



# ABSTRACT BOOK 2022



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LITHUANIAN UNIVERSITY  
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Kaunas, 2022

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### Conference winners

| Session   | Abstract title  | Authors  |
|---|---|--|
| <b>Odontology and Maxillofacial surgery</b>                             | Relationship Between Orthodontic Treatment of Class II and Temporomandibular Disorders: A Systematic Review   | Justina Šikšnelytė, Raimonda Guntulytė, Kristina Lopatienė       |
| <b>Cardiology</b>   | Quantitative Flow Ratio suitability for evaluation of the physiology significance of intermediate non-culprit arteries stenosis for STEMI patients in the acute phase | Nojus Jodka, Mindaugas Barauskas, Greta Žiubrytė, Ramūnas Unikas |
| <b>Surgery</b>  | Applicability of five risk prediction models for patients after the repair of ruptured abdominal aortic aneurysm  | Saulė Bikauskaitė, Rokas Kireilis, Linas Velička                 |
| <b>Basic Sciences</b>   | Characteristic patterns of Meckel's diverticulum in patients treated in Hospital of Lithuanian University of Health Sciences Kaunas Clinics in 2002-2019              | Ugnė Kulnickaitė, Lina Poškienė                                  |
| <b>Obstetrics &amp; Gynecology, Neonatology and Paediatrics session</b> | Symptom analysis of paediatric patients with abdominal pain that predict hospitalisation  | Eglė Gelšvartaitė, Andrius Daugėla, Lina Jankauskaitė            |
| <b>Anaesthesiology &amp; Intensive Therapy</b>                          | The effects of small dose ketamine on early postanaesthesia recovery after intraoperative remifentanyl infusions in obese patients.                                   | Viltė Jocaitytė, Darija Savinova, Aurika Karbonskienė            |

| Session                  | Abstract title  | Authors  |
|--------------------------|---|--|
| <b>Internal Medicine</b> | Gastroenteropancreatic neuroendocrine neoplasms in Lithuania 2020: a single-center analysis                           | Gabrielė Cibulskaitė ,<br>Rokas Stulpina, Ugnius Mickys  |
| <b>Radiology</b>         | Crohn's disease activity indices reflecting treatment response  | Augustina Gylienė,<br>Vestina Strakšytė  |
| <b>Neurosciences</b>     | Mir-200a-3p Expression In The Serum Of Patients With Parkinson's Disease  | Violeta Vintortaitė, Aistė Pranckevičienė, Andrius Radžiūnas, Augustina Mišeikaitė, Giedrė Miniotaitė, Paulina Vaitkienė |
| <b>Public Health</b>     | Awareness and attitude of women in Kelmė city towards primary and secondary cervical cancer prevention                | Aistė Ogulevičiūtė, Ieva Armonaitė, Dovilė Dėnaitė, Olga Meščeriakova  |
| <b>Poster</b>            | Association Between Study Load Of The High School Graduates And Subjective Mental Health During The COVID-19 Pandemic | Arminas Zizas, Austėja Judickaitė, Olga Meščeriakova   |

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## Contents

|  |           |
|--|-----------|
| <b>ORAL PRESENTATION SESSIONS .....</b>  | <b>16</b> |
| <b>ANAESTHESIOLOGY AND INTENSIVE THERAPY SESSION.....</b>  | <b>17</b> |
| Comparison of status epilepticus scoring scales for predicting mortality in<br>Neurosurgical intensive care unit.....  | 18        |
| Monitoring the Implementation of the Surgical Safety Checklist.....  | 20        |
| Nutritional assessment of critically ill patients in the NICU according to ESPEN<br>guidelines.....  | 22        |
| Preanesthetic evaluation and non-cardiac surgery: experience at Kaunas Clinics ...   | 24        |
| The value of suprainguinal fascia iliaca blockade for the treatment of postoperative<br>pain after primary hip replacement surgery: a pilot study .....          | 26        |
| Should healthy individuals be considered as non-fluid responders? .....  | 29        |
| The type of anaesthesia and outcomes of mechanical thrombectomy in patients with<br>acute ischemic stroke .....  | 31        |
| The effects of small dose ketamine on early postanaesthesia recovery after<br>intraoperative remifentanyl infusions in obese patients.....                       | 33        |
| <b>BASIC SCIENCES SESSION .....</b>  | <b>35</b> |
| Nevus-associated melanoma: histological subtype association with gender, age, and<br>anatomical localization .....   | 36        |
| The effect of IL-3, IL-5 and GM-CSF on adhesion and proliferative properties of<br>blood eosinophil subtypes in asthma .....                                     | 38        |
| Associations of polymorphism of the NRAS gene and risk factors with Laryngeal<br>Squamous Cell Carcinoma.....  | 40        |
| Evaluation of the impact of MMP8 rs11225395 and MMP14 rs1042704 in the<br>development of Dupuytren's contracture .....   | 43        |
| Association of age-related macular degeneration and macular pigment optical<br>density with rs11057841 SNP in the SCARB1 gene. ....                              | 46        |
| Associations of GJD2 and RASGRF1 gene variants with refractive errors.....   | 48        |
| Pilot study of TBEV detection and replication in permanent cell cultures .....   | 51        |
| Characteristic patterns of Meckel's diverticulum in patients treated in Hospital of<br>Lithuanian University of Health Sciences Kaunas Clinics in 2002-2019..... | 53        |
| Ultrastructural alterations of intracardiac nerves in spontaneously hypertensive and<br>normotensive rats .....  | 55        |
| <b>CARDIOLOGY SESSION .....</b>  | <b>58</b> |



|  |           |
|--|-----------|
| Changes in left ventricle function and structure in patients participating in Heart failure program .....  | 59        |
| QFR vs. visual-estimation guided PCI in STEMI patients: evaluation of the quality of life at 6-month follow up .....   | 61        |
| Quantitative Flow Ratio suitability for evaluation of the physiology significance of intermediate non-culprit arteries stenosis for STEMI patients in the acute phase...       | 63        |
| Association of myocardial injury biomarkers and left ventricular functional parameters in STEMI patients treated with PPCI. ....   | 66        |
| The association between acute coronary syndrome and local Earth magnetic field intensity changes .....   | 68        |
| Relation of myocardial strain and structural parameters in STEMI patients after Primary Percutaneous Coronary Intervention. Cardiac MRI study .....                            | 71        |
| Assessment of right heart pressures, geometry and function in pulmonary hypertension patients: correlation between echocardiographic and right heart catheterization data..... | 73        |
| The impact of obesity on in-hospital clinical outcomes after recanalisation of chronic total occlusions.....   | 75        |
| <b>INTERNAL MEDICINE SESSION.....</b>  | <b>78</b> |
| Associations between Helicobacter pylori infection and non-alcoholic fatty liver disease .....   | 79        |
| Efficacy of different treatment strategies in patients with hepatocellular carcinoma (HCC) in Hospital of LUHS Kauno Klinikos .....  | 81        |
| Factors affecting survival time in patients with hepatocellular carcinoma.....   | 83        |
| Gastroenteropancreatic neuroendocrine neoplasms in Lithuania 2020: a single-center analysis.....   | 85        |
| Analysis of early post-transplant period complications in renal transplant recipients .....  | 88        |
| Health sciences students' knowledge of hepatitis B virus and its primary prevention .....  | 90        |
| <b>NEUROSCIENCES SESSION .....</b>   | <b>93</b> |
| Measuring alexithymia in healthcare professionals: Which factors are related to it?  | 94        |
| Mir-200a-3p Expression In The Serum Of Patients With Parkinson's Disease.....  | 96        |
| The effect of blood pressure on optical coherence tomography parameters .....  | 99        |
| MRI findings association with multiple sclerosis disease course and disability .....   | 101       |
| IL-10 gene rs1800871 single nucleotide polymorphism in patients with multiple  |           |

|   |     |
|---|-----|
| sclerosis.....  | 103 |
| A Genetic Risk Score to Aid Differentiation of ON at presentation .....   | 105 |
| Changes in the prevalence of glaucoma and glaucoma suspects in Lithuania during 2001-2020.....  | 108 |
| Efficacy of artificial intelligence in detecting diabetic retinopathy from retinal fundus images. A systematic review.....                | 110 |
| <b>OBSTETRICS&amp;GYNEACOLOGY, NEONATOLOGY AND PAEDIATRICS SESSION.114</b>  |     |
| Pregnant women knowledge and attitude towards fetal ultrasound.....   | 115 |
| Breastfeeding of newborns born in the Baby-friendly Hospital in the first year of life .....  | 117 |
| Symptom analysis of paediatric patients with abdominal pain that predict hospitalization.....   | 119 |
| Impact of Gestational Diabetes Mellitus on Breastfeeding Practice.....  | 121 |
| The opportunities of lung ultrasound in children with COVID-19.....   | 123 |
| The negative impact of the COVID-19 lockdown on children with ASD: A systematic literature review .....                                   | 126 |
| Analysis of management approaches of ectopic tubal pregnancy and their effectiveness.....   | 129 |
| Vaccination status and parents attitude to vaccination of pediatric patients with rheumatic diseases.....                                 | 131 |
| Comparison of the applied treatment method for gestational diabetes mellitus and obstetric complications .....                            | 134 |
| <b>ODONTOLOGY AND MAXILLOFACIAL SURGERY SESSION.....136</b>   |     |
| The efficiency of photobiomodulation therapy on patients with temporomandibular joint disorder (TMD). Systematic literature review.....   | 137 |
| Evaluation of Postoperative Pain and Discomfort in Patients Undergoing Surgical Exposure of Impacted Maxillary Canines .....              | 140 |
| Relationship Between Orthodontic Treatment of Class II and Temporomandibular Disorders: A Systematic Review.....                          | 142 |
| Efficacy of Conservative Treatment of Peri-implantitis: A Systematic Review .....   | 145 |
| Impact of pathologic tooth migration on oral health related quality of life in adult subjectswith periodontitis. A systematic review..... | 148 |
| Blood type and dental status.....   | 151 |
| Comparison of the expression of Ki-67 marker in ameloblastoma and odontogenic   |     |

|  |            |
|--|------------|
| keratocyst: a systematic literature review.....  | 153        |
| Association between apical periodontitis and root canal treatment in patients with type II diabetes. Systematic review. ....                                 | 156        |
| The incidence of complications after replanting avulsed permanent teeth.....   | 158        |
| <b>PUBLIC HEALTH SESSION .....</b>   | <b>162</b> |
| Attitudes of health care professionals towards COVID-19 vaccine .....  | 163        |
| Analysis of sensitising components of hair dye products available on the Lithuanian market .....   | 165        |
| Emotional state and job satisfaction in hospital staff .....   | 166        |
| Medical students' knowledge of post-exposure prophylaxis for blood-borne viral infections .....  | 169        |
| Awareness and attitude of women in Kelmė city towards primary and secondary cervical cancer prevention .....   | 172        |
| Different attitudes of patients with multiple sclerosis towards COVID-19 vaccination .....   | 174        |
| Burnout, depression and anxiety among healthcare workers .....   | 177        |
| How asthma symptoms are associated with the quality of life among LUHS students .....  | 179        |
| Comparison of incidence from burns in Lithuania by place of residence, gender and age.....   | 181        |
| <b>RADIOLOGY SESSION .....</b>   | <b>184</b> |
| The influence of angiographic factors on the treatment tactics of acute superior mesenteric artery occlusion .....   | 185        |
| An Overview of Single-Centre Experience in Endovascular Therapy for Acute Superior Mesenteric Artery Occlusion .....   | 187        |
| Assessing burnout in radiologists.....   | 189        |
| The added value of SPECT/CT over planar images of lung perfusion scintigraphy in the diagnosis of pulmonary embolism.....                                    | 191        |
| Incidence of SPECT/CT findings non-related to pulmonary embolism in patients referred for lung perfusion scintigraphy with suspected pulmonary embolism..... | 193        |
| Crohn's disease activity indices reflecting treatment response .....   | 195        |
| <b>SURGERY SESSION .....</b>   | <b>198</b> |
| Applicability of five risk prediction models for patients after the repair of ruptured abdominal aortic aneurysm .....                                       | 199        |

|  |            |
|--|------------|
| The influence of different cardioplegia on the development of postoperative lung complications after open-heart surgery.....   | 201        |
| The influence of co-morbidities and smoking on respiratory system complications after open-heart surgeries.....  | 203        |
| Postoperative hypophosphatemia as a prognostic factor for postoperative pancreatic fistula: a systematic review .....  | 205        |
| Percutaneous endoscopic gastrostomy: indications, complications and outcomes   | 207        |
| Early outcomes of open surgical treatment of stenosing tenosynovitis .....   | 210        |
| <b>POSTERS .....</b>   | <b>212</b> |
| <b>ANAESTHESIOLOGY AND INTENSIVE THERAPY SESSION .....</b>   | <b>213</b> |
| Does paracetamol in adjunct to NSAIDS reduce analgesia demand in children undergoing surgery.....  | 214        |
| Effect of anterior femoral nerve branches block on early functional recovery after total knee arthroplasty: a pilot study.....   | 217        |
| Hyperthermic intraperitoneal chemotherapy with cytoreductive surgery: anesthesiologist perspective of 2-year experience in Hospital of Lithuanian University of Health Sciences, Kaunas Clinics..... | 219        |
| Influence of Epidural Analgesia on Pregnant Women with Cardiovascular Disease  | 222        |
| The effects of low dose ketamine on postoperative pain and adverse events after intraoperative remifentanil infusions.....   | 224        |
| Atrial fibrillation rate and relations between complications after a coronary bypass grafting surgery .....  | 226        |
| <b>BASIC SCIENCES SESSION .....</b>  | <b>229</b> |
| Morphological findings at autopsy of people who died from alcoholic liver steatosis and liver cirrhosis.....   | 230        |
| Autopsy findings in motor vehicle occupants involved in fatal traffic accidents.....   | 232        |
| Adipose-Derived Mesenchymal Stem Cells in Cartilage Tissue Regeneration in Osteoarthritis .....  | 234        |
| ERK5 AND H2AX EXPRESSION IN MONOCYTES AND MACROPHAGES EXPOSED TONANOPARTICLES AND AIR POLLUTANTS; EXPERIMENTAL STUDY. ....   | 237        |
| Toxic effects of alcohol on cells of the central nervous system .....  | 239        |
| Urban dust cytotoxicity in human alveolar epithelial cells (A549) with depleted glutathione.....   | 241        |
| Implications of miR-9 in cigarette smoke effects in naïve and desialylated human   |            |

|  |            |
|--|------------|
| alveolarepithelial cells (A549) .....  | 243        |
| The efficacy of nusinersen treatment in spinal muscular atrophy: a systematic review .....   | 245        |
| Impact of experimental hyperglycemia on blood lactate changes in healthy anesthetized swine .....  | 249        |
| <b>CARDIOLOGY SESSION .....</b>  | <b>252</b> |
| The heart failure patients' functional condition impact on the changes in cardiac biomarkers.....  | 253        |
| Analysis of patients diagnosed with Covid 19 virus after cardiac surgery in HLUHS .....  | 255        |
| Assessment of the inhibitors of connexins-43 using Quantitative structure-activity relationship (QSAR) model .....   | 257        |
| Evaluation of cardiac conduction abnormalities and arrhythmia in patients with pulmonary hypertension.....   | 260        |
| <b>INTERNAL MEDICINE SESSION .....</b>   | <b>263</b> |
| Long Covid-19 Syndrome: a systematic literature review.....  | 264        |
| Associations between dyspepsia and obesity in non-alcoholic fatty liver disease patients .....   | 268        |
| Correlation between Health and Demographic Peculiarities of Patients Suffering from Chronic Rheumatic Diseases and Attitude towards Remote Consulting by Rheumatologists ..... | 270        |
| Changes in the mortality from peptic ulcer disease in Lithuania during 1985-2018   | 272        |
| THE VALUE OF METFORMIN IN PANCREATIC DUCTAL ADENOCARCINOMA TREATMENT .....   | 275        |
| Thoracic endometriosis syndrome: a systematic literature review.....   | 278        |
| COVID-19 infection impact on urogenital system: a systematic literature review..   | 282        |
| Patients' knowledge about modifiable risk factors of GERD.....   | 285        |
| <b>NEUROSCIENCES SESSION .....</b>   | <b>288</b> |
| The relation between cerebrospinal fluid oligoclonal bands status and disease related featuresin multiple sclerosis patients. ....   | 289        |
| Oligoclonal bands in relation to paraclinical features in patients with the clinically isolatedsyndrome.....   | 291        |
| Suicide rates inside penitentiary institutions in Lithuania, the UK, the USA and Australia: anarrative literature review .....   | 293        |

|   |            |
|---|------------|
| Mental health literacy - definition, importance, associations with sociodemographic factors: a systematic literature review .....               | 296        |
| <b>NURSING AND REHABILITATION SESSION .....</b>   | <b>299</b> |
| Assessment of patient awareness and satisfaction .....  | 300        |
| A study of the experiences of loved ones involved in decision-making at the end of life.....  | 302        |
| Nurses attitude to the safe administration of medicines during inpatient treatment. ....  | 305        |
| Effect of anti-fatigue mat on muscle electric activity in legs and gluteal region.....  | 307        |
| Nurse managers' emotional intelligence and leadership styles.....   | 309        |
| <b>OBSTETRICS &amp; GYNEACOLOGY, NEONATOLOGY AND PAEDIATRICS SESSION .....</b>  | <b>312</b> |
| Ovarian hyperstimulation syndrome and its relation to pregnancy.....  | 313        |
| Clinical Characteristics and Outcomes of Post-COVID-19 Multisystem Inflammatory Syndrome in Children: A Systematic Review .....                 | 315        |
| An analysis of communication between obstetric specialists and primary care providers during postpartum care in Manitoba, Canada .....          | 319        |
| Effect of delayed cord clamping on neonatal bilirubin levels, jaundice, phototherapy and polycythemia. Systematic review and meta-analysis..... | 321        |
| The effect of melatonin on ovarian function and IVF outcomes: a systematic literature review .....  | 325        |
| Impact of gestational thrombocytopenia on prevalence of postpartum hemorrhage and blood transfusion .....                                       | 329        |
| <b>ODONTOLOGY AND MAXILLOFACIAL SURGERY SESSION.....</b>  | <b>332</b> |
| Orthodontic malocclusions and craniocervical posture: a systematic review .....   | 333        |
| Morphological features of impacted maxillary central incisors: a systematic review .....  | 335        |
| Comparison of students' and dentists' knowledge of the impact systemic diseases have on the dental extraction procedure.....                    | 338        |
| Evaluation of microleakage of light-curing composite used in orthodontic after thermal cycles. An in vitro study.....                           | 340        |
| Force degradation of latex and non-latex orthodontic elastics: systemic review.....   | 343        |
| Relationship between orthodontic malocclusion and fingerprints: systematic review .....   | 345        |

|   |            |
|---|------------|
| Porcelain Veneers Fracture Resistance Systematic Review .....   | 349        |
| Evaluation of the efficacy of osseodensification in enhancing primary and secondary stability of dental implants .....              | 352        |
| Teriparatide administration as an adjunctive treatment in BRONJ patients: a systemic literature review .....                        | 355        |
| <b>PUBLIC HEALTH SESSION .....</b>  | <b>358</b> |
| Change of electrical injuries in Lithuania in 2016-2020 .....   | 359        |
| Impact of comorbidity on quality of life among hypertensive patients in LUHS KC Family Medical Clinic .....                         | 361        |
| Conspiracy theories and opinions about the origin of pandemic in the student population of Latvia during the COVID-19 outbreak..... | 363        |
| The influence of sleep duration and quality on athletes: a systematic literature review .....                                       | 366        |
| Trends in esophageal cancer mortality in Lithuania, 2001-2020.....  | 368        |
| Screening tools for child abuse used in primary health care: a systematic literature review .....                                   | 371        |
| Association between study load of the high school graduates and subjective mental health during the COVID-19 pandemic.....          | 374        |

# **Oral presentations**



# **Anaesthesiology & Intensive Therapy**

## **Comparison of status epilepticus scoring scales for predicting mortality in Neurosurgical intensive care unit**

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### **Introduction**

Status epilepticus is a neurological emergency that requires immediate treatment to prevent further neurological damage [1]. Status epilepticus is the second most dangerous neurological emergency with mortality ranging from 7.6 to 39% [2]. Both under- and over- treatment carry their own risks – from prolonged seizures and neurological complications to iatrogenic damage from unnecessarily aggressive treatment [3]. The use of prognostic tools such as the Status Epilepticus Severity Score (STESS), the Epidemiology-Based Mortality Score in Status Epilepticus (EMSE), and its modification EMSE-EAC could help reduce in-hospital mortality by identifying high-risk patients with status epilepticus. The patients are scored based on consciousness, age, comorbidities, history of seizures, their types, and etiology. Individuals with higher STESS and EMSE scores are more likely to have bad outcomes.

### **Aim**

The aim of this study is to determine the value of two prognostic tools – STESS and EMSE-EAC – for predicting mortality after status epilepticus.

### **Methods**

The study was conducted using the retrospective data of 47 patients who experienced status epilepticus and were hospitalized in the LUHS KC Neurosurgical intensive care unit (NICU) during 2016-2020. Inclusion criteria were: status epilepticus, age  $\geq 18$  years. The data included all components of the STESS and the EMSE: etiology, age, comorbidities, state of consciousness, worst seizure type, history of previous seizures.

The STESS was calculated as suggested by its developers. Due to partially incomplete data in medical records, EMSE was modified to EMSE-EAC (etiology, age, comorbidity). Statistical analysis was performed using IBM SPSS Statistics 27. Receiver operating characteristics were used to determine the area under the curve (AUC), and the Chi-square and Fisher's exact tests were used to calculate the sensitivity and specificity of the prognostic scales. A significance level of 0.05 was chosen for testing the statistical hypotheses.

## Results

The data of 47 patients were analyzed. Average age  $50.74 \pm 17.06$  years (range 20-82). The average hospitalization time was  $18.86 \pm 15.01$  days (range 1-59), average NICU timewas  $4.96 \pm 6.76$  days (range 0-35). 87.23 % of seizures were generalized-convulsive and the remaining 12.77% were attributed to a broad category of "simple- or complex-partial, absence, myoclonic seizures". In-hospital mortality was 8.51%. The optimal cutoff point for EMSE-EAC was 34, with sensitivity being 100.00%, and specificity 83.70% (AUC=0.881,  $p=0.013$ ),  $\chi^2 = 14,309$ ,  $p = 0.002$ . The positive predictive value (PPV) of EMSE-EAC-34 is 100.00% and the negative predictive value (NPV) is 36.36%. AUC for STESS scale was 0.677,  $p=0.245$ ,  $\chi^2 = 0.658$ ,  $p = 0.583$ .

## Conclusions

Neither EMSE-EAC nor STESS was accurate enough to predict in-hospital mortality. The EMSE-EAC scale could be used to determine patients with a better prognosis. Both the STESS and EMSE-EAC scores are not practical enough to be used in daily practice in the NICU.

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## Monitoring the Implementation of the Surgical Safety Checklist

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### Introduction

In 2009 Surgical Safety Checklist (SSC) containing of three parts: “Sign in” (SI), “Time out” (TO) and “Sign out” (SO) was first introduced by The World Health (WHO) [1]. Nowadays it is used globally to ensure patient safety during perioperative period [2]. Since the checklist was launched mortality, surgical site infections and postoperative complications decreased by approximately 50% [2]. Nevertheless, for successful implementation, it is crucial to have all operating room (OR) personnel engaged in the adherence to the Checklist [3]. In 2020 the SSC was adapted in the Hospital of Lithuanian University of Health Sciences (LUHS) Kaunas Clinics.

### Aim

The aim of this study was to evaluate the accuracy of use of the Checklist one year after its implementation in the Hospital of LUHS Kaunas Clinics.

### Methods

The data for this observational study was collected in Urology, General Surgery and Ear, nose and throat diseases (ENT) departments of the Hospital of LUHS Kaunas

Clinics, Lithuania from November 1st to December 31st 2021. Data was gathered by the independent nonbiased concealed observers via objective monitoring of all three checklist components taking place in ORs. Statistical analysis of the data was performed using the IBM SPSS Statistics 22 software package. A significance level of 0.05 was chosen to test statistical hypotheses.

## Results

During the two-month period 69 surgeries were observed: 25 in General Surgery, 21 in Urology and 23 in ENT. In only 3 % of the operations, use of the entire checklist was observed, in 21 % use of only separate parts were observed and in 76% no parts of it were applied. The use of the checklist during the SI section was more common in the Urology department ( $\chi^2=13.944$   $p < 0.05$ ), while adherence to the protocol during the TO section was better in the General Surgery department ( $\chi^2 =12.056$ ,  $p < 0.05$ ). The age of the surgeon and the anaesthesiologist did not have any significant importance on the adherence to the SSC. Questions regarding antibiotic administration (27.54 %), surgical site (24.64 %), the duration of the operation (23.19 %) and blood loss (21.74 %) were the most frequently asked and confirmed by the surgical team. However, the least prevalent questions included the risk of hypothermia, the use of pulse oximetry and presence of the consent forms. The overall implementation of the Checklist was extremely poor with ENT adhering to it the worst, with only 2 (8.7 %) SI and 1 (4.35 %) TO conversations in 23 surgeries.

## Conclusions

Despite many benefits the WHO's SSC offers, compliance with it in Kaunas Clinics remains incomplete. To achieve better adherence to the Checklist it is crucial to promote engagement of the whole surgical team.

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## **Nutritional assessment of critically ill patients in the NICU according to ESPEN guidelines**

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### **Introduction**

Critically ill patients, especially with acute neurologic injury, are in higher risk of malnutrition because of a hypermetabolic state which results in an excessive release of stress hormones and pro-inflammatory cytokines that alter energy and protein metabolism and eventually leads to malnutrition. Malnutrition is associated with adverse clinical outcomes, therefore the proper nutritional support is essential for these patients.

### **Aim**

To analyse the nutrition support of enterally fed patients admitted to the Neurosurgery Intensive Care Unit (NICU) of the Hospital of Lithuanian University of Health Sciences (LUHS) Kaunas Clinics and to compare according to the latest European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines.

## Methods

The data for this observational study was collected from November 10th to December 10th 2021. Data was gathered by independent nonbiased concealed observers via objective information collection from prescriptions. All patients who spent more than 24h in the ICU on enteral nutrition were included in the study. Nutritional needs were assessed using VCO<sub>2</sub> parameter, when possible, or formula of 20-25 kcal/kg in the absence of VCO<sub>2</sub> and using adjusted body weight for patients with BMI >30. The results were compared with the ESPEN guidelines for clinical nutrition in the intensive care unit. Statistical analysis of the data was performed using the IBM SPSS Statistics 22 software package. The Chi-square test was used to determine the relationship between variables. A significance level of 0.05 was chosen to test statistical hypotheses.

## Results

The approval for study was given by the Bioethics Center of LUHS (protocol number BEC- MF-61). The nutrition of 26 patients, 19 men and 7 women with the mean age of  $66.08 \pm 14.792$  (range 29 -92) was assessed. 11 patients (42.3%) were hospitalised after a stroke, 11 (42.3%) after brain trauma, 2 (7.7%) had a neuro-infection and 2 (7.7%) had other diagnoses. Patient's mean BMI was  $27.43 \pm 4.99$  (range 18.59 - 42.9). The average time to start feeding was 2 days, but for 3 patients (11.5%) nutritional therapy started on day 3 or later and the reasons for this remained unclear. Caloric needs were met in 19 (73.1%) patients and protein needs in 20 (76.9%) patients in  $3.89 \pm 2.998$  and  $5.05 \pm 3.649$  days respectively, but only 61,6% (16) of patients reached their caloric intake within the recommended period of 7 days. Patients with a BMI of 25-29,99 were more likely to not reach their caloric needs and to have their calory and protein requirements calculated according to ideal or adjusted body weight instead of normal body weight ( $\chi^2 = 12.505$ ,  $p = 0.014$ ).

## Conclusions

Most of the NICU patients the enteral feeding was started according ESPEN guidelines and caloric intake and protein requirements were reached. The overweight patients were at higher risk of malnutrition.

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## **Preanesthetic evaluation and non-cardiac surgery: experience at Kaunas Clinics**

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### **Introduction**

Number of recent studies show different opinions about preoperative testing and its benefit to the patient [1]. Current guidelines and expert opinion encourage specific



testing in selected patients, especially with comorbidities [2]. Using Revised Cardiac Risk Index (RCRI) score when evaluating cardiac risk is a recommended sign of good anesthesia practice [3]. We share our findings and local experience with patients undergoing non- cardiac surgeries.

## **Aim**

To investigate preanesthetic evaluation possibilities based on the patient's laboratory and instrumental tests available on a day of hospitalization.

## **Methods**

The approval (No. BEC-MF-441) for this retrospective research, conducted from June 2021 to September 2021, was granted by the LUHS Biomedical Research Ethics Committee. Inclusion criteria for the research were: patients older than 18 years old, planned non- cardiac operation. The data was collected from the depersonalized medical documentation of 117 patients, who were hospitalized at the Hospital of LUHS, Department of Surgery. The gathered data include sex, age, comorbidities, operation type, ASA score, revised cardiac risk index (RCRI) and both laboratory and instrumental tests. These tests involve general and biochemical blood tests, coagulation panels, electrocardiograms (ECG) and others.

## **Results**

The study involved 117 patients: 27.4% men and 72.6% women. The average age of the patients was 53 years. The majority of them (84.6%) were multimorbid with comorbidities in cardiovascular (49.6%), endocrine system (38.5%), gastrointestinal (14.5%), neurological (13.7%) and respiratory system (12%). 71.8% of them had two or more comorbidities. The mean of the ASA score was 1.97, whereas cardiac risk index mean was 1.12. The analysis of available preoperative laboratory and instrumental tests showed that only 57% of the patients had their ECG on a day when operation was scheduled, 64% of them had general and 62% had biochemical blood tests. The most common additional test was the coagulation panel (n=41). The stomach reduction surgery was performed in most cases (n=22), hernia repair takes second place in frequency (n=19). We found that 25 patients had 2 or more cardiac risk index points. 15 individuals were assessed having 2 points, 14 of them had ECG and 11 of them had additional tests on a day of hospitalization. 9 patients were evaluated having 3 RCRI points, but only 3 of them had ECG and additional tests. Only 1 patient was evaluated for 4 RCRI points, he had ECG but no additional tests done. 72% of patients who were at increased cardiac risk according to RCRI (2 or more points) had ECG when they

came for surgical treatment. Unfortunately, no significant correlations were found between ASA or RCRI score and available preoperative tests.

## Conclusions

Majority of the patients with a higher cardiac risk according to RCRI score present ECG for their preanesthetic evaluation. No significant associations were found between patients ASA or RCRI scores and preoperative tests.

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## **The value of suprainguinal fascia iliaca blockade for the treatment of postoperative pain after primary hip replacement surgery: a pilot study**

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### **Introduction**

Hip replacement is a common and painful surgery with moderate to severe pain in the postoperative period despite multimodal analgesia [1]. Recent studies have demonstrated that peripheral regional blocks like suprainguinal fascia iliaca blockade (SFIB) might be a preferable procedure for pain management and may reduce the amount of consumed painkillers [2]. However, the role of SFIB for postoperative analgesia after this type of surgery remains questionable [3]. We share our pilot research with patients undergoing primary hip replacement surgery.

