like Debate should be avoided.

Effects of Step Frequency Manipulation on Running Stability and Kinematics with Auditory and Visual Feedback

Oral

*Dr. Edgars Bernans*¹

1. Rīga Stradiņš University

Objectives*

1. To evaluate the impact of step frequency manipulation ($\pm 3\%$ and $\pm 6\%$ of baseline) on running kinematics, including step length and time.
2. To analyze running stability under different feedback modalities (auditory and visual) using the Goal Equivalent Manifold (GEM) method.
3. To assess the variability in running kinematics during baseline and manipulated step frequency trials.
4. To explore the relationship between heart rate responses and changes in running stability and kinematics.
5. To investigate potential implications of step frequency manipulation on running economy and physiological effort.

Materials and Methods

Twenty trained/recreational runners (10 male, 10 female) completed 13 treadmill trials, 2 minutes each, at 12 km/h and a 1% slope. Baseline kinematics were established from two initial runs without feedback. Participants then completed trials with auditory (metronome) and visual (on-screen) feedback while matching their step frequency to predetermined targets: $\pm 3\%$ and $\pm 6\%$ of their baseline frequency. All feedback was right-leg specific, and participants were not informed of the frequency adjustments. Running kinematics, including step length and time, were recorded using the OptoJump Next system, and heart rate was monitored throughout. Stability was assessed using the Goal Equivalent Manifold (GEM) method, while kinematic variability and physiological responses were analyzed with descriptive and inferential statistics.

Results

Preliminary analyses using repeated-measures ANOVA suggest significant differences in kinematic variability and stability between baseline and manipulated step frequencies. Visual feedback trials showed greater variability compared to auditory feedback, with larger deviations observed at $\pm 6\%$ frequencies. Heart rate responses correlated with step frequency deviations, indicating increased physiological effort with larger frequency changes.

Conclusions

Step frequency manipulation significantly affects running stability and kinematics, with distinct responses to auditory and visual feedback modalities. These findings provide valuable insights into optimizing running mechanics, feedback strategies, and physiological efficiency. Future research should explore these outcomes in broader populations and extended running conditions to enhance training and rehabilitation applications.

Exploring Inter-Limb Asymmetry: Preliminary Insights on Variability across Assessment Protocols and Potential Applications for Training Programme Design

Oral

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1. Faculty of Medicine and Life Sciences, University of Latvia

Objectives*

The aim of this study was to determine the consistency of inter-limb asymmetry favoring the same limb across unilateral and bilateral assessment protocols and to evaluate the relationship between asymmetries observed in lower body maximal strength and jump tests.

Materials and Methods

With institutional ethics approval, 19 adult recreational athletes were assessed using unilateral and bilateral isometric mid-thigh pull (IMTP) and countermovement jump (CMJ) tests. Inter-limb asymmetry was calculated for both peak IMTP force and peak CMJ takeoff force as the percentage difference relative to the maximum value recorded in each test. Paired samples t-tests with Bonferroni correction to control for multiple comparisons were conducted to assess differences in the magnitudes of asymmetries. Kappa coefficients were used to evaluate the consistency of asymmetry favoring the same side across tests.

Results

Bilateral IMTP asymmetry was significantly greater than unilateral IMTP ($p < 0.001$) and bilateral CMJ ($p < 0.05$). No significant differences were observed between bilateral and unilateral CMJ tests ($p > 0.05$) or between unilateral IMTP and unilateral CMJ tests ($p > 0.05$). Further, the level of agreement for asymmetry direction among all tests indicates a poor to fair level of agreement (Kappa = -0.31 to 0.31).

Conclusions

These findings demonstrate that asymmetry varies depending on the type of test and protocol used, and limb preference is not consistent across tests. This highlights the importance of carefully selecting testing methods and ensuring that when tailored exercise training programs are designed, addressing limb-specific imbalances and interlimb coordination separately may be needed.

From Youth to Ageing: Relationship between Motor Reserves and Mental Health in Masters Basketball Players

Oral

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Objectives*

Physical activity not only enhances body functions but also contributes significantly to mental well-being. Moreover, the role of physical activity in promoting health does not commence only upon reaching middle or elderly age, but begins to develop early in life. Regular physical exercise throughout life not only improves physical endurance but also supports mental health by mitigating symptoms of depression, stress, and anxiety. “Motor reserves” refer to the cumulative experience of physical activity accrued over a lifetime. The aim of this study was to examine the relationship between accumulated physical activity experience and mental health outcomes in masters basketball players.

Materials and Methods

57 male masters basketball players aged between 51-81 years (M = 64, SD = 7.5) participated in the study. On average, participants engaged in physical activity (sport) for approximately 57 minutes per day throughout their lives. Motor reserve was assessed using the Motor Reserve Questionnaire (MRQ), which allows for retrospective measurement of physical activity over a lifetime from 18 years of age. Depression, stress, and anxiety symptoms were evaluated using scales from the abbreviated Latvian Clinical Personality Test (LCPT).

Results

Pearson’s rank correlation analysis revealed no statistically significant relationship between motor reserve and symptoms of depression, stress, or anxiety ($p > 0.001$). Symptoms of depression, stress or anxiety were within normal limits after the LCPT.

Conclusions

The study found no statistically significant correlation between motor reserve and mental health indicators such as depressive symptoms, stress, and anxiety among masters basketball players. Future research could explore whether physical activity accumulated during youth, encompassing both vigorous and moderate-intensity sports (physical activity), leads to differential development of motor reserves and their association with mental health outcomes.

Project funding: National Research Programme “Sport”: Innovations, methodologies and recommendations for the development and management of the sports sector in Latvia. (VPP-IZM-Sports-2023/1-0001)

Incidence of Vitamin D and Iron Deficiency in Youth Athletes in Latvia (IMRSports)

Oral

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Objectives*

Blood biomarkers offer an objective, individualized assessment of training load, recovery, and health status, helping to minimize injury risk and optimize performance. Biomarkers can reveal issues such as inadequate vitamin D and iron levels, low energy availability, chronic inflammation and hormonal imbalances.

The objective of this study is to elucidate the vitamin D and iron deficiency prevalence among youth athletes in Latvia.

Materials and Methods

Ninety-eight youth athletes (40 girls and 58 boys) participated in this study. Blood samples were collected after an overnight fast, and levels of vitamin D, hemoglobin, ferritin, and red blood cells were analyzed at E. Gulbis Laboratory. Iron deficiency anemia was defined as low hemoglobin and/or ferritin with decreased red blood cell levels, while iron deficiency was characterized by normal red blood cells but reduced hemoglobin, ferritin, or cell volume.

Results

Based on reference values 10 (10.2%) athletes had deficient levels of vitamin D, 46 (46.9%) athletes had insufficient levels, 32 (32.7%) athletes had sufficient levels, and only 10 (10.2%) athletes had optimal levels. Furthermore, from all 40 female participants 3 (7.5%) had iron deficiency and 6 (15.0%) of them were diagnosed with iron deficiency anemia resulting in a significant difference compared to the male participants ($p=0.003$).

Conclusions

This study highlights significant concerns regarding the health status of youth athletes in Latvia (especially female athletes), with a notable proportion exhibiting deficiencies in key biomarkers. Over 50% of study participants had insufficient levels of vitamin D. Furthermore, iron deficiency and anemia are significantly higher among female athletes. The impact of these deficiencies on athletic performance during active season will be explored in longitudinal states research program (IMRSports).

Indicators that Characterise Development of Sports in Latvia: Pilot Study in Municipalities

Oral

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Objectives*

To identify statistical indicators that characterize the development of sports in Latvia and their availability in municipalities

Materials and Methods

The research has been done in the framework of the national state research programme “Sports”. Research and analysis of literary sources (self-designed), mathematical statistics (data processing in SPSS software). To evaluate the development of sports in Latvia, it is necessary to define appropriate statistical indicators. The developed sports statistics questionnaire includes dimensions that affect sports infrastructure, governance and economic aspects. The developed sports statistics questionnaire was tested in a pilot study in 3 municipalities – Liepāja, Ludza, and Saulkrasti.

Results

During the research were refined the initially determined indicators characterizing the dimensions of sports development in sports statistics. Initial research conclusions showed a several sports directions where it was necessary to obtain information from municipalities: sports, sports organizations, interest education, and sports budget.

Conclusions

By summarizing the experience of other countries in scientific research on the development of sports, as well as the sports statistics available in Latvia, it was concluded that the primary source of sports statistical information in Latvia is at the municipal level.

Integrated Learning of Fundamental Movements and Values through Judo-Philosophy-Based Physical Activities

Oral

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Objectives*

Modern educational approaches increasingly emphasize the need to combine children's physical and moral education to promote their holistic development. This study proposes a methodology based on judo philosophy that integrates fundamental motor skill learning with moral education for 5–6-year-old children in preschool and extracurricular education. The study examines how physical activities can foster not only children's physical development but also their ethical and social values, which are essential for child-rearing in contemporary society.

Judo philosophy, developed by Jigoro Kano, is based on values such as respect, mutual assistance, friendship, and honesty, making it an ideal foundation for the development of children's physical and moral qualities. Judo not only promotes physical fitness but also instills ethical skills through various exercises and games. The program developed in this study includes a variety of physical activities, such as partner balance exercises, coordination drills, team games, and pedagogical scenarios, supplemented with character-building elements such as friendship, respect, honesty, and teamwork.

Materials and Methods

The study employed a six-month pedagogical experiment involving 114 preschool-aged children divided into five groups: three groups in extracurricular education (VZSS) and two in preschool education (PII). During the experiment, changes in children's behavior and the development of moral values were assessed using both quantitative and qualitative research methods, such as behavioral observations, psychological tests, interviews, and teacher surveys. The development of children's moral values was evaluated by analyzing their behavior during group activities and their attitudes toward peers and teachers.

Results

The results showed significant improvements in balance, agility, and coordination among the children. Additionally, positive behavioral changes were observed: the children demonstrated greater respect for their peers and teachers, improved their teamwork skills, and displayed better emotional regulation in conflict situations. These results confirm that judo-philosophy-based physical activities are an effective tool for combining physical fitness with moral education. The children became more capable of understanding the consequences of their actions, showing increased empathy and responsibility, which facilitated harmonious group relationships.

Conclusions

The findings highlight that this integrated approach is a significant contribution to preschool and extracurricular education programs, fostering children's emotional, social, and physical development. This approach not only prepares children for future education but also lays the foundation for their development as morally responsible and socially engaged individuals. Furthermore, the study emphasizes the need to further develop and adapt such programs for various age groups and educational settings to ensure comprehensive child development in all aspects.

Keywords: judo philosophy, moral education, physical activities, preschool, child development.

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Investigating Preschoolers' Emotional Responses to Outdoor Activities Using Face Reader

Oral

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Objectives*

This study aims to evaluate the emotional states of preschoolers (5–6 years old) participating in outdoor activities by using FaceReader as a facial emotion analyzer.

