sciendo

PROCEEDINGS OF THE LATVIAN ACADEMY OF SCIENCES. Section B,
Vol. 79 (2025), No. 1/2 (754/755), pp. 43–70.

DOI: 10.2478/prolas-2025-0005

83rd INTERNATIONAL SCIENTIFIC CONFERENCE ON MEDICINE AND HEALTH SCIENCES OF THE UNIVERSITY OF LATVIA: INTERNAL AND CARDIOVASCULAR MEDICINE

On 25 April 2025, the University of Latvia in Rīga is hosting the International Scientific Conference on Medicine organised within the frame of the 83rd International Scientific Conference of the University of Latvia (see for details: Leja, M., Stonāns, I. 83rd International Scientific Conference on Medicine and Health Sciences of the University of Latvia: Basic Medical Science and Pharmacy, p. 19, this issue).

The "Internal and Cardiovascular Medicine" section includes a broad and interdisciplinary collection of abstracts reflecting important clinical and scientific developments in the fields of internal medicine, cardiovascular health, metabolic and autoimmune diseases, and infection management.

Within the area of diabetes and metabolic disorders, the studies provide insights into the interactions between chronic hepatitis C infection and type 2 diabetes, highlighting mechanisms of insulin resistance and glycaemic control challenges. Age-related cardiovascular complications in diabetics are analysed, highlighting the increased risks and necessary preventive strategies in elderly patients. Machine learning-based predictive modelling is applied to diabetes risk, validating the significance of BMI and HbA1c as predictors, thus underscoring the importance of precise and early interventions. Additionally, post-transplantation diabetes mellitus in kidney transplant recipients and continuous glucose monitoring studies reveal novel risk factors and early markers of disease progression, illustrating the need for targeted clinical management and personalised patient care strategies.

The autoimmune and inflammatory conditions cluster highlights advancements in the understanding of complex autoimmune pathologies and their diagnostic profiles. Studies investigate associations between autoantibodies, interstitial lung disease, systemic sclerosis, and systemic lupus erythematosus, emphasising the diagnostic utility of antibody profiles combined with imaging and capillaroscopy data. Furthermore, research on autoimmune liver diseases highlights the high prevalence and significance of concurrent extrahepatic autoimmune diseases and underscores the need for comprehensive diagnostic and treatment protocols in clinical practice.

In cardiovascular medicine, several abstracts present sophisticated prediction models for atrial fibrillation utilising clinical medication data, thereby advancing patient risk stratification and preventive care. Additional contributions focus on heart failure patient profiling, exploring the clinical, biochemical, and echocardiographic characteristics essential for precise clinical assessment. Metabolic and hormonal disorders such as acromegaly are also evaluated, focusing on treatment effectiveness and metabolic comorbidities, further enhancing the understanding of disease management and patient prognosis.

Gastrointestinal and kidney disease management studies address clinical challenges and therapeutic outcomes. Investigations on gastroesophageal reflux disease provide insights into age-related clinical presentations, enhancing patient-specific diagnostic approaches. Additionally, studies on colorectal polyps emphasise early detection through improved screening methods, while research on malnutrition prevalence in dialysis patients stresses the importance of nutritional management to reduce adverse health outcomes. The significant impact of haemodialysis on patient employment and quality of life highlights the broader socioeconomic implications of chronic kidney disease treatment.

Finally, research in infectious diseases examines critical care quality indicators, notably in managing *Staphylococcus* aureus bacteraemia, assessing adherence to treatment protocols, and evaluating patient outcomes. Antimicrobial stewardship initiatives through regular ward rounds demonstrate measurable improvements in antibiotic use and clinical outcomes, reinforcing the importance of multidisciplinary and educational approaches in healthcare practice.

Collectively, these abstracts illustrate the complex research activities that have implications for improving clinical outcomes, promoting innovative diagnostic techniques, and advancing patient-centred care across the disciplines of internal and cardiovascular medicine.

Ilmārs Stonāns

MUPIROCIN SUSCEPTIBILITY IN METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* STRAINS ISOLATED IN VILNIUS, LITHUANIA, IN 2024

Pfeifer, Lea-Sophie[1], Bratchikov, Maksim[2], Kirkliauskienė, Agnė[2], Kučinskienė, Živilė[3], Miciulevičienė, Jolanta[3], Ragalevičiūtė, Kotryna[4], Vizujė, Greta[4]

[1] Vilnius University, Vilnius, LITHUANIA; lea-sophie.pfeifer@mf.stud.vu.lt

[2] Department of Physiology, Biochemistry, Microbiology, and Laboratory Medicine, Institute of Biomedical Sciences, Faculty of Medicine, Vilnius University, Vilnius, LITHUANIA