### **Aim**

To evaluate the effectiveness of pain relief after primary hip replacement surgery using suprainguinal fascia iliaca blockade.

### **Methods**

The approval (No. BEC-MF-250) for the research was granted by the LUHS Biomedical Research Ethics Committee. Prospective, double-blinded, randomized pilot study was conducted at the Clinic of Anesthesiology, LUHS. Preoperatively, patients were blindly randomized into two groups: SFIB group and control group. Neither the patient nor the independent investigator were not informed whether they received the blockade or not. Evaluation of pain: at 3, 6, 24 and 48 hours postoperatively, patients were assessed for subjective hip pain using a visual analog scale (VAS) and the location of pain on the operated leg at rest, in active and passive 45° flexion positions. The need for additional painkillers has been reported. The statistical analysis was performed using IBM SPSS Statistics software (v. 23.0). Interpretation involved evaluating frequencies, means, calculating Paired Samples T-test. Results were considered statistically significant at  $p < 0.05$ .

### **Results**

10 patients were examined: 9 men and 1 woman. The mean of age was 65.5. Patient characteristics or operations did not differ between groups. No statistical significance was found in the SFIB group compared with the control group in terms of pain at 3, 6

and 24 hours after surgery. 48 hours postoperatively, pain in the passive and active 45° flexion was lower in the blockade group than in the control group. In the passive 45° flexion position, average VAS pain score was 2.1. The mean pain score was 1.8 with SFIB and 2.4 without block. These findings were not significantly associated ( $p=0.120$ ). In the active 45° flexion position, the mean of pain was described 2.2 by VAS. Blockade group had a mean pain score of 1.8, while in the control group the average pain score was 2.6. Unfortunately, no strong correlation was observed between these groups ( $p=0.053$ ). Furthermore, 50% of the individuals received additional painkillers, of which 40% in the blockade group and 60% in the control group.

## Conclusions

Our collected data suggest that postoperative pain management with suprainguinal fascia blockade may be valuable after hip replacement surgery. However, a larger study involving more individuals is needed to make the data more reliable.

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## **Should healthy individuals be considered as non-fluid responders?**

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### **Introduction**

In critical care, evaluating a patient's fluid responsiveness by observing a cardiac output changes using passive leg raising (PLR) method is safe and reasonable practice [1]. PLR has been developed to help predict whether volume expansion will significantly increase a patient's cardiac output and improve hemodynamics [2]. However, it is not profoundly explored how healthy individuals living ordinary lifestyle respond to PLR. Understanding the physiological mechanisms behind the PLR we formulated a hypothesis that healthy individuals are non-fluid responders.

### **Aim**

To evaluate the changes of healthy individuals systemic circulation during passive leg raising test and determine their fluid responsiveness.

### **Methods**

We conducted a trial at LUHS Hospital Kaunas Clinics Department of Intensive care, where 21 healthy volunteers were examined. The protocol for the trial was approved by LUHS Biomedical Research Ethics Committee (No.BEC-MF-03). All volunteers who participated in the study signed an informed consent form. Criteria for inclusion in the trial group: age of the volunteers from 18 to 65, no history of chronic illness, healthy at

the present time. A passive leg raising test was performed and systemic circulation changes were registered by non-invasive impedance cardiography monitor before the PLR and after. Systemic hemodynamics data of the participants was collected. An increase in cardiac output (CO)  $\geq 10\%$  was considered a positive test result and a person considered being a fluid responder accordingly. Statistical analysis was performed using SPSS 22.0

## **Results**

The study involved 21 volunteers, 7 of them were males (33.3%) and 14 females (66.7%). The age median of the participants was 23 (24-26) years. The median of mean arterial pressure before the test was 93 (88-103) mmHg. We discovered a significant decrease of the heart rate before and after the passive leg raising: 78 (67-88) bpm vs. 73 (61-82) bpm,  $p=0.001$ . The analysis also showed significant increase of cardiac output median before the PLR test 6.8 (5.6-8.1) l/min in comparison after the test 7.8 (5.9-8.7) l/min,  $p=0.004$ . A significant CO increase ( $>10\%$ ) was noted in 9 patients, meaning that 43% of study participants were fluid responders. In the rest 12 patients (57%) no significant CO changes were found, showing that they could be non-fluid responders.

## **Conclusions**

9 out of 21 participants had a significant CO increase of  $>10\%$ , which shows a positive response to PLR. These results suggest that there could be both fluid responders and non responders in the observed healthy population.

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## **The type of anaesthesia and outcomes of mechanical thrombectomy in patients with acute ischemic stroke**

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### **Introduction**

Ischemic stroke is the second most common cause of death after ischemic heart disease and the leading cause of a long-term disability [1, 2]. Mechanical thrombectomy (MTE) is one of the methods to reach brain reperfusion. Two types of anaesthesia are used in MTE: conscious sedation (CS) or general anaesthesia (GA). However, the impact of the type of anaesthesia used during mechanical thrombectomy on patient outcomes remains controversial [3].

### **Aim**

The aim of this study is to evaluate the association between the type of anaesthesia used during mechanical thrombectomy and hospital outcome of acute ischemic stroke treatment.

### **Methods**

Acute stroke patients treated in the Hospital of Lithuanian University of Health Sciences (LUHS) Kaunas Clinics and undergoing MTE were included. Patients were divided into two groups according to the type of anaesthesia: GA and CS. Demographic, clinical and logistic data were evaluated. Favourable hospital improvement was defined as decreased National Institutes of Health Stroke scale

(NIHSS) score by  $\geq 4$  points from baseline. Favourable hospital outcome was considered modified Rankin Scale (mRs) 0 – 2 score on discharge and favourable radiologic landmark - successful reperfusion (mTICI = 2b – 3). All analyses were performed using SPSS (Statistical Package for the Social Sciences) version 24.0. The difference or relationship was considered statistically significant when the significance of the applied criteria was  $p < 0.05$ .

## Results

A total of 73 patients were included in the study. 40 patients (54,8%) received GA and 33 (45,2%) – CS. The probability of experiencing any stroke related complication was significantly lower in CS group (75,0% vs. 48,5%,  $p = 0.020$ ). No significant difference was found in the rates of hospital improvement between GA and CS groups (65,0% vs. 63,6%,  $p = 0.904$ ). There was a trend of better hospital outcome in CS group (27,5% vs. 45,5%,  $p = 0,111$ ), but not statistically significant. Rate of successful reperfusion was similar across two groups (82,5% vs. 87,9%,  $p = 0.740$ ). The median door to groin time (DGT) was 138,5 (IQR 66) minutes in GA and 120,0 (IQR 89) minutes in CS group. Rates of NIHSS were similar in both GA and CS groups before MTE (11,58 vs 12,90,  $p = 0,270$ ) and 7 days after (5,45 vs 7,09,  $p = 0,270$ ). No significant difference was found between the rates of hospital NIHSS improvement when comparing GA and CS groups (5,74 vs 6,00,  $p = 0,859$ ).

## Conclusions

Our study showed that patients who received GA or CS during MTE had similar hospital outcome and rates of successful reperfusion. The probability of experiencing any stroke related complication was significantly lower and a trend of better hospital improvement was observed in CS group. Further studies are needed to evaluate influence of anaesthesia choice and to determine the prognostic factors of clinical outcome after mechanical thrombectomy.

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## **The effects of small dose ketamine on early postanaesthesia recovery after intraoperative remifentanyl infusions in obese patients.**

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### **Introduction**

Safe and rapid recovery of patients after anaesthesia is one of the important factors for good operating room turnover. Intraoperative low dose ketamine is an attractive adjuvant to traditional pain management protocols enabling to reduce opioid consumption and side effects of them. (1) However, the rate of recovery of patients after anaesthesia must also be taken into account when developing methods of anaesthesia and postoperative analgesia. (2)

### **Aim**

Assess the significance of low dose ketamine for early postanaesthesia recovery of obese patients by comparing postoperative recovery time and vital signs.

## Methods

A prospective, randomized, double-blind, placebo-controlled study. The study included 53 bariatric patients undergoing laparoscopic gastric bypass with remifentanyl-based anaesthesia in HLUHS. Patients were given 0,3 mg/kg for lean body mass (LBM) ketamine (test, group K=23) or placebo injection (control, group S=30) during anaesthesia induction. Vital signs (arterial blood pressure (BP), heart rate, saturation (SpO<sub>2</sub>)) were evaluated postoperatively every 2 minutes after termination of remifentanyl infusion as well as spontaneous respiration recovery time, time of extubation, eye opening, recovery of orientation and beginning of response to verbal command.

## Results

The groups were similar in terms of demographic data, body mass index, total dose of remifentanyl ( $p>0,05$ ). When assessing patients' postanesthetic recovery, we did not notice a significant difference between the control and test groups in spontaneous respiration recovery time, time of extubation, eye opening, recovery of orientation and beginning of response to verbal command ( $p>0,05$ ), but the data differed when comparing postoperative vital signs. The heart rate and SpO<sub>2</sub> values were similar in both groups, but differences were found in values of BP (median systolic BP: 131 (103;165) mmHg (S group) and 118 (88;154) mmHg (K group),  $p<0,05$ ; median diastolic BP: 76 (54;99) mmHg (S group) and 64 (41;87) mmHg (K group),  $p<0,05$ ).

## Conclusions

A low dose ketamine during anaesthesia induction was not relevant for the early recovery of obese patients after anaesthesia. Values of vital signs were within normal limits in both groups, but slightly lower BP was observed in the test group. Based on this data, it can be concluded that the small dose (0,3mg/kg for LBM) of ketamine during induction of anaesthesia does not adversely affect patients' postoperative recovery and does not have any impact on operating room turnover.

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# **Basic Sciences**

## **Nevus-associated melanoma: histological subtype association with gender, age, and anatomical localization**

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### **Introduction**

Nevus-associated melanoma (NAM) is a malignant cutaneous tumor, which arises from melanocytes, and is defined by the coexistence of nevus components and melanoma features on histopathologic examination [1]. According to Pampeņa et al., NAM is significantly associated with younger age, superficial spreading histological subtype, and localization of the trunk [2].

### **Aim**

To evaluate nevus-associated melanoma histological subtype association with gender, age, and anatomical localization.

### **Methods**

The approval (No.: BEC-MF-150) for the research was granted by the Centre for Bioethics of Lithuanian University of Health Sciences (LUHS). This retrospective study analyzed the data from 2005 to 2020 of the Hospital of LUHS Kaunas Clinics, the department of Pathological anatomy. We found 125 pathological records of nevus-associated melanoma. All patients were divided into four groups by age (1 – 18; 19 – 39; 40 – 60; >60). Localization was divided into 5 areas: head-neck, upper extremities,

lower extremities, abdominal-chest, and back-trunk. Melanomas were classified into four subtypes: superficial spreading; nodular; lentigo maligna; acral lentiginous. The statistical analysis was performed using IBM SPSS Statistics software (v. 28.0). Chi-square test ( $\chi^2$ ) was used for testing relationships on categorical variables, and to evaluate test of independence. Also, data differences were considered statistically significant at  $p \leq 0.05$ .

## Results

A statistically significant association was established with the histological subtype of melanoma and the anatomical localization. Superficial spreading melanomas were more often diagnosed on the upper extremities (86.4%) and back-trunk (70.6%) rather than head-neck area (26.7%) ( $\chi^2=59.98$ ;  $p<0.001$ ). Lentigo maligna melanomas were located mainly in head-neck (46.7%) compared to the other localizations ( $\chi^2=59.98$ ;  $p<0.001$ ). No significant association was established with melanoma histological subtype and gender ( $p=0.882$ ), neither age groups ( $p=0.138$ ).

## Conclusions

According to our study, the histological subtype of melanoma is statistically significantly associated with anatomical localization ( $p<0.001$ ). However, no significant association was established with histological subtype and gender, nor age groups.

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## **The effect of IL-3, IL-5 and GM-CSF on adhesion and proliferative properties of blood eosinophil subtypes in asthma**

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### **Introduction**

Two different subtypes of blood eosinophils have recently been identified [1] as inflammatory-like eosinophils (iEOS-like) and resident-like eosinophils (rEOS-like) which differ in biological properties. The  $\beta$  common chain cytokines granulocyte-macrophage colony-stimulating factor (GM-CSF), interleukin (IL)-3, and IL-5, also known as eosinophilopoetins, have many common functions on eosinophils [2]. Thus, we hypothesized that eosinophilopoetins could differently affect eosinophils subtypes in asthma

## **Aim**

To investigate IL-3, IL-5 and GM-CSF effect on blood eosinophils subtypes proliferative properties and adhesion to airway smooth muscle cells (ASMC) in asthma.

## **Methods**

We included 10 allergic asthma (AA), 8 severe eosinophilic asthma (SEA) patients and 7 healthy control subjects (HS). Eosinophils were isolated from peripheral blood by using high-density Ficoll centrifugation and magnetic separation methods. Subtyping of eosinophils was based on magnetic beads-conjugated antibodies against L-selectin. Eosinophils adhesion was evaluated by measuring eosinophils peroxidase activity in combined cell cultures (absorbance at 490nm, expressed as % of adhered eosinophil number from max added, calculated from control point absorbance value). ASMC proliferation was measured by AlamarBlue assay. Significant differences between two independent groups were determined by Mann-Whitney U-test; within one group-Wilcoxon matched-pairs two-sided test. Data presented as mean  $\pm$  SEM. Minimum limit for statistically significant values was  $p < 0.05$ .

## **Results**

IL-3, IL-5 and GM-CSF significantly enhanced iEOS-like cells adhesion to ASM cells -  $66.6 \pm 4.2$ ,  $67.5 \pm 5.5$  and  $86.3 \pm 3.3\%$  vs.  $50.5 \pm 4.2\%$  respectively in AA and  $78 \pm 3.6$ ,  $80.2 \pm 3.3$ ,  $89.5 \pm 2.6\%$  vs.  $58.9 \pm 3.6\%$  in SEA ( $p < 0.05$ ), while only GM-CSF had a significant effect on rEOS-like cells -  $87 \pm 1.8\%$  vs.  $61.4 \pm 2.9\%$  ( $p = 0.01$ ) in AA and  $89.5 \pm 1.8\%$  vs.  $72.3 \pm 3.0\%$  in SEA,  $p = 0.006$ . In HS group only GM-CSF significantly enhanced adhesion - iEOS-like cells  $65.8 \pm 4.5\%$  vs.  $46.6 \pm 4.7\%$  ( $p = 0.0071$ ) and rEOS-like cells by  $72.3 \pm 1.8\%$  vs.  $53 \pm 3.3\%$ ,  $p = 0.005$ . IL-5 and GM-CSF-activated iEOS-like and rEOS-like cells of both asthma groups demonstrated significantly enhanced effect on ASM cells proliferation compared to non-activated eosinophils - AA iEOS-like by  $29.5 \pm 5.7$  and  $32 \pm 3.8\%$  vs.  $9.1 \pm 1.4\%$  ( $p < 0.05$ ), rEOS-like by  $38.9 \pm 1.8$  and  $31.1 \pm 5.3\%$  vs.  $22.1 \pm 3.7\%$  ( $p < 0.05$ ); meanwhile SEA iEOS-like by  $43.9 \pm 6.8$  and  $48.7 \pm 6.9\%$  vs.  $20.7 \pm 1.3\%$  ( $p < 0.05$ ) and rEOS-like by  $46.4 \pm 5.4$  and  $60.8 \pm 4.4\%$  vs.  $34.8 \pm 2.8\%$  ( $p < 0.05$ ). In HS group IL-3 and GM-CSF had no effect on both eosinophil subtypes, but activation by IL-5 had significant effect on proliferative properties only on iEOS-like cells -  $20.3 \pm 3.5\%$  vs.  $4.3 \pm 0.8\%$ ,  $p = 0.0313$

## **Conclusions**

GM-CSF enhance the adhesion of both eosinophil subtypes while IL-3 and IL-5 only

the adhesion of iEOS-like cells in asthma. Moreover, IL-5 and GM-CSF enhance the proliferative properties of eosinophil subtypes in both asthma groups, while IL-3 had an effect only on rEOS-like cells in AA group.

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## Associations of polymorphism of the NRAS gene and risk factors with Laryngeal Squamous Cell Carcinoma

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## Introduction

Tumors that form in the head and neck are often malignant carcinomas. Carcinoma is the sixth most common cancer type in the world. About 25% of head and neck tumors are laryngeal squamous cell carcinomas (LSCC). 200 cases of LSCC are diagnosed every year in Lithuania and often diagnosed in the elderly men population. Risk factors like smoking, alcohol abuse, gender, and older age are strongly associated with the pathogenesis of the LSCC as well as genetic factors. Single nucleotide polymorphisms in NRAS proto-oncogene can affect the onset of oncological LSCC disease. The investigated NRAS rs14804 G>A polymorphism is in the 3'UTR regulatory sequence, associated with the miRNA binding site, and results in increased expression of the NRAS gene. Our hypothesis is that changed NRAS gene expression may lead to LSCC occurrence.

## Aim

Determine the NRAS rs14804 gene polymorphism in patients with LSCC and the control group. Also, to evaluate the role of polymorphism and risk factors that may influence the pathogenesis of LSCC.

## Methods

Genomic DNA and clinical data were collected from 324 adult men with LSCC. The control group was formed from 357 healthy men. Genomic DNA was isolated from peripheral blood leukocytes by DNA salting-out method. Genotyping of NRAS rs14804 was performed using the RT-PCR method, and the obtained results were processed with the statistical data analysis program - "IBM SPSS Statistics 26". Data were evaluated by comparing patients with LSCC and the control group. Age, smoking, alcohol consumption of patients and the control group were compared using the  $\chi^2$  criterion. The homogeneity of the distribution of polymorphism genotypes between patients and controls was compared using the  $\chi^2$  criterion. A binary logistic regression analysis was performed to estimate the odds ratio with a 95% confidence interval (CI) for LSCC to occur in genotype inheritance and allele carrier models.

## Results

We found no statistically significant differences between the NRAS rs14804 genotypes and allele frequencies of the study groups. According to the dominant inheritance model, NRAS rs14804 SNP statistically significantly by 1,2 times ( $p=0.032$ ) reduce the risk of developing LSCC. The risk is lower for G allele carriers by 1,51 times ( $p=0.028$ ).

Having a G allele at over 61 years of age decreases the risk of developing LSCC by 2,45 times ( $p=0.039$ ). After assessing the impact of risk factors, we found that 61 years and older age, smoking, and alcohol consumption statistically significantly increase the risk of developing LSCC, respectively: 3,273 ( $p=0.034$ ), 3,149 ( $p<0.001$ ), 146,944 ( $p<0.001$ ).

## Conclusions

Individuals with the NRAS rs14804 GG genotype and the G allele have a statistically significant reduction in disease risk and for persons older than 61 years and those with the G allele, the risk is lower. Assessing the impact of environmental factors, we found that 61 years and older, smoking and alcohol consumption statistically significantly increase the risk of developing LSCC.

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## **Evaluation of the impact of MMP8 rs11225395 and MMP14 rs1042704 in the development of Dupuytren's contracture**

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**Introduction**

Dupuytren's contracture (DC) is a fibroproliferative pathology, resulting in finger joint contractures and hand disability. DC is associated with unbalanced degradation of the extracellular matrix (ECM), that is why matrix metalloproteinases (MMPs) might play an important role in its pathogenesis. The main function of MMPs is the degradation of various types of collagen and other ECM and non-ECM substrates. The MMP8 rs11225395 single nucleotide polymorphism (SNP) leads to a C to T change in the promoter region, it alters MMP8 promoter activity, gene and protein expression and affects MMP8 function. MMP14 rs1042704 SNP results in the missense mutation, therefore, the translated MMP14 protein exhibits significantly lower collagenolytic activity compared to the wild-type enzyme.

**Aim**

To investigate the contributions of MMP8 rs11225395 and MMP14 rs1042704 functional SNPs and lifestyle factors to the development of DC.

## Methods

Genomic DNA and clinical data were collected from 219 individuals (116 DC patients and 103 healthy controls). DNA was extracted from leukocytes by salt-precipitation method. RT-PCR was performed for detecting the SNPs of the MMP8 and MMP14. The obtained results were processed and the impact of lifestyle factors was evaluated with the statistical data analysis program “IBM SSPS Statistics 26”.

## Results

To evaluate the associations of MMP8 and MMP14 SNPs with the previous onset of the disease, the DC patients were divided into groups ( $>56$  and  $\leq 56$ ) according to the age when first symptoms appeared. Statistical analysis showed that 16.8% of DC patients carrying the MMP14 rs1042704 AA genotype observed first symptoms of DC at less than 56 years of age ( $p = 0.040$ ). It was revealed that AA genotype also increases the risk of DC development 2.16-fold (95% CI: 2.160-7.824;  $p = 0.024$ ) while G allele carriers has 2.16-fold lower risk (OR 0.463; 95% CI: 0.278-0.678;  $p = 0.024$ ). Risk analysis was conducted to examine the impact of lifestyle factors and their combination with analyzed SNPs on DC. The most high-risk factor (OR 14.00) of DC development was for individuals who have a combination of smoking, manual labor and MMP14 rs1042704 minor A allele (95% CI: 1.807-108.450;  $p = 0.010$ ).

## Conclusions

MMP14 rs1042704 AA genotype increases the risk of developing first symptoms at a younger age. MMP14 rs1042704 minor A allele together with smoking and manual labor was found to be the most high-risk factor. These results suggest MMP14 rs1042704 become a marker for predicting the disease. However, MMP8 rs11225395 may not be significantly associated with the development of the disease.

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## **Association of age-related macular degeneration and macular pigment optical density with rs11057841 SNP in the SCARB1 gene.**

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## **Introduction**

No analogous studies have been performed to analyse the rs11057841 SNP in the SCARB1 gene in patients with various forms of age-related macular degeneration (AMD). However, analysis of scientific literature suggests a possible relationship between the SCARB1 gene and the pathogenesis of AMD, as the gene encodes HDL receptors that play an important role in cholesterol and lutein metabolism and may be involved in the formation of cholesterol-containing drusen. Also, there has been observed an association between macular pigment and lipoproteins that transport lutein and zeaxanthin. The SCARB1 gene is involved in lipid pathways, so mutations in this gene may result in impaired lutein and zeaxanthin transportation and lower macular pigment optical density (MPOD).

## **Aim**

To evaluate the association of rs11057841 SNP in the SCARB1 gene with AMD and macular pigment optical density.

## **Methods**

To determine the effect of genetic and environmental factors on macular pigment optical density, the twin method was used, 108 twins were examined by the twin method. To evaluate the influence of the SCARB1 rs11057841 polymorphism on MPOD values, the study examined a group of individuals and determined MPOD characteristics using the heterochromatic photometry method. This group consisted of 67 individuals. To investigate the significance of rs11057841 SNP in the SCARB1 gene for AMD, the study enrolled 101 patients with AMD and 171 healthy subjects. Exclusion criteria were applied: cataract, previous interventions that may have affected refraction and refusal to participate in the investigation. DNA from peripheral blood leukocytes were purified using the DNA salting-out method and the concentration was measured with a spectrophotometer. The genotyping test was carried out using the real-time polymerase chain reaction method. The results were assessed using IBM SPSS Statistics methods of statistical analysis, including intraclass correlation, chi-squared test, binary logistic regression, and Student's t-test.

## **Results**

This study showed statistically significant differences in the mean MPOD value in the right and left eyes between subjects with the wild-type CC genotype and subjects with the CT genotype, a genotype that has a single risk allele. A decrease in the mean

MPOD value was observed both in the right eye ( $p=0.037$ ) in the Group II with the CT genotype (0.110 DU) compared to CC genotype subjects (0.117 DU), and in the left eye of CT genotype subjects (0.109 DU) compared to CC genotype subjects (0.114 DU) ( $p=0.038$ ).

## Conclusions

Individuals with the CT genotype and a single risk allele had statistically significantly lower mean MPOD values in both eyes compared to subjects with the wild-type CC genotype.

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## Associations of GJD2 and RASGRF1 gene variants with refractive errors

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**Introduction**

Most of our information about the world around us comes from our visual system. When this system functions well, relevant objects in our field of vision are imaged and focused on the retina. Refractive errors are among the most frequent treatable “diseases” [1]. Refractive errors occur when the refractive system of the eye fails to correctly focus rays of light from an object onto the retinal plane [2]. Refractive errors are the most common vision defect affecting all age groups and their number is always growing [3]. Knowledge of the prevalence of refractive errors and risk factors can help plan effective measures to reduce them.

**Aim**

To identify GJD2 (rs634990, rs524952) and RASGRF1 (rs8027411, rs4778879, rs28412916) gene variants in subjects with refractive errors and control subjects. To evaluate the significance of GJD2 (rs634990, rs524952) and RASGRF1 (rs8027411, rs4778879, rs28412916) gene variants for ocular refractive errors. To evaluate the associations of GJD2 (rs634990, rs524952) and RASGRF1 (rs8027411, rs4778879, rs28412916) gene variants with the degree of myopia and hyperopia.

**Methods**

The study included 373 individuals with refractive errors and 104 ophthalmologically healthy subjects. DNA was extracted from peripheral blood leukocytes using the salting-out method. The quantitative real-time polymerase chain reaction (qRT-PCR) method was chosen for genotyping. Statistical calculations and analysis of the results were performed using “IBM SPSS Statistics” software.

## Results

Five polymorphisms in two genes were studied: GJD2 rs634990, GJD2 rs524952, RASGRF1 rs8027411, RASGRF1 rs4778879, RASGRF1 rs28412916. The TT genotype of the GJD2 SNP rs634990 increases the risk of hyperopia and astigmatism 2.36-fold, while the CT genotype decreases the risk of hyperopia and astigmatism 0.51-fold ( $p < 0.05$ ). The AT genotype of the GJD2 rs524952 reduces the risk of hyperopia and astigmatism 0.53-fold ( $p < 0.05$ ).

The TG genotype of RASGRF1 rs8027411 reduces the risk of high myopia in the right eye 0.09-fold ( $p < 0.05$ ). The AT genotype reduces the risk of mild hyperopia in the right eye 0.26-fold ( $p < 0.05$ ).

## Conclusions

The TT genotype of the GJD2 gene rs634990 SNP increases the risk of possible hyperopia with astigmatism 2.36-fold. Both heterozygous genotypes of the GJD2 gene SNPs reduce the risk of hyperopia with astigmatism 0.51-fold. The TG genotype of the RASGRF1 rs8027411 SNP reduces the risk of high myopia. The AT genotype of the GJD2 rs524952 reduces the risk of high hyperopia.

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## **Pilot study of TBEV detection and replication in permanent cell cultures**

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### **Introduction**

Tick borne encephalitis virus (TBEV) is one of the most common and important endemic zoonotic agent transmitted via infected ticks' saliva during bite (1). Morbidity remains high in Lithuania compared to other European countries (2). Using RT-PCR method it was previously confirmed that minimum infectious rate of ticks with TBEV is only 0,34% (3). Therefore, initial TBEV concentration in ticks is often way too low to be detected with direct molecular methods. Published data also shows that after the infected ticks suck blood, virus titer significantly increases by 500 times (4).

### **Aim**

To investigate prevalence of TBEV in questing ticks and ticks after blood suck from dogs and to determine effectiveness of virus replication and isolation in permanent cell cultures.

### **Methods**

Questing ticks (n=128) and ticks after blood suck from dogs (n=61) were collected from various Lithuanian regions. 8 questing ticks were grouped per pool. Each full of blood tick was tested separately. Suspensions were made in the laboratory. RNA was extracted from suspensions using "GeneJet RNA Purification Kit" (Thermo Fisher Scientific) and tested by RT-qPCR. In this reaction Luminaris Probe qPCR Mastermix, TBEV-specific primers and probe were used as described earlier (5). Tick suspension samples were also used for TBEV isolation in Neuro-2a and Marc-145 permanent cell

cultures. Isolation success was assessed by RT-qPCR as before. Statistical analysis was performed using IBM SPSS Statistics 27.0 program. McNemar test was used to evaluate the identification of the virus prior and post cell culture sampling. Value  $p < 0,05$  was considered as statistically significant.

## Results

Out of 16 questing tick pools, 6 (38%) were positive for TBEV-RNA at first. After the second cell line passage, 12/16 (75%) tested tick pools were positive for TBEV in Neuro-2a and 11/16 (68,8%) in Marc-145 cell cultures. Number of positive samples increased statistically significantly by 37% and 30,8 % ( $p = 0,031$ ) after TBEV isolation in Neuro-2a and Marc-145 cell culture accordingly. 32/62 (52%) samples of ticks that blood suck from dogs were positive for TBEV at first and 24/62 (39%) after the second Neuro-2a passage ( $p = 0,152$ ). None of the TBEV isolated samples caused cytopathic effect in Neuro-2a cells. However, it was observed in Marc-145 after the second passage and the average TBEV titer was  $\text{TICD}_{50}/\text{ml } 3,87 \pm 0,33 \log_{10}$ .

## Conclusions

Tick borne encephalitis virus detection increases significantly after replication in permanent cell cultures. TBEV caused cytopathic effect only in Marc-145 cells after replication.

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## **Characteristic patterns of Meckel's diverticulum in patients treated in Hospital of Lithuanian University of Health Sciences Kaunas Clinics in 2002-2019.**

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### **Introduction**

Meckel's diverticulum is the most common anomalous development of the gastrointestinal system that results from an incomplete vitelline canal. Meckel's diverticula are usually clinically asymptomatic but it can also cause life-threatening complications, which are associated with acid-secreting heterotopic mucosa of Meckel's diverticulum. (1) Therefore, it is essential to search and identify pathophysiological characteristics in detail in order to prevent complications.

### **Aim**

The aim of this study was to review and analyze clinical and morphological data on the diagnosis of Meckel diverticulum.

### **Methods**

This was a retrospective study of 117 patients who were treated in the Hospital of Lithuanian University of Health sciences Kaunas Clinics and underwent surgery for Meckel diverticulum between 2002 to 2019. Parameters for Meckel's diverticula included gender, age, histological mucosa type, presence of complications. Data were analysed statistically using SPSS 27.0 software. Were used descriptive statistics to data. Differences between the variables assessed using the chi-square ( $\chi^2$ ) test. The results were statistically significant when  $p < 0,05$ .

## Results

Total of 116 patients: 74 (%) children and 42 (%) adults were diagnosed with Meckel's diverticulum after pathology testing. The age of the pediatric patients ranged from 1 to 17 years (median, 7,33 years). Meanwhile, the age of adult patients ranged from 18 to 84 (median, 52,31 years). Histology revealed 3 types of mucosa: mucosa of the small intestine (66,4%, n=77), ectopic gastric mucosa (30,2%, n=35) and combination of gastric and pancreatic tissue (3,4%, n=4). Gender had no statistically significant change for the type of mucosa ( $p=0,081$ ). However, we found a significant correlation between mucosa type and age group ( $p=0,000$ ). Ectopic mucosa (gastric and combination types) was more common in children group (n=35, 31,2%), ( $p=0,0001$ ). A correlation was found between mucosa type and presence of complications in men group ( $p=0,001$ ). The study revealed that complications were more frequently present in men who have atopic mucosa type ( $p=0,0001$ ). In children group, complications were also statistically significantly more frequent in children who had tissue heterotopy ( $p=0,001$ ).