Materials and Methods

Participants. The study included 20 preschool children (14 boys and 6 girls), aged 5 ($n = 6$) and 6 ($n = 14$), from a public preschool in Riga, Latvia. *FaceReader.* Emotional states were analyzed with FaceReader Version 9.1, which uses deep neural networks to predict six basic emotions (happy, sad, angry, scared, disgusted, surprised).

Procedure. Children were randomly assigned to an intervention group (IG, $n = 10$) or a control group (CG, $n = 10$). The IG engaged in outdoor activities (e.g., walking, games) for three 40-minute sessions per week over three weeks, while the CG did not participate in outdoor activities.

Statistical Analysis. Data were analyzed using the Shapiro-Wilk test, paired t-test, and Wilcoxon signed rank test ($p < 0.05$).

Results

Significant reductions were found in sad ($W = 55$, $z = 2.80$, $p = 0.002$) and disgusted emotions ($t(9) = 3.146$, $p = 0.01$) in the IG, but not in the CG (sad: $t(9) = -0.265$, $p = 0.79$; disgusted: $W = 2$, $z = -0.56$, $p = 0.62$). No significant changes were found for happy, angry, surprised, or scared emotions in either group ($p > 0.05$).

Conclusions

The use of FaceReader to analyze preschoolers' emotional states revealed that outdoor activities significantly reduced sadness and disgust in the intervention group, highlighting the potential of such activities to influence specific negative emotions. However, no significant changes were observed for other emotions or in the control group. These findings suggest that outdoor activities and advanced FaceReader can offer valuable insights into emotional development. Further research with larger samples is foreseen to validate and expand these results.

Maximal Oxygen Consumption (VO₂ max) Determination Options for Master Basketball Players with the Astranda Cycle Ergometry Test, the YMCA Cycle Ergometry Test, and the Polar O₂Nindex Test

Oral

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Objectives*

Maximal oxygen consumption (VO₂max) is the gold standard for assessing cardiorespiratory fitness (CRF) and is widely recognized as an indicator of physical and mental health. Various indirect tests have been developed to measure CRF, but there is limited data on their objectivity in specific populations. This study aimed to evaluate the objectivity of the Astrand and YMCA cycle ergometry tests and the Polar O₂Nindex test for VO₂max in physically active master basketball players.

Materials and Methods

Fifty-nine male basketball players aged 51-81 years (M age = 64, SD = 7.5 years) participated. Nine were excluded if they did not perform at peak exercise, took medication affecting heart rate (HR), or did not reach HR 120 bpm during peak exercise. VO₂max was assessed using the RAMP test with continuous ECG monitoring on a cycle ergometer. The Astrand test was performed using a Monark Ergonomic 839E cycle ergometer. The YMCA test followed its standard methodology, and the Polar O₂Nindex test was conducted using a Polar V800 smartwatch. Funding: State Research Programme “Sports” - Innovations, methodologies and recommendations for the development and management of the sport sector in Latvia. (VPP-IZM-Sports-2023/1-0001)

Results

The mean maximal VO₂max in the cardiopulmonary exercise test was 30.44±7.32 ml/kg/min. Compared with VO₂max obtained by direct gas analysis, the Bland-Altman Bias systemic error and mean absolute error were -0.386±7.50 and 5.45±5.09 ml/kg/min in the Astrand test, -0.580±6.95 and 5.20±4.59 ml/kg/min in the YMCA test, and -9.16±7.97 and 9.86±7.06 ml/kg/min in the Polar O₂Nindex test.

Conclusions

In this group of master basketball players, the Astrand and YMCA cycle ergometry tests were the most objective indirect tests. Compared with direct gas analysis, the systematic and absolute errors were similar. The average systematic error was below 2%, while the average absolute error was above 17%. The O₂Nindex test results were the most biased, with both the average systemic and absolute error above 30%.

Maximal Oxygen Uptake (VO₂ Max) is not Associated with Depressive Symptoms and Working Memory Performance in Master Basketball Players

Oral

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Objectives*

Maximal oxygen uptake (VO₂ max) is a gold standard for assessing cardiorespiratory fitness (CRF) and is widely recognized as a marker of physical and mental health. Low VO₂ max has been associated with elevated depressive symptoms and impaired cognitive functions, such as working memory (WM). This study aimed to investigate whether VO₂ max correlates with depressive symptoms and WM performance in physically active master basketball players.

Materials and Methods

57 male master basketball players aged 51-81 (M age =64, SD=7.5 years) participated in the study. VO₂ max was assessed using a RAMP test with continuous ECG monitoring on a cycle ergometer at the RSU LASE Health Care Research Center and the Sports Science Research Laboratory. WM performance was measured as reaction time using the Sternberg Working Memory Test. Depressive symptoms were evaluated using the Depression Symptoms (DS) scale from the abbreviated Latvian Clinical Personality Test (LCPT).

Results

Spearman rank correlation analysis did not indicate a statistically significant relationship between VO₂ max, depressive symptoms, and WM results (p>.05).

Conclusions

In this group of master basketball athletes, VO₂ max was not associated with depressive symptoms or WM performance. These findings suggest that the protective effects of physical fitness on mental health and cognitive function may vary across populations. Further research with more diverse groups is needed to explore these associations.

Project funding: National Research Programme “Sport”: Innovations, methodologies and recommendations for the development and management of the sports sector in Latvia. (VPP-IZM-Sports-2023/1-0001)

Mental Fatigue in Sports: From the Lab to the Field

Oral

Prof. Bart Roelands¹

1. Vrije Universiteit Brussel

Objectives*

Over the last decade awareness of a mental component in fatigue has grown enormously. This presentation will cover the most important findings in the lab (consequences and mechanisms), and on the field. At the same time we will look at potential countermeasures that have been identified and how they can potentially alleviate the negative consequences of mental fatigue on performance capacity.

Optimizing Resistance Training for Cardiovascular Health: A Comprehensive Approach

Oral

Prof. Amelia Guadalupe Grau¹

1. University of Castilla-La Mancha

Objectives*

The lecture will cover the role of resistance training in cardiovascular disease management, focusing on its benefits for heart function, blood pressure, and body composition. It will explore safe protocols, how strength training improves vascular health, and the synergy between resistance and aerobic training. Key topics include the integration into cardiac rehabilitation, and muscular and metabolic adaptations that enhance cardiovascular health.

Overview of Experimental Setups for Ice Friction Testing

Oral

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1. Mechanical and Biomedical Engineering Institute, Riga Technical University, 2. V Research GmbH

Objectives*

This study focuses on the diverse testing methods and setups utilized in ice friction research, which plays a critical role in ice sports performance and safety applications. The study of ice friction is complex due to the various interacting parameters, making the choice of testing method essential for reliable results. Laboratory setups, such as small-scale rotary and linear tribometers, offer controlled environments, allowing for precise adjustments of parameters like load, velocity, and temperature. These controlled tests enable detailed analysis of the frictional behavior between ice and different materials, yet they may not fully replicate real-world conditions. Large-scale and on-field setups, while offering a closer approximation to practical scenarios, introduce challenges such as limited environmental control, reduced repeatability, and increased logistical complexity.

This study compares these methodologies, revealing that laboratory tests excel in providing reproducible data under controlled variables, which is beneficial for fundamental research. In contrast, large-scale and on-field setups are essential for translating findings into practical applications, particularly for high-performance sports and safety gear. The findings underscore the importance of developing standardized protocols and enhancing large-scale setups to improve study comparability and data reliability. Such advancements could lead to more effective applications, such as optimized sports equipment, improved footwear for icy conditions, and safer transportation solutions. Ultimately, this study aims to bridge the gap between controlled laboratory research and real-world applications, supporting further progress in ice friction research for performance and safety.

Problematic Internet Use Relationship with Cognitive and Physical Abilities in Adolescent Participating in Extracurricular Sports

Oral

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Objectives*

This study investigated the influences of extracurricular sports involvement on the cognitive abilities (CA), physical abilities (PA) and its association with the problematic internet use (PIU) of adolescents.

Materials and Methods

A cross-sectional study design with correlational analysis with Pearson's correlation [AK3] was employed. The study participants comprised 57 adolescents aged 12-16 years from general education schools in Riga, Latvia. Participants were divided into two groups: those involved in extracurricular sports (ES) and those engaged in non-sports extracurricular activities (NS).

The Problematic and Risky Internet Use Screening Scale (PRIUSS) was used to assess problematic internet use (PIU). Cognitive abilities were measured using the Raven's Progressive Matrices test, and Assessment of physical abilities is specialized in the motor proficiency component (MP) was assessed with the Bruininks-Oseretsky Test of Motor Proficiency Second Edition (BOT-2).

Results

This study found that 38% (N 57) of the participants were at risk of PIU. The results showed significant positive correlations between PIU and MP ($p < 0.01$) and between PIU and CA ($p < 0.01$). Adolescents involved in extracurricular sports showed a mean CA score of (41) compared to (38) in NS. Furthermore, adolescents in ES had a mean PIU score of (25) and NS (24). To determine the effect of ES on CA, PIU and MP, Eta square (η^2) test was conducted with the value of NS (MP=0.44, PIU=0.43 and CA=0.46) while ES (MP=0.56, PIU=0.57 and CA = 0.54) with interprets “small”. In addition, adolescents in ES showed a mean score of MP (25) and NS (24). As for the standard deviation for PIU (SD) in NS was (8.7) and ES (7.5), the SD value of MP for NS (1,55) and ES (1,9) while CA is NS (9) and ES (7,8).

Conclusions

These findings suggest that participation in extracurricular sports positively influences physical abilities, enhances cognitive abilities, and may mitigate the negative impact of problematic internet use. Therefore, schools and relevant stakeholders should encourage and facilitate regular student participation in extracurricular programs.

Self-efficacy, Perceived Stress, Physical Activities and Sleep Quality of Sport Educators

Oral

Prof. Andra Fernate¹, Prof. Juris Grants¹, Prof. Zermena Vazne¹, Dr. Katrina Volgemute¹, Dr. Viktors Veliks¹, Ms. Eilina Antapone¹, Mrs. Valerija Steinmane¹, Mr. Dinass Talents¹

1. RSU Latvian Academy of Sport Education

Objectives*

The objective of the research is to determine the psychological aspects (self-efficacy, perceived stress), physical activities and sleep quality of sport educators.

Materials and Methods

Participants were 199 sport educators (51% women and 49% men). Following survey data set were selected: General Self-Efficacy scale (GSES), Perceived Stress Scale (PSS), IPAQ and Pittsburgh Sleep Quality Index (PSQI). All instruments are widely used questionnaires and adapted into Latvian. The questionnaire process and collection of respondents' data took place anonymously, in accordance with the Vienna Convention on Human Rights. Mathematical statistics (descriptive statistics and the inferential statistics) were used. This research was funded by the framework of the Plan of the European Union Recovery and Resilience Facility and the State budget grant Nr. RSU/LSPA-PA-2024/1-0009.