[3] Laboratory Medicine Centre, Vilnius City Clinical Hospital, Vilnius, LITHUANIA

[4] Microbiology Laboratory, Republic Vilnius University Hospital, Vilnius, LITHUANIA

Background. Methicillin-resistant *Staphylococcus aureus* (MRSA) remains an important pathogenic and invasive organism, particularly in wounds. MRSA poses a significant threat in healthcare facilities due to its resistance to multiple antibiotics, leading to various complications such as sepsis, pneumonia, and skin infections. Colonisation with MRSA significantly increases the risk of adverse health outcomes. Preventing and treating MRSA infection and transmission among hospitalised patients is a critical priority for patient safety. Mupirocin can be an important component, contributing to the prevention of MRSA and eradication of nasal MRSA colonisation.

Aim. To determine the antimicrobial susceptibility to mupirocin in methicillin-resistant *Staphylococcus aureus* strains from clinical samples.

Methods. Clinical samples from patients were collected between January and November 2024 at Hospital A and Hospital B. The strains were analysed using standard microbiological methods to confirm the presence of MRSA. All MRSA strains were stored and tested in the Microbiology Department in the Faculty of Medicine, Vilnius University. Low- and high-level mupirocin resistance was screened using 5 μg and 200 μg discs (Liofilchem®, Italy), respectively, by disk diffusion (EUCAST v.12.0), and confirmed by the gradient method (E-test 0.064-1024 mg/l, Liofilchem®, Italy), and additionally, qPCR testing (Rotor-GeneQ, QIAGEN) was conducted to validate the results by examining the prevalence of genes encoding mupirocin resistance (mupA and mupB).

Results. During the study, a total of 95 MRSA strains were examined. The majority of MRSA isolates were isolated from skin and soft tissues (65.3%), followed by blood (14.7%), respiratory tract (7.4%), urine (4.2%), and other specimens (8.4%). The mean age of the patients was 65.6 years of age. 36.8% of MRSA strains were isolated from women, and 63.2% from men. 78.9% of specimens were collected at Hospital A, while 21.1% were collected at Hospital B. All 95 MRSA strains were tested for mupirocin resistance using 5 μg and 200 μg discs and showed an inhibition zone of 14 mm and 30 mm. Using the gradient method, the results demonstrated a Minimum Inhibitory Concentration of mg/l in all cases. qPCR analysis for mupA and mupB genes revealed that these genes were not detected in any strains.

Conclusion. The tested methicillin-resistant *Staphylococcus aureus* strains were found to be susceptible to mupirocin. No low- or high-level resistance was identified among the isolated strains. Therefore, mupirocin can be effectively used to treat skin and soft tissue infections and eradicate nasal carriage in high-risk pollutions of Vilnius, Lithuania.

Acknowledgments. The authors declare the absence of a conflict of interest.

PANTON-VALENTIN LEUKOCIDIN GENE PREVALENCE IN HOSPITAL-ACQUIRED *STAPHYLOCOCCUS AUREUS* STRAINS IN VILNIUS, LT

Schneider, Lilian Jenny Babette[1], Misevič, Adam[1], Miciulevičienė, Jolanta[2], Vizujė, Greta[3], Bratchikov, Maksim[4], Ragalevičiūtė, Kotryna[3], Kučinskienė, Živilė[2], Kirkliauskienė, Agnė[4]

[1] Faculty of Medicine, Vilnius University, Vilnius, LITHUANIA; lilian.schneider@mf.stud.vu.lt

[2] Laboratory Medicine Centre, Vilnius City Clinical Hospital, Vilnius, LITHUANIA

[3] Microbiology Laboratory, Republic Vilnius University Hospital, Vilnius, LITHUANIA

[4] Department of Physiology, Biochemistry, Microbiology, and Laboratory Medicine, Institute of Biomedical Sciences, Faculty of Medicine, Vilnius University, Vilnius, LITHUANIA

Background. *Staphylococcus aureus* (*S. aureus*) infections play a serious role in hospital-acquired infections. An important virulence factor of *S. aureus* is the Panton-Valentin Leukocidin Toxin (PVL), whose gene consists of *lukS-PV* and *lukF-PV* genes. PVL is a pore-forming toxin and can cause serious complications like leukocytolysis and tissue

necrosis, even in young, generally healthy individuals. Complications of PVL-producing strains of *S. aureus* are especially found in methicillin-resistant *S. aureus* (MRSA).

Aim. The study aimed to evaluate the prevalence of the *lukF-PV* gene in MRSA strains isolated in hospital settings in Vilnius, Lithuania.