## Conclusions

According to our results, presence of complications is associated with tissue heterotopy in Meckel's diverticulum mucosa. In children, Meckel's diverticulum with heterotopy is more likely to cause complications because of acid-secretion. Complications in adults group presented less commonly since they are most likely to be associated with intestinal structural changes and functional disorders.

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## Ultrastructural alterations of intracardiac nerves in spontaneously hypertensive and normotensive rats

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### Introduction

Intrinsic cardiac autonomic nervous system plays a major role in the regulation of physiological heart functions [1, 2]. Intrinsic autonomic dysfunction arises from diseases, such as arterial hypertension (AH), which leads to structural and functional remodeling of the heart tissue [3]. Hypertension-induced cardiac damage could result in several complications such as myocardial ischemia [3], arrhythmias and heart failure [4, 5]. Therefore, it is of particular importance to elucidate the origin of autonomic cardiac innervation defects in the background of AH.

### Aim

To determine and compare the impact of AH on the structural organization of the intracardiac nerves in spontaneously hypertensive (SHR) and age-matched normotensive Wistar-Kyoto (WKY) rats.

### Methods

Cardiac nerves of the atria and ventricles in old (48-53 weeks) SHR (n=2) and WKY (n=2) rats were studied. Ultrathin samples were examined with a Tecnai BioTwin Spirit G2 transmission electron microscope using 2900x. Images were taken using Eagle 4K camera employing TIA software (FEI) and analyzed manually with a software package AxioVision. Unmyelinated (UNF) and myelinated (MNF) nerve fibers were evaluated:

the number of axons inside UNF and number of MNF in the nerve were counted; axons area, myelin sheath area, and nerve area were measured. From gathered data G-ratio (the ratio of the axon diameter to the diameter of the myelin sheath) and area occupied by UNF axons were calculated. Abnormalities of nerve fibers (artefacts, deformation of myelin sheath or Schwann cells) were marked. Statistical data was analyzed by IBM SPSS 20.0, results were described as  $n$ , mean  $\pm$  standard error and compared by the Student's  $t$ -test or Chi-square test,  $p$ -value $<0.05$ .

## Results

In SHR UNF (WKY  $n=4203$ , SHR  $n=4954$ ) were seen as less compact and with incorporation of collagen inside. In SHR UNF axon area (WKY  $1.32 \pm 0.02$ , SHR  $1.18 \pm 0.02 \mu\text{m}^2$ ,  $p<0.001$ ) was decreased while axon-free area of nerve increased (WKY  $43.96 \pm 0.79$ , SHR  $49.69 \pm 0.64\%$ ,  $p<0.001$ ) indicating axonal degeneration.

In cardiac nerves, the density of MNF (WKY  $n=487$ , SHR  $n=338$ ) decreased in SHR (WKY  $=17.7 \pm 2.22$ , SHR  $=8.5 \pm 1.30 /1000\mu\text{m}^2$ ,  $p<0.001$ ). There were more abnormalities of myelin sheath such as loss of compactness, formation of loops in SHR atria. Only 1% of SHR MNF did not contain any changes ( $\chi^2=65.66$ ,  $df=11$ ,  $p<0.001$ ). The artefacts in the atrial Schwann cells ( $\chi^2=15.06$ ,  $df=3$ ,  $p=0.002$ ) and in the ventricular axons ( $\chi^2=16.73$ ,  $df=4$ ,  $p=0.002$ ) were found in both groups, although, SHR MNF seemed to be more damaged. A decrease in SHR axon diameter (WKY  $1.7 \pm 0.05 \mu\text{m}$ , SHR  $1.43 \pm 0.1 \mu\text{m}$ ,  $p=0.01$ ), as well as lower G-ratio (WKY  $0.61 \pm 0.02$ , SHR  $0.44 \pm 0.03$ ,  $p<0.001$ ) reflect axonal degeneration.

## Conclusions

Nerve fibers' degeneration was more expressed in SHR, this could indicate the damaging effect of AH. However, changes of nerve ultrastructure were found in both SHR and WKY rats. This could show a possible genetic predisposition for AH because both groups of rats originated from the same genetic line.

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# **Cardiology**

## **Changes in left ventricle function and structure in patients participating in Heart failure program**

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### **Introduction**

The amount of patients suffering from heart failure (HF) is growing significantly every year [1]. Some guidelines are set to reduce possible consequences and improve patients' quality of life. One of the main guidelines is the HF management program. This program includes four visits to the hospital. During the meetings, topics of self-care (nutrition, physical activity, harmful habits) are analyzed, while patients are taught about HF and diagnostic tests are performed [2]. One of the most important tests is the cardiac examination test - transthoracic echocardiography. Important aspects, such as myocardial structure, function, and hemodynamics are assessed during ultrasound evaluation [3].

### **Aim**

The aim is to investigate changes between left ventricle structure and systolic function parameters before and after 4 visits of the HF program.

### **Methods**

The study was approved by the Bioethics center of Lithuanian University of Health Sciences (No. BEC-MF-184). It included 99 patients with HF who had completed all 4

visits of the HF program. The data were retrospectively enrolled into the study from the first and last visits. The left ventricular systolic function and structure changes were assessed echocardiographically. Systolic function was reflected by ejection fraction (EF), calculated by Simpson's method. The structure was reflected by the left ventricle end-diastolic diameter (LVEDD). Changes in the results of these tests were monitored and cardiac function benefits were assessed. The statistical analysis was performed with a statistical tool (SPSS version 28.0.1.0). Data significance was evaluated using Paired Samples T-test. The result was statistically significant at  $p < 0.05$ .

## Results

There were 99 participants overall, 14.1% ( $n=14$ ) women and 85.9% ( $n=85$ ) men. The mean age was 63 (SD 20) years. The EF mean of the first visit for women was 35.43% (normal range 54-74%) and for men – 24.99% (normal range 52 - 72%). The fourth visit results accordingly were 35.07% and 29.61%. These results show that there were no statistically significant differences for women between the first and the last visit ( $p > 0.05$ ), while for men a statistically significant difference was found after the completion of the HF program ( $p < 0.05$ ). While measuring changes in LVEDD, mean for women at the first visit was 54.77 mm (normal range 37.8-52.2 mm); for men – 62.46 mm (normal range 42.0-58.4 mm), during the fourth visit: 52.31 mm and 60.09 mm, respectively. Comparing changes in LVEDD showed a statistically significant difference after the HF program for men ( $p < 0.05$ ), whilst no significant difference was found for women ( $p > 0.05$ ).

## Conclusions

Patients enrolled in the HF program have shown improvement in parameters (EF and LVEDD) measured echocardiographically. Additionally, the improvement in both results is considered statistically significant for men, but not for women. It may be considered that the statistically insignificant results for women were found because the number of female participants was too small.

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## **QFR vs. visual-estimation guided PCI in STEMI patients: evaluation of the quality of life at 6-month follow up**

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## Introduction

Quantitative flow ratio (QFR) is a relatively new method to evaluate significant physiology stenosis without additional risks for the patients. Here, we present data on quality of life in patients who survived STEMI, and non-culprit lesion PCI was performed guided by QFR.

## Aim

This study was aimed to investigate outcomes differences of QFR-guided versus angiography-guided non-culprit lesion PCI in STEMI patients.

## Methods

In total, 76 patients with STEMI and at least one non-culprit lesion with intermediate (50- 90%) diameter stenosis and a reference diameter  $\geq 2$  mm according to visual estimation have been included in this prospective single-center study between February 2021 and June 2021. All patients were randomized into two groups: (1) QFR-guided PCI; (2) visual-estimation- guided PCI. The primary endpoint was the impact of non-culprit lesion revascularization strategy on quality of life (QOL) estimated by Seattle angina score. The physical limitation and angina frequency according to the Seattle score were classified as minimal (scores 75–

100), mild (50–74), moderate (25–49), and severe (0–24). We considered a composite endpoint of major adverse cardiovascular events (MACE) as a secondary endpoint within 3 months of hospital discharge. Our out-patient examination obtained the three-month follow-up in all of the cases. Additionally, an assessment of functional status and QOL was evaluated by questionnaire forms answered by study participants. Statistical analyses were performed using the SPSS 28.0 software. The chosen level of significance was  $p < 0.05$ .

## Results

Of all, 35 (46.1%) patients were randomized to the QFR-guided PCI group, and 41 (53.9%) patients were included in the angiography-guided PCI group. The six-month follow-up showed slightly lower incidences of MACE in the QFR-guided PCI group (11.62% vs. 21.15%,  $p = 0.012$ ). In addition, there were no significant differences in quality of life six-month in minimal (40.5% vs. 39.6%,  $p > 0.05$ ) and mild (54.8% vs. 54.2%,  $p > 0.05$ ) physical activity limitation according to Seattle angina score after PCI. Meanwhile, significantly more patients in the angiography-only PCI group suffered moderate physical limitation (4.65 % vs. 11.54%,  $p = 0.015$ ) during daily physical exertion.

## Conclusions

As experts recommend, physiology-guided PCIs improve patient outcomes. QFR-guided PCIs improve patients' quality of life as more of them could do daily physical activity without moderate limitations than angiography-only-guided PCIs. This is why QFR application in clinical practice may increase patient outcomes after PCI.

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## **Quantitative Flow Ratio suitability for evaluation of the physiology significance of intermediate non-culprit arteries stenosis for STEMI patients in the acute phase.**

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## Introduction

Most of the experts recommend physiology-guided PCIs worldwide. The treatment based on physiology evaluation greatly protects patients from major adverse cardiac events in the future. A gold standard physiology evaluation method is fractional flow reserve (FFR). However, the use of FFR in non-culprit arteries in acute coronary syndrome (ACS) patients remains an issue worldwide because it requires more time, pressure wire manipulations, and the use of adenosine. The combination of all these domains is inappropriate to be used for STEMI patients. Quantitative Flow Ratio (QFR), a novel non-invasive FFR value computation method that has an excellent agreement to FFR in clinical decision comparison, is an advantageous physiology evaluation method.

## Aim

This study was aimed to study numerical and treatment decision-making differences between QFR measurements in the non-culprit lesion in STEMI patients performed at ACS procedure and during the second-stage procedure before PCI.

## Methods

In total, 81 vessels of 68 patients who had STEMI and second stage PCI other than culprit artery between June 2021 and December 2021 have been included in this single-center study. For all included patients, QFR analyses were performed twice – at ACS PCI (QFR 1) and during the second stage procedure before PCI and at least three months later (QFR 2). For the difference evaluation, head-to-head numerical comparison and differences in treatment decision-making were chosen. Statistical analysis was performed using the software package SPSS 28.0. The chosen level of significance was  $p < 0.05$ .

## Results

Of all included arteries, 46 (56.8%) were left anterior descending (LAD), 25 (30.9%) were left circumflex (LCx), and 10 (12.3%) were right coronary arteries (RCA). A good agreement was found in all investigated lesions,  $r = 0.931$ ,  $p < 0.001$ . After dividing all lesions according to coronary artery (CA) following results were found LAD  $r = 0.911$ ,  $p < 0.001$ , LCx  $r = 0.977$ ,  $p$

$< 0.001$  and RCA  $0.946$ ,  $p < 0.01$ . The secondary and even more research was differences in clinical treatment decision-making, which generally showed strong agreement between the 1st and the 2nd QFR analyses,  $r = 0.980$ ,  $p < 0.001$ . After dividing according to coronary arteries, good results were found in all: LAD  $r = 1.0$ ,  $p <$



0.001; LCx  $r = 1.0$ ,  $p < 0.001$ ; RCA  $r = 0.843$ ,  $p < 0.001$ . There was only one disagreement in RCA between the 1st and 2nd QFR analyses. In this case, the 1st QFR was non-significant (0.85), and the second was marginal (0.80).

## Conclusions

QFR is a novel physiology evaluation method that can be performed within a couple of minutes and requires only coronary artery angiograms. Furthermore, it has an excellent agreement between the acute phase and at 3-month follow-up period. Therefore, wider QFR application in ACS is reliable for treatment decision-making and can be used as a single physiology evaluation method for physiology-guided PCIs. It decreasing the patients' risk and increasing the quality of life.

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## **Association of myocardial injury biomarkers and left ventricular functional parameters in STEMI patients treated with PPCI.**

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### **Introduction**

Acute myocardial infarction (MI) - is a condition characterized as extensive myocardial damage with active inflammatory response which leads to left ventricular (LV) remodeling and functional impairment [1]. Cardiac magnetic resonance imaging (CMR) is a gold standard method for assessing LV function, which is the key prognosticator in ST elevation myocardial infarction (STEMI) patients [2]. Additionally, CMR enables us to incorporate myocardial strain, which is more specific approach in detecting early or subclinical LV functional changes [3]. Combining this sensitive technique with

biomarkers for myocardial necrosis and inflammation may allow us to detect high-risk STEMI patients and improve the prognosis of adverse cardiac events [4].

## **Aim**

To investigate the relationship between LV functional parameters from CMR and laboratory biomarkers in patients presenting with acute STEMI treated with primary percutaneous coronary intervention (PPCI)

## **Methods**

The study included 30 patients with acute STEMI. Laboratory tests, such as troponin I, leukocytes, neutrophils, hs-CRP (high sensitivity - C reactive protein) and CRP were examined after PPCI. Baseline CMR was performed 2-5 days after ACS (n=30). Follow-up imaging was performed 6 months later (n=26). CMR analysis included the quantification of LV ejection fraction, as well as the measurement of global longitudinal (GLS) and global circumferential (GCS) strain using the feature tracking technique. These parameters were carried out using Medis 3.2 software. The differences between baseline and follow-up CMR parameters were compared, and the correlations between CMR results and laboratory findings were investigated. The statistical analysis was carried out using SPSS version 28.0.1.0. The result was declared statistically significant when the calculated p value was less than 0.05.

## **Results**

The mean age of the participants was 60 ( $\pm 11$ ). At the follow-up, there was a significant improvement in LVEF ( $44.17 \pm 9.61\%$  vs.  $47.52 \pm 11.30\%$ ;  $p < 0.05$ ), GLS ( $-19.29 \pm 3.74\%$  vs.  $-21.87 \pm 5.65\%$ ;  $p < 0.05$ ), and GCS ( $-24.22 \pm 5.70\%$  vs.  $-26.28 \pm 6.91\%$ ;  $p < 0.05$ ) compared to the baseline. Additionally, there was a moderate correlation between troponin I and baseline GLS ( $r = 0.462$ ;  $p = 0.010$ ), GCS ( $r = 0.452$ ;  $p = 0.012$ ) and LVEF ( $r = -0.432$ ;  $p = 0.017$ ) as well as follow-up GLS ( $r = 0.444$ ;  $p = 0.026$ ) and LVEF ( $r = -0.544$ ;  $p = 0.004$ ). Moderate correlation was also found between CRP and follow-up GCS ( $r = 0.520$ ;  $p = 0.008$ ). There were no statistically significant differences between other laboratory and LV functional parameters.

## **Conclusions**

A significant improvement in LV functional parameters 6 months after the ACS was observed. Troponin I was significantly associated with all measured LV functional parameters. Moreover, CRP was significantly associated with follow-up GCS

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## The association between acute coronary syndrome and local Earth magnetic field intensity changes

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**Introduction**

Although a number of risk factors and comorbidities are known to contribute to the progression of ischemic heart disease, environmental factors such as the geomagnetic field are also known to have a significant impact on cardiovascular regulation. Further research is needed to assess if geomagnetic field strengthening in high frequency ranges causes a negative effect on cardiovascular diseases [1-4].

**Aim**

To identify correlation between changes in local Earth magnetic field intensity and patients with ST segment elevation myocardial infarction (STEMI) and non-ST segment elevation myocardial infarction (NSTEMI).

**Methods**

A retrospective study of 1667 patients, who were admitted to the Hospital of Lithuanian University of Health Sciences Kaunas Clinics between 1st January and 31st December 2019 due to acute coronary syndrome (STEMI and NSTEMI), were included into the study. Local Earth magnetic field was measured by a magnetometer located in Baisogala, Lithuania. Data from the magnetometer was collected daily, and weekly averaged. We assessed the correlations between average weekly geomagnetic field strength in six different frequency ranges (Hz): P1 (SDelta) [0-3.5]; P2 (STheta) [3.5-7.0]; P3 (SAlpha) [7.0-15.0]; P4 (SBeta) [15.0-32.0]; P5 (SGamma) [32.0- 65.0]; P6 [0-65.0] and average number of STEMI and NSTEMI cases per week. Study period was divided into 4 seasons: Winter (December - February), Spring (March - May), Summer (June - August), Autumn (September - November). Microsoft Excel and IBM SPSS Statistics version 27.0 were used for analysis. The Kolmogorov-Smirnov test showed that data was normally distributed. Data was analyzed using descriptive statistics and Pearson correlation coefficient (r). The relationship between the two quantitative

features was considered weak if the correlation coefficient ( $r$ ) was up to 0.3, moderate-between 0.3 and 0.75, and strong if it was greater than 0.75. P value  $<0.05$  was considered statistically significant.

## Results

There were a total of 1667 patients in the study, 1073 (64.37%) were male and 594 (35.63%) were women. Mean ages of men were 65.2 (SD=12.22) and 74.01 (SD=11.01) for women. Out of all cases, 726 (43.55%) were STEMI and 941 (56.45%) - NSTEMI. Analyzing the data of 2019, it was observed that the presence of a stronger magnetic field in the frequency range 32-65 Hz increased statistically significantly in the STEMI group during the winter season ( $r$

$= 0.583$ ,  $p = 0.036$ ), while in the NSTEMI group no reliable correlations were found ( $r = -0.116$ ,  $p = 0.706$ ). There were no significant geomagnetic field strength changes in other frequency ranges (0-3.5 Hz; 3.5-7.0 Hz; 7.0-15.0 Hz; 15.0-32.0 Hz; 0-65.0 Hz) during the winter season in both STEMI and NSTEMI groups. No reliable correlations were found in geomagnetic field changes in the spring, summer, and fall season groups.

## Conclusions

Based on the described data, increased local geomagnetic field strength in high frequency (SGamma) range correlates with a higher number of STEMI cases.

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## **Relation of myocardial strain and structural parameters in STEMI patients after Primary Percutaneous Coronary Intervention. Cardiac MRI study**

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### **Introduction**

Mortality in ST-elevation myocardial infarction (STEMI) patients has decreased significantly over the last decade due to improved reperfusion strategies [1]. Cardiac magnetic resonance (CMR) has great accuracy in quantifying functional and structural myocardial parameters such as myocardial strain, infarct size (IS), area-at-risk (AAR) and microvascular obstruction (MVO) in STEMI patients [2]. According to recent studies, combining functional and structural CMR measures is more accurate than LVEF alone to

assess early and late prognosis following STEMI [3].

## Aim

To evaluate the relationship between CMR myocardial functional and structural parameters in patients presenting with acute STEMI treated with primary percutaneous coronary intervention (PPCI).

## Methods

Fifty-one patient were included in our study. Initial CMR was performed 2-5 days after the diagnosis of STEMI, while a follow-up study was completed 6 months later. Analysis of CMR images was performed using Medis Suite 3.2 software. Left ventricular global longitudinal strain (LVGLS), global circumferential strain (LVGCS), right ventricular strain (RVS), left atrium strain (LAS), and the right atrium strain (RAS), were analyzed using the feature tracking technique. Structural parameters (IS, AAR, MVO) were evaluated for 31 patients. The differences between functional baseline and follow-up CMR parameters were compared, and the correlations between functional and structural measures were investigated. The statistical analysis was performed with SPSS version 28.0.1.0. The result was statistically significant when the calculated p-value was less than 0.05.

## Results

Mean of age was  $59.1 \pm 10.5$  years. From baseline to follow-up there was significant improvement in GLS ( $-19.80 \pm 3.86\%$  vs.  $-23.28 \pm 5.35\%$ ;  $p < 0.05$ ), GCS ( $-26.34 \pm 6.10\%$  vs.  $-27.48 \pm 11.95\%$ ;  $p < 0.05$ ), RVS ( $-23.00 \pm 6.23\%$  vs.  $-25.50 \pm 10.54\%$ ;  $p < 0.05$ ) and LAS ( $18.16 \pm 6.10\%$  vs.  $21.20 \pm 6.23\%$ ;  $p < 0.05$ ). RAS did not change significantly at follow-up. At baseline mean of IS was  $44.40 \pm 18.75\%$ , AAR -  $52.89 \pm 18.40\%$  and MVO -  $8.73 \pm 7.82\%$ . Baseline GLS correlated moderately significantly with baseline IS ( $p < 0.001$ ;  $r = 0.693$ ) and follow-up IS ( $p = 0.004$ ;  $r = 0.545$ ), AAR ( $p < 0.001$ ;  $r = 0.660$ ), and weakly correlated with MVO ( $p = 0.031$   $r = 0.395$ ).

Moreover, significant moderately correlations according were detected with baseline GCS and baseline AAR ( $p = 0.002$ ;  $r = 0.547$ ), IS ( $p = 0.002$ ;  $r = 0.543$ ) and follow-up IS ( $p = 0.019$ ;  $r = 0.455$ ). Also there was significant correlation between baseline LAS and baseline IS ( $p = 0.045$ ;  $r = -0.375$ ). There were no significant correlations between RAS, RVS and structural myocardial parameters.



## Conclusions

In our study, we observed a significant improvement in myocardial strain parameters 6 months after STEMI. Additionally, correlations demonstrated that myocardial strain is closely related to structural changes, particularly infarct size. The combination of these parameters is becoming more valuable in cardioprotective studies focusing on myocardial ischaemic reperfusion injury following PPCI.

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## Assessment of right heart pressures, geometry and function in pulmonary hypertension patients: correlation between echocardiographic and right heart catheterization data

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**Introduction**

Right heart catheterization (RHC) is a gold standard test used to determine pulmonary hypertension (PH) after PH is suspected by echocardiography. Research into how the invasively measured pressures of the right heart and pulmonary artery (PA) correlates with right-sided heart geometrical and functional parameters is currently lacking.

**Aim**

To analyze the correlation between transthoracic 2D echocardiographic and RHC derived parameters of PA pressures, right heart chambers size and right ventricular (RV) function

**Methods**

This prospective study consisted of 41 patients with PH (mean pulmonary artery pressure (PAP)  $44 \pm 16,38$  mmHg, Wedge pressure  $12,68 \pm 7,59$  mmHg), confirmed by RHC. RV end diastolic diameter, RV longitudinal systolic function parameters (RV S', TAPSE), right and left atrium diameters and mean and maximal systolic PA pressures were evaluated using 2D echocardiography. RHC parameters were as follows: mean and maximal PA pressures, Wedge and right atrium pressures. Pearson correlation analysis was performed and two-tailed probability value  $<0,05$  was considered statistically significant.

**Results**

The average age was  $57 \pm 14$  years with the majority of women (62,5%). 56% of the study patients were in I, 27% in II, 2% in III and 15% in IV PH WHO group. There was a significant correlation between non-invasively (using echocardiography) and invasively (using RHC) measured mean and maximal PAP ( $R=0,37$ ,  $p=0,01$  and  $R=0,399$ ,  $p=0,013$ , respectively). The invasively measured mean PA pressure correlated with right

ventricular diastolic diameter ( $R=0,403$ ,  $p=0,008$ ), however no correlation with RV longitudinal function parameters ( $S'$  and TAPSE,  $p=0,222$  and  $p=0,212$ , respectively) was found. The invasively measured Wedge pressure had a significant correlation with left atrial diameter ( $R=0,452$ ,  $p=0,003$ ), but not with left ventricular ejection fraction ( $p=0,221$ ).

## Conclusions

Although RHC is the gold standard of pulmonary artery pressures estimation, echocardiography, as a more accessible examination, may provide clinically useful measures of PA mean and maximal pressures in PH patients. The mean pulmonary artery pressure estimated by RHC has a significant correlation with right ventricular diastolic diameter, but not with RV longitudinal function parameters.

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## The impact of obesity on in-hospital clinical outcomes after recanalisation of chronic total occlusions

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## **Introduction**

Recanalisation of chronic total occlusions (CTOs) in interventional cardiology is one of the most challenging and complex procedures [1]. Coronary artery CTOs can be identified in one in every five patients who show clinical indications for coronary angiography [2]. Obesity is linked to a heightened risk of cardiovascular disease (CVD) [3]. Currently, no data are available about the impact of BMI on success rates among CTO patients undergoing percutaneous coronary intervention (PCI).

## **Aim**

To investigate the impact that BMI has on success rates, complications, and procedure characteristics among a large group of CTO patients who underwent percutaneous coronary intervention.

## **Methods**

The study retrospectively included 420 patients who underwent PCI for at least one chronic total occlusion in the LUHS Kaunas Clinics. All patients were grouped by their BMI level based on the World Health Organisation classification: from 18.5 to 24.9 kg/m<sup>2</sup>=normal weight; from 25 to 29.9 kg/m<sup>2</sup>=overweight; from 30 to 34.9 kg/m<sup>2</sup>=obesity; greater than or equal to 35 kg/m<sup>2</sup>=very obese. In order to subdivide the patients according to the complexity of the CTO– PCI, the Japanese–CTO (J–CTO) score was used prior to the interventions. The definition of success in the procedure was a restoration of TIMI grade 3 flow and recanalisation of CTO. Each patient had a composite safety endpoint evaluation. This summarized complications: stroke, cardiac tamponade, vascular complications, or in–hospital death. Statistical analyses were performed using SPSS 20.0 software. The value of  $p < 0.05$  was considered as statistically significant.

## Results

Males (62%) made up the majority of patients and were younger than female patients ( $67 \pm 7.1$  years vs.  $72.2 \pm 4.4$  years;  $p < 0.001$ ). Mean BMI was  $26.8 \text{ kg/m}^2$  ( $\pm 6.5 \text{ kg/m}^2$ ). From the 420 patients the following BMIs were recorded: normal weight–42 (10%); overweight–252 (60%); obese–100 (23.8%); very obese–26 (6.2%). Positive correlations were detected between BMI and cardiovascular risk factors: normal BMI patients had higher HDL cholesterol ( $p < 0.05$ ) and lower triglycerides ( $p < 0.05$ ). The amount of contrast medium used increased as the BMI increased ( $p = 0.012$ ) also as fluoroscopy time ( $p = 0.03$ ). Procedure duration of normal patients was lower as compared to patients with non-normal BMIs ( $p = 0.024$ ). There was no statistically significant difference in procedural complications ( $p = 0.12$ ). The complications that did occur were mostly vascular. In 3 cases cardiac tamponade occurred. Similarly, 3 patients were diagnosed with acute stroke after CTO-PCI. No in-hospital deaths were recorded.

## Conclusions

This retrospective study indicates that BMI has no statistically significant impact on in-hospital outcomes in patients with chronic total occlusion after percutaneous coronary intervention.

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# ***Internal Medicine***

## **Associations between *Helicobacter pylori* infection and non-alcoholic fatty liver disease**

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### **Introduction**

The relationship between *Helicobacter pylori* (HP) infection and non-alcoholic fatty liver disease (NAFLD) is a matter of debate and the results remain controversial, although meta-analysis indicate a positive association between HP infection and NAFLD. By confirming the link, new insights might be provided in the management of NAFLD.

### **Aim**

The aim of this study was to determine the association between HP infection and NAFLD.

### **Methods**

We performed a retrospective study involving 120 patients diagnosed with NAFLD at the LUHS KC Department of Gastroenterology in 2020. Inclusion criteria were age  $\geq 18$  years, diagnosis of NAFLD and other causes of hepatitis ruled out. Analyzed data: liver enzymes and total serum bilirubin, body mass index (BMI), obtained attenuation parameter and liver stiffness measurements using FibroScan. HP infection was assessed and patients were grouped according to infectivity. Diagnosis of HP infection was based on the results of a serum anti-HP IgG antibody test or histology. Statistical analysis was performed using IBM SPSS 28.0 Statistics software. Data significance was evaluated using Mann-Whitney U-test and Student's T-test. Data differences were considered statistically significant at  $p < 0.05$ .

## Results

Out of 120 patients with NAFLD 58 (48,3%) were men and 62 (51,7%) were women. Mean age of the participants was  $51,6 \pm 12,9$  years. HP infection was diagnosed in 24 patients (20%). Alanine transaminase (ALT) and aspartate transaminase (AST) were significantly higher in HP-negative patients ( $p=0,019$  and  $p=0,001$  accordingly). Gamma-glutamyl transferase (GGT) and total serum bilirubin were insignificantly higher in HP-negative patients ( $p>0,05$ ). Alkaline phosphatase (ALP) was similar in both HP-positive and HP-negative groups ( $p>0,05$ ). Although average BMI was similar in both groups ( $p>0,05$ ), average steatosis, steatosis grade and fibrosis, fibrosis stage were insignificantly higher in HP-negative patients ( $p>0,05$ ).

## Conclusions

One fifth of patients with NAFLD had HP infection, which corresponds with the prevalence of infection in general population. According to our retrospective analysis, there is no connection between NAFLD and HP infection.

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## **Efficacy of different treatment strategies in patients with hepatocellular carcinoma (HCC) in Hospital of LUHS Kauno Klinikos**

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### **Introduction**

Hepatocellular carcinoma (HCC) is the fifth most common cancer which has an increasingly high mortality rate worldwide [1]. It is predicted that the incidence and mortality of HCC will significantly increase in the next decade [2].

## **Aim**

To assess the efficacy of different treatment methods in patients with hepatocellular carcinoma in the Hospital of LUHS Kauno Klinikos and to compare survival times with global BCLC guidelines.

## **Methods**

We retrospectively analyzed 105 patients treated in the Hospital of LUSH Kauno Klinikos with an HCC diagnosis in 2012-2022. Patients were divided into 2 groups based on their Barcelona Clinic Liver Cancer (BCLC) stage at the time of diagnosis: 39 (37.14%) patients in Group A with stages 0-A (very early, early) and 66 (62.86%) patients in Group B with stages B-D (intermediate, advanced, terminal). Treatment methods were grouped into 4 groups: transarterial embolization (TAE+TACE), systemic, radical (radiofrequency ablation, tumor resection, liver transplantation) and multiple (2 or more combined). Outcomes were compared between groups A and B, survival times were compared with BCLC guidelines [3]. The normality of data was assessed with Kolmogorov–Smirnov, Shapiro-Wilk tests. For descriptive statistics, median values (min-max) were used. For nonparametric statistics, a Mann–Whitney test was performed for a comparison between two groups and Kruskal-Wallis for more than two groups. Statistical significance:  $p < 0.0$ .