Results

The preliminary results have shown that 22% of sports educators do not engage in vigorous physical activities, while 21% engage in them two days a week. On the other hand, 8% of sports educators do not engage in moderate physical activities during the week. 60% of sports educators rate their sleep quality as quite good, while only 3% rate it as very poor. The results of the study indicate that the self-efficacy levels of the sports educators in the sample are assessed as average ($M=31.43$; $SD=4.45$). In contrast, their perceived stress levels are assessed as high ($M=31.10$; $SD=4.66$).

Conclusions

Considering the interconnected role of sleep, physical activity, and self-efficacy, perceived stress, poor sleep quality and insufficient physical activity can impact self-efficacy, perceived stress. Based on the results, a contradiction exists among sports educators between their self-efficacy assessments and their perceptions of stress, indicating the need for further in-depth research.

Sensor System for Monitoring Technical Sports

Oral

Dr. Leo Selavo¹

1. University of Latvia

Objectives*

We are designing a sensor system for monitoring technical sports performance with the aim to improve the technical aspects of the devices involved as well as to assess the contribution of sportists v.s. the technology to the results. The context of this research is luge and bobsled.

Materials and Methods

The proposed system is using multi-tier approach, First, there is a mobile system with many individual sensor nodes connected to a central hub. One of the challenges is the scalability of the system. Another is to sustain the wide data bandwidth to capture them in time. After the measurement run the data are sent to a server for storage and analysis.

Results

We are building a hardware and software system for the data capture, transfer, storage, visualization and analysis. The presentation will reveal the current architecture and preliminary results of the system.

Conclusions

Although the developed sensor system is targeted towards luge and bobsled, it can be useful and applied to other disciplines and environments, for example, wheelchairs could be instrumented for distance sports.

Sports Aerodynamics: Computational and Experimental Fluid Dynamics (CEFD) Based Technologies for Improved Performance

Oral

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1. Riga Technical University, Aeronautics, Space Engineering and Transport Institute

Objectives*

Sports Aerodynamics aims to develop Computational and Experimental Fluid Dynamics (CEFD) based technologies in sports fields. The research focuses on improved aerodynamic designs of Latvian sports equipment and athletes (gestures, postures, and clothing), leading to improved performance in sports such as luge, bobsleigh, skeleton, car racing, cycling, athletics, etc. Unlike conventional (flight) aerodynamics, sports aerodynamics is extremely complex and challenging due to relatively smaller structures and higher speeds where a fraction of deviation in airflow results in a significant efficiency drop. Therefore, innovative aerodynamic designs of sports equipment and (most importantly) their optimization according to the athletes' bodies is the main aim of the VPP project section: Sports Aerodynamics. In sports, reducing drag force is the main ground where improvements can be attempted for enhanced aerodynamic performance. Drag generated from the athlete's body and the sports equipment is complicated and offers minimal opportunities in terms of design.

During the VPP Sports project execution (so far), aerodynamics research has been carried out in several fields. For example, (i) Design improvement and aerodynamic drag modeling have successfully been implemented to improve the performance of the Latvian national Luge team athletes, (ii) A special research focus has been dedicated to the impact of (sports) helmet designs on the aerodynamic forces that impact the athlete performance, (iii) Inspired from golf ball surface roughness, specific Passive Flow Control Devices were designed and named as Dimpled Vortex Generators (DVGs) which exponentially increased the aerodynamic characteristics of the surfaces (the work has been published in the Scopus indexed conference proceedings), (iv) research was developed for the aerodynamic surfaces flutter which will be further used in the sports equipment surfaces (the work has been published in the Q1/Q2 journals). In addition, work is on the way to improve the aerodynamics of F1 cars, sports aircraft, and cycling.

Study of Static and Dynamic Mechanical Properties of Wood Fiber Composites for Technical Sports Applications

Oral

Dr. Andrejs Pupurs¹, Dr. Mārtiņš Irbe¹

1. Riga Technical University

Objectives*

Despite recent developments of high-performance materials such as carbon and glass fiber reinforced composites, many technical sports applications favour the use of wood-based materials due to their unique combination of static and dynamic mechanical properties that their synthetic counterparts cannot offer. Successful use of wood-based materials in luge sleds, ice hockey sticks, alpine and cross-country skis among others has demonstrated capability of the equipment to perform on world elite level. Depending on the requirements of specific sports application, certain static and dynamic mechanical properties are required and in this regard a typical approach for tailoring the required performance is mainly empirical. A systematic research investigation revealing importance of material parameters is missing in the literature. The present study aims to bridge this gap by performing a detailed parametric study of correlation between static and dynamic mechanical properties of wood fiber composites.

Materials and Methods

Different solid wood and plywood materials have been studied by experimental testing and numerical modeling. Mechanical tensile and bending tests were performed on small-scale standard material specimens to measure their elastic modulus and strength. Additionally, dynamic vibration damping properties were measured on larger scale specimens using laser vibrometer obtaining damping coefficients and various eigenfrequency values and modes. Material characterization data obtained from tests were used as input data in numerical models for prediction of behavior of large-scale structural elements for luge sports equipment.

Results

Results indicate a relatively large scatter in mechanical properties of thin plywood sheets. Laser vibrometer tests for vibration damping properties demonstrated a clear dependency on the specimen dimensions. Mechanical deformation of luge sled runner were calculated using numerical FEM models. Results were validated by experimental tests.

Conclusions

Overall, it was concluded that the proposed modeling approach and a sufficient amount of tests give reliable predictions of behavior of large-scale wood composite elements for sports applications.

Toward a Framework of visuo-spatial Measurements in Sports

Oral

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Objectives*

Visuospatial processes (spatial abilities and visual midlevel perception) are (1) crucial for higher cognition, (2) provide baseline factors for mental and neurological performance. The aim of our work is to develop a set of measurements to explore how physical activity (in grassroots and adapted sports) changes the overall visuospatial performance that might impact higher cognitive processes.

Materials and Methods

Correlational and experimental tests were conducted: (1) Spatial tests covering allocentric and egocentric cognition (Mental rotation (Shepard & Metzler, 1988), Perspective taking (Kozhevnikov & Hegarty, 2001), Santa Barbara Sense of Direction Scale (SBSOD) (Hegarty et al., 2002)). (2) Eye tracking experiments on midlevel perception.

Participants from grassroots sports (n=186) were tested in two stages. The first stage was conducted through a web application. The second stage (eye-tracking experiment) took place in the Lab. Participants from adapted sports (n=30) were tested remotely and in person, depending on the specific test. Several tasks were adjusted to impaired populations (according to different mental ages).

Results

Our preliminary results (currently 31% of the grassroots and 33% of the adapted sports samples are screened) indicate that (1) the performance in mental rotation is similar across groups, suggesting that this visuospatial skill is not significantly affected by the type of sport or sample; (2) participants from the grassroots sports perform better in the perspective-taking test, highlighting potential challenges in spatial reasoning for the impaired population; (3) SBSOD measurements are slightly better in adapted sports, possibly due to specific compensatory strategies in these populations.

Conclusions

Based on these results we develop screening tools, applicable to different types and levels of sports (covering grassroots and adapted sports populations). These tools integrate assessments of visuospatial and mid-level processes to (1) provide a comprehensive understanding of visuospatial functioning, and (2) identify strengths, areas for improvement, and promoting personalized training strategies.

Ultra-Endurance Velo Race Induces 10-Fold Increase in Serum FGF-21 Levels

Oral

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Objectives*

Fibroblast growth factor 21 (FGF21) is a stress-inducible hormone that participates in regulation of energy balance and glucose and lipid homeostasis. Its therapeutic potential in metabolic diseases has been discussed. Furthermore, its relationship with free fatty acids (FFA) and glycerol in humans, as well as its response to exercise, has been an area of active research. The aim of the study was to assess the effect of ultra endurance velo race on serum FGF-21 levels and its association to FFA and glycerol.

Materials and Methods

Data from participants (n=44; age: 38.8 ±8.4 years) who finished self-planned ultra endurance velo race (average 341.1±7.8 km) under 24 hours were included in the study. Blood samples were collected 1-2 hours before and right after the finish of the race, as well as ~ 20 hours in recovery. Friedman test was used to estimate the differences at different time points, while PCA analysis and Linear Mixed Model (LMM) was used to identify factors related to FGF-21.

Results

FGF-21 levels increased 10-fold during the ultra-endurance velo race (2409 (1511–4221) vs 20409 (12515–35280) pg/ml, correspondingly) and returned to baseline levels (3831 (1846–6908) pg/ml) ~ 20-hours in recovery. Furthermore, LMM revealed a strong positive association between the component of FFA and glycerol and FGF-21 (p < 0.001).

Conclusions

The component of FFA and glycerol predicts ultra endurance velo race induced increase in serum FGF-21 levels with high accuracy, supporting the hypothesis that FGF-21 could act as a mediator to optimize substrate utilization during exercise.

Acute Effects of Beetroot Juice Supplementation on Aerobic Performance in Endurance Athletes: Randomised Controlled Trial

Poster

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1. RSU Latvian Academy of Sport Education, 2. Rīga Stradiņš University

Objectives*

Beetroot juice is a dietary supplement containing nitrates, believed to enhance oxygen utilization efficiency and endurance performance. However, evidence regarding its acute effects on aerobic capacity remains limited and inconsistent. **Objective:** To examine the acute effects of beetroot juice supplementation on aerobic performance in endurance athletes.

Materials and Methods

The study involved 50 endurance athlete participants (32 males, 18 females, aged 18-42 years). Anthropometric characteristics included an average age of 22.9 ± 5.6 years, height of 165.8 ± 7.14 cm, and weight of 64.0 ± 0.57 kg. Aerobic capacity was assessed using a cardiopulmonary exercise test (CPET). Participants were randomly assigned to the experimental group (beetroot juice supplementation, BJG) or control group (placebo group). Two and a half hours before the second test, participants consumed 50 ml of beetroot juice concentrate (6.2 mmol NO₃⁻) or a placebo. Data were analysed using SPSS (version 29.0) and Excel. The Kolmogorov-Smirnov test assessed normality, and a sphericity test was performed. Cohen's d values calculated effect sizes for repeated measures. Statistical significance was set at $p < 0.05$.

Results

The BJG showed a significant increase in maximal oxygen uptake (VO₂ max) by 4.21% ($p < 0.05$), while the placebo group's VO₂ max decreased by 0.40%. Oxygen pulse decreased by 1.05% in the BJG, while it increased by 3.70% in the placebo group. Maximum heart rate decreased by 1.91% in the BJG and increased by 2.54% in the placebo group. Ventilatory efficiency (VE/VO₂) decreased in the BJG ($p < 0.05$), while it increased in the placebo group. Pulmonary ventilation and carbon dioxide production decreased in the BJG and increased in the placebo group.

Conclusions

Beetroot juice supplementation enhances aerobic performance, as indicated by improvements in VO₂ max and ventilatory efficiency, making it a potential ergogenic aid for endurance athletes. Further research is needed to explore broader effects on cardiovascular function.