Methods. The retrospective study was conducted from 2 January 2024, to 1 November 2024. All MRSA strains were isolated from hospitalised adult patients (> 18 years) and identified using the MALDI-TOF MS-based VITEK® MS Microbial Identification System (*bioMérieux*, France) in the microbiology laboratories of Vilnius City Clinical Hospital and Republican Vilnius University Hospital. MRSA strains isolated from the same person repeatedly were excluded from the study. Collected MRSA strains were stored and tested in the Microbiology Department in the Faculty of Medicine, Vilnius University. All MRSA lysates were analysed for the *lukF-PV* gene and 16S rRNA coding sequence targets by our designed real-time PCR protocols. The 16S rRNA target was applied as an internal PCR control. The reactions were performed using a Rotor-GeneQ 5plex HRM thermal cycler (*QIAGEN*, Germany). Data was analysed using *MS Excel* and *SPSS Statistics* software.

Results. 95 MRSA strains were collected, 14 were excluded, and 81 were tested for *lukF-PV* gene presence during the study period. The study included 33.3% (n = 27) female and 66.7% (n = 54) male patients. MRSA strains were isolated from skin and soft tissues (64.2%, n = 52), blood (16.0%, n = 13), respiratory tract (8.6%, n = 7), urine (4.9%, n = 4), and from other specimens (6.2%, n = 5). 75.3% (n = 61) of strains were PVL-positive, and 24.7% (n=20) were PVL-negative. Of all 61 PVL-positive strains, 68.9% (42/61) were isolated from skin and soft tissue specimens, 16.4% (10/61) from blood, 4.9% (3/61) from the respiratory tract, 3.3% (2/61) from urine, and 6.6% (4/61) from other specimens. 76.9% (10/13) of MRSA strains isolated from blood contained the *lukF-PV* gene.

Conclusion. Of all MRSA strains isolated in 2024, 75.3% were PVL-positive. PVL-positive MRSA strains were mostly found in skin and soft tissue specimens. 76.9% (10/13) of MRSA strains isolated from blood were PVL-positive.

Acknowledgements. No conflict of interest to declare.

PREDICTING FACTORS OF TWO-STENT STRATEGY FOR TRUE CORONARY BIFURCATION TREATMENT

Vasecko, Anastasija, Bolsteina, Eva, Briede, Ieva, Dombrovska, Kristine, Dombrovskis, Andis, Erglis, Andrejs, Jegere, Sanda, Kumsars, Indulis, Laduss, Arnis, Latkovskis, Gustavs, Lismanis, Aigars, Narbute, Inga, Rudzitis, Ainars, Sondore, Dace, Trusinskis, Karlis

Faculty of Medicine and Life Sciences, University of Latvia, Rīga, LATVIA; ezuk34@icloud.com

Background. True coronary bifurcation lesions present unique challenges in interventional cardiology due to their anatomical and haemodynamic complexity. Selecting a two-stent strategy for treating these lesions depends on various factors. Accurate prediction of these factors can guide treatment decisions, optimise outcomes, and reduce complications.

Aim. The aim of this study was to identify and analyse predictive factors — patient clinical characteristics and coronary bifurcation lesions anatomy, associated with the selection of a two-stent strategy for the treatment of true coronary bifurcation lesions, to become better treatment and outcome results.

Methods. This study is a retrospective analysis of the Coronary Bifurcation Treatment registry in Latvia Centre of Cardiology. Patients enrolled in this study were categorised based on whether a one-stent or two-stent strategy was employed. For the analysis and interpretation of data were used the SPSS statistics programme and the Chi Square and Kolmogorov–Smirnov tests, and Microsoft Excel. Statistical analysis was performed to assess the relationship between patient clinical description (sex, hypertension, diabetes, smoking, family history, dyslipidemia, prior MI and others) and coronary bifurcation lesion anatomical characteristics (total number of lesion 50%, number of implanted DES, bifurcation location, RVD in MB, pre-%DS in MB, lesion length in MB, RVD in SB, pre-%DS in SB, lesion length in SB, stent diameter in MB, stent length in MB, number of stents in bifurcation and others) and the chosen stenting approach.

Results. To analyse predictive factors for a two-stent strategy in this study were selected patient clinical description and coronary bifurcation lesion anatomical characteristics. The study included 757 patients, with a two-stent strategy employed in 20% and a one-stent strategy in 80% of cases (n = 152 vs n = 605).

Altogether 703 patients (92.8%) diagnosed with hypertension and only 151 (21.5%) underwent the double stenting technique (p = 0.3). Among the 149 patients with diabetes, 38 underwent double stenting vs 111 diabetic single-stented patients ($p = 0.145$). Dyslipidemia was diagnosed in 91.4% patients and 145 underwent double stenting (21%, $p > 0.05$). Among the patients who also received double stenting, 108 had no history of myocardial infarction (MI),