## **Results**

The most used treatment method was radical (48.7%,  $n=19$ ) in group A and systemic in group B (40.9%,  $n=27$ ). In both groups, patients survived the longest after receiving multiple treatment methods: in group A: 38.5 months (15-120;  $p=0.031$ ), in group B: 23 months (2-89). Patients treated with radical treatment methods survived 31 months (1-139;  $p=0.031$ ) in group A vs. 15 months (0-89) in group B. Those who underwent transarterial embolization survived 17 months (6-22;  $p=0.031$ ) in group A vs. 19 months (1-91) in group B. Patients who received systemic treatment survived 38 months (23-44;  $p=0.031$ ) in group A vs. 13 months (1-46) in group B. Median survival time in group A was 30 months (3-139,  $p < 0.001$ ) which is shorter than predicted survival time for patients with BCLC 0-A stages ( $>60$  months). Patients in group B survived 17.5 months (0-91,  $p < 0.001$ ) which is also shorter than BCLC predictions for patients with B ( $>30$  months) or C ( $>24$  months) stages.

## **Conclusions**

Multiple treatment methods are the most effective therapeutic strategy with the

longest survival time for HCC patients with BCLC stages 0-A as well as B-D. Patients treated with multiple treatment methods survived longer because in the early 0-A stages treatment usually starts with radical procedures, followed by other treatment methods when the disease is progressing, whereas in B-D stages treatment usually right from the start consists of several treatment methods combined.

Our patients in both BCLC stages 0-A and B-D reached shorter survival times compared with BCLC guideline.

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## Factors affecting survival time in patients with hepatocellular carcinoma

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## **Introduction**

Hepatocellular carcinoma (HCC) is a malignant primary liver cancer. In recent years, the number of diagnoses and mortality rate of HCC has been increasing in many regions of the world [1]. It is very important to identify prognostic factors for survival time of HCC patients.

## **Aim**

The aim of this study is to identify factors that affect the survival time of patients with hepatocellular carcinoma before they undergo a specific treatment.

## **Methods**

This retrospective study analysed 127 patients with diagnosis of hepatocellular carcinoma (HCC) who were treated in The Hospital of Lithuanian University of Health Sciences (LSMU) Kauno klinikos between 2016 June and 2020 December (LSMU Centre for Bioethics permission No. BE-2-31). The following data were collected: the concentration of the first time measured alpha-fetoprotein (AFP) in serum, Child- Pugh classes, patients age and sex, diameter of the largest tumour node, multinodular/non-multinodular HCC. The normality of data was assessed with Kolmogorov-Smirnov, Shapiro-Wilk tests. For descriptive statistics means (SD), median values (min-max) were used. For nonparametric statistics, a Mann-Whitney U - test was performed for a comparison between two groups and Kruskal-Wallis for more than two groups. The association between two quantitative variables was counted with Spearman's correlation coefficient. Statistically significant difference is when  $p < 0,05$ .

## **Results**

The mean of patient age was 63,99 ( $\pm 10,066$ ). The median of survival time in months was 20 (0-139). The difference between men (19 (0-139) and women (22 (0-91) was not statistically significant ( $p = 0,998$ ). There were 88 (69,29%) patients with Child-

Pugh class A, 20 (15,75%) - class B, 10 (7,88%) class C, and 9 (7,09%) with an unknown class. The median of survival time of patients with Child-Pugh class A liver function was 22,5 (0-139), B - 8 (0-89), C - 2,5 (0-30) months with statistically significant difference ( $p < 0,001$ ). The median of survival time of multinodular HCC patients was 13,50 (0-139), for non-multinodular patients - 22 (0-120) ( $p = 0,05$ ). There was a statistically significant correlation between the diameter of the biggest tumour node and survival time ( $R = -0,359$ ,  $p < 0,001$ ). However, there was no statistically significant correlation between the concentration of first time measured AFP and the survival time ( $R = -0,167$ ,  $p = 0,125$ ).

## Conclusions

Liver function (defined as Child-Pugh class) and the size of tumour both affect the survival time of HCC patients and they are important for predicting the prognosis.

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## Gastroenteropancreatic neuroendocrine neoplasms in Lithuania 2020: a single-center analysis

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## Introduction

According to the current classification of tumors of the digestive system, the neuroendocrine spectrum is split into well differentiated neuroendocrine tumors (NETs, graded into G1-G3) and poorly differentiated neuroendocrine carcinomas (NECs, small cell and large cell types), both of which can also be a component of mixed neuroendocrine-non-neuroendocrine neoplasms (MiNEN).[1,2] The tumor grading system has been constantly changing in search of the most appropriate way to group these neoplasms, causing organ-specific diagnostic differences.[1,2] This analysis reports the rate of gastroenteropancreatic neuroendocrine neoplasms (GEP NENs), as well as reflects shifts in classification, to facilitate diagnostic improvement.

## Aim

To analyze 2020 pathology reports in National Center of Pathology (Lithuania) and summarize the whole spectrum of GEP neuroendocrine lesions with emphasis on their location.

## Methods

A total of 209 cases with confirmed lesions of neuroendocrine origin diagnosed in the NCP (Lithuania) during a one-year period of 2020 were identified and further analyzed. The pathologic diagnoses were obtained from "PathIS" information system using filters for key phrases and disease classification codes. Descriptive statistics were obtained using MS Excel after manually categorizing the unstructured data.

## Results

Of 209 cases (consisting of neuroendocrine hyperplasia, non-neuroendocrine tumors with partial neuroendocrine differentiation, NETs, NECs and MiNENs), 160 (81 biopsy specimens, 67 surgical resections and 12 consultations) were first time NEN diagnoses. Of 160 NENs, 48 (30%) were of pulmonary origin, 64 (40%) were of GEP origin, 33 (21%) originated from other locations, 15 (9%) cases were metastasis of unknown origin. GEP NENs were most prevalent in stomach (27; 42%), pancreas (13; 20%) and colon (11; 17%), 5 (8%) cases were found in the appendix, the rest originated in the duodenum (2; 3%), ampulla of Vater (2; 3%) and small intestine (2; 3%). Sporadic GEP NENs were diagnosed in the esophagus and the rectum. 7 GEP MiNENs were found in the stomach (3; 43%), colon (3; 43%) and a. of Vater (1; 14%). 1/7 GEP MiNEN cases had a NET G1 component, 5/7 had a NEC component, and 1/7 was a G3 amphicrine MiNEN. The rest of 57 GEP NENs were categorized as G1 (30;

53%), G2 (13; 23%), G3 (14; 24%) 2 were NET G3s and 12 were NECs). 59/64 (92%) GEP NEN cases had their Ki-67 proliferative index assessed. In 33 (51%) cases the index was <3%, in 9 (14%) it ranged 3-20%, in 17 (27%; 10 NECs, 7 NET G3s) it was above 20%. 5 (8%) GEP NEN cases were not evaluated for Ki-67.

## Conclusions

As data from previous years shows, the most common GEP NENs origin sites in Lithuania remain the stomach, pancreas and colon. These persistent differences from the most common NEN sites reported in USA (rectum and small intestine) could be an interesting topic for further investigation. Incidence of gastric NENs has increased, though this deviation is likely sporadic and depends on local diagnostic approach.

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## **Analysis of early post-transplant period complications in renal transplant recipients**

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### **Introduction**

Kidney transplantation (KT) is the treatment of choice for end-stage kidney disease. Despite the advances, the risk of early post-transplant complications (PTC) remains high. Complications associated with delayed graft function (DGF), immunosuppressive therapy as well as urological and infectious causes can lead to increased morbidity, prolonged hospital stay or a need for a second surgical procedure.

### **Aim**

To analyze the frequency of complications and DGF in renal transplant recipients during the early post-transplant period and to determine independent factors affecting the complications and DGF rate.

### **Methods**

We performed a retrospective epidemiological study of patients, who underwent KT in 01/01/2020 - 31/07/2021 period at the Hospital of LUHS Kaunas Clinics. Data were collected using an electronic medical record system and a special questionnaire. For statistical analysis, we used SPSS v. 27.0. For the evaluation of continuous variables, the statistical mean and standard deviation were used. Kolmogorov–Smirnov



statistics were used to evaluate sample normality distribution. Comparison between groups was performed using the Student's t-test and Mann–Whitney U test. Spearman rank correlation was used to evaluate the relationship between sets of data. The logistic regression analysis has been conducted during which the odds ratios (OR) for appearing DGF (need for dialysis, within 1 week after kidney transplantation) and other early complications, that appeared during the first hospitalization after the surgery, have been established. Significant values were considered when  $p < 0.05$ .

## Results

A total of 59 kidney recipients were included in the study: 23 (39%) women and 36 (61 %) men, mean age  $49.9 \pm 12.9$  years. 62.7% of patients suffered from early PTC. The most common complications were: infectious complications (IC) (47.5%), complications of immunosuppression (22.1%), lymphatic system complications (10.2%), hematoma (6.8%), urine leakage (3.4%), acute rejection (3.4%). 50.8% of patients had a DGF. Patients age and gender didn't affect DGF, however, women were more likely to experience other PTC. OR for experiencing postoperative complications (95% CI) among women was higher 4.75 [1.236-16.758] than among men ( $p=0.012$ ). Women were more likely to suffer from IC (95% CI) OR 4.57 [1.482 -14,102] compared to men ( $p=0.007$ ). We analyzed correlation between recipients body mass index (BMI) and DGF. Patients, who have suffered from DGF had a mean BMI of  $27.9 \text{ kg/m}^2$ , meanwhile, recipients without DGF had a BMI of  $25.1 \text{ kg/m}^2$  ( $p=0.035$ ).  $\text{BMI} > 25$  was an independent prognostic factor for DGF (OR 3.606; 95% CI 1.214-10.71;  $p=0.019$ ).

## Conclusions

Our data showed that 62.7% of patients suffered from early post-transplant complications, most commonly infectious complications. Women were more likely to experience early post-transplant and infectious complications compared to men. More than half of the patients had a delayed graft function and it was more common among patients who were overweight.

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## **Health sciences students' knowledge of hepatitis B virus and its primary prevention**

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### **Introduction**

Studies show that a full course of hepatitis B virus (HBV) vaccination provides protection for at least 15 years (sometimes for life) (1, 2) and the majority (>95%) of immunocompetent adults are able to recover spontaneously after infection (3). However, despite decades of HBV vaccine and effective antiviral drugs use since 1998, approximately 250 million people remain infected worldwide (4). The spread of the virus may be facilitated by asymptomatic course of the disease in 50-70% of adolescents and adults. It is also known that HBV can survive outside the body for at least 7 days (5). Prevention and management of HBV for all health science students before starting practical work is one of the pillars of an infection control strategy.

## **Aim**

To assess and compare the knowledge of students from different faculties of the LUHS about HBV and its prevention.

## **Methods**

The study was conducted using an original anonymous survey. Considering the highest risk of blood-borne infections in the future profession, it was decided to include students from 3 faculties in the survey: the Faculty of Dentistry (FD), Nursing (FN) and Medicine (FM). Data analysis was performed using SPSS statistics 25.0,  $\chi^2$  test of homogeneity and Fisher's exact test.

## **Results**

A total of 149 students' answers about HBV and its prevention was included in the analysis: 41 from the FD, 45 from the FN and 63 from the FM. The students were similarly distributed in terms of duration of study: 80% of students were studying in higher than the 2nd year. 55.7% of students were under the mistaken belief that a person with HBV infection is more likely to experience certain symptoms than to have an asymptomatic course of the disease, with no significant difference between faculties ( $p=0.177$ ). 83.9% of respondents thought that spontaneous recovery after HBV infection is not common (all students were equally wrong,  $p=0.869$ ). When asked about the resistance of HBV to environmental factors, 49.7% of students said that HBV remains viable on surfaces for up to 24 hours, and 30.9% thought that it could survive for 3 days. FN students were more likely to choose the correct answer (26.7%), but there was no significant difference between groups ( $p=0.198$ ). 51.7% of respondents incorrectly believed that a full course of the vaccine always provides protection for life. However, 87.9% of students rated the risk of HBV in their future occupation as higher than moderate, and 83.2% agreed that it is recommended to be vaccinated with HBV vaccine/know their immunological status before starting practical work. During the study year, information about HBV received by medical students was more often forgotten (61.9%), while FD (78%) and FN (60%) students stated that they received too little or no information at all.

## **Conclusions**

The results show no significant difference in students' knowledge of HBV between faculties. The information received during the study year is insufficient especially for students of the Faculties of Dentistry and Nursing.

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**Neurosciences**

## **Measuring alexithymia in healthcare professionals: Which factors are related to it?**

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### **Introduction**

Alexithymia describes limited skills to emotion processing and recognition, characterizing an alexithymic person as not being able to differentiate between bodily sensations and emotions. The prevalence of alexithymia in the general population samples is reported to range from 10% to 13%. There are some analyses describing correlation between alexithymia and various medical conditions, such as burnout syndrome or depression. Since statistically the medical population is prone to experience higher level of stress and other mentally detrimental factors, it is worth investigating alexithymia in healthcare workers.

### **Aim**

Evaluate the rate of alexithymia and its relation to different sociodemographic factors in healthcare professionals.

### **Methods**

The research data were collected using anonymous self-rating questionnaires for 257 doctors. The Lithuanian version of the 20-item Toronto Alexithymia Scale (TAS-20) was used to assess the prevalence of alexithymia: a score of 52 and more indicated alexithymia or a tendency for alexithymia whilst a score of 51 and less indicated no alexithymia. An additional questionnaire composed of different multiple choice and scaling questions was designed to rank the available answers, related to an experienced stress level, a tendency to seek psychological help, sociodemographic (age, gender) and work-related (branch of medicine) information. Data was processed using R Commander.

## Results

In 28.4% of participants (n=254) alexithymia or a tendency for alexithymia was present. The mean of alexithymia score was 45.2, median 44. Further analysis of TAS-20 mean scores revealed, that there was no significant difference between gender (47.0 vs 45.0,  $P = 0,372$ ; comparing males and females), maturity (categorized as  $\leq 39$  and  $\geq 40$  years old; 45.9 vs 44.8,  $P = 0,252$ ) and branches of medicine (surgical 44.0 vs therapeutic 45.6,  $P = 0,825$ ), comparing them in different categories linked to alexithymia. Alexithymic healthcare workers had a significantly higher average stress level (7,81) compared to non-alexithymic ones (6,55),  $P < 0,05$ .

## Conclusions

The results of this pilot study shows that almost a third of medicine-practicing individuals has alexithymia or a tendency for alexithymia, which is a higher number if compared to the general population. Furthermore, alexithymic healthcare professionals experience significantly higher stress level. Since alexithymia could be an explanatory variable for higher stress levels, these results might be used to develop individual-directed interventions.

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## **Mir-200a-3p Expression In The Serum Of Patients With Parkinson's Disease**

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**Introduction**

Parkinson's disease (PD) is a neurodegenerative disorder that results in bradykinesia and tremor due to the death of dopaminergic neurons. PD progresses for several years before a clinical diagnosis is made and its treatment isn't curative [1]. Recently, miRNA (microRNA) interference has been extensively studied due to its effects in many biological processes, including manifestation of neurodegenerative diseases [2]. MiRNA molecules formed in various body cells can be packaged into extracellular vesicles (EV), then infiltrate the extracellular space and travel through biological fluids providing long lasting expression of disease – related genes [3]. EV miRNAs are expected to help differentiate diseases, their stages and their progression.

**Aim**

The aim of this study was to determine EV miR-200a-3p expression in the serum of patients with PD.

**Methods**

MiRNA expression was evaluated by age, sex, the onset of the disease, its duration, severity of symptoms and selected method of treatment for 88 individuals with PD. 36 control group patients received medicational treatment, 39 deep brain stimulation and 13 gamma knife surgery. EV miRNAs were isolated from collected samples of blood serum, transcribed into cDNA and its expression was measured by RT-PCR. Statistical analysis was performed using Student's t test, ANOVA criteria and Pearson's correlation coefficient in GraphPad Software Inc. Prism 8.

## Results

The results revealed that patients who were assigned for surgical PD treatment showed quantitatively higher levels of miR-200a-3p in their blood samples than patients in control group when using ANOVA criteria. It was also noticed that 95% of control group experienced no to moderate PD symptoms, whereas 90% of patients in surgical treatment groups faced mild to severe intensity of tremor and bradykinesia. All patient data were pooled into groups by intensity of their symptoms to address whether the severity of PD was associated with increased miR-200a-3p expression levels. ANOVA test confirmed that as symptoms of bradykinesia become more intense, miR-200a-3p levels increase gradually. Similar miR-200a-3p changes were observed as symptoms of tremor intensify, but these results were not statistically significant. Unfortunately, miR-200a-3p levels were not affected prior and post surgical treatment when using paired Student's t test. Also, no statistically relevant miR-200a-3p expression levels were observed regarding gender, patients age, the onset of the disease and its duration.

## Conclusions

In conclusion, primary data suggest that patient groups with elevated EV miR-200a-3p expression levels experience stronger PD related symptoms and require surgical treatment. More detailed studies of miR-200a-3p expression levels are needed to support obtained results which could be useful in clinical practice to facilitate diagnosis, prognosis and therapeutic applications for patients with PD.

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## **The effect of blood pressure on optical coherence tomography parameters**

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### **Introduction**

According to 2019 Eurocast data, more than 22% of people in Europe had high blood pressure, which is associated with cardiovascular, cerebrovascular and eye diseases [1][2]. Over the last decade, greater efforts have been made to find links between high blood pressure and reductions in ganglion cell-inner plexiform layer (GC-IPL) and retinal nerve fiber layer (RNFL) thickness [3][4][5].

### **Aim**

To evaluate the effect of blood pressure on optical coherence tomography (OCT) parameters in women with healthy retina.

### **Methods**

The pilot prospective study included women  $\geq 50$  years who had an eye examination in the Consultation Center of Republican Vilnius university hospital in 2021. Age, primary arterial hypertension (PAH), anamnesis of drugs, home monitoring blood pressure (systolic and diastolic) were recorded, best-corrected visual acuity (BCVA), eye pressure (air-puff tonometry) were measured, biomicroscopy, ophthalmoscopy, OCT (Cirrus 5000, Zeiss, 2016), RNFL (Optic Disk Cube 200 x 200) and macula scans (GC-IPL thickness, inner limiting membrane-retinal pigment epithelium (ILM-RPE) thickness (Macular Cube 512 x 128)) were performed. T-test, Pearson correlation coefficient and variance inflation factor metric were calculated using IBM SPSS 23.0 software.

## Results

The study included 50 women (100 eyes) without a diagnosis of retinal disease or glaucoma. The median age was 64 (51-86) years. 48.8% of the subjects had a previous diagnosis of PAH, for which they were treated. There was no statistically significant difference in age between subjects with PAH and without a diagnosis of PAH. The mean blood pressure was: systolic

129.34 mmHg ( $\pm 12.98$ ) and diastolic 81.68 mmHg ( $\pm 8.98$ ). The median BCVA was 0.9 (0.2-1), the mean eye pressure – 17.57 mmHg ( $\pm 3.53$ ). A strong negative correlation was found between age and BCVA ( $r = -0.68$ ,  $p < 0.01$ ). Age also correlated negatively with GC-IPL ( $r = -0.44$ ,  $p < 0.05$ ). A moderate negative correlation was found between systolic blood pressure and average RNFL and GC-IPL thickness ( $r = -0.45$ ;  $r = -0.51$ ,  $p < 0.01$ ). Strong multicollinearity between age, systolic blood pressure and GC-IPL thickness was observed. We found very weak or not significant correlations between diastolic blood pressure and OCT scan results: average RNFL, GC-IPL and ILM-RPE thickness ( $r = -0.22$ ;  $r = -0.06$ ;  $r = -0.11$ ;  $p > 0.05$ ). Group of PAH had statistically significant higher blood pressure and lower average RNFL and GC-IPL thickness in comparison with subjects with no PAH ( $p < 0.05$ ), but no difference in ILM-RPE thickness was observed ( $p > 0.05$ ).

## Conclusions

Higher systolic blood pressure might be related to the reduction of retinal GC-IPL and RNFL thickness. Subjects with diagnosed PAH have higher blood pressure and lower average RNFL and GC-IPL thickness.

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## **MRI findings association with multiple sclerosis disease course and disability**

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### **Introduction**

Magnetic resonance imaging is an obligatory element in the diagnostic process of MS [1]. Furthermore, it can also work as a biological marker of the severity and progression of this

disease [2]. In our research we are investigating the association mentioned above and sharing findings from a local MS center.

## Aim

To identify and investigate MRI findings at the moment of MS diagnosis and its association with disease course and disability.

## Methods

We included 120 patients with multiple sclerosis diagnosis who were treated at the Hospital of LUHS Kaunas Clinics Neurology Department. The MRI data was collected from medical documentation. Disability assessment was made according to EDSS on diagnosis and latest visit to the clinic. MSSS score was calculated using a conversion table based on EDSS score and duration of disease in years. Statistical analysis was performed using IBM SPSS Statistics software (v. 23.0) using Mann-Whitney U Test and  $\chi^2$ .

## Results

The study involved 44 male (36.7%) and 76 female (63.3%) patients with an age median of 44 years (19-60). Most frequent change found in MRI at the time of diagnosis was periventricular lesions (96.7%,  $n=116$ ). Periventricular lesions were most frequent in RRMS patient group (98.2%,  $n=54$ ,  $p>0.05$ ) as well as corpus callosum lesions (89.1%,  $n=49$ ,  $p>0.05$ ). Lesions in brainstem were mostly found in PPMS patients (75%,  $n=9$ ,  $p>0.05$ ), cerebellum and subcortical lesions in SPMS (54.7%,  $n=29$  and 60.4%,  $n=32$ ,  $p>0.05$ ). Lesions in the cervical and other parts of the spinal cord showed a tendency to be found in PPMS type patients (25%,  $n=3$  and 16.7%,  $n=2$ ,  $p>0.05$ ). These differences were only seen in our research descriptive statistics while statistically significant differences between localization and disease course are absent. MRI changes on diagnosis and also a number of different localizations had no statistically significant differences between disease courses. EDSS score on diagnosis had no statistically significant differences between different localizations of MRI findings. MSSS score median for all patients was 7.11 (0.64-9.95). Only patients with lesions in brainstem on diagnosis MRI, MSSS score median was statistically significantly higher compared to those who had not (7.60(0.64-9.95) vs. 6.48 (0.77-9.34),  $p=0.02$ ).

## Conclusions

At the moment of MS diagnosis MRI lesions found in brainstem, cerebellum and spinal cord could be associated with a more severe form of MS (mostly found in PPMS and SPMS patients). Lesions found in brainstem can also predict the possibility of a higher disability progression (MSSS score median 7.6 (0.64-9.95),  $p=0.02$ ). The lack of statistically significant correlations might be associated with a limited sample of lesions in different localizations.

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## **IL-10 gene rs1800871 single nucleotide polymorphism in patients with multiple sclerosis.**

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### Introduction

Multiple sclerosis (MS) is a chronic autoimmune disease of the central nervous system that causes demyelination and neurodegeneration [1]. It is the most common disease in young people, affecting approximately 2.3 million people worldwide. MS is characterized by progressive neurological and ophthalmological symptoms: fatigue, insomnia, mobility disfunction, impaired visual acuity, partial or complete loss of visual functions [2]. Recently, more and more attention is paid to the research for new genetic markers importance for the development and progression of MS. Genetic

factors importance for the pathogenesis of MS have been identified as IL-16, IL2RA gene polymorphisms, decreased CXCL8 (IL-8) gene expression [3 - 6]. One of the genetic factors that may be associated with development of MS in the clinical course could be the IL-10 gene polymorphism.

### **Aim**

To determine the relationship between IL-10 rs1800871 genotypes and alleles in patients with MS.

### **Methods**

The study enrolled 75 patients with MS and 197 healthy controls. Samples of DNA from peripheral blood were purified by salting-out and commercial kit. The genotyping test was carried out using the method of RT-PCR. The results were assessed using the statistical analysis program "IBM SPSS Statistics 27.0"

### **Results**

Our data demonstrated no statistically significant differences of IL-10 rs1800871 gene polymorphism between patients with MS and healthy controls (AA/AG/GG prevalence 1.3%, 41.3% and 57.3% vs. 6.7%, 36.3% and 57%,  $p = 0.184$ ). Analysis revealed that IL-10 rs1800871 AA, AG and GG genotypes did not statistically significantly differ between MS and control group males (3.6%, 35.7% and 60.7% vs. 6.1%, 36.7% and 57.1%,  $p = 0.875$ ) as well as in females group (0%, 44.7% and 55.3% vs. 6.9%, 36.1% and 56.9%,  $p = 0.138$ ).

When analysing subjects by age ( $\leq 30$  and  $>30$ ) AA/AG/GG prevalence in both groups had no any statistical significance. Group  $\leq 30$  (0%, 45.5% and 54.5% vs. 7.7%, 36.5% and 55.8%,  $p = 0.217$ ), group  $>30$  (5.6%, 38.1% and 59.5% vs. 2.4%, 36% and 58.4%,  $p = 0.707$ ).

### **Conclusions**

IL-10 rs1800871 gene polymorphism had no predominant effect on the development of MS.

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## **A Genetic Risk Score to Aid Differentiation of ON at presentation**

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## **Introduction**

Optic neuritis (ON) is a rare yet potentially treatable cause of blindness, which typically affects young adults, with an estimated incidence of 2500 new cases annually in the UK(1). ON may be the first presentation of multiple sclerosis (MS) or systemic autoimmune disease. In ON cases associated with MS (MS-ON), which comprise approximately a third of presenting ON cases, vision usually recovers to near-baseline over time, and current evidence does not support treatment with corticosteroids. However, there is a time-critical and potentially sight- saving role for urgent immunosuppression in cases of ON not associated with MS. Currently, clinicians judge whether presenting ON is likely to be associated with MS based on clinical characteristics, such as sex and age of the patient.

Genetic risk scores (GRS) have been previously shown to improve the classification/diagnosis of autoimmune diseases, mostly due to strong HLA allele association. (2)

## **Aim**

We aimed to assess the discriminative and predictive performance of an MS genetic risk score (MS-GRS) in people with optic neuritis without a prior diagnosis of MS.

## **Methods**

Our data source was UK Biobank (UKBB), which is a large collection of phenotypic and genetic data on 500,000 individuals from the UK. We then analysed demographic characteristics such as sex, age, smoking status, the birth latitude of each group. Utilising the data from large genome-wide association studies (GWAS), we developed an MS genetic risk score (MS-GRS) based on 308 single nucleotide polymorphisms (SNPs) from outside of the HLA region (3), and 8 HLA alleles + 2 SNPs for the HLA-GRS. (4) We scored the non-HLA alleles using log odd ratios as weights using PLINK2, and calculated an interaction HLA-GRS in Python. We assessed the power of MS-GRS to discriminate between MS cases (n=2368) and healthy controls (n=481113) using receiver-operator characteristics-area under the curve (ROC-AUC). We analysed the ability of MS-GRS to stratify people presenting with ON by the risk of subsequent MS by MS-GRS quartiles and plotted Kaplan-Meier MS-free survival analysis.

## **Results**

We retrieved 2368 MS cases (Female: male ratio: 2.59, mean age at diagnosis  $\pm$  SD:

44.52 ± 12.39), 687 cases of ON (F:M ratio: 2.00, mean age at diagnosis ± SD: 45.24 ± 14.54). Our MS-GRS was discriminative of MS cases (ROC-AUC = 0.757). People with ON only had a statistically lower MS-GRS (p-value < 0.0001), while the MS-GRS distribution in individuals with MS-ON was not different from MS only. Using multivariable survival regression analysis, we showed that MS-GRS significantly enhances stratification of presenting ON by a risk of developing subsequent MS.

## Conclusions

MS-GRS may aid stratification of presenting ON and may be a valuable addition in predicting the risk of developing subsequent MS. Utilising genetic information may aid clinical decision-making in high stakes environment. and will result in precision-based treatment of ON, helping to avoid unnecessary administration of aggressive treatment.

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## **Changes in the prevalence of glaucoma and glaucoma suspects in Lithuania during 2001-2020**

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### **Introduction**

Glaucoma is an optic neuropathy, which is caused by progressive death of retinal ganglion cells (1). It is characterised by cupping of the optic nerve and visual field loss (2). Glaucoma can be asymptomatic until a severe stage and it is expected that almost 50-90% of patients remain undiagnosed worldwide (3). According to the World Health Organization (WHO), glaucoma is the 2nd leading cause of blindness globally (4). This disease is multifactorial and the most common cause is increased intraocular pressure (5). Glaucoma can affect people of all ages, but it is more prevalent in people over 40 due to the rapid increase in aging populations worldwide (6). Based on prevalence studies, it was estimated that in 2020 about 76 million people suffered from glaucoma and in 2040 this number will reach approximately 111.8 million (7).

### **Aim**

The aim of this study was to assess trends in the prevalence of glaucoma and glaucoma suspects in Lithuania during the period of 2001-2020.

### **Methods**

Retrospective data analysis was performed. Data on glaucoma suspects, open-angle,

angle- closure, secondary and other types of glaucoma (ICD-10 code H40-H42) in Lithuania during 2001-2020, was obtained from the Institute of Hygiene. The prevalence of glaucoma and glaucoma suspects in adults and children was calculated per 100 000 population. Changes in the prevalence of glaucoma by age and sex during 2001-2020 were assessed using Joinpoint regression analysis (8).

## Results

In 2020, the overall prevalence of glaucoma and glaucoma suspects was 3137/100 000 of the population. Based on international research forecasts the estimated number of cases in Lithuania may actually to reach 6274/100 000 population or more. The prevalence of glaucoma and glaucoma suspects in Lithuania has increased about 3.5-fold over 20 years. During 2001-2020, the average annual increase among adults was 6.6% per year ( $p < 0.001$ ), while among children was 3.2% per year ( $p < 0.001$ ). The prevalence of glaucoma and glaucoma suspects was higher in women than men, with the average ratio of 1.7:1. Comparing the results among the patients older than 40 years, the prevalence of glaucoma and glaucoma suspects increased with age: in the 40-59 age group the average prevalence was 1254/100 000, in the 60-79 age group was 6488/100 000, and in the 80+ age group reached 11621/100 000. During 2001-2020, the highest increase of glaucoma and glaucoma suspects was observed in patients older than 80 years (6.0%/year,  $p < 0.001$ ), with the ratio of 1:3.

**Conclusions**

The prevalence of glaucoma and glaucoma suspects over the past 20 years in Lithuania was increasing. This could be due to the significant improvement in eye examination and diagnostic tools. In addition, older people are more likely to develop glaucoma.

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## **Efficacy of artificial intelligence in detecting diabetic retinopathy from retinal fundus images. A systematic review.**

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## **Introduction**

Diabetic retinopathy (DR) is a complication of diabetes mellitus, which damages the blood vessels of retina. Early diagnosis and treatment are important for proper management and reduced risk of vision loss [1]. Artificial intelligence (AI) based algorithms have been used to detect DR [2].

## **Aim**

The purpose of this review is to evaluate scientific literature about the efficacy of AI in detecting diabetic retinopathy from retinal fundus images.

## **Methods**

Systematic literature review was carried out following PRISMA guidelines. “PubMed” and “ScienceDirect” databases were used for the search of scientific literature. Keywords and combinations of possible synonyms used for search were selected using the Medical Subject Headings dictionary. Both databases were last searched on 15th of February 2022.