Analysis on Physical Characteristics of Functional Mobility, Trunk and Shoulder Girdle Muscle Strength Balance in Young Sailors

Poster

Dr. Laura Zaliene¹, Ms. Kristina Rukuižienė¹

1. Klaipeda University

Objectives*

Sailing is a complex water sport in which the sailors use their body weight, position changes, a series of maneuvers and equipment adjustments to maintain the balance of the hull and optimal speed according to the environmental conditions (Pan et al., 2022). This study was to assess functional mobility, trunk and shoulder girdle muscle strength balance in young sailors.

Materials and Methods

The study included 31 young sailor's from 7 to 17 ($\pm 10,25$) years old (F=7; M=24; Ilca, N=7; Optimist, N=24). Four evaluations were performed in the study: posture (using W. K. Hoeger posture assessment methodology), isometric maximum strength relations and absolute strength of the shoulder girdle and trunk (BackCheck @ compact 608), asymmetries, imbalances in mobility and stability (Functional Movement Screen), dynamic balance on both the upper and lower quarters of the body (Y Balance Test).

Results

The results of the functional mobility test revealed that the sailors lacked pelvic-trunk mobility and rear leg muscle mobility. Optimist class sailors have a lower than average isometric muscle strength balance of the trunk and shoulder girdle. After analyzing young sailor's posture, we can see that a higher percentage of children had a satisfactory posture in the aforementioned body parts.

Conclusions

Conclusions: most young sailors have sufficient functional mobility. According to the posture results, the most abnormal part of the body was the abdomen, shoulder girdle.

Optimist class sailors have a better balance of both torso and shoulder girdle muscle forces than ILCA class athletes.

Recommendations: physical conditioning exercises for both class sailors include open and closed kinetic chain exercises to strengthen the rotator cuff and scapula stabilizing muscles. Also, include exercises on unstable planes to reduce the imbalance of the trunk and shoulder girdle muscles. During training on the water, include exercises requiring static and dynamic balance, to improve the balance of trunk muscle forces.

Breathing Techniques for Enhancement of Cognitive Function and Stress Reduction in 14–17-year-old Adolescent Athletes: Scoping Review

Poster

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1. Rīga Stradiņš University, 2. Aston University

Objectives*

Identify, summarize and analyze breathing techniques for the enhancement of cognitive functioning and stress reduction in an adolescent athlete population aged 14 to 17 years.

Materials and Methods

Eight databases were scanned (Science Direct; Scopus; Cochrane; ProQuest; PsycINFO; Google Scholar; The Web of Science; EBSCOhost Complete) from January 2000 till December 2023 for any type of research in English regarding breathing techniques used in adolescent sport environment.

Five articles were deemed eligible by the pre-determined criteria. Data charting was conducted including sport, sample, purpose, breathwork and key findings among others.

Results

Among the five articles included in the final selection two were using HRV biofeedback, one was using slow paced breathing, one was using Yogic breathing techniques and one did implement relaxation breathing as part of a Psychological skills training program.

Three of the studies implemented an RCT study design while the last two had a Quasi-experimental non-equivalent group design and exploratory design respectively.

Because of various possible reasons some of the studies had mixed results in some of the outcome variables but in general all of the studies had significant results in the stress and anxiety management domain. Most of the studies involved the evaluation of psychological skills but only two did evaluate the cognitive function. In one of the studies physical performance was also evaluated.

Conclusions

A total of five articles were included in the final selection with a wide variety of samples and breathing techniques used. Although two of the studies used a similar breathing technique concept, no clear consensus can be made as to which breathing technique might be more prominent or useful.

Despite heterogeneity among the samples and breathing techniques used, this scoping review provides first look into this field for adolescent athlete population.

More standardized and homogenous research is needed for a more comprehensive analysis.

Effect of Different Teaching Methods on Acquisition of Front Crawl in Healthy Children with Residual Primitive Reflexes

Poster

Ms. Irina Bogdanoviča¹, Prof. Viesturs Lāriņš¹

1. RSU Latvian Academy of Sport Education

Objectives*

Primitive reflexes (PR) are automatic muscle reactions that can remain active in some healthy children, potentially affecting their ability to learn swimming skills. This study investigates how two different teaching methods effect on the acquisition of front crawl (FC) in 6–7-year-old children with residual PR.

Materials and Methods

The participants were divided into two groups of 11 children each. The first group practiced FC by breaking it into separate components – body position, head position, breathing, and limb movements – before combining these elements. The second group focused on developing bilateral coordination of arms and legs within a single movement cycle. Both groups attended 16 lessons (30 minutes each, once per week). Performance was measured by assessing FC proficiency, maximal swimming distance, heart rate (HR), and heart rate variability (HRV) before and after exercises. In the first group, initial 8x25m sets concentrated on individual FC components, followed by 2x25m sets incorporating the full stroke. The second group focused on diagonal coordination during the 8x25m sets and progressed to 2x25m sets that integrated arm and leg movements with a 2:6 frequency ratio. Short rests of 10 seconds between sets were used to provide feedback and adjust technique. HRV was measured after exercises to evaluate recovery and balance of the autonomic nervous system.

Results

The second group showed significantly better swimming performance, including greater proficiency in FC, longer swimming distances, and lower HR during swimming ($p < 0.05$). Their HRV significantly increased after recovery, indicating faster autonomic reactivation and reduced stress. In contrast, the first group showed HRV decreases, suggesting dysregulation and exhaustion.

Conclusions

The study highlights that teaching methods emphasizing bilateral coordination and diagonal limb interactions are more effective than focusing on isolated components. This approach improves swimming performance and reduces stress, making it a preferable option for children with residual PR.

Effects of Breathing Exercises on Young Swimmers' Respiratory System Parameters and Performance

Poster

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1. Lead Researcher, 2. Senior Teacher

Objectives*

Breathing exercises are widely used to enhance respiratory function and athletic performance. This study aimed to assess the efficacy of a modified exercise regimen on respiratory parameters and its effect on the performance of young swimmers in competition.

Materials and Methods

Thirty-one swimmers aged 16–17 from various clubs in Latvia were selected, comprising an experimental group (n = 15, height: 174.36 ± 7.85 cm, weight: 65.80 ± 9.35 kg, body mass index: 21.60 ± 1.54) and a control group (n = 16, height: 180.78 ± 7.05 cm, weight: 69.90 ± 6.49 kg, body mass index: 21.40 ± 1.56). With an average of eight years of experience, participants trained for approximately 43–45 weeks annually (pool and gym sessions), with an average training duration of 20 ± 2 hours per week. Measurements were conducted on days one and 30, involving spirometry and swimming performance assessment based on the best results in the 100-meter distance. The experiment consisted of a modified breathing exercise performed thrice weekly for four weeks.

Results

The experiment consisted of a modified breathing exercise performed thrice weekly for four weeks. Significant improvements were observed in the experimental group compared to the control group in forced vital capacity (p = 0.02), peak inspiratory flow (p = 0.001), and performance (p = 0.001), with p-values < 0.05. However, no significant changes were noted in peak expiratory flow (p = 0.46 > 0.05).

Conclusions

The findings indicate that modified breathing exercises effectively enhance respiratory parameters and performance in competitive swimmers.

Effects of Eight-Week Training with Core Exercises on Core and Pelvis Muscle Strength Balance in Adulthood Male Soccer Players

Poster

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1. Higher Education Institution / Klaipėdos valstybinė kolegija

Objectives*

Back-check is an effective tool for assessing the effects of a trunk and pelvic muscle strength balance program in soccer players, but this testing method is not yet actively used for prevention. The purpose of the study is to evaluate the effect of an eight-week core exercise program on the balance of trunk and pelvic muscle forces in adulthood soccer players.

Materials and Methods

42 football players aged 13-17 participated in the study (14 ±1.9 years). The strength balance of the subjects' trunk and pelvic muscles was assessed twice: before the study and after the study (BackCheck ® compact 608). The study began in January-April 2024. The subjects were divided into three groups: the control group - which did not receive an exercise program (N=9), E1 - exercised 1 time a week (N=9), E2 - exercised 2 times a week (N=11).

Results

The isometric muscle strength balance of the trunk and lower limb of soccer players was insufficient before the study. The overall Back-check result of the subjects of the control group was average and did not change during the course of the study, Group 1 had a tendency to decrease, group 2 - on the contrary, increased. The overall result of group 2 after the study is statistically significantly higher than that of group 1 subjects ($p<0.05$). The total trunk score of control subjects was average and did not change over the course of the study. The total trunk score of group 1 subjects tended to decrease, while the trunk score of group 2 subjects improved, but no statistically significant difference was obtained ($p>0.05$). The trunk total score of group 2 after the test was statistically significantly higher than 1 ($p<0.05$).

Conclusions

An eight-week exercise program is effective in reducing strength imbalances in the torso and pelvic muscles in adulthood soccer players.

Gas Exchange Kinetics in Cross-country Skiers Executing Repeated Dynamic High Intensity Intervals

Poster

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1. Rīga Stradiņš University

Objectives*

- 1) Analyze the scientific literature on the topic.
- 2) Collect, systematize and analyze training data of participants
- 3) Investigate differences in heart rate and oxygen consumption dynamics during interval work at VO₂max power level.
- 4) Compare the characteristics of aerobic capacity before and after dynamic intervals of "2 x to 10" and the ability of the subjects to maintain work capacity indicators.
- 5) Discover potential efficiency in exercise dosing using the subject's ability to maintain constant power as a criterion.
- 6) Develop recommendations for trainers regarding the selection of a dynamic high-intensity interval training protocol and proposals for further study of the problem.

Materials and Methods

Methods: Anthropometry

Ergometry

Gas exchange analysis

Pulsometry

Mathematical statistics

Participants:

Cross-country skiers

Interval protocol: For two weeks, the participant performs interval training according to the dynamic high-intensity interval training protocol "2x up to 10 min" with rest ratio of 1 : 2. In this mode, training is carried out for 2 weeks, 3 times a week.

Results

Exhaled carbon dioxide level of the second interval session is lower compared to the first ($p < 0.01$). And analyzing the oxygen consumption kinetics of the first and second phases of both interval sessions shows increased oxygen consumption in the second interval ($p < 0.01$). When evaluating the data day by day, the effect of adaptation reactions crystallizes.

Another strongly observed phenomenon is later respiratory equivalent (RER) values of 1.0. reaching the second interval. ($p < 0,01$)

Conclusions

When performing dynamic high-intensity interval training, it is possible to effectively follow one long interval until failure to perform several shorter 1-1.5 min intervals, thereby reducing the risk of oxygen debt and oxidative stress, while at the same time effectively stimulating oxygen consumption.