Articles were selected according to inclusion and exclusion criteria, developed using PICO method. Eligible studies met the following inclusion criteria: used artificial intelligence to detect DR and evaluated the accuracy of it by sensitivity (Se), specificity (Sp) and AUROC (area under the receiver operating characteristic curve), the index test was compared with ophthalmologists’ diagnosis as a ground truth and the diagnosis was made solely based on retinal images captured by fundus photography. For inclusion the publication had to be published in the last 10 years, written in English and have open access to full text.

Case reports, literature reviews, systematic reviews and meta-analyses were excluded from this review. Two reviewers independently screened the titles and the abstracts of the citations from the literature search. Risk of bias was evaluated according to QUADAS-2 criteria.

## Results

Out of the 2322 scientific publications collected with keywords and filters, 158 potentially relevant studies were left after the elimination of duplicates and a brief analysis of titles and abstracts. Full texts were further screened for final inclusion and 15 studies from 14 scientific publications were included in this systematic review. Part of studies were done using publicly available datasets [3-10], while others collected their own data [11-16]. Sample size in studies varied from 321 to 75137 images, with a total sample size of 150179 images included in this review. Average Se of AI-based algorithm was 92.58%, ranging from 76.2% to 100% by Roychowdhury et al. [6] with Sp of 53.16% and AUROC of 0.904. Average Sp was 87.22%, with lowest of 53.16% and highest of 98.5% by He et al. [12] with Se of 90.79% and AUROC of 0.946. Average AUROC was 0.937, with a variation of 0.843 to 0.9905 by Li et al. [13] with Se of 96.93% and Sp of 93.45%.

## Conclusions

Our results show that AI-based algorithms can accurately detect DR in retinal fundus images. These systems should be considered of use in clinical practice to save time and reduce costs.

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**Obstetrics  
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## **Pregnant women knowledge and attitude towards fetal ultrasound**

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### **Introduction**

Obstetric ultrasonography is one of the main tools providing objective information about the fetal health during pregnancy as well as having additional psychological value developing maternal bond [1]. Even though it has been already more than six decades since the first fetal ultrasound examination [2], there are still considerable amount of myths and misinformation spread among pregnant women regarding safety of obstetric ultrasonography [3].

### **Aim**

To evaluate pregnant women knowledge and attitude towards obstetric ultrasonography.

### **Methods**

An online survey designed by authors was conducted from October 11 to December 11 in 2021. It was addressed to women who gave birth in no more than one month period or is in the ninth month of pregnancy and consisted of demographic questions, obstetrical history and True/False statements concerning obstetrical ultrasound examination safety in 3D/4D vs. 2D, sound waves effect on fetal hearing, ultrasound examination accuracy determining sex, weight, gestational age etc. The study was approved by the Lithuanian University of Health Sciences Ethics Committee. Calculations were performed using Microsoft Excel and IBM SPSS 27.0 software, using Chi-square and Mann Whitney-U tests. Results with values of  $p < 0.05$  were considered statistically significant.

## Results

There were 167 pregnant women with single pregnancies who participated in the survey. 76,6% (n=128) of women declared that ultrasound is completely safe during pregnancy and there was no significant correlation between age and attitude towards ultrasound safety during pregnancy ( $p=0.165$ ). However, results suggest that multiparous women tend to rely on ultrasound safety more often than the first-time pregnant women (92.9% vs. 68.8%,  $p=0.027$ ). Responding to True/False statements regarding fetal ultrasound, women showed that their knowledge is above average and the median of correctly answered questions is 5 (SD=1.53) out of 8. Only 39,5 % respondents knew that “3D/4D ultrasound is not always more accurate than 2D” and 55,1% thought that “ultrasound examination can accurately determine duration of pregnancy”. Nevertheless, 89,8% knew that “ultrasound waves cannot adversely affect fetal hearing” and 86,8% were aware that “ultrasound examination of the fetus does not determine fetal sex with 100% accuracy”. No statistically significant correlation between correctly answered questions and the number of previous pregnancies was observed ( $p=0.327$ ), although women under 25 answered statistically significant more questions correctly than in an age group of 25-35 years ( $Z=-2.603$ ;  $p=0,009$ ).

## Conclusions

Younger women have more information regarding safety of obstetric ultrasonography, however there is no evidence that the age of the mother has impact on her attitude towards its’ safety, and vast majority consider it safe. Although multiparous women tend to rely on ultrasound safety more often.

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## **Breastfeeding of newborns born in the Baby-friendly Hospital in the first year of life**

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### **Introduction**

The WHO recommends that children initiate breastfeeding within the first hour of birth and be exclusively breastfed for the first 6 months of life and from the age of 6 months, children should begin eating complementary foods while continuing to breastfeed for up to 2 years and beyond if possible [1]. Lithuania has created favorable conditions for breastfeeding according to the WHO recommendations. At the present time there are 17 (65 %) maternity hospitals in the country, that have the name of a Baby-Friendly hospital [2]. According to the data of the Lithuanian Institute of Hygiene in 2015 32 % of infants under 6 months of age were exclusively breastfed and in 2019 – 37,8 % [3]. A small number of studies have been conducted in Lithuania on the peculiarities of breastfeeding. After identifying the breastfeeding problems faced by Lithuanian mothers, it is possible to improve breastfeeding courses for pregnant and lactating women, recognize the risk factors and pay more attention to breastfeeding the newborn in the hospital.

### **Aim**

To analyze the peculiarities of breastfeeding cessation in infants born in a Baby-Friendly hospital.

## Methods

A mixed (retrospective + prospective) study was performed to examine 642 healthy and full term infants  $\geq 37$  weeks who were born to healthy women in 2019 LSMU KK in the Perinatal Center Level III with a Baby-Friendly hospital name and exclusively breastfed from birth. 642 mothers who gave birth were interviewed about breastfeeding characteristics by telephone. Data were analyzed using “The IBM SPSS Statistics 23” statistical analysis package.

## Results

Up to 6 months of age were breastfed 76,8% and until 12 months of age - 59.4% of all newborns. The most common causes for breastfeeding cessation were personal reasons (26.2%) and infant rejecting breast (25.2%). When analyzing breastfeeding termination for up to 3 months of age and 3–5 months of age it was found that the most common reason was insufficient lactation / hungry infant (46.1%, 49.3%). Mothers who breastfed for only up to 3 months of age were more likely to use social networks, as a source of information about breastfeeding, than mothers who breastfed for longer period of time. Mothers who were breastfeeding for 3–5 months of age used literature (14.1%) as a source of information more often than those who breastfed until 12 months of age ( $p < 0.05$ ). The most common source of information about breastfeeding among women who breastfed 6–11 months of age (44.6%) and  $\geq 12$  months of age (42.2%) was personal experience.

## Conclusions

Three-quarters of newborns born in a Baby-Friendly hospital were breastfed for up to 6 months of age and more than half  $\geq 12$  months of age. The most common reason for breastfeeding cessation until 6 months of age was insufficient lactation/hungry infant and  $\geq 12$  months of age - personal reasons. All mothers, regardless of how long they breastfed, mostly relied on personal experience as a source of information about breastfeeding.

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## **Symptom analysis of paediatric patients with abdominal pain that predict hospitalization**

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### **Introduction**

Acute abdominal pain is one of the most common complaints at the paediatric emergency department (PED) (1). It is highly important to distinguish between the cases which need urgent surgical treatment, such as appendicitis, and those which can be treated at home (2). Timely hospitalization can be crucial for the effective treatment of acute conditions (3).

### **Aim**

In this study, we aimed to analyse what symptoms could predict the hospitalization of

children with abdominal pain at Hospital of Lithuanian University of Health Sciences Kauno klinikos PED.

## Methods

We performed a retrospective epidemiological study of PED patients with abdominal pain 1st- 30th of September 2018. Data were collected using electronic medical record system. The analysed month was selected randomly. We included referral time, age, symptoms, clinical examination data, final diagnosis at PED, and outcomes and compare between divided age- groups (older and younger than 10 years old). P value  $<0.05$  was defined as significant.

## Results

In total, we analysed a retrospective data of 254 children. 47.2% of them were male. The majority of children were older than 5 years ( $n=207$ ). Girls presenting with abdominal pain were older compared to boys (10.04 (9.26-10.82) vs. 8.4 (7.57-9.22) respectively,  $p=0.005$ ). 160 (63%) of paediatric patients with abdominal pain presented within 24h from the onset of pain. 89 (35%) children were hospitalized. 49 of them were diagnosed with appendicitis, 5 had other surgical abdominal conditions, 25 had gastroenteritis. There was no significant difference in hospitalization based on age groups or such symptoms as fever, nausea/vomiting or decreased appetite. However, patients with reported abdominal pain migration were hospitalized more frequently (40% vs. 60%,  $p=0.015$ ). Moreover, children with peritoneal irritation were more frequently hospitalized (25.8% vs. 74.2%,  $p<0.001$ ). However, in the multivariate analysis, only children with peritoneal irritation were 9 times more likely to be hospitalized compared with others (95% CI [3,125, 26,917];  $p<0.001$ ; OR (adjusted to age) 7.97, 95% CI [2.62 – 24.28];  $p<0.001$ ). None other factors, such as lab tests or results of abdominal ultrasound were associated with hospitalization.

## Conclusions

Assessing the data of patients presenting with abdominal pain to the PED it is apparent that symptom of peritoneal irritation was more likely to be associated with hospitalization. It is not surprising, as peritoneal irritation is highly sensitive diagnostic factor for appendicitis. No other symptoms were significant in predicting hospitalization.



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## Impact of Gestational Diabetes Mellitus on Breastfeeding Practice

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### Introduction

Gestational diabetes mellitus (GDM) rate from 2015 to 2019 increased >4 times in Lithuania[1]. According to the literature, women with GDM are less likely to start breastfeeding than women without GDM. Mothers who start breastfeeding a newborn do it shorter and are ~3 times less likely to feed a newborn exclusively with breast milk (BM)[2- 6].

## Aim

To evaluate the influence of gestational diabetes mellitus on breastfeeding practice during the first month after delivery.

## Methods

A prospective study at LUHS Hospital Kaunas Clinics. The study protocol was evaluated by the Bioethics Center with permission. Medical records of 82 healthy full-term newborns who were born between 2021 October 1<sup>st</sup>-November 31<sup>st</sup> by healthy nulliparous women were analyzed. All mothers agreed to participate in the study. Newborns were divided into two groups: mothers with GDM and mothers without GDM (NGD). Of 32 women with GDM, 20 mothers had type A1 GDM and the remaining 12 mothers had type A2 GDM. Mothers' telephone surveys 1 month after delivery were performed to assess breastfeeding and related problems. Statistical analysis was performed using IBM SPSS 26.0 version. Descriptive analysis, correlation criteria were used to analyze data, statistically significantly different at  $p < 0.05$ . Obtained results reflect the tendencies of this research group, though further research is needed.

## Results

Mothers' age (mean  $\pm$  SD) was  $29 \pm 4.03$  years. 70.7% gave birth vaginally, 29.3% -by C-section. Newborn's APGAR scores (median(min-max)) at 1 min. 9(7-10), at 5 min. 10(8-10), birth weight was  $3469.29 \pm 543.53$  g. 85.7% of newborns had skin-to-skin contact in the delivery/operative room, 81.3% of newborns were breastfed during the first 2 hours. 39% of newborns were in the GDM group, 61% - NGD. There was no significant difference between newborn groups. Group of GDM newborns was significantly more frequently supplemented with formula (F) on the second day of life (40.6% compared with 12% NGM)( $p=0.007$ ). During the first month of life, 73.2% of neonates were fed BM, 13.4% were fed with a combination of BM and F, 13.4% were fed only with F. There was no significant difference in how mothers feed a newborn during the first month of life between GDM and NGD groups ( $p=0.164$ ). The most common reason for supplementation at the hospital (68.6%) and 1 month after birth (77,3%) was insufficient milk production. There was no significant difference in hospital due to insufficient lactation between the GDM and NGD groups (GDM 34.4% compared with 26% NGD)( $p=0.416$ ), but after one month, the GDM group newborns were significantly more likely to be fed with supplementation due to lactation deficiency (GDM 12.5% compared with 0.0% NGD)( $p=0.10$ ).

## Conclusions

Group of GDM newborns was significantly more frequently supplemented with formula on the second day after birth. After one month, neonates in the GMD group were significantly more likely to be fed with supplementation due to lactation issues.

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## The opportunities of lung ultrasound in children with COVID-19

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**Introduction**

During the COVID-19 pandemic, lung ultrasound (US) has gained an incentive for development.

The preference of lung US should be given in the following cases: 1- young children (CT difficult for them), 2- if necessary to diagnose a large number of patients, 3- when transport of ill children is impossible. Furthermore, "Pocket" US (POCUS) are easier to disinfect. Also, the absence of radiation makes it possible to re-examine and evaluate dynamics changes. However, a downside is that US signs of lung involvement are not highly specific.

**Aim**

To establish the features of ultrasound pictures of lung lesions in children with COVID-19.

**Methods**

During the period of Oct. – Dec. 2021, 565 children received a lung US at the St. Zinaida Sumy Children's Clinical Hospital, of which 492 children were diagnosed with interstitial syndrome of varying severity. The etiology of pneumonia was established on the basis of PCR data (detection of RNA of SARS-CoV-2 virus in nasopharyngeal swab) and ELISA method (IgM to SARS-CoV-2 in blood). US was carried out on a FUJIFILM (Hitachi) ARIETTA 50 ultrasound scanner (Japan), linear sensor 10-12 Hz. The Commission on Bioethics of V. N. Karazin Kharkiv National University found that the study meets the ethical principles of medical research conducted on humans (protocol 12 from 07.12.2021).

## Results

75% of the COVID-19 patients had bilateral lesions in the lower lobes of both lungs. The following typical features were identified: multiple bilateral B-lines ("caput medusae") that were fixed, broad and confluent. With the progression of the disease, the number of B-lines increases, they merge up to the appearance of a single echopositive image – "white lung" as a reflection of interstitial syndrome. The next most frequently (71%) diagnosed symptom is a change in the pleural line (increase in thickness and its unevenness). Less common (39%) small subpleural consolidations were determined. With COVID-19, consolidated cells are always determined against the background of interstitial syndrome.

Studies during the influenza A (H1N1 and H7N9) cases allowed to establish US features of viral pneumonia: signs of interstitial syndrome (B-lines), small subpleural consolidated, multifocal bilateral changes. Thus, COVID-associated pneumonia is determined by the same ultrasound signs, as with any other viral pneumonia.

## Conclusions

The US signs of COVID-19 are: multiple bilateral B-lines; with the progression of the disease, appearance of a "white lung", as a reflection of the interstitial syndrome; increase in thickness or unevenness of the pleural line; subpleural consolidations. It has been established that these US signs are not specific and are determined in viral pneumonia of any other etiology. Therefore, the diagnosis of COVID-pneumonia in children should be based on a set of data from clinical, laboratory and instrumental methods. Lung US does not replace and cannot be opposed to lung CT, but is a promising additional method for diagnosing pathological changes in the lungs.

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## **The negative impact of the COVID-19 lockdown on children with ASD: A systematic literature review**

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### **Introduction**

In 2020 countries imposed strict lockdowns due to COVID-19 causing disruptions in families' routines and negatively affecting children's with autism spectrum disorder (ASD) mental health [1]. Children with ASD comprise a particularly vulnerable population during COVID-19 not only due to disrupted routines, but also due to limited access to therapy, which result in changes of symptoms [2, 3].

## **Aim**

The aim of this systematic literature review is to present current knowledge of the negative impact of the COVID-19 lockdown on children with ASD.

## **Methods**

A PubMed and Researchgate databases search was done according to PRISMA guidelines. Following combination of keywords were used: (autism AND covid) AND (impact OR effect). Also, filters “child: birth-18 years”, “language: English” were applied. The screening process included reading titles and abstracts. The most relevant articles were selected and their backward and forward citations were also inspected. Selected studies were fully read, resulting in an overall number of 14 articles included in this systematic literature review.

## **Results**

After analyzing the literature, we summarized the results in the following four aspects. 1) Behavior changes and overall worsening of the symptoms ( $p < 0,05$ ): increased motor and vocal stereotypies, mannerisms, moodiness, irritability and aggression [4-12]. Certain authors found no significant worsening in problem behaviors (PB), and aggression [13, 5]. At least a

third of the children with ASD showed an increased intensity or frequency in PB [14, 8]. In comparison to children without PB, children who had already had PB prior to the pandemic were twice as likely to display more frequent or intense PB ( $p < 0,001$ ) [14]. 2) Comparing children who followed their routines with those who did not, the latter had greater levels of anxiety ( $p < 0,001$ ) [11]. 3) In contrast to the pre-pandemic period, sleep quality, and sleep- related problems worsened [6, 7, 12]. Difficulty falling asleep, bedtime anxiety, and daytime sleepiness increased ( $p < 0,05$ ) [15, 16]. Yet, there were different findings showing either increase or no change in night awakenings, hypnic jerks, rhythmic movement disorder, restless sleep, and sleepwalking [7, 15, 16]. 4) Decreased functioning due to lockdown was linked to reduced levels of pleasant emotions ( $p < 0,001$ ) [4].

## **Conclusions**

In conclusion, this systematic literature review indicates several negative effects of the COVID-19 lockdown on children with ASD. Firstly, there was an overall increase in problem behavior. Secondly, children with ASD who did not maintain routines had higher mean levels of anxiety. Additionally, sleep disturbances increased. Also,

decreased functioning was associated with lower levels of positive emotions. However, we found inconclusive results regarding aggression, hypnic jerks, rhythmic movement disorder, restless sleep, sleepwalking, and nocturnal awakenings. Lastly, we found a single research regarding no changes in problem behavior.

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## **Analysis of management approaches of ectopic tubal pregnancy and their effectiveness**

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### **Introduction**

Ectopic pregnancy occurs approximately in 2% of all pregnancies and can be life

threatening. The most common location is the fallopian tube which accounts for 96% [1]. There are 3 management approaches: expectant management, methotrexate (MTX) therapy and surgery. Historically, ectopic pregnancy was managed surgically but in current practice MTX therapy is preferred for properly selected women [2].

## **Aim**

To analyse treatment methods of tubal pregnancy (TP) and their effectiveness in 2021 at the Department of Obstetrics and Gynaecology, Lithuanian University of Health Sciences (LUHS).

## **Methods**

A prospective analysis of TP management approaches was conducted at the Department of Obstetrics and Gynaecology, LUHS from 1 of January to 31 of December, 2021 (bioethics approval No.BEC-MF-196). All women who were treated during this period of time and agreed to participate were included in the study. Women were divided into 3 groups depending on the TP treatment method. Data collected from medical records and completed patient questionnaires included management method and its effectiveness, human chorionic gonadotropin (hCG) dynamics until unreachable level and women's awareness and satisfaction of treatment. Statistical analysis was performed using the data collection with IBM SPSS 26.0.

## **Results**

A total of 72 women were included in this study: 34 (47.2%) undergone surgery, 31 (43.1%) were eligible for MTX therapy and 7 (9.7%) had expectant management. Follow-up questionnaire was completed by 50 women (response rate-69.4%), 25 of which had surgery, 21-MTX therapy and 4-expectant management. Other treatment approach was required for 6 women. MTX therapy was necessary for 1 woman in the expectant management group (effectiveness-75.0%), 4 women required surgery after MTX therapy (effectiveness-80.9%) and 1 woman needed re-operation because of severe abdominal pain and heavy bleeding after surgery (effectiveness-96.0%). Adverse effects occurred in 6 (28.6%) women treated with MTX, most common was nausea (66.7%). A total of 34 women followed hCG dynamics until the level was undetectable. The average time in weeks did not differ between groups ( $p=0.764$ ) and was  $3.7 \pm 0.6$  for expectant management,  $4.5 \pm 2.6$  for MTX therapy and  $3.6 \pm 2.0$  for surgery. There was no statistical significance between groups regarding women's awareness. Overall, 43 (86.0%) women agreed that information on TP and its management approaches were understandable ( $p=0.650$ ) and 48 (96.0%) understood

the choice of treatment method used ( $p=0.831$ ). A total of 32 (64.0%) women were satisfied with the management approach and that did not differ between groups ( $p=0.909$ ).

## Conclusions

More than half (52.8%) women with TP received conservative management approach. The most effective management approach was surgical, followed by MTX therapy. The average time in weeks until hCG reached undetectable level did not differ between treatment methods. The majority of women were well informed and two thirds were satisfied with the treatment.

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## Vaccination status and parents attitude to vaccination of pediatric patients with rheumatic diseases

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## **Introduction**

Pediatric patients with autoimmune diseases are more prone to different infections preventable by routine vaccination (1, 2). However, with increasing antivaccination movements and different immunosuppressive treatments prescribed, vaccination coverage remains low in this children population (3).

## **Aim**

To assess the vaccination status of children with rheumatic diseases and the attitude of parents towards vaccination of children with chronic rheumatic diseases.

## **Methods**

An anonymous questionnaire was used to find out the attitude of parents towards vaccination of children with rheumatic diseases during the visit to pediatric rheumatologist in an out-patient clinic of tertiary care Hospital of Lithuanian University of Health Sciences Kauno klinikos. The survey lasted between January 2020 and January 2022. Data analysis was performed using SPSS software. P value <0.05 was considered significant.

## **Results**

The questionnaire was distributed to 36 parents, response rate was 58.3 % (n=21). The most common disease among the children whose parents responded to the questionnaire was juvenile idiopathic arthritis (85.7%). The mean age of patients was 12.11 years (SD 4.79). 14 patients (66.7%) were under any kind of immunosuppressive treatment for 3 months or more. The majority of parents (95.2%) claimed to know about the higher risk for infections due to the disease and immunosuppressive treatment. 81% of patients were vaccinated according to the national immunization schedule. Even though 47.6% of the respondents indicated that their child with rheumatic disease had received additional vaccines (the most common was against tick-borne encephalitis), 78.95% respondents stated not having heard that children with a chronic disease could get additional vaccination. More than a half of parents (61.9%) stated they did not consider the disease to be a contraindication for vaccination. However, we

found no correlation between this group of parents ( $p=0.606$ ) or between the group of those who assume they get sufficient information about vaccines ( $p=0.389$ ) and the rate of additional vaccination. 19 (90.5%) respondents indicated that the most information about vaccines is provided by their general practitioner 76.2% of respondents would accept the physician's suggestion to vaccinate their child and 68.75% of respondents, who answered the question, would like to discuss the vaccination questions with a general practitioner or pediatric rheumatologist.

## Conclusions

The majority of patients in this survey were fully vaccinated according to the national immunization schedule. A number of patients have also been vaccinated with additional vaccines. Most parents presume that their child's disease is not a contraindication for vaccines and would agree to vaccinate their child by the recommendations of a physician. The survey results showed the need for additional information for parents regarding vaccinations for children with rheumatic diseases.

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## **Comparison of the applied treatment method for gestational diabetes mellitus and obstetric complications**

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### **Introduction**

The increasing frequency of diagnosis of gestational diabetes mellitus (GDM) requires more attention to be paid to diagnosis-related treatment [1]. GDM is classified according to P. White: A1 – glycemia is corrected by lifestyle changes (diabetic diet and physical activity), A2 – lifestyle changes and insulin therapy. Insulin therapy is given if despite adequate lifestyle changes there are 3 or more pathological glycemias per week [2]. International Association of Diabetes and Pregnancy Study Groups (IADPS) recommended to emphasize the importance of understanding how different treatment method affects outcomes for these women [3].

### **Aim**

To determine obstetric complications related to GDM treatment method.

### **Methods**

A retrospective case-control study was performed using the data from the Department of Obstetrics and Gynecology of the Lithuanian University of Health Sciences (LUHS) Birth Registry in 2020 to compare two groups of women with GDM: Group I – White A1, Group II – White A2. Data analyzed using IBM Statistics SPSS for frequencies, t and  $\chi^2$  tests. Results with values of  $p < 0.05$  considered statistically significant.

## Results

Majority of women 620 (70.5 %) patients were treated with White A1. Women in group I were younger (76.5%,  $p = 0.024$ ), in contrast, in group II were older (30.8%  $p = 0.013$ ). The pregestational BMI of group II were statistically significantly higher (27.9 kg/m<sup>2</sup>,  $p = 0.011$ ). Obesity was more common in group II (35.0%,  $p = 0.001$ ). Weight gain during pregnancy was higher in group II (12.4 kg,  $p = 0.001$ ). GDM more frequently was diagnosed with the fasting glucose test in the first trimester between women in group II (69.6%,  $p = 0.005$ ) and with OGTT in group I (39.4%,  $p = 0.014$ ). In regards of glycemic control, fasting and OGTT after 1 hour were higher in group II (5.5 mmol/l,  $p = 0.008$ ; 9.3 mmol/l,  $p = 0.017$ ). Polyhydramnios and macrosomic newborns were more diagnosed in group I (10.0%,  $p = 0.041$ ; 13.9%,  $p = 0.033$ ). Large for gestational age newborns were more found in group II (15.4%,  $p = 0.047$ ). Induction of labor more frequently used in group II (65.0%,  $p = 0.001$ ), according to method, amniocentesis and prostaglandin administration were more often used (34.6%,  $p = 0.017$ ; 22.3%,  $p = 0.035$ ). In group II patients, induction of labor was more commonly finished with the caesarean section (10.8%,  $p = 0.021$ ).

## Conclusions

GDM is commonly treated with lifestyle changes and a diabetic diet. Indications for concomitant insulin therapy is significantly more frequent in obese women. There were significant links between the treatment method for GDM and these obstetric complications: polyhydramnios, macrosomic and larger for gestational age newborns, induction of labor, because glucose intolerance in group II is higher and more difficult to correct and complicated.

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# **Odontology & Maxillofacial Surgery**



## **The efficiency of photobiomodulation therapy on patients with temporomandibular joint disorder (TMD). Systematic literature review**

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### **Introduction**

TMD is a relevant topic among dental patients: its prevalence in the society is larger than 5% and more than 12% of patients have experienced clinical symptoms (1). Such disorders are multietiological – they are caused by biological, behavioural, social and cognitive factors (2). TMDs are usually treated noninvasively (3). In the recent decade, more and more discussions arise about photobiomodulation therapy potentially being an effective non-invasive treatment for TMD patients.

### **Aim**

To assess the efficiency of photobiomodulation's application while treating TMDs.

### **Methods**

Data was retrieved according to PRISMA criteria. Electronic databases: PubMed, Cochrane Library, and Science Direct. Keywords: photobiomodulation therapy, low-level laser therapy, TMD, TMJ disorder, treatment. PICO question: is the application of photobiomodulation treatment on TMD patients more effective than a control group or other methods? 32 sources were sampled from 100. By applying sampling criteria

(photobiomodulation clinical trials on treating TMDs, studies not older than 10 years, full text), 10 publications in English were chosen and used in the review. The risk of bias was assessed using the Cochrane risk of bias tool (RoB 2).

## Results

VAS pain scale value in painful areas decreased in 3,65 points while applying photobiomodulation therapy on TMD patients using a GaAlAs laser (energy density – 105 J/cm<sup>2</sup>) (5,9). Photobiomodulation significantly reduces pain by palpating the TMJ area ( $p < 0,05$ ) (7,8). Photobiomodulation significantly increases maximum values of the mouth opening amplitude ( $p < 0,05$ ) (10,13). By comparing nonpainful values of mouth opening in placebo and photobiomodulation groups, significant differences were not found ( $p > 0,05$ ) (7,10). Differences between pain values were also not found by comparing the efficiencies of photobiomodulation and occlusal splint ( $p > 0,05$ ) (6,11). A significantly better infrared radiation impact is noticed in VAS values ( $p = 0,039$ ) in 2 studies, which assessed photobiomodulation's efficiency with infrared (790nm) and red (660nm) radiations, 180 days after the last intervention (4,12).

## Conclusions

Photobiomodulation increases maximum mouth opening. Photobiomodulation and placebo evenly increase maximum mouth opening. Photobiomodulation and occlusal splints reduce pain evenly. Infrared laser radiation more effectively reduces pain than red laser radiation.

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## **Evaluation of Postoperative Pain and Discomfort in Patients Undergoing Surgical Exposure of Impacted Maxillary Canines**

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### **Introduction**

In orthodontic practices impacted maxillary canines (IMC) are quite frequent, with up to 23.5% of cases [1]. Combined surgical-orthodontic treatment is commonly used to resolve this condition, however it causes discomfort and postoperative pain [2]. Patients need to be informed about the procedures that will be performed, especially about the pain and discomfort they cause [3].

### **Aim**

To evaluate pain and discomfort related to surgical exposure of impacted maxillary canines.

## Methods

Permit (No BEC-OF-128) was obtained from the Bioethics Centre of LUHS to perform a retrospective study. Data of 25 patients (17 female, 8 male) with the mean age of 15 (range 12-21), treated with combined surgical-orthodontic approach was analyzed retrospectively. Data was obtained from pre-treatment CBCT and discomfort evaluation questionnaire, created based on previous studies [3-5]. The questions included: level of discomfort during surgery (0-10), level of pain (0-10) in the evening, one, two days and a week after surgery. CBCT analysis consisted of evaluation of IMC mesiodistal inclination, horizontal, vertical dislocation from alveolar process edge, labiopalatal localization, length of IMC eruption path [6,7]. IBM SPSS Statistics software was used. To carry out research objectives a non-parametric Spearman correlation coefficient, Mann-Whitney U test, intraclass correlation coefficient and Cohen's Kappa coefficient were used. Value of  $p < 0.05$  was considered statistically significant.

## Results

Average level of discomfort during the procedure was 2.8 (SD=2.3). Pain level the evening after the surgery was 3.3 (SD=2.1), on the second day - 2.8 (SD=2.7), the third day - 1.7 (SD=2.2), a week after, the average pain level was 0.5 (SD=0.8). Pain level differed significantly between different days ( $p < 0.001$ ). The pain after the procedure was not statistically significantly related to age or gender ( $p > 0.05$ ). The level of discomfort during the procedure did not differ significantly in the labial and palatal IMC groups with the mean scores of 3.5 and 2.6 respectively ( $p > 0.05$ ). In addition, neither labial or palatal location of IMC nor the impaction being unilateral or bilateral had effect on the level of pain during different stages of measuring ( $p > 0.05$ ). The average mesial inclination of IMC in the palatal group was  $49^\circ$  and in the labial -  $59^\circ$ . Impaction depth in palatal and labial IMC groups was 10.06 mm and 3.55 mm respectively. Impaction height in the palatal group was 11.93mm, in the labial - 15.93 mm. Eruption path length in the palatal group was 14.52 mm and in the labial - 16.86 mm. Impaction height, depth, eruption path length and IMC inclination were not statistically significantly related to discomfort and pain ( $p > 0.05$ ).

## Conclusions

Pain the evening after intervention was rated the highest and decreased over time. There was no significant relation between the discomfort and the location of the impacted tooth. Patient's gender or age did not have an impact on discomfort and pain.

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## **Relationship Between Orthodontic Treatment of Class II and Temporomandibular Disorders: A Systematic Review**

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**Introduction**

Temporomandibular disorders (TMD) is a complex of diseases with multifactorial etiology and might manifest as limitation of mandibular movement and mouth opening, joint clicking or locking as well as pain located in the masticatory muscles and/or temporomandibular joint (TMJ) [1,2]. The usual orthodontic treatment option for Class II is fixed appliances such as Herbst and braces. It is thought that orthodontic treatment causes TMD, however, the results of numerous clinical trials, evaluating this relationship are different and demanding thorough investigation [3-5].

**Aim**

To evaluate the influence of Class II orthodontic treatment with fixed appliances on temporomandibular disorders.

**Methods**

The protocol of the systematic review is according to PRISMA requirements. An electronic search with keywords “orthodontic treatment”, “temporomandibular joint disorder” was carried out on December 15, 2021 in Pubmed, ScienceDirect, Web of Science, Google Scholar, ResearchGate and Plos One databases. Inclusion criteria were: research articles published less than 10 years ago, written in English, evaluating the influence of Class II orthodontic therapy with fixed appliances on the development of symptoms of TMD or on the improvement of the symptoms. Exclusion criteria: the subjects with craniofacial syndromes, cleft lip and/or palate, systemic arthritic and muscular diseases, skeletal asymmetries, previous trauma of the orofacial region or orthognathic surgery. The quality of each study was evaluated using the Joanna Briggs Institute’s (JBI) critical appraisal checklists for cross-sectional and cohort studies.

## Results

A total of 1370 initially identified articles were found and full texts of 46 articles were read and assessed for eligibility, 5 of them (2 cross-sectional and 3 cohort studies) were included in this review. 544 subjects were involved in the studies consisting of 490 (323 Angle Class II) patients treated orthodontically using Herbst and/or braces and 54 subjects of the control group. The signs and symptoms of TMD (clicking, tenderness in masticatory muscles, myofascial pain) were assessed using questionnaires and clinical examinations. One retrospective cohort study [6] found an increase in TMD symptoms during the orthodontic treatment, however, the symptoms were mostly relieved upon completion of the therapy. There was an actual improvement in myofascial pain after orthodontics. As reported by the other studies [7,8] comparing orthodontic and control groups, TMD manifestation was observed at a similar frequency and these subjects did not differ significantly according to TMD symptoms. The studies by Ortega et al. [9] and Ruf et al. [10] stated that no statistically significant relationship was found between orthodontic therapy and TMD development.

## Conclusions

There is no significant evidence that orthodontic therapy is a predisposing factor for temporomandibular disorders. However, the symptoms of TMD might be improved during orthodontic treatment of Class II patients.

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## **Efficacy of Conservative Treatment of Peri-implantitis: A Systematic Review**

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## **Introduction**

One of the most common late biological complications in implantology is peri-implantitis. Over the past decades, a variety of interventions, alone or in combination, has been investigated for the conservative treatment of peri - implantitis. It includes debridement with curettes, ultrasonic devices or via air abrasion, additionally probiotics, antibiotics or local anti-infective therapy can be added.

## **Aim**

To evaluate the efficacy of non-surgical treatment methods of peri-implantitis.

## **Methods**

A comprehensive electronic database search was carried out in compliance with PRISMA. The search with keywords “peri-implantitis”, “therapy”, “non-surgical” was performed on January 26, 2022 in Pubmed, ScienceDirect and Web of Science online libraries. Inclusion criteria were: research articles published less than 5 years ago, written in English, the follow-up must have been up to 6 months at least, the treatment outcomes had to include changes in probing depth (PD) and/or bleeding on probing (BOP) and/or radiologic marginal bone-level (MBL). The quality of all the included studies was assessed by the

Cochrane Collaboration’s tool (RoB 2).

## **Results**

After an initial search, 227 articles were found and 22 full texts were read, 6 were included in this review. Summarizing the risk of bias for each study, 1 study [1] was classified as having a high risk, the remaining 5 studies had a low risk of bias [2-6]. Three studies [3- 5] had up to 6 months of follow-up, and the rest [1,2,6] included up to

1 year of follow-up. Altogether 519 patients were involved in the studies. Four studies [3-6] showed a significant improvement in PD and BOP scores. Three [1,4,6] studies reported a change in MBL following treatment, but only one [6] of them was significant. No significant difference in PD and BOP change was found in the systemic metronidazole (MTZ) (400 mg) + amoxicillin (AMX) (500 mg) and non-surgical debridement (NSD) in the treatment of peri-implantitis [2]. No significant difference in PD and BOP change was observed between the adjunct drops and lozenges containing *L. reuteri* and NSD [3] as well as erythritol airpolishing and ultrasonic therapy [1]. NSD with the additional use of desiccant material reduces PD more ( $p = 0,0229$ ) than the adjunct glycine powder [4]. The additional insertion of chlorhexidine digluconate (CHX) chips reduced PD significantly more ( $p = 0,01$ ) compared to NSD alone [5]. Also, the additional systemic MTZ (250 mg) significantly reduced PD and increased radiographic bone-level more ( $p < 0,05$ ) than the NSD with irrigation of 0.12% CHX alone [6].

## Conclusions

The additional desiccant material was more effective than the glycine powder and the adjunct systemic MTZ or CHX chips were more efficient than the NSD alone in the treatment of peri-implantitis. The erythritol airpolishing was as limited in effectiveness as an ultrasonic scaling. Also, no additional effects have been observed with the use of *L.reuteri* probiotics or the systemic use of MTZ + AMX in combination with NSD.

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## **Impact of pathologic tooth migration on oral health related quality of life in adult subjects with periodontitis. A systematic review**

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### **Introduction**

Periodontitis is one of the most frequent oral diseases which prevalence is up to 40% of the adult population [1]. Loss of periodontal attachment leads to pathologic tooth migration, tooth mobility and compromised smile aesthetics, which can affect physical and psychosocial well-being [2].

## **Aim**

To assess the current evidence on the relationship between pathologic tooth migration and oral health related quality of life (OHRQoL) in subjects with periodontitis.

## **Methods**

A systematic literature review was performed according to PRISMA statement. The search was performed using databases of Pubmed, Research Gate, the Cochrane and ScienceDirect between January 5 and January 21. Following keywords were used: “periodontitis”, “oral health-related quality of life”, „pathologic tooth migration”, “tooth mobility”, “clinical attachment loss”. Inclusion criteria: studies in English language analysing Oral Health Impact Profile (OHIP) or Oral Health-Related Quality-of-Life (OHRQoL) of adult patients with periodontitis, tooth mobility and pathologic tooth migration. The research scope excluded case series or reports, systematic reviews, and pilot studies. Electronic search was supplemented by manual searches and reference links. Eligible literature was assessed for the risk of bias using the Appraisal tool for cross – sectional studies (AXIS tool) and was critically appraised by two authors [3].

## **Results**

Database search yielded 49 articles. After checking the titles for relevancy, 11 articles were selected for the full-text analysis. After applying selection criteria, 6 studies were included in this systematic review with a total number of 1312 patients with periodontitis. The overall estimated quality of the included studies was good. Five of them investigated the effect of different forms of periodontitis on OHRQoL [4,5,6,7,8]. Four articles demonstrated significantly higher results on the impact of OHRQoL for patients with full mouth mean clinical attachment loss above 3 mm or probing depth 4-6 mm (severe periodontal attachment loss group) [4,5,6,8]. However, another study proved, that OHRQoL statistically significantly depends on periodontitis, but the severity of periodontitis is not an influential factor on patients’ OHRQoL [7]. A statistically significant link was displayed between tooth mobility and it was one of the most affected parameters of OHRQoL, especially its psychological factor ( $p < 0.05$ ) [9].

## **Conclusions**

There is lack of evidence on the impact of tooth mobility and pathologic tooth migration on OHRQoL. According to the current literature, periodontal disease is linked with poorer oral health related QoL, however factors, which affect it are still unclear and should be further analysed.

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## Blood type and dental status

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### Introduction

Dental status is a complex and multi-component concept that combines the status of teeth and dentition, oral hygienic status, periodontal condition and state of oral mucosa. The parameters of dental status can be influenced by many factors, some of which are genetically determined. Recent findings regarding to the fact that periodontal pathologies can be determined with genetically inclinations according to the blood type antigens of the AB0 system [1, 2]. The associative connections of the blood type with dental caries have also been revealed [3, 4]. Identifying connection between dental status parameters and antigens of the blood type in the future allows to identify high-risk groups and increase the effectiveness of primary prevention of dental diseases.

### Aim

Study the connection between indicators of dental status and blood types of respondents.

### Methods

34 young people aged 20-27, who are graduates of Poltava State Medical University, took part in the research. All participants were examined with the determination of the hygienic index by Green-Vermillion, the prevalence and intensity of caries (CFE), papillary- marginal-alveolar index of PMA (modified by Parma). Blood types according to the AB0 system was recorded during the subjective examination.

### Results

The majority of participants in the study, namely 17 people (50%) had blood type II. 26.5% noted that they have I blood group, and people with III and IV blood groups were only 11.8%. The prevalence and intensity of carious lesions in the subjects

did not differ significantly in respondents with different blood groups. Whereas the respondents with blood group I had a significantly worse GI, compared with people with other blood groups ( $p < 0,01$  between I and II gr;  $p < 0,01$  between I and III gr;  $p < 0,05$  between I and IV gr.). Study participants with II, III and IV blood groups were characterized by oral hygienic status, which did not differ significantly in numerical representation ( $p > 0,05$ ).. 75% of respondents with blood group III found various forms of periodontal tissue damage. Among the respondents with blood groups I and II, persons with periodontal disease and healthy periodontal tissues were approximately halved. Respondents with type IV blood had the lowest number of people with periodontal disease.

## Conclusions

The results of the study may indicate the connection between the parameters of dental status and blood type. The obtained research results require further detailed study and comprehensive analysis.

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## **Comparison of the expression of Ki-67 marker in ameloblastoma and odontogenic keratocyst: a systematic literature review**

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### **Introduction**

The development and progression of odontogenic cysts and tumors are associated with incorrect adhesion of molecules, proliferation of cells, angiogenesis and osteolysis [1]. Ki- 67 is a proliferation marker (nuclear non-histone protein) used in the diagnosis and prognosis of pathological lesions, mainly in human tumors [2]. This marker helps to assess the aggressive potential of lesions, mostly by measuring cell proliferation index (PI) [3]. Ki- 67 marker differences of proliferative activity in odontogenic keratocyst and ameloblastoma are considered, because it could play a role in biological aggressive behavior [4].

## **Aim**

The aim of this study is to compare the proliferation index in ameloblastoma and odontogenic keratocyst in order to find out which lesion has a higher potential for aggression.

## **Methods**

A systematic search was conducted in five electronic databases, including Pubmed, Wiley Online, Cochrane Library and ScienceDirect. The protocol of the study was conducted in line with the PRISMA statement. Combinations including keywords „ameloblastoma“,

„odontogenic tumor“, „odontogenic keratocyst“, „immunohistochemical markers“ were used. According to the PICOS schema, the study included prospective trials (S) in which adult patients diagnosed with ameloblastoma or odontogenic keratocyst (P), which immunohistochemical expression of Ki-67 were investigated (I) in different lesions (C) in order to evaluate the aggressive potential of lesions (O). The criteria for the study inclusion were full-text studies published in English, clinical studies with humans.

## **Results**

In total, 4014 were initially identified in the electronic databases. After the final screening of 42 full texts, 5 studies were included in the final evaluation. In studies comparing the amount of positive cells between ameloblastoma and odontogenic keratocyst were observed that positive cells were found more in odontogenic keratocyst from 11.57 % to 46.4% in two studies, which means that odontogenic keratocyst is more aggressive. These results can confirm a study, which observed a statistical significant difference between the PI range of ameloblastoma (2.20-5.92) and odontogenic keratocyst (8.29-20.49). Other authors also showed that the proliferation index also was higher in odontogenic keratocyst (31.1%) than in ameloblastoma (6%) by 25.1%. Although the rate of PI was considerably lower in another study, there was also a statistical difference between ameloblastoma (5.12%) and odontogenic keratocyst (9.22%) immunostaining by 4.1%. The PI was very different in all studies, but can be concluded that the expression of the Ki-67 marker was statistically significantly higher in odontogenic keratocyst than in ameloblastoma, which causes biological aggressive behavior ( $P < 0.05$ ).

## Conclusions

The higher the proliferation index was found in odontogenic keratocyst than in ameloblastoma. The higher expression of the Ki-67 marker of odontogenic keratocyst highlights more aggressive behavior of these cystic lesions.

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## **Association between apical periodontitis and root canal treatment in patients with type II diabetes. Systematic review**

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### **Introduction**

Type II diabetes mellitus (T2DM) is a chronic endocrine disease affecting over 6% of world population [1]. Sustained hyperglycaemia plays a role in inhibited healing and chronic inflammation which can lead to complications after root canal treatment, such as apical periodontitis [2]. For diabetic patients with long-term poor glycaemic control, dentists should evaluate oral conditions, glycaemic control status, and treat infections accordingly[3]

### **Aim**

To evaluate the relationship between apical periodontitis and root canal treatment in patients with type II diabetes.

### **Methods**

The systematic review adhered to PRISMA guidelines and databases of PubMed, ScienceDirect, The Cochrane library were used to perform the search. The search was carried out between November 15 and November 30 in the year 2021. Following searchterms were used: “Diabetes”, “Periodontitis”, “Root canal”. Inclusion criteria were: studies in English not older than 10 years, studying adult patients with T2DM

after root canal treatment. Case reports, systematic reviews, meta-analyses, animal studies were excluded from the search.

## Results

Primary database search yielded 313 results. After checking the content and relevance of the articles, 4 articles were used with a total of 15810 patients. Out of 4 studies, 3 concluded that apical periodontitis after root canal treatment was statistically significantly more frequent in patients with T2DM than in control groups [2,4,5]. However, the results from another study showed that there is no significant correlation between T2DM and post-treatment apical periodontitis ( $p>0.05$ ) [6]. A study performed by Yip et al. also investigated the effect of glycaemia control on the outcome of endodontic treatment – the results showed a significant association between AP and poor glycaemia control [2]. Another author found similar results as Yip et al, as in poorly controlled T2DM group, apical periodontitis lesions were statistically significantly more frequent than in well controlled T2DM group [4].

## Conclusions

A statistically significant relationship was found between T2DM patients and the occurrence of apical periodontitis in most studies. In addition, a link between glycaemia control and post-treatment apical periodontitis was found which could have a great impact on managing endodontic patients with T2DM.

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## **The incidence of complications after replanting avulsed permanent teeth**

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### **Introduction**

Teeth avulsions account for 0.5 to 16 % of all dental injuries[1]. Prognosis after such

injury depend on the actions taken at the place of accident and promptly after them[2]. Replantation remains the treatment of choice but cannot always be carried out immediately. Because of delayed tooth replantation, various complications may occur.

## **Aim**

To determine the incidence of complications after replanting avulsed permanent teeth under varying conditions

## **Methods**

An electronic search was carried out according to PRISMA guidelines through Pub Med, ResearchGate and Google scholar databases with keywords: “dental trauma”, “avulsion”, “root resorption”, “ankylosis”, “total luxation”, “complications” “replantation”. A focus question based on PICO was formed: What is the incidence of complications (O) after replantation of permanent teeth(I) for patients who suffered avulsion (P) under varying conditions (C) such as: transport mediums, extra-oral time, stage of root development? Systematic reviews, meta-analyses, case reports, in vitro, animal studies were excluded. Only full-text articles clinical trials and randomized controlled trials between the years 2012 and 2022 were included. The risk of bias was assessed using the Cochrane risk-of-bias tool for randomized trials(RoB 2)and ROBINS-I tool for non- randomized studies.

## **Results**

A total of 220 articles were found. 14 were selected for full text analysis. 9 fit the final inclusion criteria. Delayed replantation has poor long-term prognosis [2,3]. After replantation of the tooth, various complications can occur: ankylosis(AN), pulp necrosis(PN), inflammatory external root resorption(IERR), and replacement resorption(RR) [3,4]. 7 out of 8 studies that included mature teeth replantation reported PN followed by endodontic treatment. Advanced root development stages in teeth with immature roots were also a strong predictor of PN (78.2%). [5] Immature root development showed significantly less PN ( $P < 0.05$ ) compared to teeth with full root formation. [6] All included studies indicate 16,66%-57.6% incidence of RR, 22.5%-36,97% IERR and 8,33%-65,8% AN after replantation.[9,10,11,12] Dry time before replantation varied greatly in each study 5 minutes - 7 days with standard deviations of 82-151 minutes.[7] Storage medium was significant ( $P < 0.05$ ) for development of ankylosis-related resorption and only root development for pulp necrosis.[6] The incidence of periodontal ligament necrosis of replanted teeth stored in a physiologic medium in one study was 61.3% (19/31), which was significantly lower than that of

replanted teeth stored in a non - physiologic medium (94/114,82.5%) ( $P = 0.025$ ). [8]

## Conclusions

1) Incidence of complications such as PN, AN, IERR and RR, depend on extra-oral time, transport medium and maturity of the root. 2) The longer the extra-oral time, the more periodontal tissue damages irreversibly. 3) Treatment of dental avulsions is usually delayed which explains the occurrence of pulpal and periodontal complications.

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# **Public Health**

## **Attitudes of health care professionals towards COVID-19 vaccine**

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### **Introduction**

COVID-19 caused a global pandemic in 2019, two years later it remains a leading cause of death [1]. The WHO declared that vaccination provides strong protection against severe illness, hospitalization and may reduce the chance of onward virus transmission [2]. The opinions of healthcare professionals (HCPs) on the COVID-19 vaccine may affect the public perception of vaccination and management of the pandemic [3].

### **Aim**

To evaluate the attitude toward vaccination against COVID-19 infection of Lithuanian healthcare professionals.

### **Methods**

An anonymous online survey, that consisted of 16 original questions that were prepared by the authors, was conducted from August to December of 2021 in Lithuania. The study included 860 Lithuanian healthcare workers: physicians, resident physicians, and nurses. Statistical calculations were performed using SPSS 28.0 software. Statistically significant findings were assumed with  $p < 0.05$ . Chi-square and z tests were used to determine a relationship between categorical variables ( $\alpha = 0.05$ ).

## Results

Out of 860 HCPs, 88.3% were female, 11.7% – male, 37.3% – physicians, 20.1% – resident physicians, and 42.6% – nurses. 90.3% were vaccinated, 74.7% of unvaccinated HCPs were not planning to get vaccinated. 74.0% would consider revaccination. Physicians were more likely to get vaccinated compared to the nurses (96.6% vs. 86.9%, respectively;  $p < 0.001$ ). The main reasons for vaccination were a desire to protect themselves (39.8%), to protect others (32.3%), recommendations from the government (12.4%), and pressure in the workplace (5.7%). 55.4% of unvaccinated participants stated that the reason is side effects and doubts about the effectiveness of the vaccine, and about 20.0% have immunity after COVID-19 infection. Unvaccinated HCPs, that do not consider vaccination, significantly less often recommend vaccination for their relatives (0.7% vs. 50.5%, respectively;  $p < 0.001$ ) and patients (1.4% vs. 41.0%, respectively;  $p < 0.001$ ) in comparison to vaccinated HCPs. 67.9% stated that they have sufficient knowledge about COVID-19 vaccines and 29.8% would like to know more. HCPs, that are not vaccinated and do not consider vaccination, significantly more often stated, that they are not sufficiently informed about the vaccination compared to those, who are more aware of it (13.7% vs. 3.3%, respectively;  $p < 0.001$ ).

## Conclusions

Over 90% of HCPs were vaccinated, three-fourths would consider revaccination. Physicians were more likely to get vaccinated compared to the nurses. The reasons behind vaccination were: a wish to protect themselves and others, recommendations from the government, and pressure in the workplace. The main reasons for refusing vaccination are side effects and doubts about the effectiveness of the vaccine and acquired immunity after COVID-19. The majority of HCPs, that are unvaccinated and do not consider vaccination, stated that they are lacking knowledge about it. They significantly less often recommend vaccination for their relatives and patients.

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## **Analysis of sensitising components of hair dye products available on the Lithuanian market**

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### **Introduction**

The prevalence of sensitising ingredients in hair dyes raises concerns about a higher incidence of allergic and dermatological diseases among the general consumers and hairdressing professionals. [1] [2]

### **Aim**

The aim of the study was to determine the most common hair dye allergens in the Lithuanian market and the average allergen number in different price intervals, according to marketing slogans and the type of store it was sold at.

### **Methods**

The sensitising agents in the ingredient labels of 89 different hair dye products were

evaluated in accordance with the hairdressing series (Chemotechnique, Vellinge, Sweden). The average number of allergens was determined according to the sales location, the price interval and the advertising slogan.

## Results

The 10 most common ingredients were: m-aminophenol, toluene-2,5-diamine sulfate, resorcinol, panthenol, p-aminophenol, cocamidopropyl betaine, 2-methylresorcinol, methylisothiazolinone + methylchloroisothiazolinone, p-phenylenediamine (PPD), sodium metabisulfite.  $2.7 \pm 2.2$  allergens were found in hair dye products sold in general stores,  $5.4 \pm 1.8$  in pharmacies,  $3.8 \pm 1.9$  in professional stores,  $1.6 \pm 2.9$  in "eco" stores. Products in the (0€; 5€] price range had  $2.6 \pm 2.0$  allergens, [5€;10€) had  $2.9 \pm 2.3$ , >10€  $3.9 \pm 2.6$  allergens. Products labelled as "professional" had on average  $3.6 \pm 1.8$  allergens, products without a slogan had  $2.5 \pm 2.2$  allergens.

## Conclusions

79.8% of the hair dye products in the Lithuanian market contained sensitising ingredients. Products with the highest average number of allergens were sold in the pharmacy and were priced at more than 10€. Products labelled as "professional" had the highest average allergen number.

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## Emotional state and job satisfaction in hospital staff

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**Introduction**

COVID-19 pandemic has a lot of impact on health care workers (1,6,9). Research shows that during the coronavirus outbreak people working in hospitals experience stress, anxiety, depression, and insomnia (9). Subsequently, medical staff is experiencing medium levels of perceived stress at the time of outbreak (1,6). Moreover, non-adaptive emotion regulation strategies may be a risk factor for burnout among medical staff (5). At the same time cognitive emotion regulation strategies may reduce that risk (2). Even though medical workers are satisfied with their job overall, research shows that they are not happy with their pay (11).

**Aim**

Aim of the study is to evaluate hospital workers' job satisfaction, perceived stress, used methods of emotion regulation, and to assess the relationships between those phenomena.

**Methods**

The cross-sectional study has been held from July 5 to August 20, 2021 in Šakiai Hospital, Lithuania. In total, 121 staff members' forms were included in the analysis. All Šakiai Hospital staff, who agreed to participate, were selected to the research. 8,3% of them were medical doctors, 24% was nursing staff, 9,9% was junior medical staff, 4,9% - management staff, 16,5% - technical staff and 36,4 did not mark their position. Statistical analysis was made using MS Excel and IBM SPSS Statistics 21. Stress level has been measured using Perceived Stress Scale (3). For emotion regulation evaluation, Emotion Regulation Questionnaire (4) has been used. Job satisfaction was assessed using 4 subscales (Pay, Supervision, Operating conditions, Coworkers) of Job Satisfaction Survey (8). ANOVA test was used to compare means of job satisfaction and emotion regulation among different work positions. For associations among all phenomena, Pearson (r) and Spearman (rho) correlation was used.

## Results

Most of staff (74.4%) was satisfied with their coworkers and the minority (20.7%) was satisfied with their pay. There is a significant difference of job satisfaction among various work positions. Hospital staff experience medium stress (94.2%). Workers use both – adaptive ( $M=29,73$ ) and non-adaptive ( $M=17,08$ ) emotion regulation strategies. Negative correlation between perceived stress and satisfaction with pay ( $r=-0,21$ ;  $p=0,021$ ) as well as satisfaction with supervision ( $\rho=-0,30$ ;  $p=0,001$ ) and satisfaction with coworkers ( $\rho=-0,26$ ;  $p=0,005$ ) has been found. Additionally, correlation between cognitive reappraisal emotion regulation and perceived stress ( $r=-0,19$ ;  $p=0,041$ ) was found.

## Conclusions

Hospital workers experience medium levels of stress. Emotion regulation strategies, both cognitive reappraisal and expressive suppression, are used equally and at medium intensity. Most of respondents are satisfied with coworkers and supervisors, however they are not happy with their pay and ambivalent with operating conditions. Weak to medium correlations between perceived stress and job satisfaction as well as cognitive reappraisal was found.

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## **Medical students' knowledge of post-exposure prophylaxis for blood-borne viral infections**

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## **Introduction**

The risks associated with blood-borne pathogens, especially human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV), in healthcare workers and students are often ignored and insufficient attention is paid to post-exposure prophylaxis (PEP). It is important to know that HIV PEP can be initiated within 72 hours after exposure (1), while HBV PEP is effective if administered within 7 days (ideally within 24 hours) (2, 3). The use of post-exposure antiviral therapy against HCV remains controversial (4) and is not used in Lithuania.

## **Aim**

To assess and compare medical students' knowledge and self-assessment of PEP for blood-borne viral infections between courses.

## **Methods**

The study was conducted using an anonymous survey. Clinical medicine starts from the 3rd year, during this year students are introduced to PEP, therefore 3–5-year students were included in the study (6<sup>th</sup> year students were not included due to low participation). Data analysis was performed using SPSS statistics 25.0, the  $\chi^2$  test with z-test and Bonferroni correction, Fisher's exact test were applied.

## **Results**

A total of 162 students participated in the survey: 54 third-year, 52 fourth-year and 56 fifth-year. Although 92.6% of the students had heard of HBV PEP, only 38.3% correctly identified both PEP methods (revaccination and immunoglobulin): the 5<sup>th</sup> year students responded better (57.1%), while the 4<sup>th</sup> year students answered the worst (15.4%) (comparing with 3<sup>rd</sup> year  $p=0.011$ , with 5<sup>th</sup> year  $p<0.001$ ). 75.3% of students mistakenly believe that HBV PEP becomes delayed and ineffective after 24 hours post-exposure, with no significant difference between groups ( $p=0.349$ ). Slightly better student

knowledge was observed for HIV PEP: 40.7% of students reported that its effectiveness could be expected if antiretroviral drugs were administered within 72 hours of the incident. However, 18.5% of respondents had never heard of HIV PEP (no difference between courses,  $p=0.074$ ). 51.9% of students incorrectly answered that HCV PEP is also available; 4<sup>th</sup> year students were the least likely to be wrong (69.2% correct; comparing with 3<sup>rd</sup> year  $p=0.001$ , with 5<sup>th</sup> year  $p=0.018$ ). 5<sup>th</sup> year students rated their knowledge of PEP most critically (50% rated it as minimal; the answers differed only between 5<sup>th</sup> and 3<sup>rd</sup> year students,  $p=0.007$ ). Overall, no students rated their knowledge as good/very good. More than 2-thirds of 4<sup>th</sup> and 5<sup>th</sup> year students said that they received enough information about PEP during the study years, unfortunately, much was forgotten, while 44.4% of 3<sup>rd</sup> year students said they received insufficient or no information at all.

## Conclusions

The results showed that during the study year, medical students are indeed introduced to PEP. However, both the students' responses and the subjective assessment of their knowledge showed that knowledge about PEP is insufficient to start medical practice safely. The knowledge of the students did not differ much depending on the course in which they were studying.

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## **Awareness and attitude of women in Kelmė city towards primary and secondary cervical cancer prevention**

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### **Introduction**

Cervical cancer (CC) is one of the most common cancer in Lithuania [1]. To reduce the incidence of CC, primary and secondary prevention programs are being used – vaccination against human papillomavirus (HPV) and participating in CC screening program [2,3]. Nevertheless, more than 5 thousand women are still receiving abnormal cervical screening test results every year and for more than 500 of them these changes develop into CC [4]. After analyzing causes of current situation, the main problem for ensuring good CC prevention is lack of knowledge. Women do not know what causes CC and how it can be prevented. Women's awareness of CC prevention is particularly low in rural areas of the country [5].

### **Aim**

To assess the awareness and attitude of women in the city of Kelmė about the primary and secondary prevention of CC.

## Methods

Anonymous expeditionary questionnaire survey was conducted in February 2019 in Kelmécity. 203 women in the age group of 25-60 years old were interviewed (response rate – 61.1%). Hypotheses about dependence between different variables were verified by calculating the chi square ( $\chi^2$ ) and z criteria. The differences between the variables were considered statistically significant when  $P < 0.05$ .

## Results

68% of respondents knew that the main risk factor for CC is HPV. 20.7% of them did not know this information and even 11.3% stated that HPV is not a major risk factor for CC development. Respondents that were employed (74.8%) or had a higher education (85.2%) were more likely to be aware that HPV is the main risk factor for a CC comparing to unemployed (38.5%) and with lower than higher education (50.6%,  $P < 0.05$ ). 29.6% respondents were aware that primary prevention for CC is HPV vaccination but only 10.3% respondents said there was enough information about the HPV vaccine. None of the respondents had been vaccinated against HPV and only 11.8% of the respondents had vaccinated their daughters. 36.4% of respondents were against HPV vaccination. Respondents with higher (50%) and lower than higher (41.9%) education were more likely to remain against HPV vaccination ( $P < 0.05$ ). The main reason (60.7%) for this attitude was lack of information about HPV vaccines. Only 65% of respondents participated in CC screening program. Respondents aged 51–60, unemployed, having lower education and unmarried were more likely choose not to participate in CC screening program comparing to those aged 25–39 and 40–50, employed, with higher education and married or not married but living with a partner. Respondents that were not participating in the selective CC screening program noted lack of information (53.5%) and lack of time (35.2%) as the main reason.

## Conclusions

Kelmé women lack of information and education on the importance of HPV vaccination

and CC screening. In the opinion of women in Kelmé it is important to increase an availability of information on HPV vaccines and importance of this primary CC prevention program, especially for woman that are older and with a lower education.

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## Different attitudes of patients with multiple sclerosis towards COVID-19 vaccination

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## **Introduction**

During the COVID-19 pandemic, vaccination became an important tool to prevent severe illness [1]. COVID-19 vaccines are safe and effective for people with multiple sclerosis (MS) [2]. However, coronavirus outbreak has also raised awareness of vaccine skepticism. In the US and other countries, some studies evaluated the link between willingness to get vaccinated against COVID-19 and sociodemographic factors or MS exacerbation [3–6]. In Lithuania, specific reasons for vaccine hesitancy among people with MS have not been described. We created a survey from 1 November 2021 to 1 February 2022 to estimate positive and negative attitudes of COVID-19 vaccination among patients with MS.

## **Aim**

To evaluate the peculiarities of vaccination against COVID-19 infection in patients with MS and their attitude towards vaccination.

## **Methods**

The study was approved by Bioethics center of Lithuanian University of Health Sciences (LUHS) (BEC-MF-153). The research was performed at LUHS Kaunas Clinics Neurology unit and Diseases of Nervous System Outpatient unit. 100 people with MS were asked to fill an original questionnaire, in total 80 patients responded. Survey was about patients' sociodemographic aspects, MS exacerbation, COVID-19 vaccination and their attitudes towards this process. Data was analyzed with IBM SPSS Statistics 27.0, with calculation of the Chi-square and Mann – Whitney U test and p-value (statistically significant if  $< 0.05$ ) for each hypothesis.