Methodology for Determination of Maximal Oxygen Consumption (VO₂ max) by Incremental Exercise Cycle Ergometry Test in Master Basketball Players

Poster

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Objectives*

Maximal oxygen consumption (VO₂max) is the gold standard for assessing cardiorespiratory fitness (CRF) and is widely recognized as a marker of physical and mental health. Various indirect tests have been developed to measure CRF, but there is limited data on their objectivity in specific populations. This study aimed to develop a methodology for accurately determining VO₂max using incremental exercise cycle ergometry tests in physically active master basketball players.

Materials and Methods

Fifty-nine male basketball players aged 51-81 years (M age = 64, SD = 7.5 years) participated. Nine were excluded if they did not perform maximal exercise, took medication affecting heart rate (HR), or did not reach HR 120 bpm during maximal exercise. VO₂max was assessed using the RAMP test with continuous ECG monitoring on a cycle ergometer. Indirect cycle ergometry was performed using a Concept 2 cycle ergometer, increasing the load every 25 W to submaximal (80-85% of maximal). A linear regression equation calculated VO₂max for maximal aerobic power at maximal HR, and a formula using artificial intelligence minimized systematic error (Bias).

Funding: State Research Programme "Sports" - Innovations, methodologies and recommendations for the development and management of the sport sector in Latvia. (VPP-IZM-Sports-2023/1-0001)

Results

Comparison of VO₂max determined by direct gas analysis and the incremental exercise test showed a Bland-Altman Bias of 0.006±2.58 ml/kg/min and an absolute error of 2.73±2.62 ml/kg/min. Pearson correlation analysis showed a strong, statistically significant association ($r = 0.759$, $p < 0.001$). The lowest systemic and absolute error and the strongest correlation occurred when formulas used the actual maximum HR determined at peak exercise.

Conclusions

A methodology and formula were developed to estimate VO₂max using an incremental exercise cycle ergometry test, providing a relatively objective assessment in master basketball players. The test's objectivity needs dynamic evaluation after changes in aerobic performance, and further studies with diverse groups are needed.

Monitoring Stress and Recovery: Preliminary Latvian Version of the Recovery-Stress Questionnaire (RESTQ-Sport)

Poster

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1. Rīga Stradiņš University, 2. Jozef Pilsudski University of Physical Education in Warsaw, Faculty of Physical Education and Health, Biala Podlaska

Objectives*

The objectives of this study are to preliminary test and internal reliability of the Recovery-Stress Questionnaire for athletes (RESTQ-Sport) in Latvian, allowing optimization of their performance and minimization of risks of overtraining or burnout.

Materials and Methods

Participants. A sample of Latvian athletes (n = 64) aged 18 to 25 from various sports completed the questionnaire. *The REST-Q.* The questionnaire contains 76 questions on 19 scales grouped into four dimensions. There are seven general stress (GS), five general recovery scales (GR), three sport stress (SS), and four sport recovery scales (SR). Answers are on a Likert scale from 0 (never) to 6 (always). *Procedure.* The English versions of the (RESTQ)-Sport were translated through a parallel back-translation procedure by six specialists, academic staff, and Riga Stradins University (RSU) experts. The Latvian version was pre-tested with a small group of athletes (n = 11), who were asked to provide feedback on the questionnaire. *Statistical analysis.* The analyses were conducted using Microsoft Office Excel and IBM SPSS version 26. The reliabilities of scales were assessed using Cronbach's alpha analysis.

Results

Most of the scales achieved alpha coefficients equal to or higher than 0.70. However, some showed moderately low values for Conflicts/Pressure, physical complaints, physical recovery, disturbed breaks, emotional exhaustion, and personal accomplishment ($\alpha = 0.69, 0.61, 0.63, 0.67, 0.67, 0.60$).

Conclusions

The Latvian version of the REST-Q shows internal consistency. The lowest reliability values achieved in some scales may be explained by the questionnaire's construction because the general module of the RESTQ-Sport is based on the Recovery-Stress Questionnaire from Kallus (1995), who pointed out that the meaning of the generally formulated dimension could be different for athletes compared to non-athletes. The research represents a preliminary test, and further work is required to confirm factorial and external validity (*Project No. 5.2.1.1.i.0/2/24/I/CFLA/005*).

Motivation of Latvian Junior Athletes to Engage in Powerlifting

Poster

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1. Rīga Stradiņš University

Objectives*

Identify and compare the factors that influence women's and men's motivation to engage in powerlifting, as well as compare motivational factors with those available from other countries study's.

Materials and Methods

The study utilized the Exercise Motivations Inventory (EMI-2), a self-assessment tool with 51 statements across 16 subscales measuring various motivational factors. The EMI-2 is valid for both men and women.

Research results were processed and analyzed using SPSS 29.0 and Microsoft Excel. Descriptive statistical methods (mean values, standard deviation, minimum and maximal values) were applied.

Powerlifting, a strength sport with three disciplines (squats, bench press and deadlift), is seeing increasing interest among men and women.

The study included 36 respondents (13 women and 23 men), aged 18-24.

Results

The study shows differences in motivational factors between men and women. For women, key factors include joy, strength and endurance, revitalization, good health, challenges, stress management and competition. For men, strength and endurance, joy, competition, revitalization, challenges, good health and stress management.

In one of the studies, the majority of athletes were younger than 25 years old. In this study the main motivation being the desire to achieve high athletic results. Survey analysis confirms powerlifting significantly impacts psychological stability, self-esteem, lifestyle and social status (Garipova, 2015). Men are more motivated by achievements, while women focus on skill mastery (Marin et al., 2018).

Conclusions

In the motivation factors of Latvian junior powerlifters, both similarities and differences are observed between women and men. Men are more focused on competition and achieving results, while also not excluding other dominant factors related to the enhancement of biomotor abilities. For women, the emotional factor and the improvement of biomotor abilities are important, while also considering other dominant factors.

In foreign scientific articles, the dominant motivation factor is achievements, high results, and the development of mastery.

Parental Support in Competitive Youth Hockey

Poster

Mr. Rodrigo Lavins¹, Prof. Andra Fernate¹

1. RSU Latvian Academy of Sport Education

Objectives*

Previous studies have indicated that young athletes experience stress due to parental expectations, problematic behavior, excessive involvement in their training and the financial pressure associated with their families' investment in their athletic growth. Further exploration of the nature of parental support in youth hockey is crucial to intentionally reduce the pressure on young athletes. The aim of this research is to investigate the nature of parental support in youth hockey.

Materials and Methods

Scientific literature analysis, questionnaire, mathematical statistics. 262 parents and guardians (men n=98 and women n=164) of young hockey players from several children's and youth hockey clubs voluntarily participate in a custom-designed questionnaire. Data were processed with SPSS 28.

Results

The more hockey plays a central role in the family, the more it becomes a key aspect of the parents' and guardians' lives ($r_s = .745$; $p < .01$). If logistical support becomes more important for parents and guardians, financial support decreases in significance for them ($r_s = -.699$; $p < .01$). Parents and guardians who analyzed their child's performance after practice are also inclined to do so after games ($r_s = .660$; $p < .01$). The higher parents need for psychological and emotional support from the club, the greater the demand for general educational support as well ($r_s = .666$; $p < .01$).

Conclusions

The results of this study indicated that there were significant relationships observed between all types of parental support in youth hockey. The current study adds to the body of knowledge as it addresses the lack of studies seeking to explore parental support in competitive youth hockey.

Persistence of Residual Primitive Reflexes during Acquisition of Swimming Strokes in Healthy Children

Poster

Ms. Irina Bogdanoviča¹, Prof. Viesturs Lāriņš¹

1. RSU Latvian Academy of Sport Education

Objectives*

Primitive reflexes (PR) are unconscious muscle reactions linked to involuntary movements in response to a specific stimulus. Normally, PR disappear by the age of one, but recent studies reveal their persistence in children. This study investigates the presence of residual PR during swimming strokes acquisition in healthy 6–7-year-old children.

Materials and Methods

Seventy-eight children (40 boys and 38 girls) attending swimming lessons were assessed for PR using the test "Assessing Neuromotor Readiness for Learning" methodology. With six tests were evaluated PR activity on a scale from 0 (no activity) to 4 (maximum), with total scores (TS) classified activity as follows: 0 (no activity), 1–7 (low), 8–14 (medium), 15–19 (high), and 20–24 (maximal).

Results

Residual PR were detected in 97.4% of children across different levels of activity. Among them, 6.4% had high TS, while 44.9% and 46.2% showed low and medium activity, respectively. Maximal PR activity was not observed.

Conclusions

The study demonstrates that residual PR can persist in healthy children, impacting swimming strokes acquisition. Head and body movements during swimming often trigger these reflexes, affecting the child's ability to maintain balance in a horizontal position and execute voluntary limb movements. These involuntary motor responses increase muscle tone and complicate controlled movement, requiring more energy and cognitive effort. Retained PR can hinder body stabilization and delay the acquisition of swimming strokes, highlighting the importance of customized teaching strategies for swimming instruction.

Polygenic Profile of PPARs Genes Family in Elite Athletes

Poster

Prof. Valentina Gineviciene¹

1. Translational Health Research Institute, Faculty of Medicine, Vilnius University

Objectives*

Peroxisome proliferator-activated receptors (PPARs) belong to a ligand-activated nuclear receptor super-family that includes three members and two coactivators encoded by distinct genes (*PPARA*, *PPARG*, *PPARD*, *PPARGC1A*, *PPARGC1B*). PPARs family are key regulators of energy homeostasis and metabolism. The aim of this study was to investigate a polygenic profile that combined PPARs genes polymorphisms (*PPARA* rs4253778, *PPARD* rs2016520, *PPARG*rs1801282, *PPARGC1A* rs8192678, *PPARGC1B* rs7732671) among elite athletes from Lithuanian population.

Materials and Methods

PPARs 5 single-nucleotide polymorphism (SNPs) was investigated in 200 elite athletes representing three sports groups [endurance, N=59; sprint-power, N=69, and team-sports, N=72], as well as in 220 non-athletes controls from Lithuanian population. Genotyping was performed using restriction fragment length polymorphism method. We determined total genotype score (TGS, maximum value of “100” for the theoretically optimal polygenic score) for explaining individual variations in athletes and controls. Statistical analysis was performed using Rv3.2.

Results

It was found that the TGS of 5 SNPs differed significantly between the groups. The mean TGS was higher in sprint-power athletes (54.2±9.2) compared to endurance athletes (49.75±7.5; p=0.04), team-sports (48.2±9.2; p=0.02) and controls (47.9±11.3; p=0.02). A total of 6 athletes had a theoretically “optimal” TGS of 66.5 and two athlete - highest TGS of 80 in sprint-power group. Genotypes of the *PPARGC1B*(CC), *PPARD*(TT) and *PPARA*(GA) genes were noted as promising genetic markers for elite sprint/power athlete’s status.

Conclusions

We have characterized polygenic profile (of 5 SNPs of PPARs) for elite athletic performance. The TGS was higher in elite sprint-power athletes than in the endurance, team sports, or controls. Only 2 of the best Lithuanian sprint/power athletes (who are also amongst the best in the world) had the best polygenic profile (TGS 80) and none of all athletes or controls had the optimal profile (TGS 100). We have identified a polygenic profile that allows us, at least partly, to distinguish elite sprint-power athletes from nonathletic population.

Relationship between Maximal Oxygen Uptake (VO₂ max) and Body Composition Indicators in Master Basketball Players

Poster

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Objectives*

VO₂max is a key marker of physical fitness and cardiovascular health, while body composition indicators, such as fat and muscle mass, provide insights into overall health. The relationship between VO₂max and body composition in physically active populations, like master basketball players, remains underexplored. This study aimed to examine the association between VO₂max and body composition indicators in master basketball players.

Materials and Methods

The study involved 59 male basketball players aged 51 to 81 years (mean age = 64, SD = 7.5 years). Nine participants were excluded due to the inability to reach maximal effort during the cardiopulmonary exercise test, the use of heart rate (HR)-affecting medications, or failing to achieve HR ≥ 120 bpm during maximal effort. VO₂ max was assessed using the RAMP test with continuous ECG monitoring on a cycle ergometer. Body composition was analysed using the Tanita MC 780 bioimpedance device.

Results

Pearson correlation analysis showed a statistically significant strong negative correlation between VO₂ max and visceral fat level ($r = -0.811, p < 0.001$), body fat percentage ($r = -0.737, p < 0.001$), fat mass ($r = -0.680, p < 0.001$), body mass index ($r = -0.626, p < 0.001$), and body weight ($r = -0.562, p < 0.001$). Moderate correlations were found with muscle mass ($r = -0.382, p < 0.01$), fat-free mass ($r = -0.381, p < 0.01$), and total body water ($r = -0.329, p < 0.05$).

Conclusions

In master basketball players, VO₂max showed strong negative associations with fat-related parameters, particularly visceral fat, and moderate correlations with muscle mass and fat-free mass. These findings highlight the importance of body composition in cardiovascular health and performance. Further studies should investigate these relationships over time to guide fitness and health interventions.

Funding

Supported by the Latvian State Research Program “Sports” (VPP-IZM-Sports-2023/1-0001).

Swimmers' Shoulder Injury Prevention by Testing at a Young Age

Poster

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1. RSU Latvian Academy of Sport Education, 2. Rīga Stradiņš University

Objectives*

To determine the incidence and causes of shoulder injury and muscle imbalance by testing in Latvian young freestyle swimmers.

Materials and Methods

107 young males from 3 age groups (13-18 years old) from different clubs in Riga, Latvia, were selected. A questionnaire, a body posture assessment according to a diagnostic testing method for visual diagnostics, muscular functional testing, and swimming video analysis were used.

Results

The questionnaire result shows increasing pain in all age groups (group 2, 15-16 years old (32%), group 1, 13-14 years old (11%) and group 3, 17-18 years old (7%)). The body deviation forward, so-called “body falling” forward, was observed in all groups (1, 2, and 3); the distance from the vertical line between the outer ankle and the auricle of the ear in all three groups is 10.5 ± 0.4 to 11.4 ± 0.9 cm. The video analysis showed that the streamlined position is not achieved. The muscles holding the shoulder joint stretch, and the blade comes up. A straight-arm pull crossing the body's middle line was observed.

Conclusions

In all swimmer's groups, evidence indicates the tendency of pain in shoulder areas appearing when swimming. Expressed as changes of posture statics parameters; the greatest distance from the body vertical line swimmers have in the shoulder girdle. In 107 swimmers, The upper part of the big chest muscle is shortened, and shoulder blade fixators are weak. The spine hyper-kyphosis in the chest part and the shortening of the small chest and upper trapezius muscles have been shown.

In all three groups, irrational streamlining position is caused by posture changes and muscle disbalance, and irrational arm movements stress the shoulder joint.

Tendencies in the Use of Game Zones and Effectiveness of Players' Actions in Different Game Formats in the U13 Age Group

Poster

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1. RSU Latvian Academy of Sport Education, 2. Department of Psychology, University of Latvia

Objectives*

To evaluate tendencies in the use of game zones and the effectiveness of players' actions in the completion zone for U13 age group between game formats 9vs9 and 11vs11.

Materials and Methods

The players (n = 45, 6 goalkeepers and 39 field players, age 12.6 ± 0.7 years; height: 1.65 ± 0.18 m; weight: 54.3 ± 10.2 kg) in three teams played two one day tournaments (game order: C-B, C-A, B-A) using two competition formats (9vs9 and 11vs11). A quasi-experimental design was used to assess the tendencies of game format changes. Comparing the 9vs9 (9 players per team, field size – 74x52 m) and 11vs11 formats (11 players per team, field size – 106x68 m), were employed observational methodologies, to analyze six matches recordings by computer program Lince 2.1., recorded with two VEO Gen.2 cameras, which were placed on tripods (5.2 and 7.4 m) in the center of the playing field, to evaluate the start and end zones of game episodes, including the shots at the opponent's goal.

Results

It was found that the game episodes that started in the confidence zone ended in the completion zone significantly more often in the 9vs9 format (59.2% of episodes) than in the 11vs11 format (20.8% of episodes). Game episodes that started in the forming zone ended in the forming or completion zone are more common in a 9vs9 format (71.3% of episodes) than in an 11vs11 format (45.1% of episodes).

Conclusions

The results show that there is a significant relationship between the effectiveness of players' actions and reaching the completion zone and the game formats, which indicates a trend that players in format 9vs9 produced more number and variability in the tactical actions, a greater number of actions with teammates and more efficient in completion zone than in 11vs11 format.

Surgery

Emergency Cholecystectomy versus Bridging Cholecystostomy for Moderate and Severe Acute Cholecystitis: Retrospective Cohort Study

Poster

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Objectives*

According to the Tokyo Guidelines (TG18), the management of moderate acute cholecystitis (AC) includes either laparoscopic cholecystectomy (LC) or percutaneous cholecystostomy (PC), while for severe AC, straightforward LC is recommended only for selected patients. We aimed to compare the outcomes of emergency cholecystectomy (EC) and bridging PC for patients with moderate and severe AC.

Materials and Methods

A retrospective analysis was conducted on 328 patients with moderate and severe AC who underwent cholecystectomy at Riga East University Hospital between 2018 and 2023. Patients were categorized by TG18 severity criteria and subdivided into the EC and preoperative PC groups. Outcomes were analyzed and compared.

Results

For moderate AC (n=296), patients who underwent PC were older (68 vs 77 years, $p<0.001$), had higher ASA-PF score (50.0% vs 77.3%, $p<0.001$) compared to the EC group. Furthermore, EC was associated with shorter hospital stay (8 vs 14 days, $p<0.001$) and fewer postoperative complications (4.8% vs 12.1%, $p=0.044$). For severe AC (n=32), bridging PC was the preferred treatment (62.5%, $p<0.001$), moreover no significant difference was found between EC and PC groups regarding hospital stay ($p=0.691$) and postoperative complications rate ($p=1.0$). In both moderate and severe AC groups, LC was performed in 86.4% and 70.0% of patients following PC, while incidence of conversion to open cholecystectomy was higher in the EC groups ($p<0.001$). No deaths were observed after PC, while two (16.7%) patients died in the EC group with severe AC.

Conclusions

The upfront surgery approach was associated with shorter hospital stay and fewer postoperative complications in moderate AC, but with a higher rate of conversion. Bridging PC appeared to be a safe treatment approach, and could offer time to prepare for LC even high-risk patients. This study highlights the importance of personalized treatment protocols based on AC severity and patient risk factors.

Management of Rare Complication after Nuss Procedure

Poster

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Objectives*

Aim of the study: To present a case of rare early postoperative complication and its management after Nuss procedure. The Nuss procedure nowadays is well known surgical procedure for repairing pectus excavatum. Pericardial effusion as postoperative complication after Nuss procedure incidence is 1,6 - 3,3% and may cause cardiac tamponade.

Case description: 14 years old boy with pectus excavatum, Haller index 3,2. Nuss procedure with bilateral VATs was performed and two metal bars were inserted. No complications during surgery. Early postoperative period without complications, with stable hemodynamics and normal chest X-ray. Day 5th after surgery: subfebrile temperature appeared. Blood tests showed increased inflammatory markers. Day 7th: X-ray showed segmental pneumonia, antibacterial therapy was started. Day 8th: pleural cavity ultrasonography (US) showed 3 cm of fluid in both sides. Day 10th: US suggested increased volume of fluid in pleural cavities and concerned of fluid in pericardium. Transthoracic echocardiography (TTE) - fluid in pericardium. Deviations in electrocardiogram. Emergency pleural and pericardial drainage with transesophageal echocardiography (TEE) was performed – 700 ml sanguineous fluid from pericardium and 1000 ml of serosanguineous fluid from pleural cavities was obtained. Daily TTE was performed. Drains from pericardium and pleural cavities evacuated on 14th and 15th day accordingly, discharged day 18th on peroral antibacterial therapy.

Conclusions: Indications for routine TTE and US of pleural cavity after Nuss procedure to exclude pericardial effusion remains controversial, but it is strongly recommended if the clinical course is not smooth.

Surveillance of Chronic Kidney Disease

Kidney Replacement Therapy in Latvia: Five-Year Analysis of Demographics, Trends, and Regional Disparities

Oral

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Objectives*

The study aimed to analyze 5 years of data from the Latvian Kidney Patients Database (LKPD) on patients receiving kidney replacement therapy (KRT) in Latvia, highlighting regional differences.

Materials and Methods

LKPD contains data on all kidney transplant recipients and 89% of hemodialysis (HD) and peritoneal dialysis (PD) patients in Latvia over the past 5 years. Microsoft Excel was used to create and analyse the LKPD data.

Results

The total number of KRT patients rose from 1040 in 2019 (585 transplant recipients, 358 HD, 97 PD) to 1129 in 2023 (568 transplant recipients, 457 HD, 104 PD). The mean number of patients starting KRT was 136 ± 32 , with the lowest number recorded in 2020 – 105.

The median age of new KRT patients decreased from 65 years [1-91] in 2019 to 63 years [22-93] in 2023. A stable male predominance was observed, with 58% of new patients being male. The leading causes of end-stage kidney disease were diabetes mellitus (21%), glomerular disease (18%), pyelonephritis (12%), hypertension (11%), and autosomal dominant polycystic kidney disease (9%).

Regional distribution of prevalent KRT patients in 2023 showed a concentration in Riga and its suburbs (822 patients, including 544 transplant recipients), followed by Vidzeme (382 patients), Kurzeme (404 patients, down from 444 in 2021), Zemgale (288 patients), and Latgale (318 patients). The total number of patients increased in all regions except Kurzeme, which experienced a decline. The number of kidney transplant surgeries ranged from 28 in 2021 to 46 in 2023.

Conclusions

The number of KRT patients in Latvia has steadily increased from 2019 to 2023, with notable regional variations and a consistent male predominance, highlighting the need for further research to adjust prevalence and incidence rates to regional population sizes and address healthcare disparities.