## **Results**

Among 80 respondents, 63.1% were female and 32.1% were male. Mean respondents age was  $39 \pm 9.8$  years. 78.6% ( $n=66$ ) of patients were vaccinated and only 16.7 % ( $n=14$ ) were not. Vaccinated respondents age median -  $37 \pm 9.9$  years, non-vaccinated age median -  $47 \pm 8.0$  years. Most popular positive opinions were that COVID-19 vaccines have more benefits than harm 57.1%, willingness to get an immunity 63.1% and mostly agreed negative view was a fear of side effects 84.6%. Intended uptake was strongly associated with younger age ( $p=0.021$ ), higher education level ( $p=0.008$ ) and employment status ( $p=0.028$ ). There was no further link between other sociodemographic factors such as gender, residency, and even with exacerbation of MS during 2020 1 January – 2022 1 February ( $p>0.05$ ).

## Conclusions

Even though there was some hesitancy about Covid-19 vaccination, people with MS were more likely to take COVID – 19 vaccine because of their positive attitude towards this process. Willingness to vaccinate was associated with respondents' age, education level and employment status.

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## **Burnout, depression and anxiety among healthcare workers**

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### **Introduction**

Burnout is defined as a syndrome that consists of emotional exhaustion, cynicism, and reduced personal efficacy at work. [1] The COVID-19 pandemic has affected the working conditions of healthcare workers. During the COVID-19 emergency in the spring of 2021, one in four physicians has had depressive symptoms. [7] Healthcare workers are at high risk for burnout. [2] According to Medscape 2020 report, 42% of physicians reported that they are burned out [3] According to study of US physicians, 54.4% of population reported at least one symptom of burnout [4] Up to now, in Latvia, there has been little research done on burnout; its prevalence among physicians was last studied in 2015 [5], among nurses in 2021 [6] Depression and anxiety have burnout-like manifestations and can be considered as diagnoses associated with burnout syndrome. [2]

### **Aim**

To study the prevalence of burnout symptoms, clinically significant depressive and anxiety symptoms among healthcare workers at National Rehabilitation Centre “Vaivari”. To evaluate the correlation of burnout syndrome, depression and anxiety.

### **Methods**

This cross-sectional study was carried out in the January 2022. During one month period healthcare workers in person were invited to complete the socio-demographic questionnaire, burnout syndrome questionnaire (Maslach Burnout Survey - General Survey), the Patient Health Questionnaire (PHQ-9) and the Generalized Anxiety Disorder questionnaire (GAD-7). Maslach Burnout Survey consists of three subscales, which were analyzed separately – emotional exhaustion subscale, cynicism subscale, professional efficacy scale. Statistical analysis using IBM SPSS Statistics V26.0 was

performed, using descriptive statistical methods, correlation methods.

## Results

98 people, 13 men (13.3%) and 85 (86.7%) women participated in the study. A high level of emotional exhaustion was found in 27.6% of respondents, an average level in 27.6% of respondents. High level of cynicism was found in 22% of respondents, average in 44%. Low professional efficacy was found in 16.3% of respondents. Clinically significant depression was observed in 19.6% of respondents, clinically significant anxiety in 14.1%. Depression had a moderate correlation with emotional exhaustion, a Spearman coefficient of 0.538 ( $p < 0.001$ ), and a weak correlation with cynicism ( $r = .387$ ,  $p < 0.001$ ). There is a weak statistically significant correlation between anxiety and exhaustion ( $r = 0.300$ ,  $p < 0.001$ ).

## Conclusions

Burnout symptoms were detected in up to 27,6% of respondents.

A statistically significant association between emotional exhaustion and clinical symptoms of depression and anxiety was found. These results may be used in planning preventive strategies to reduce mental health problems among healthcare workers.

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## **How asthma symptoms are associated with the quality of life among LUHS students**

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### **Introduction**

Asthma is the most common chronic respiratory illness that affects more than 300 million people worldwide [1,2]. Symptoms are non-specific, but the most common ones include wheezing, shortness of breath, chest tightness, and cough [3,4]. Difficulties with self-management are associated with reduced quality of life [5].

### **Aim**

To evaluate if asthma symptoms have association on quality of life among LUHS students.

## Methods

The study was approved by the Kaunas regional biomedical research ethics committee (No. BEC-MF-335). There were 361 study participants aged between 19-41 who completed a self-administered anonymous questionnaire, which consisted of questions about gender, age, asthma symptoms and quality of life (5 questions: current well-being, restriction of daily activities, sleep disorders, fatigue during the day, emotional state). 24 (6.6%,  $p < 0.001$ ,  $\chi^2 = 271.38$ ) of participants had a confirmed diagnosis of asthma. 337 (93.4%,  $p < 0.001$ ,  $\chi^2 = 271.38$ ) of participants had not confirmed diagnosis of asthma. Research objectives  $\chi^2$  criteria was used. The results are statistically reliable when  $p < 0.05$ . The statistical analysis was performed by using Microsoft Excel and statistical software SPSS 17.0.

## Results

Among confirmed diagnosis of asthma, there was a statistical significance between the respondents who selected their well-being as bad ( $n=1$ , 4.2%), responders who picked their well-being as great (0%). Among those without allergic asthma, there were statistically significantly more respondents who rated their health as excellent ( $n=45$ , 13.4%) than as

poor (1, 0.3%). In statistically significantly confirmed diagnosis of asthma group we found that the greater number of respondents stated that they did not experienced restriction of daily activities ( $n=9$ , 37.5%), among those without allergic asthma, there were also statistically significantly more respondents who stated that these complaints did not restrict their daily activities ( $n=223$ , 66.2%) than slightly ( $n=100$ , 29.7%) or severely restrict them ( $n=14$ , 4.2%). No suffering from sleep disorders ( $n=12$ , 50.0 %). Also, among those who did not have confirmed allergic asthma, there were statistically significantly more respondents who stated that they did not experience sleep disorders due to the above complaints ( $n=270$ , 80.1%) than slightly ( $n=53$ , 15.7%). No fatigue during the day ( $n=11$ , 45.8%), among those who did not have confirmed allergic asthma, there were statistically significantly more respondents who stated that they did not feel tired during the day due to the above-mentioned complaints ( $n=235$ , 69.7%) than they felt very much ( $n=31$ , 9.2%). Although, no strong correlation was observed about emotional state between different groups.

## Conclusions

Our data suggest that diagnosis of asthma is not necessarily related to the reduced quality of life. It could be presumed that the students have enough knowledge about disease and ways of controlling it.

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## Comparison of incidence from burns in Lithuania by place of residence, gender and age

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## **Introduction**

A burn is an injury to the skin or other tissue primarily caused by flame or hot fluids or due to radiation, radioactivity, electricity, or contact with chemicals. Every day, over 30,000 people suffer new burns worldwide, severe enough to warrant medical attention, equating to an estimated 11 million new burns each year globally [1,2]. In addition, burn injury cause physical and mental health damage which leads to worsened quality of life [3]. Burn prevention programmes are the most efficient solution to reach significant reductions in the incidence of burns. Burn prevention requires adequate knowledge of the epidemiological characteristics and associated risk factors [4].

## **Aim**

The aim of the study is to analyze changes in incidence of burns in Lithuania by place of residence, gender, age and their changes in Lithuania in 2001 – 2019.

## **Methods**

A retrospective review of data (aged 0+) on incidence from burns (ICD-10 codes T20-T32) in 2001 – 2019 was obtained from Hygiene Institute The Health Indicators of Lithuania database. Incidence rates from burns by place of residence, gender and age were calculated per 100,000 population. For the assessment of the trends of incidence during 2001 – 2019, Joinpoint regression analysis was applied. Average annual percent change considered statistically significant when  $P < 0.05$ .

## **Results**

In 2001 – 2019 incidence rate of burns increased more rapidly in rural area (on average by 2.19% per year [95% CI 0.88 – 3.51],  $P < 0.01$ ) compared to urban area (on average by 1.12% per year [95% CI 0.37 – 1.87],  $P < 0.01$ ). In 2001 – 2019 incidence rates of burns changes were similar in females (on average by 1.65% per year [95% CI 0.73 – 2.59],  $P < 0.001$ ) and males (on average by 1.18% [95% CI 0.25 – 2.12] per year,  $P < 0.01$ ). According to statistical data in 2001 – 2019 incidence rates increased the most in the age group 0 – 17 years (on average by 3.68% per year [95% CI 2.66 – 4.72],  $P < 0.000001$ ). Incidence of burns increased on average by 1.5% per year [95% CI 0.39 – 2.61] in the age group 18 – 44 years,  $P < 0.01$ . Besides, incidence rates increased: on

average by 0.22% per year [95% CI -0.68 – 1.12] among adults aged 45 – 64 years and on average by 0.47% per year [95% CI -0.41 – 1.36] among adults  $\geq$  65 years,  $P > 0.05$ .

## Conclusions

During 2001 – 2019 incidence of burns have been increased in rural and urban areas. Incidence rates among females and males were similar in 2001 – 2019. Moreover, the highest incidence rates of burns were in age group 0 – 17 years.

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# **Radiology**



## **The influence of angiographic factors on the treatment tactics of acute superior mesenteric artery occlusion**

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### **Introduction**

Acute mesenteric ischemia is a dangerous condition which is linked to high mortality rates [1]. Recent studies suggest that endovascular treatment (EVT) in most cases should be the initial approach [2]. Acute superior mesenteric artery (SMA) occlusion can be caused by both thrombotic changes due to atherosclerosis of the arteries (usually in the ostium) and embolism (usually more distally) [3].

### **Aim**

The aim is to assess the influence of different etiologies and the level of occlusion on treatment tactics when treating acute SMA occlusion.

### **Methods**

We retrospectively analysed 80 patients diagnosed with acute SMA occlusion who underwent EVT at the Hospital of LSMU Kauno Klinikos during the 3-year-period from 2018 to 2020. Based on the findings of computed tomography angiography (CTA) and digital subtraction angiography (DSA), we classified all cases by the number of SMA large branches that remained non-occluded: ostial occlusion (0 patent branches), proximal occlusion (1, 2 or 3 patent branches), distal occlusion (4, 5 or 6 patent

branches). Moreover, by analysing CTA and DSA results we defined the etiology of occlusions.

## Results

Thrombotic etiology was identified in 25,0% and embolic in 75,0% of patients. Thrombosis was associated with more proximal (less patent large branches) occlusion, while embolism was related to more distal occlusion ( $p < 0,001$ ). Ostial occlusion was present in 23,8%, proximal occlusion in 47,5% and distal occlusion in 28,7% of patients. Mechanical aspiration thrombectomy was performed statistically significantly more frequently, when more non- occluded large branches were present, whereas PTA/stenting was performed in cases with fewer intact large branches ( $H = 15,49$ ;  $p < 0,001$ ). In all cases of embolism, mechanical thrombectomy was the technique of choice, 21,7% of embolism cases required secondary PTA/stenting. In case of thrombosis, EVT techniques dispersed equally: a half of patients received mechanical thrombectomy with subsequent PTA/stenting, while for the other half PTA/stenting was the primary and only treatment performed.

## Conclusions

The most commonly observed etiology was embolic and the most frequent SMA obstruction site was proximal occlusion. Mechanical aspiration thrombectomy was performed more frequently, when more non-occluded large branches were present and etiology was embolic, whereas PTA/stenting in cases with fewer patent large branches and thrombotic etiology.

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## **An Overview of Single-Centre Experience in Endovascular Therapy for Acute Superior Mesenteric Artery Occlusion**

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### **Introduction**

Acute superior mesenteric artery (SMA) occlusion is a life-threatening condition associated with high mortality rate. Even though endovascular and surgical treatment of this condition is constantly improving and overall survival has been increasing in recent years, perioperative mortality still varies between 31 and 62% [1,2].

### **Aim**

To evaluate technical success, failures, complications and intrahospital mortality of endovascular therapy (EVT) for acute SMA occlusion at Kauno Klinikos during the 3-year-period from 2018 to 2020.

## Methods

We retrospectively assessed 80 patients, which were presented to EVT due to acute SMA occlusion. Restored flow to the SMA stem and all large branches was considered to be a technical success. Restored stem flow with at least one large occluded branch was assumed as a partial success. Failure to restore blood flow in SMA stem was defined as a failure. Success rate was calculated by combining fully and partially successful cases.

## Results

Three endovascular treatment pathways were registered: the most frequent was mechanical thrombectomy (MT) alone (58,8%), then followed MT with subsequent PTA/stenting (28,7%) and PTA/stenting alone (12,5%). Success rate (full and partial success combined) for each type of procedure were 83,0%, 69,5% and 90,0% accordingly, however the difference was statistically insignificant ( $p=0,175$ ). In general, 67,5% of cases were technically successful, 12,5% were partially successful and 20% ( $n=16$ ) were a failure (success rate - 80%). In 5 of the latter cases the reason for failure was unsuccessful access due to proximal occlusion of the SMA. In 7 other cases EVT failed due to long thromboembolic segments of the artery. In 4 cases, difficult vascular anatomy was the main reason for a technical failure. There were two serious complications related to EVT (total complication rate - 2,5%): inguinal haematoma and bleeding from left common iliac artery after unsuccessful access to the SMA. Overall intrahospital mortality among all patients was 58,8%. The more successful EVT was, the lower intrahospital mortality rates were (Mann-Whitney  $U=532,50$ ;  $p=0,004$ ). In case of EVT being a failure, intrahospital mortality was 87,5%, in case of partial success - 70,0% and in case of technical success - 48,1%.

## Conclusions

Our study revealed that overall technical success rate was 80%, failures occurred mostly due to complexity of the occlusion or difficult vascular anatomy and complications were rare, while intrahospital mortality significantly depended on EVT technical success.

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## Assessing burnout in radiologists

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### Introduction

A work related burnout is a multifactorial syndrome, which consists of three fundamental symptoms – emotional exhaustion, cynicism and decreased professional efficacy. Recent studies suggest that burnout may erode professionalism, influence quality of care, increase the risk for medical errors.

### Aim

To examine the prevalence and associated factors of professional burnout syndrome in radiologists.

## Methods

A 23-item anonymous survey, including seven original questions and the 16-item scale Maslach Burnout Inventory – General Survey (MBI-GS) was handed out to Radiology doctors and resident doctors in Lithuanian University of Health Sciences, Kaunas Clinics, Department of Radiology. Original questions assessed included data on personal characteristics and workplace. MBI-GS scale is divided in three subscales that measure work related burnout – exhaustion, cynicism and professional efficacy. Burnout was measured in 5 profiles (burnout – high exhaustion, high cynicism, low professional efficacy, overextended – high exhaustion, ineffective – low professional efficacy, disengaged – high cynicism, engaged – low exhaustion, low cynicism, high professional efficacy). All calculations were performed using ©SPSS for Windows 24.0™ software and ©Microsoft Excel 16™. The P-value less or equal to 0.05 was considered statistically significant.

## Results

Data of 71 respondents was collected including 49.3% doctors and 50.7% resident doctors. 37.5% were men and 62.5% were women. Mean respondent age  $33.48 \pm 10.18$ . Average work experience was  $8.48 \pm 8.94$ . 46.5% were married and 50.7% were not married. 48.6% of all respondents were satisfied with work environment and only 27.8% were satisfied with salary. The burnout rate in study population was 19.7%, 26.8% felt overextended, 19.7% respondents were ineffective, 4.2% were disengaged, 31% respondents were engaged, meaning no symptoms of burnout. Burnout was identified in 64.3% resident doctors and in 35.7% of all doctors. The incidence of overextended within resident doctors was 25% and within doctors 28.6% of all respondents. Lower satisfaction in salary associated with greater rate of burnout ( $p=0.007$ ,  $\chi^2=9.99$ ). Lower satisfaction in work environment also associated with greater rate of burnout ( $p=0.005$ ,  $\chi^2=10.66$ ). Shorter work experience associated with burned out respondents ( $p=0.02$ , PI 95%). No associations with gender, marital status among burnout profiles were found.

## Conclusions

Twenty percent of radiologists suffer from burnout syndrome and another twenty five percent of them experience high exhaustion. Only a third of respondents experiencing no symptoms of burnout. Factors such as work experience, salary and work environment were significantly related to burnout syndrome.

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## **The added value of SPECT/CT over planar images of lung perfusion scintigraphy in the diagnosis of pulmonary embolism**

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### Introduction

Pulmonary embolism (PE) is a frequently underdiagnosed condition potentially leading to death [1]. For proper evaluation of PE, nuclear medicine imaging techniques are widely implemented [2]. One of the main diagnostic methods used for the assessment of PE is lung perfusion scintigraphy, which provides data about the physiological performance of the respiratory system [3]. However, in comparison to planar imaging technique, a hybrid modality, known as a single-photon emission computed tomography/computed tomography (SPECT/CT), allows simultaneous acquisition of physiological and anatomical views, therefore, is expected to improve markedly the diagnostic efficacy for PE over planar scintigraphy [4].

## **Aim**

To evaluate the diagnostic performance of SPECT/CT in comparison with planar scintigraphy in patients with suspected PE.

## **Methods**

The analysis of 61 patients imaging data, who arrived at the Department of Nuclear Medicine of the Hospital of Lithuanian University of Health Sciences Kauno Klinikos from September 2021 to January 2022 due to a suspect of pulmonary embolism (PE), for lung perfusion scintigraphy. All patient underwent planar lung perfusion scintigraphy and SPECT/CT of the lungs. Planar anterior/posterior scintigraphic imaging and chest / SPECT/CT was performed on a Mediso Anyscan SPECT/CT gamma camera after injection of  $135.6 \pm 20.3$  MBq of  $^{99m}\text{Tc}$ -MAA over several breaths. Imaging results data were analysed using SPSS Statistics version 25.0 (IBM SPSS, USA). Non-parametric data were shown as median with interquartile ranges (IQR), whereas categorical variables as a number and percentage. Chi-square was used to analysed categorical data. A p-value of  $<0.05$  was considered significant.

## **Results**

Out of 61 patients, 37 (62.3%) were females ( $p=0.073$ ). The median age was 68 (IQR 55.5-77.5) years. PE was observed in 26 (42.6%) patients. The sensitivity and specificity for planar scintigraphy were 69.2% and 94.3% ( $p<0.001$ ). The sensitivity and specificity for SPECT/CT were 96.2% and 100% ( $p<0.001$ ). The prevalence of both false-positive (FP) and false-negative (FN) results were higher within planar scintigraphy (10% and 19.5%, respectively) compared to SPECT/CT (0% and 2.8%, respectively). The positive predictive value (PPV) and negative predictive value (NPV) of each method were as follows: for planar scintigraphy 90% and 80.5%, and for SPECT/CT 100% and 97.2%. SPECT/CT showed better accuracy compared to planar scintigraphy (98.4% vs. 83.6%).

## **Conclusions**

The SPECT/CT has better diagnostic efficacy in the diagnosis of PE compared to planar scintigraphy. Therefore, in order to achieve the most accurate diagnosis, a wider implementation of SPECT/CT in the context of suspected PE should be considered.



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## **Incidence of SPECT/CT findings non-related to pulmonary embolism in patients referred for lung perfusion scintigraphy with suspected pulmonary embolism**

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### Introduction

Pulmonary embolism (PE) gives a burden on the respiratory system leading to its functional damage [1]. However, non-thrombotic lung diseases could also disrupt pulmonary perfusion and mimic perfusion defects seen in PE [2]. Such similarity between PE and non-PE findings on pulmonary perfusion scintigraphy may result in a

misleading diagnostic yield as well as inadequate treatment, therefore determination of the origin of the abnormal findings should be fundamental. A hybrid imaging modality combined of single-photon emission computed tomography (SPECT) and low-dose computed tomography (CT), known as SPECT/CT, precisely characterizes the physiological and anatomical components of the lung perfusion, therefore is capable to differentiate the cause of the perfusion defects [3].

## **Aim**

To assess the incidence and type of lung perfusion abnormalities non-related to PE using SPECT/CT in patients with suspected PE.

## **Methods**

The retrospective analysis of 61 patients imaging data, who arrived at the Department of Nuclear Medicine of the Hospital of Lithuanian University of Health Sciences Kauno Klinikos from September 2021 to January 2022 due to a suspect of pulmonary embolism (PE) for lung perfusion imaging. All patients underwent lung perfusion SPECT/CT after the injection of  $135.6 \pm 20.3$  MBq of  $^{99m}\text{Tc}$ -MAA over several breaths. SPECT/CT was performed on Mediso Anyscan SPECT/CT gamma camera. Imaging results data were analysed using SPSS Statistics version 25.0 (IBM SPSS, USA). Non-parametric data were shown as median with interquartile ranges (IQR), whereas categorical variables as a number and percentage. Chi-square was used to analyse categorical data. A p-value of  $<0.05$  was considered significant.

## **Results**

Out of 61 patients, 37 (62.3%) were females ( $p=0.073$ ). The median age was 68 (IQR 55.5-77.5) years. PE was observed in 26 (42.6%) patients. A total incidence ratio of findings non-related to PE was 29.5%. The most common CT finding mimicking PE on lung perfusion SPECT, non-related to the PE was lung parenchyma consolidation, which was detected in 11.5% of patients. Three other pathologies, including lung foci, high diaphragm arcus, and pleural effusion individually showed the same incidence ratio of 4.9%. Less common pathological findings were atelectasis and ground-glass appearance, which individually accounted for 3.3%. Emphysematous bullae were found in 1.6% of patients. None of these findings were related to PE ( $p>0.05$ ).

## Conclusions

Structural changes in the lungs, that resemble defects caused by PE, can be assessed by SPECT/CT imaging. Findings non-related to the PE occur in almost one-third of patients with suspected PE. However, the incidence ratio of findings individually is not high, with consolidation being the most common abnormality occurring in approximately 1 of 10 patients with suspected PE. Therefore, the usage of low-dose CT for the diagnosis of PE reduces false positive findings on lung scintigraphy imaging.

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## Crohn's disease activity indices reflecting treatment response

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## Introduction

Crohn's disease is a lifelong illness that affects the entire gastrointestinal tract. It manifests with fatigue, fever, abdominal pain, weight loss, and diarrhea [1]. The response to treatment starts to diminish in some cases [2]. Various indices are used to evaluate treatment effectiveness and disease activity.

## Aim

To evaluate Crohn's disease patients' responsiveness to treatment using disease activity indices.

## Methods

Medical data of thirty-seven patients with active Crohn's disease, who underwent repeated magnetic resonance enterocolonography (MR-EC), endoscopy, and blood tests after six months of treatment, was collected prospectively. According to Crohn's disease activity index (CDAI) score, they were divided into two groups: the non-responders' group was described as patients whose CDAI score decreased or increased by less than 70 points, the responders' group consisted of patients who achieved remission and/or whose CDAI score decreased by 70 or more points. Evaluated MR-EC indices included magnetic resonance index of activity global (MaRIA-G), modified magnetic resonance index of activity global (mMaRIA-G), and Clermont global index (Clermont-G). Activity indices in the blood test included C reactive protein (CRP) and white blood cell count (WBC). Other activity parameters were Crohn's disease endoscopic index of severity (CDEIS), Lemann index, and inflammatory bowel disease questionnaire (IBDQ). All indices were collected for all patients.

## Results

Changes in CDAI after the therapy in the non-responders' group (n=21) were not significant 136.89 (65.46) vs. 167.74 (72.42) (p=0.166). MaRIA-G, mMaRIA-G, and Clermont-G indices also decreased insignificantly in this group after the treatment 63.93 (21.32) vs. 61.12 (23.84) (p=0.126), 57.62 (17.53) vs. 55.15 (19.99) (p=0.095), 88.38 (17.55) vs. 86.11 (20.02) (p=0.106) points, respectively. The patient's quality of life slightly increased after treatment based on the IBDQ score 158.42 (27.52) vs. 163.42 (27.8) (p=0.332) points. Other evaluated indices also did not change significantly before and after treatment. In the responders group (n=16), CDAI and MR-EC indices reduced significantly CDAI: 224.44 (69.5) vs. 105.94 (47.4) points

( $p < 0.001$ ), MaRIA-G: 67.27 (15.45) vs. 42.22 (11.3) ( $p < 0.001$ ), mMaRIA-G: 58.1 (13.63) vs. 36.63 (10.8) ( $p < 0.001$ ), Clermont-G: 89.91 (14.34) vs. 66.2 (12.02) ( $p < 0.001$ ). A significant decrease was noted in CDEIS 5.48 (4.03) vs. 4.86 (3.28) ( $p = 0.05$ ), as well as in CRP and WBC count 39.38 (37.16) vs. 1.93 (2.11) mg/L ( $p = 0.001$ ) and 9.84 (3.22) vs. 6.6 (2.41)  $\times 10^9/L$  ( $p = 0.002$ ), respectively. IBDQ increased significantly in this group 149.19 (21.05) vs. 165.13 (28.15) ( $p = 0.05$ ). Lemann index decreased minimally 3.36 (4.2) vs. 3.33 (4.64) ( $p = 0.945$ ).

## Conclusions

Only the responders' group achieved a significant increase in life quality and decreased MR-EC, endoscopic, and serum Crohn's disease activity indices after the therapy. In both groups, Lemann index scores changed minimally.

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**Surgery**

## **Applicability of five risk prediction models for patients after the repair of ruptured abdominal aortic aneurysm**

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### **Introduction**

Abdominal aortic aneurysm (AAA) is associated with a high rate of mortality which only increases in the presence of rupture, comorbidity, and older age [1]. V-POSSUM, Glasgow aneurysm score (GAS), Edinburgh Ruptured Aneurysm Score (ERAS), Hardman index, and Vascular Study Group of New England (VSGNE) risk score were developed to predict outcomes and estimate pre-operative risk after repair of ruptured AAA [2,3].

### **Aim**

To evaluate the applicability of existing risk prediction models in the clinical practice for patients who underwent ruptured AAA repair.

### **Methods**

The approval (No.: BEC-MF-08) for the research was granted by the Centre for Bioethics of Lithuanian University of Health Sciences. This retrospective study analyzed 118 patients who underwent a repair of ruptured AAA between January 2010 and December 2020 in the Hospital of LUHS Kaunas Clinics. The pre-operative risk was calculated using formulas of five different risk prediction models. The statistical

analysis was performed using IBM SPSS Statistics software (v. 23.0). Results are presented as medians, interpercentile ranges, and Mann–Whitney U statistics. Data differences were considered statistically significant at  $p \leq 0.05$ . The score  $\geq 50$ th percentile was considered to indicate a higher risk for fatal outcomes.

## Results

Statistically significant differences were observed only in four risk prediction models in the group of males from 65 to 74 years old. V-POSSUM Mortality rates of survived patients (Mdn = 70.55; 51.53 – 88.3) were statistically significantly lower than those of deceased patients (Mdn = 95.4; 85.75 – 98.1),  $U = 25$ ;  $p < 0.001$ . The corresponding results were established in ERAS (Mdn = 0; 0 – 1 vs. Mdn = 1; 1 – 2),  $U = 40$ ;  $p = 0.009$ , Hardman index (Mdn = 0.5; 0 – 1 vs. Mdn = 2; 1 – 2),  $U = 32.5$ ;  $p = 0.003$ , and VSGNE risk scores (Mdn = 0; 0 – 1.25 vs. Mdn = 1; 0.5 – 3),  $U = 46.5$ ;  $p = 0.029$ . No statistically significant differences were observed in GAS between any groups. Only VSGNE risk scores of the group of males from 75 to 84 years old were statistically significant. Pre-operative risk scores of survived patients (Mdn = 2; 0.5 – 2.5) were statistically significantly lower than those of deceased patients (Mdn = 3; 2 – 4),  $U = 102$ ;  $p = 0.025$ .

## Conclusions

In our study, existing risk prediction models were not relevant for female patients. However, we found that V-POSSUM (risk increases when mortality rate  $\geq 95.4$ ), ERAS (risk increases when score  $\geq 1$ ), Hardman index (risk increases when score  $\geq 2$ ), and VSGNE risk score (risk increases when score  $\geq 1$ ) statistically significantly reflect the outcomes for males from 65 to 74 years old. For the elderly patients from 75 to 84 years old only VSGNE risk score (risk increases when score  $\geq 3$ ) is relevant.

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## **The influence of different cardioplegia on the development of postoperative lung complications after open-heart surgery**

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### **Introduction**

Respiratory system complications are one of the most common forms of postoperative problems after open-heart surgeries [1-3]. There are not many studies that compare the effects of Cold Crystalloid Cardioplegia (CCC) and Warm Blood Cardioplegia (WBCP) on post-operative pulmonary complications. It is crucial to determine if the type of cardioplegia used has a significant role in pulmonary complications development. That could help anaesthesiologists to choose between CCC and WBCP taking into consideration other patients' risk factors.

### **Aim**

To determine and assess the impact of cardioplegia used during the open-heart surgeries to development of pulmonary complications.

## Methods

The Bioethics Center of the Lithuanian University of Health Sciences gave its approval to the research. This is a retrospective study. At the Cardiac, Thoracic, and Vascular Surgery Department of the Lithuanian University of Health Sciences Kaunas Clinics, 287 patients (209 men, 78 women) had open-heart surgery with CCC or WBCP and normothermic cardiopulmonary bypass during the period of 2019 11–2021 06. CCC was given to 246 people, while WBCP was given to 41. We have evaluated the X-rays taken on the first and the fifth day post-surgery. To analyse the data, we used SPSS 28.0. The chi-square ( $\chi^2$ ) test was used to analyse differences between the variables. All p values  $<0,05$  were deemed statistically significant.

## Results

On the first day after the surgery the observed X-rays showed venous stasis to 135, atelectasis to 18, infiltration to 43 and pleural effusion to 143 patients. Patients who received WBCP had more complications of venous stasis compared to the ones who received CCC (accordingly 58,8% vs. 45,1%). All the other complications occurred more often in patients who had CCC compared to people who received WBCP: atelectasis (7,3% vs. 0%), infiltration (15% vs. 14,6%), pleural effusion (51,2% vs. 41,5%). However, the statistical relation wasn't significant, and all the p values were  $>0,05$ . X-rays taken on the fifth day after surgery indicated venous stasis in 98 patients, atelectasis in 21, infiltration in 47, and pleural effusion in 132. Those who received WBCP experienced more frequent venous stasis complications when compared to those who received CCC (accordingly 41,5% vs. 32,9%). All the other complications occurred more often in patients who had CCC compared to people who received WBCP: atelectasis (7,7% vs. 4,9%), infiltration (17,9% vs. 7,3%), pleural effusion (50% vs. 22%). Patients who received CCC statistically were more likely to develop pleural effusion on the fifth day ( $p=0,001$ ) post-surgery. Nevertheless, other results didn't show statistical significance ( $p>0,05$ ).

## Conclusions

This study demonstrates a significant relation that patients who received CCC were more liable to develop pleural effusion post-surgery.

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## **The influence of co-morbidities and smoking on respiratory system complications after open-heart surgeries**

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### **Introduction**

Pulmonary complications are common after cardiac surgeries [1-3]. Clarifying which patients are more likely to have postoperative pulmonary difficulties can aid in the development of efficient measures to avoid or minimize these complications.