Telemedicine

Evaluating a Telemedicine-Integrated Workflow to Enhance Acute Ischemic Stroke Care: Protocol for Observational Multicenter Study

Oral

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Objectives*

The study aims to investigate the impact of a telemedicine-integrated care pathway tailored for the “drip-and-ship” model on reducing treatment delays and improving clinical outcomes in patients with acute ischemic stroke due to large vessel occlusion (AIS-LVO).

Materials and Methods

This multicenter, prospective study involves primary and tertiary stroke care centers across Europe. The proposed pathway incorporates a telemedicine platform for real-time clinical and imaging data sharing, enhancing interprofessional collaboration and facilitating direct patient transfers from primary to comprehensive stroke centers. The workflow aims to bypass traditional delays, such as emergency department triage, by directly transferring eligible patients to neuro interventional suites. Key primary outcomes include door-to-groin puncture (DTG) and door-to-reperfusion (DTR) times, successful recanalization rates (mTICI \geq 2b), and functional independence (mRS \leq 2) at three months. Secondary outcomes will include protocol adherence, technology usability, and healthcare equity.

Results

The study has commenced with retrospective data collection and the creating of a prospective data file to enable systematic data collection for evaluating the future telemedical implementation. It is hypothesized that implementing the telemedicine-integrated workflow will significantly reduce treatment delays, improve patient outcomes, and provide a scalable model for time-sensitive care. Expected findings include a reduction in DTR times by 20-30%, along with higher rates of functional independence compared to traditional care pathways.

Conclusions

This future study will explore the potential of digital health innovation in acute stroke management. By integrating a new telemedicine tool, the streamlined workflow is anticipated to transform acute stroke care by reducing time-to-treatment, improving patient clinical outcomes, and optimizing resource allocation across diverse healthcare settings.

Latvian Primary Care Physicians’ Attitudes and Intentions to Use Telemedicine in Daily Practice

Poster

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Objectives*

Telemedicine includes communication via e-mail, online messaging platforms, video calls and phone calls. The aim of this study was to explore the attitudes of family doctors in Latvia towards the use of telemedicine in daily practice during consultations with their patients, using the PAIT questionnaire (Physicians’ Attitudes and Intentions to use Telemedicine), created in Sweden in 2019.

Materials and Methods

A descriptive, cross-sectional on-line study, September-December 2024. The anonymous questionnaire was distributed to 500 practicing Latvian family doctors of various ages and years of experience, and analysed using descriptive statistics.

Results

In total, 200 questionnaires were completed (40% response rate). Only 30 respondents (15%) declared that they keep themselves up-to-date with healthcare digital tool development. Reported use of telemedicine depended on the modality: 99 respondents (49.5%) had used video consultations at least once, 161 respondents (80.5%) used chat platforms, 189 respondents (94.5%) used e-mails and 190 respondents (95%) used text messages in their everyday work.

Respondents were asked to evaluate their opinion of using different consultation methods using a Likert scale (1=“not using at all”, 7= “using very much”). Use of face-to-face consultations had a mean overall score of 6.55, while, use of video consultations had a much lower score of 2.38.

Only 19 respondents (9.5%) felt experienced in monitoring chronic diseases using digital tools, while 29 respondents (14.5%) stated they have no experience of this at all, with an overall mean score of 3.99.

Regarding video consultations, 39 respondents (19.5%) strongly disagreed that if they had the opportunity they would use this in their daily work, but 52 respondents (26%) stated they would use digital tools more often for monitoring chronic diseases.

Conclusions

Our data suggest that the use of different digital contact methods is in common use among Latvian family doctors, while monitoring chronic diseases using digital tools is little used.

Treatment Methods for Hard-to-Treat Infections

Advanced Hydrogel Platforms: Cross-linked Polypeptide for Non-Antibiotic Antibacterial Applications

Oral

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Objectives*

Antibiotic resistance and bacterial infections remain critical global health challenges, highlighting the urgent need for innovative, locally effective therapeutic approaches. This study focuses on the development of advanced non-antibiotic hydrogels, utilizing a chemically cross-linked ϵ -polylysine-hyaluronic acid (ϵ -PL-HA) polypeptide matrix, offering a potential breakthrough in infection management strategies.

Materials and Methods

A series of ϵ -PL-HA hydrogels were synthesized using 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide (EDC) and N-hydroxysuccinimide (NHS) as cross-linking agents, with varying ϵ -PL to HA mass ratios. Comprehensive characterization of physicochemical features (molecular structure, morphology, viscoelastic properties etc. of the hydrogels was performed. Advanced antibacterial testing was conducted *in vitro* against both ATCC and clinically isolated multidrug-resistant Gram-positive and Gram-negative bacterial strains.

Results

The physicochemical characterization of the ϵ -PL-HA hydrogels revealed the formation of amide bonds between ϵ -PL and HA, solid-like viscoelastic behaviour with tissue-favourable stiffness modulus from 10-15 kPa, autoclavability, smooth surface topology and macroporosity. Selected formulations exhibited potent bactericidal activity (up to 168h) against both reference (*E.coli*, *S.aureus*, *S.epidermidis*) strains and clinically isolated (*P.aeruginosa*), including multidrug-resistant (MRSA and ESBL *E.coli*) Gram-positive and Gram-negative bacteria. Further studies revealed bacteria inability to develop resistance against antibacterial component of the performed matrix - ϵ -PL within 10 passages.

Conclusions

This study presents a versatile biomaterials platform based on chemically cross-linked ϵ -PL/HA hydrogels, offering tunable properties influenced by the feed ratio of the biopolymers. The formulations exhibited therapeutic antibacterial activity against a range of pathogens and retained their functional properties after steam sterilization, highlighting their potential for clinical translation.

Acknowledgement

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Ultrasound in Obstetrics and Gynaecology

Ophthalmic Artery – Is it Possible in our Setting?

Oral

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Objectives*

The ophthalmic artery is easily accessible for Doppler assessment, providing insights into intracranial circulation. In preeclampsia, it shows reduced flow resistance and increased velocities compared to normotensive pregnancies. Recent studies highlight its cost-effective and accurate use as a biomarker for predicting preeclampsia, comparable to PLGF and sFlt-1 tests, though requiring specialised expertise for precision

Materials and Methods

We conducted a prospective pilot study in pregnant women with singleton pregnancies, referred for third-trimester ultrasound at 35–36 weeks of gestation at Rīga Maternity Hospital. Ethical approval for the study was obtained from the Rīga Stradiņš University Ethics Committee. Additionally, all women provided informed consent prior to their inclusion. One ultrasound specialist (NV) performed the assessments, measuring the ophthalmic artery flow velocities in 50 pregnant women.

The mother was placed in the supine position, and a linear transducer was gently placed over her closed upper eyelid after applying conduction gel. Color flow Doppler was used to identify the ophthalmic artery, which was located superior and medially to the optic nerve. Pulsed-wave Doppler recorded 3–5 similar waveforms. Settings included an angle of insonation $<20^\circ$, a sample gate of 2 mm, a depth of 3.0–4.5 cm, a high-pass filter of 50 Hz, and a pulse repetition frequency of 125 kHz. The average of 4 measurements (2 from each eye) was obtained. The measurements were completed within a timeframe of 2 to 4 minutes.

Results

In two women, the ophthalmic artery could not be visualized, which may be attributed to a history of astigmatism and retinal dystrophy. The average peak systolic velocity ratio in the normotensive group was 0.45–0.59 cm/sec, compared to increased measurements (0.59–0.79 cm/sec) in the hypertensive group, superior to the uterine artery pulsatility index.

Conclusions

This method is easy to learn, quick to perform, and provides insights into hypertensive complications. Residents can use it to refine their skills.

Placental Development: Spontaneous Versus Assisted Reproductive Techniques

Oral

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Objectives*

Assisted Reproductive Techniques (ART) are associated with an increased risk of defective placentation and placental insufficiency, contributing to preeclampsia (PE) and intrauterine growth restriction (IUGR). This study hypothesizes that pregnancies conceived through ART exhibit detectable impairments in placental volume and vascular development during the first trimester, measurable through 3D Doppler ultrasound.

Materials and Methods

The study included 40 healthy women with ART pregnancies and 40 with spontaneous pregnancies, enrolled during their first visit for first-trimester screening. Placental volume (PV), vascular index (VI), flow index (FI), and vascularization flow index (VFI) were measured using 3D VOCAL software in the first and second trimesters. The placental quotient (PQ) was calculated as PV (cm³) divided by crown-rump length (CRL) (cm) to account for gestational age.

Results

Both groups were demographically comparable, except for age. No significant differences in vascular indexes (VI, FI, VFI), PV, or PQ were observed. Potential reasons for the lack of differences include the small sample size and the timing of measurements, which may need to occur earlier in pregnancy, around week 10.

Conclusions

This study found no significant differences in placental volume or vascular indexes between ART and spontaneous pregnancies. These findings suggest that placental functional impairment in ART pregnancies may not be directly related to reduced placental size or blood flow. Further research is needed to explore alternative markers of placental function, including earlier measurements and potential correlations between embryo quality and known complications.

Routine Third Trimester Ultrasound Nowadays

Oral

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Objectives*

The importance of third-trimester ultrasound screening lies in its potential to detect late-onset fetal anomalies and refine fetal growth assessments. Our main objectives were to determine the incidence and types of fetal anomalies observed during routine third-trimester ultrasound scans.

Materials and Methods

A retrospective cohort study was conducted, analysing data from patient files who gave birth at Riga Maternity Hospital from November to December 2023. A total of 322 cases were identified (singleton pregnancies with one or more third-trimester ultrasound scans performed at a perinatal care center and no fetal anomaly identified during the second-trimester ultrasound scan). Statistical analysis was performed using IBM SPSS 29.0.

Results

From a total of 322 patients, 46,3% had their last ultrasound performed at 36–37 weeks. A statistically significant difference was found between fetal weight percentile measured on the last third-trimester ultrasound and birth weight percentile recorded postpartum in cases when last ultrasound was done at 33-35 weeks ($p=0.003$) and at 36-37 weeks ($p<0.001$).

A third-trimester ultrasound revealed newfound anomalies in 21.7% of patients, most often at 38 weeks or later. Common findings included increased uterine artery pulsatility index measured by Doppler, which may have an impact on fetal growth (30–32 weeks); macrosomia (33–35 weeks); and macrosomia with polyhydramnios (36–37 weeks); with polyhydramnios being most common at 38 weeks or later. Other observed anomalies were IUGR (18%), hydrocele (6,7%), macrocephaly (3,4%), premature maturation of placenta (3,4%).

This is an ongoing study and more elaborate data will be presented at the conference.

Conclusions

Third-trimester ultrasound scans are important for identifying anomalies and changes in fetal growth patterns that may not be apparent earlier, enabling timely interventions to improve perinatal outcomes. The gestational age at the time of the last scan can impact the range of findings and their significance.

Vasa Praevia: 10-Year Retrospective Analysis at Riga Maternity Hospital, 2014–2024

Oral

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Objectives*

Vasa praevia is a rare but serious condition where fetal blood vessels cross the lower uterine segment near the cervix, unprotected by the placenta or cord, risking rupture during labor. Currently, there are no unified guidelines for routine screening in all pregnancies.

Materials and Methods

Retrospectively, we reviewed 7 cases of vasa praevia diagnosed at Riga Maternity Hospital between 2014 and 2024.

Results

Initially, 10 cases were identified, but 3 were excluded due to lack of evidence. Among the 7 cases, 4 were associated with velamentous cord insertion, and 3 with bilobed placenta. Outpatient ultrasonography diagnosed 5 cases, highlighting the importance of prenatal imaging. However, 2 cases were only identified upon hospital admission due to bleeding, stressing the need for vigilance in late pregnancy and proper second-trimester screening.

Emergency cesarean deliveries were performed in 2 cases: one at 37+4 weeks after an outpatient diagnosis and another at 37+0 weeks following admission for bleeding. The remaining 5 cases—4 diagnosed outpatient and 1 admitted for bleeding—were managed with planned cesarean deliveries between 36 and 38 weeks. However, deliveries at 38 weeks were likely too late due to delayed identification and intervention. Despite efforts, complications were significant. Pathological blood loss occurred in 3 cases, with B-Lynch sutures needed in one to control hemorrhage. Perinatal hypoxia was observed in 5 cases, and neonatal anemia in 1, highlighting the substantial risks of late diagnosis and delivery.

Conclusions

This analysis emphasizes the importance of early and accurate prenatal diagnosis of vasa praevia through advanced ultrasound. Timely interventions, such as well-planned cesarean sections, are vital to prevent severe complications for both mother and baby. Inadequate or inconsistent screening protocols increase the likelihood of missed diagnoses, leading to higher maternal and neonatal risks. Future research should focus on creating standardized screening protocols to enhance early detection and reduce perinatal morbidity/ mortality.

Approach to Transplacental Therapy of Pathological Fetal Tachycardias: Distinct Cases

Poster

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Objectives*

Fetal tachycardia presents significant risks, including low cardiac output, fetal hydrops, and neurological impairment. While treatment options for supraventricular tachycardia (SVT) are not always effective, this report showcases the successful use of Digoxin and Sotalol for severe SVT with hydrops and Metoprolol for early SVT.

Case 1: 29 yo woman was diagnosed with fetal ascites and persistent fetal tachycardia (FHR 260-280/min) at 25⁺⁴ weeks. Fetal echocardiography revealed SVT with 1:1 AV conduction, tricuspid and mitral valve regurgitations, and cardiomegaly, but no structural defects. Initial treatment with Metoprolol (300 mg/day) was ineffective, as FHR reached 300/min and hydrops progressed. At 27⁺⁶ weeks, treatment was switched to Sotalol (480 mg/day) and Digoxin (0.75 mg/day), resulting in FHR 130/min and the resolution of ascites by 30 weeks. Cardiomegaly improved by 32 weeks, and FHR normalized to 118/min by 34 weeks. Due to abnormal umbilical Doppler and malpresentation, cesarean section at 37⁺⁵ weeks resulted in a 3700 g neonate (Apgar 7/8). Postnatal ECG was normal, and the child remained healthy at 2 years, receiving Propranolol until 1 year of age.

Case 2: 30 yo primigravida was incidentally diagnosed with fetal SVT (210-218/min) at 22⁺⁴ weeks. No signs of heart failure were noted. Metoprolol (50 mg/day) was started, restoring SR with good maternal tolerance. The baby was born spontaneously at 36⁺⁶ weeks, with a birth weight of 3175 g (Apgar 8/9). Postnatally, Propranolol (1,5 mg/kg/day) was continued, the baby remained healthy at 6 months.

These two distinct cases underscore the importance of individualized management. The choice of treatment depends on different factors. In cases with hydrops, Digoxin has limited placental transfer, while transplacental Metoprolol therapy can be effective. In our refractory case, sinus rhythm was achieved only after maximal doses of Sotalol and Digoxin, emphasising the need for personalised treatment plans.

Case of Acheiria after Conception with Donor Oocytes

Poster

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Objectives*

Acheiria is a rare congenital condition affecting the upper limbs, defined by the absence of a hand. We report a case identified during a first-trimester ultrasound examination in a patient who underwent assisted reproductive treatment using donor oocytes and preimplantation genetic screening.

The patient, a 44-year-old female with poor ovarian response and a 38-year-old male partner aimed to conceive following a history of previous reproductive challenges. Both partners' karyotypes were normal. Recessive disorder carrier screening for the male partner and the oocyte donor was done and revealed no additional reproductive risks. Throughout the reproductive treatment, three ovarian stimulations failed, and the pair proceeded with the egg donation cycle. After unsuccessful frozen embryo transfer (FET), the pre-receptive endometrium and low CD56 cell (40 cells/mm²) count in the endometrium were found. The patient received endometrial platelet-rich plasma treatment and the pregnancy proceeded successfully. During the first-trimester ultrasound investigation, unilateral left-side acheiria was found. Several hyperechogenic points were present at the finger projection place, giving the impression of the rudimentary soft tissue of the fingers. Detailed visualization of the palm's anatomy was impossible due to the early gestation. Measurements of upper limb long bones corresponded to normal values for gestational age bilaterally. No signs of amniotic bands or other anatomical deviations were present. Patients received the clinical geneticist consultation, even though they decided to terminate the pregnancy.

Acheiria is a rare malformation that can be detected during the first anatomical scan. However, identifying additional abnormalities or syndromic forms at this gestational stage remains challenging. For patients who undergo oocyte donation, the diagnosis can carry additional psychological distress, as feelings of guilt, anxiety or frustration may arise regarding the reproductive process and its outcome. While elucidating risk factors is essential, the rarity of this condition complicates efforts to address the issue comprehensively.

Case Report of Osteogenesis Imperfecta Type II-rare Lethal Disorder

Poster

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Objectives*

Osteogenesis imperfecta (OI) is a heterogeneous disorder characterized by bone fragility, multiple fractures, bone deformity, and short stature. A deficiency in collagen type I synthesis contributes to bone brittleness and its significant phenotypic consequences. We present a case of severe, perinatally lethal OI form.

A 38-year-old G4P3 woman with three healthy children was evaluated during the first-trimester scan. At the time of examination (The crown-rump length =84 mm), enlarged nuchal translucency (4,85 mm), an impression of defective cranial ossification and femur deformation were present. Chorion biopsy revealed no chromosomal pathologies. The ultrasound test at 16+5 weeks revealed caput membranaceus, shortened limbs, deformed long bones, and rib deformities. Diminished transverse trunk diameter and ascites were observed. US results contributed to the possible lethal phenotype of OI type II. The parents were counseled about possible options for pregnancy prolongation and termination. In search of potential treatments, the patient agreed to enroll in an experimental therapy involving umbilical stem cells for OI type III. Unfortunately, the genetic examination confirmed OI type II. The patient opted to continue the pregnancy, which progressed until 32 weeks of gestation when premature labor commenced due to polyhydramnios. The infant succumbed immediately following delivery.

OI type II is exceptionally severe and perinatally lethal. Based on pathogenesis and multiple early bone fractures, the optimal period for prenatal diagnosis is the first-trimester screening. The ideal timeframe for confirming the diagnosis is 16 gestational weeks, and an expert skeletal ultrasonogram would be advantageous. Approval of a specific OI type is essential for allowing experimental, though promising, treatment possibilities. The prompt diagnosis may alleviate anxiety and frustration for the patient and give time for tailored family decisions.

Clinical Insights into Agenesis of the Septum Pellucidum: Case Report

Poster

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Objectives*

Agenesis of the septum pellucidum (ASP) is the incomplete development of the membrane separating the brain's lateral ventricles. It can occur alone or with other abnormalities, often linked to complex conditions like holoprosencephaly or corpus callosal agenesis. While isolated ASP typically has a favorable prognosis, 14% of cases may involve additional anomalies that impact outcomes.

We present a case of isolated ASP that involved a challenging consultation and management process. A 27-year-old (G2P1) pregnant woman underwent anomaly ultrasound in the second trimester, which revealed collapsed anterior horns and absent cavum septum pellucidum. The full length of the corpus callosum, A. pericallosum, and optic chiasma were visualised. There was uncertainty regarding proper brain lamination in the frontal regions.

First-trimester screening showed low risks for T21, T18, and T13, with incomplete nasal bone ossification observed. NIPT indicated low risk, and the 16-week ultrasound showed no pathology. A differential diagnosis for septo-optic dysplasia (SOD) was considered due to similarities in presentation. SOD is a rare congenital disorder characterized by optic nerve hypoplasia, pituitary dysfunction, and midline brain malformations, including agenesis of the septum pellucidum. A consultation on neuronal migration disorders was also provided.

The family opted to continue the pregnancy, and further testing, including amniocentesis, Chromosomal Microarray Analysis, and MRI, confirmed the diagnosis. The pregnancy progressed without complications, and the baby was born at 38+1 weeks, weighing 2935 g, with an APGAR score of 9/9. At 3 months, the child had normal hearing, age-appropriate vision, and MRI confirmed isolated agenesis of the septum pellucidum.

A comprehensive knowledge of brain anatomy, combined with the use of advanced ultrasound settings, is vital for identifying subtle structures and recognizing related anomalies. A detailed antenatal study of the optical tract, optical nerve and optical chiasma in fetuses with ASP is essential to identify SOD.

Ultrasonographic and Hysteroscopic Diagnosis of Adenomyosis: Case Study

Poster

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Objectives*

The objective of this case study is to evaluate the role of imaging techniques in diagnosing and confirming **adenomyosis**, as well as differentiating it from other conditions.

The study is based on the analysis of a clinical case involving a 37-year-old patient, diagnosed with secondary infertility for two years. Data were obtained through clinical monitoring, **Ultrasound** examination, complemented by **hysteroscopy**, review of medical records, and a comprehensive literature review.

The patient's obstetric history included complications such as a miscarriage and a previous C-section. Clinical examination revealed an enlarged uterus with a firm consistency and tenderness upon palpation. US findings indicated a slight asymmetry of the uterine walls, the presence of black subendometrial cysts, white islands, and deformation of the uterine cavity. Color Doppler velocimetry proved useful in distinguishing vascularized structures from non-vascularized adenomyotic cysts. Hysteroscopy further identified an irregular endometrium with tiny surface openings, marked hypervascularization, a “strawberry-like” appearance, fibrous cystic intrauterine lesions, and hemorrhagic cystic lesions with a dark blue hue, confined to the superficial layer of the endometrium.

In conclusion the use of advanced imaging techniques, such as **Ultrasound**, and endoscopic methods, like **hysteroscopy**, plays a crucial role in confirming the diagnosis of adenomyosis. These tools are also vital for distinguishing adenomyosis from other uterine conditions, enabling accurate and timely management of infertility.

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