## **Aim**

To determine and evaluate the impact of co-morbidities and smoking addiction on respiratory system complications following open-heart surgeries.

## **Methods**

The study was approved by the Lithuanian University of Health Sciences Bioethics Center. The study is retrospective. During the period of 2019 11–2021 06, 287 patients (209 men, 78 women) underwent open-heart surgery with normothermic cardiopulmonary bypass at the Cardiac, Thoracic, and Vascular Surgery Department of the Lithuanian University of Health Sciences Kaunas Clinics. The current investigation is focused on patients with smoking addiction (105 smokers and 182 non-smoker) and their co-morbidities, i.e., asthma, heart failure (CHF), kidney failure, chronic obstructive pulmonary disease (COPD) and pulmonary arterial hypertension (PAH). We have analysed X-rays performed on the first and the fifth day after the surgery. We have used the SPSS 28.0 to analyse data. Differences between the variables assessed using the chi-square ( $\chi^2$ ) test. All p values  $<0,05$  were considered statistically significant.

## **Results**

First day after the surgery non-smokers had more complications of infiltration ( $p=0,021$ ). Smokers on the first day ( $p=0,033$ ) and the fifth day ( $p=0,017$ ) post-surgery statistically had more complications of pleural effusion. On the first day after the surgery, patients with PAH ( $p=0,023$ ) and asthma ( $p=0,018$ ) were more likely to develop pleural effusion. People with COPD ( $p=0,036$ ) and CHF ( $p=0,05$ ) were more liable to infiltration. Patients with kidney failure were more prone to venous stasis ( $p=0,005$ ). On the fifth day post- surgery, patients with asthma ( $p=0,039$ ) and CHF ( $p=0,002$ ) were more likely to develop pleural effusion. Venous stasis was more prevalent among patients with left heart failure ( $p=0,007$ ).

## **Conclusions**

This study demonstrates a significant relation ( $p\leq 0,05$ ) that smokers, also patients with PAH and asthma are more prone to develop pleural effusion. Non-smokers, people with COPD, asthma and CHF more frequently developed infiltration after the cardiac surgery. Patients with kidney failure and left heart failure were more liable to develop venous stasis.

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## Postoperative hypophosphatemia as a prognostic factor for postoperative pancreatic fistula: a systematic review

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### Introduction

Postoperative pancreatic fistula (POPF) is one of the most challenging complications after pancreatic resection, associated with prolonged hospital stay and high mortality [1, 2]. Early identification of pancreatic fistula is important for the treatment to be effective. Several prognostic factors have been identified, although it is not clear which one is the most significant [2]. Some studies show that post-pancreatectomy hypophosphatemia may be associated with the development of POPF [3].

## **Aim**

To perform a systematic literature review on postoperative hypophosphatemia as a prognostic factor for postoperative pancreatic fistula.

## **Methods**

The systematic literature review was performed according to preferred reporting items for systematic reviews (PRISMA) statements and was registered in the International prospective register of systematic reviews (PROSPERO). The PubMed, ScienceDirect and Web of Science databases were systematically searched up to 31<sup>st</sup> of January 2022 for studies analyzing postoperative hypophosphatemia as a prognostic factor for postoperative pancreatic fistula. Data including study characteristics, patient characteristics, operation type, definitions of postoperative hypophosphatemia and postoperative pancreatic fistula were extracted.

## **Results**

Initially, 149 articles were retrieved. After screening and final assessment, 3 studies with 3022 patients were included in this review. Association between early postoperative hypophosphatemia and the postoperative pancreatic fistula was found in all included studies. Patients undergoing distal pancreatectomies were more likely to develop severe hypophosphatemia compared to proximal pancreatectomy patients [4,5]. More severe hypophosphatemia following distal pancreatectomies was associated with surgical technique, pancreatic duct size and texture of remnant pancreas [4]. At least 1 complication was present for patients whose nadir serum phosphate levels were recorded during POD 2 and 3 [4,5,6]. Serum phosphate levels on POD 4 and POD 5 remained significantly lower in patients who developed leak related complications showing a slower recovery of hypophosphatemia from POD 3 through POD 7 [5,6]. It is considered, that continued pancreatic injury due to POPF development leads to continued protease and phosphaturin activation, causing prolonged and more severe hypophosphatemia – this association may be relevant to POPF development [3,5]. Moreover, body mass index (BMI) higher than 30 kg/m<sup>2</sup>, soft pancreatic tissue, abnormal white blood cell count on POD 3 and shorter surgery time were associated with leak related complications and lower phosphate levels [5,6].

## **Conclusions**

The results indicate that early postoperative hypophosphatemia might be used as a

marker for early identification for postoperative pancreatic fistula. However, more studies are needed to better identify significant cut-off levels of postoperative hypophosphatemia and changes in phosphorus levels during the postoperative period.

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## Percutaneous endoscopic gastrostomy: indications, complications and outcomes

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**Introduction**

Percutaneous endoscopic gastrostomy (PEG) is formed for feeding and nutritional support in patients with a functional gastrointestinal system who require long-term enteral nutrition. Besides its well-known advantages over parenteral nutrition, PEG offers superior access to the gastrointestinal system over surgical methods. The main indications of PEG-tube placement are enteral feeding and stomach decompression. It is considered to be a safe procedure, however, there is also a risk for minor or major complications.

**Aim**

The main objective of this study was to evaluate indications and complications of PEG-tube placements at the Hospital of Lithuanian University of Health Sciences.

**Methods**

A retrospective study at the Hospital of Lithuanian University of Health Sciences in 2021 in which 150 cases with described PEG-tube placements were analysed. Permission for the research was granted by the Bioethics center (No. BEC-MF-254).

**Results**

150 cases with performed PEG-tub placement were analysed. Among those 60 were female patients and 90 – male. The average age of the patients was 65 years. The main indications of PEG-tube placement for patients were oncology (cancers of hypopharynx, oropharynx, tongue, larynx and esophageal cancer) in 44 (29,33%) cases, traumatic brain injuries – 35 (23,33%), ischemic or hemorrhagic stroke – 29 (19,33%), neurological degenerative diseases – 16 (10,67%), other disorders of consciousness – 15 (10%), other causes of dysphagia – 5 (3,33%) and in 6 (4%) cases were other disorders. Complications can be divided into 2 separate groups: early and late term.



First PEG-tube placement early complications were bleeding in 8 (5,33%) cases (1-hemoperitoneum, 7-incision site bleeding), infection – 7 (4,67%), pneumoperitoneum – 1 (0,67%), inadvertent PEG removal – 4 (2,67%) and late term complications were PEG-tube leakage in 2 (1,33%) cases, buried bumper syndrome – 2 (1,33%), the dysfunction of PEG-tube – 3 (2%), persistent gastric fistula – 3 (2%) and in 120 (80%) cases there were no complications. The total risk of complications was 20%, a concise conclusion on what had the biggest impact of them occurring cannot be made due to the lack of data. The main risk of experiencing complications is to have to repeat the PEG-tube placement procedure which was done in 13 (8,67%) cases, the main reason was inadvertent PEG-tube removal – 4 (30,8%), followed by dysfunction – 3 (23,1%) and persistent gastric fistula – 3 (23,1%). After the PEG-tube replacement there were no complications. Also, 78 (52%) patients had antimicrobial therapies during this procedure. Antibiotics were prescribed to treat infections and this was not empiric therapy for this procedure.

## **Conclusions**

The most frequent indications for PEG formation are oncology, traumatic brain injuries, ischemic and hemorrhagic stroke. The most common complications were bleeding, infection, inadvertent tube removal, dysfunction or leakage of PEG-tube and a persistent gastric fistula.

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## Early outcomes of open surgical treatment of stenosing tenosynovitis

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### Introduction

Stenosing tenosynovitis also known as Trigger finger is a common condition which may cause significant functional impairment of the hand. Repetitive use of flexor tendon-sheath complex results in chronic inflammation response. In addition, chronic inflammation induces thickening of flexor tendon which causes clinical manifestation of pain and locking of the finger movement [1]. Percutaneous or open release of the A1 pulley is considered the treatment of choice in management of stenosing tenosynovitis when conservative treatment is inefficient [2].

### Aim

To evaluate early outcomes of open surgical treatment of stenosing tenosynovitis.

### Methods

A prospective study was conducted on patients with isolate stenosing tenosynovitis of II, III, IV or V fingers. Patients were included only after they met all inclusion criteria of research: patient is older than 18 years and diagnosed with isolate stenosing tenosynovitis of II, III, IV or V fingers without surgical treatment of fingers in past medical history. Pregnant women and all patients with autoimmune diseases were

excluded. All patients were treated in plastic and reconstructive surgery department of Kaunas clinics. Open surgical release of A1 pulley was used for the treatment of patients. Valid QuickDASH questionnaire was used to measure patient hand function. For the short-term functional outcomes QuickDASH questionnaire was applied one week and three months after the surgical treatment. Evaluation of early postoperative complications were recorded at each follow-up visit. Analysis was performed using SPSS 22.0 software package. For the statistical analysis a non-parametric related samples Friedman's test was used.

## Results

17 patients with stenosing tenosynovitis were included in the trial over the course of 6 months. For the evaluation of short-term functional outcomes 10 patients answered QuickDASH questionnaire one week and three months after the surgical treatment. The median pain (VAS) and hand function (QuickDASH) score before the surgery was 4 (IQR 4) and 58 (IQR 36) respectively. One week after the surgery median VAS 2.5 (IQR 6), median QuickDASH 56 (IQR 19). Three months after the surgery median VAS 1.5 (IQR 3), median QuickDASH 3.5 (IQR 23). Pain (VAS) and hand function (QuickDASH) score difference at different time points (before surgery, one week and three months after surgery) was statistically significant ( $p = 0.021$ ) and ( $p = 0.001$ ) respectively. None of early postoperative complications were recorded at patients follow-up visits.

## Conclusions

Patients assessment of pain (VAS) decreased and hand function (QuickDASH) improved within a period of three months. Decreased VAS and QuickDASH scores indicates successful short-term recovery of hand after open surgical treatment of stenosing tenosynovitis. Moreover, none of early postoperative complications were found during follow-up visits. Technique of open release of the A1 pulley is an effective procedure in achieving at least short-term resolution of trigger finger.

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# Posters

# **Anaesthesiology & Intensive Therapy**

## **Does paracetamol in adjunct to NSAIDS reduce analgesia demand in children undergoing surgery**

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### **Introduction**

Opioid medications are very often an important component of pediatric postoperative pain treatment but have been associated with perioperative complications such as nausea, vomiting, constipation, physical dependence, tolerance and respiratory depression [1]. Extensive efforts have been made toward reducing postoperative opioid use in children [2]. Multimodal postoperative analgesia is widely used but lacks evidence of benefit [3].

### **Aim**

Our aim is to perform a systematic review and find out if a single dose of paracetamol (enteral or intravenous) given in addition to NSAIDs results in a reduced need for opioid based rescue analgesia compared to NSAID alone in children within 1–4 h after general/orthopedic, oral and maxillofacial surgery.

### **Methods**

The type of this study is a systematic review of the literature that was conducted based on PRISMA guidelines. Search and analysis of scientific publications were performed using the PubMed. Keywords applied: paracetamol, NSAID, opioid, child, surgery. Double-blind randomized clinical trials, published 2002 - 2022 years were included in the analysis. Study participants – patients aged 1-18 years, study groups: the first group - patients receiving NSAIDs and placebo or NSAID alone, the second group - patients receiving NSAIDs + paracetamol (no dose restriction), types of operations – general/orthopedic surgery, oral, maxillofacial surgery.

## Results

We identified 121 records; 104 were removed - publications older than 20 years, not suitable research groups and types of surgeries, literature reviews, meta-analysis. 17 records were screened. 9 records excluded – not suitable study groups were compared, patients - younger than 1 year and older than 18. A total of 8 articles, 606 patients of whom 301 received NSAIDs + paracetamol, were included in this systematic review of the literature. Assessing the need of rescue analgesia, that was opioid based (morphine/hydromorphone/tramadol/meperidine) within 1-4 hours after surgery in children treated with NSAIDs: ibuprofen [4,5], diclofenac [6,7], ketorolac [8], or ketoprofen [9,10,11] with additional doses of paracetamol rectally (4 studies 40-60 mg/kg) or intravenously (4 studies 10 mg/kg-48 mg/kg/d, max 2,4 g). The reduced need of rescue analgesia was observed in 3 out of 8 articles [6,10,11]. The longer time to the first dose of opioid was also reported in 2 studies where the time to the first dose was evaluated [7,10].

## Conclusions

The majority of included double-blind randomized clinical trials do not report the evidence for the significant benefits in reduced need for opioid based rescue analgesia in the immediate postoperative period, when rectal or intravenous paracetamol was given in adjunct to NSAIDs after general/orthopedic, oral or maxillofacial surgery in 1-18 year old children. Due to the small number of articles included, these results should be treated with caution, meta-analysis is required to clarify the evidence of superiority of NSAID and paracetamol combination over NSAID alone.

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## **Effect of anterior femoral nerve branches block on early functional recovery after total knee arthroplasty: a pilot study**

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### **Introduction**

Total knee arthroplasty (TKA) is one of the most common joint replacement surgeries [1]. Despite the undeniable benefits, patients experience severe to moderate pain in the post-operative period [2]. Peripheral nerve blocks are gaining increasing attention and new techniques are being introduced. Some studies have shown that blocking the

anterior branches of femoral nerve (FN) in combination with the femoral triangle (FT) and adductor canal (AC) might increase patients' satisfaction and improve early ambulation [3]. We share our insights from a pilot study with patients who underwent TKA.

## **Aim**

The aim was to pilot functional recovery in patients after primary TKA by comparing distal FT (dFT) and distal AC (dAC) block with block of the proximal FT (pFT), dAC and anterior FN branches.

## **Methods**

The data for this prospective, double-blind, randomised pilot study was collected at the Department of Anaesthesiology, Hospital of Lithuanian University of Health Sciences (LUHS) Kauno Klinikos. 10 patients undergoing TKA under spinal anaesthesia were blindly randomised into two groups of 5 patients each. Group A (A) underwent block of the pFT, dAC and anterior FN branches, group B (B) underwent dFT and dAC block. The extent of motor block (Bromage scale) was assessed 3, 6, 24 and 48 hours after the surgery, and the ability of early ambulation (Timed Up and Go (TUG) test) - 24 and 48 hours after the surgery.

## **Results**

10 patients were tested: 3 men and 7 women, aged between 47 and 79 years. The mean age of A was 60 (8.631) years and that of B 72.20 (6.535),  $p = 0.036$ . 3 hours after surgery only 1 patient in A was able to fully move the leg (Bromage scale 0), while the others could not move the leg at all (Bromage scale 3),  $p > 0.05$ . Meanwhile, in B 60 % of patients were able to move the leg freely, while the rest moved their leg partially - 20 % could only move the ankle, and another 20 % could bend the knee as well,  $p > 0.05$ . After 6 hours 90 % of all patients were able to move freely, except for 1 person in B, who was still unable to lift the leg upwards,  $p > 0.05$ . After 24 hours, the results remained the same. After 48 hours, all patients regained the ability to raise the leg straight up. The mean TUG test scores at 24 and 48 hours were 43.61 (18.649) and 41.46 (18.544) seconds in A and 35.64 (3.375) and 34.26 (3.438) seconds in B, respectively,  $p > 0.05$ .

## Conclusions

The extent of motor block and the ability of early ambulation did not differ statistically significantly between groups. Further research with a larger sample is therefore needed.

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## **Hyperthermic intraperitoneal chemotherapy with cytoreductive surgery: anesthesiologist perspective of 2-year experience in Hospital of Lithuanian University of Health Sciences, Kaunas Clinics**

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### **Introduction**

Hyperthermic intraperitoneal chemotherapy (HIPEC) and cytoreductive surgery (CRS) is a two-step procedure used to treat certain tumors with abdominal metastasis. CRS is performed to remove cancerous tumors and the heated chemotherapy drugs are applied directly inside the abdominal cavity to eliminate the remaining cancerous cells [1,2]. From the 2000s all over the world, HIPEC with or without CRS has been gaining popularity for different neoplastic diseases that involve the peritoneal surface [3].

### **Aim**

This study aim is to retrospectively review and assess the 2 years of HIPEC treatment experience in the Hospital of Lithuanian University of Health Sciences, Kaunas Clinics.

### **Methods**

After ethics committee approval (BEC-MF-263) retrospective study was conducted on patients treated in the Hospital of Lithuanian University of Health Sciences, Kaunas Clinics. From January of 2020 to December of 2021 all cases of HIPEC with or without CRS were analyzed. Data including patient demographics, indications for multimodal therapy (HIPEC + CRS), duration of the anesthesia, and postoperative complications were collected. Analysis was performed using SPSS 27.0 software package. Normality of data checked by the Shapiro-Wilk test. Normally distributed variables are reported as mean and standard deviation (SD).

### **Results**

We analyzed 43 patients who were treated with CRS and HIPEC. There were more female patients ( $n=30$ , 69.77%) than men ( $n=13$ , 30.23%). The mean age was 53.42 (SD 10.99). To evaluate a patient's physical status and predict perioperative risk, the American Society of Anesthesiologists (ASA) class was given. In most cases, classification was III ( $n=34$ , 79.07%). The most common indication for this treatment among women was ovary cancer ( $n=11$ , 25.58%) and between men – gastric cancer ( $n=8$ , 18.60%). Usually during HIPEC treatment anesthesia lasts from 7 to 10 hours

(n=26, 60.47%). In other cases, anesthesia lasts from 4 to 7 hours (n=17, 39.53%). In 41.86% of cases (n=18) multimodal therapy was performed under general anesthesia and in 25 cases (58.14%) under combined (general and epidural) anesthesia. CRS was performed for thirty-eight patients (88.37%). The most frequent adverse events in the postoperative period were electrolyte disturbance (n=39, 90.70%), hypoalbuminemia (n=29, 67.44%), and hematological problems such as anemia, or thrombocytopenia (n=14, 32.56%).

## Conclusions

From our 2 years of experience, we can conclude that patients who undergo CRS with or without HIPEC are usually suffering from severe disease, which limits their activity but is not incapacitating. Usually, in these cases, anesthesia lasts longer, so the anesthesiologist should be prepared for prolonged anesthesia risks such as deep vein thrombosis, hypothermia, sore ulcers, and others. In the postoperative period, almost all patients suffer from electrolyte disturbances, hypoalbuminemia, anemia, or thrombocytopenia, so laboratory tests should be performed and evaluated daily.

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## **Influence of Epidural Analgesia on Pregnant Women with Cardiovascular Disease**

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### **Introduction**

Maternal morbidity and mortality because of cardiovascular disease (CVD) are increasing in the western world [1]. During labor, the blood pressure increases, the activation of sympathetic nerves and increased venous return can cause arrhythmias [2]. Epidural analgesia reduces labor pain and can be beneficial for blood pressure control. Moreover, the frequency of arrhythmias decreases due to sympathetic blockade [3]. Thus, it is very important to evaluate the effect of epidural analgesia on the mother and fetus.

### **Aim**

To evaluate the effect of epidural analgesia on hemodynamic parameters, maternal and neonatal outcomes of pregnant women with CVD.

### **Methods**

A retrospective study of 112 women with CVD that gave birth at the Hospital of Lithuanian University of Health Sciences Kaunas Clinics from 2017 to 2020 was performed. The following data were analyzed: age, gestational age, CVD, hemodynamic parameters (first recorded systolic blood pressure (sBP), the maximal recorded sBP), maternal outcomes (spontaneous vaginal delivery rate, duration of labor, blood loss

(<500; 500-1000; >1000 ml), neonatal outcomes (Apgar's score and pH of umbilical cord). Patients were divided into two groups: epidural group (E) and no-epidural group (NE). Statistical analysis was processed using IBM SPSS Statistics 25. Quantitative variables were described as mean with standard deviation (SD) or median and interquartile range (IQR). Differences between the groups were analyzed using  $\chi^2$  test of independence, Student's t and MannWhitney's U tests and considered statistically significant when  $p < 0.05$ .

## Results

112 patients were identified with mean age 28.6 years old (SD=5.5) and median gestational age 39 weeks (IQR=2). The most common CVD was congenital heart disease  $n=44$  (39.3%). There were 50 (44.6%) cases in the E group and 62 (55.4%) in the NE group. No cardiovascular events were observed. There was no significant difference in the first recorded sBP between E (Mdn=123.5, IQR=15.25) and NE group (Mdn=123.5, IQR=13);  $U=1390.5$ ,  $z=-0.935$ ,  $p=0.35$ . The maximal sBP was significantly lower in the E group ( $M=124.56$ ,  $SD=12.58$ ) vs NE group ( $M=129.87$ ,  $SD=12.22$ );  $t(110) = 2.26$ ,  $p=0.026$ . The duration of labor (measured in minutes) was significantly longer in the E group ( $M=794.7$ ,  $SD=423.21$ ) versus NE group ( $M=588.69$ ,  $SD=288.76$ );  $t(99) = -2.894$ ,  $p=0.005$ . Maternal blood loss and spontaneous vaginal birth rate did not differ between groups,  $\chi^2(2, 112) = 2.573$ ,  $p=0.276$  and  $\chi^2(1, 112) = 1.033$ ,  $p=0.309$ , respectively. Apgar's score at 1 min did not differ between the E (Mdn=9, IQR=1) and NE (Mdn=9, IQR=1) group,  $U=1471.5$ ,  $z = -0.497$ ,  $p=0.619$ . The pH was not significantly different in the E ( $N=19$ , Mdn=7.29, IQR=0.139) and NE group ( $N=15$ , Mdn=7.24, IQR=0.197),  $U=123.5$ ,  $z=-0.659$ ,  $p=0.52$ .

## Conclusions

The most common CVD was congenital heart disease. The maximal sBP during labor was lower and the duration of labor was longer in the epidural group. There were no other significant differences between hemodynamic, maternal, or neonatal outcomes.

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## **The effects of low dose ketamine on postoperative pain and adverse events after intraoperative remifentanil infusions**

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### **Introduction**

In modern surgery, with the rapid introduction of new surgical techniques and enhanced recovery protocols, it is particularly important to maintain acceptable postoperative pain intensity using the lowest possible doses of morphine. The search for methods for reduction of postoperative opioid requirements is constantly evolving [1]. Ketamine is one of the most attractive additives to achieve these goals, but the exact dose of ketamine is still not accurate[2,3].

### **Aim**

Assess the significance of low dose ketamine (0,3mg/kg by LBM (lean body mass)) for postoperative morphine requirements and side effects in patients after remifentanil anaesthesia in bariatric surgery.



## Methods

A prospective, randomized (random number generator), double-blind, placebo-controlled study. The study included 47 patients, who underwent bariatric surgery at HLUHS. Following informed consent adult obese patients up to ASA class III undergoing laparoscopic gastric bypass with remifentanyl anaesthesia were given equal volume (5 ml) of study medication: single dose of ketamine 0,3 mg/kg (test, group K=30) or saline (control, group S=17) at anaesthesia induction. Study medication was prepared by anaesthesia provider not involved in postoperative care of patients. Postoperatively pain intensity, morphine requirements and side effects were recorded every 15min up to 155 minutes in postanesthesia care unit.

## Results

The pain intensity was similar in both groups in all points of observation ( $p=0,05-0,973$ ). K and S groups did not differ in demographic values such as BMI ( $45.3 \pm 6.4$  vs.  $43.7 \pm 6.1$ ), age ( $42 \pm 12$  vs.  $46 \pm 10$ ) or gender – majority of patients were female (K = 73,3% vs. S = 70,6%). Morphine consumption was lower in the test group (group K - median 6 (25% = 5; 75% = 9) mg, group S - median 10 (25% = 9, 75% = 11,5) mg,  $p<0,001$ ). The incidence of side effects was similar in both groups ( $p=0,613$ ).

## Conclusions

The 0,3 mg/kg (LBM) ketamine dose reduces postoperative morphine consumption without impact on postoperative side effects in bariatric patients.

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## **Atrial fibrillation rate and relations between complications after a coronary bypass grafting surgery**

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### **Introduction**

Atrial fibrillation (AF) is one of the most common complications after cardiac surgery. Based on the literature, the incidence of AF has been found to be 25% after isolated coronary artery bypass grafting (CABG) and 40-50% in complex CABG / heart valve replacement surgery [1,2]. Despite the advances in modern cardiac surgery, the mortality and morbidity associated with AF after cardiac surgery remain unchanged [3]. The results of individual studies on the association of AF with postoperative complications are debatable and controversial and a more accurate analysis of treated cases is needed to assess the effectiveness of treatment to analyze and understand these trends.

### **Aim**

To determine the frequency of perioperative atrial fibrillation and its association with postoperative complications and duration of hospitalization in patients undergoing CABG.

### **Methods**

The research was carried out with the permission of the LUHS Center of Bioethics (No. BEC-MF-302) from January 1st, 2021 to February 28th, 2021. Clinical and laboratory

data of 100 patients were collected retrospectively and analysed who underwent cardiac CABG with cardiac pulmonary bypass (CPB) that were treated in the LUHS Kaunas Clinics, Clinic of Cardiothoracic and Vascular Surgery. Patients were divided into 2 groups: Group I with AF in perioperative period (n=45), Group II (n=55) with no AF cases in perioperative period. Statistical analyses were performed using SPSS 22.0 software. The value of  $p < 0.05$  was considered as significant.

## Results

The study population was 100 patients: 57 male and 43 females. The mean age was 66.3 ( $\pm 10.2$ ) years old. There were 13% of patients operated as a matter of urgency, 87% were scheduled. Atrial fibrillation (AF) after CABG is a common complication, accounting for a total of 45% of patients, of whom 36% were new AF episodes. There was a positive, weak statistically significant association between AF and age ( $r = 0.40$ ;  $p = 0.045$ ), indicating that the incidence of AF in the postoperative period increases significantly among older ages. There was no statistically significant difference between male and female groups ( $p = 0.49$ ). The duration of CPB in group I was 102.0 min ( $\pm 58.0$ ), in group II 91.0 ( $\pm 60.0$ ),  $p = 0.6$ . The infectious complications were identified in group I - 7%, in group II 3%,  $p = 0.22$ . Postoperative renal failure was 8% in group I and 2% in group II,  $p = 0.06$ . Pulmonary complications developed in group I - 7%, in group II - 5%,  $p = 0.53$ . Pts with a new AF episode were significantly longer stay in ICU for 3.4 days ( $\pm 1.5$ ) compared with pts without an AF episode ( $p < 0.05$ ).

## Conclusions

This study suggests that AF is a common complication after heart surgery in older than 65 years. Patients with AF episode have significantly longer stay in ICU. The identification of higher-risk patients enables early diagnosis and application of recovery protocols, which is more likely to contribute to a significant reduction in the use of healthcare resources by these pts.

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# **Basic Sciences**

## **Morphological findings at autopsy of people who died from alcoholic liver steatosis and liver cirrhosis**

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### **Introduction**

According to Lithuanian Institute of Hygiene, in 2020 liver diseases (K70-K76) were the third leading cause of death among working-age adults. WHO warns that health systems may face a significant increase in treatment demand for alcoholic liver diseases and their complications. Stickel et al. found that alcoholic liver disease is a clinically silent disease with little or no signs in the early stages. In some patients any complications of cirrhosis might be the first symptom of alcoholic liver disease, in others alcoholic steatohepatitis is the primary manifestation.

### **Aim**

To analyze tendencies of morphological organ changes and relations between different organ systems dysfunctions in individuals who died from alcoholic liver steatosis and liver cirrhosis.

### **Methods**

A retrospective analysis was performed on data of people who died from alcoholic liver disease (steatosis and cirrhosis) and underwent autopsy in Kaunas Department of The State Forensic Medicine Service from 2014 to 2018. Alcoholic liver steatosis and cirrhosis were underlying diseases in these individuals. Autopsy findings used for the

study include age, sex, cardiovascular, digestive and immune systems abnormalities. Descriptive observational study was performed. Examination reports of 162 individuals were examined: 91 cases of alcoholic liver steatosis and 71 of liver cirrhosis. Statistical analysis was done with Excel and IBM SPSS Statistics 26 software. Descriptive analysis methods were used to analyze collected data, demographic statistics. Differences between variables assessed using chi-square criteria, Mann-Whitney tests, tests of normality. Results were statistically significant when  $p < 0.05$ .

## Results

Age mean for alcoholic liver steatosis was  $57,3 (\pm 10,5)$  years, cirrhosis –  $54,3 (\pm 8,9)$ . Among the deaths from alcoholic liver steatosis there were 69 % men, 31 % women, among liver cirrhosis – 55 % and 45 % respectively. Ascites was significantly more common in the group of liver cirrhosis ( $p < 0,05$ ), so was the esophageal varices ( $p < 0,05$ ) and jaundice ( $\chi^2 = 30,754$ ;  $df = 2$ ;  $p < 0,05$ ). The enlarged spleen has been found more often in the group of liver cirrhosis (median 227,5g; range 60-2310) than in the group of alcoholic liver steatosis (median 130g; range 30-570) ( $p < 0,05$ ). The enlarged heart was detected more commonly in the liver cirrhosis group (median 410g; range 210-720) than in the other group (median 380g; range 220-610) ( $p < 0,05$ ). Overall no complications including ascites, esophageal varices, jaundice\* were detected on 43,8 % of examined bodies, one for 24,7 %, two - 21,6 %, three - 9,9 %.

\*for 13 corpses jaundice has not been evaluated.

## Conclusions

Men were the most dominant gender in groups of alcoholic liver steatosis and liver cirrhosis. The age mean was similar in both groups and does not differ significantly. Complications such as ascites, esophageal varices, jaundice were more common in the group of liver cirrhosis. Enlarged spleen and heart were detected more often in the liver cirrhosis group.

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## **Autopsy findings in motor vehicle occupants involved in fatal traffic accidents**

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### **Introduction**

Car drivers and passengers was the largest group of traffic accident fatalities and accounted for 44,2% of road deaths in the European Union in 2019 [1]. According to Lithuanian Traffic Police Service, between 2017 and 2020 in road traffic accidents died 726 people and, among those, 422 were motor vehicle occupants [2]. However, there is a lack of studies which would evaluate injury patterns of car crash victims, traumas indicating instant death at the scene and prevalence of driving under the influence of alcohol.



## **Aim**

The goal of the study is to assess autopsy findings in motor vehicle occupants involved in fatal traffic accidents.

## **Methods**

A retrospective analysis of The State Forensic Medicine Service Kaunas Department data of fatally injured motor vehicle occupants from 2017 to 2020. Autopsy findings used for this study include age, sex, site of death, traffic participation mode, injured body regions, toxicological investigation results. Statistical analysis will be conducted using statistical software IBM SPSS Statistics. Chi-square test was used to compare qualitative data between groups. Data differences were considered statistically significant at  $p < 0.05$ .

Permission for the research was obtained by the Bioethics center (No. BEC-MF-246).

## **Results**

The total of 53 fatally injured motor vehicle occupants were included in this study. Among those, 81,1% ( $n=43$ ) were male and 18,9% ( $n=10$ ) were female. The average age of road traffic accident victims was 43,33 y.o. (SD 20,125). Polytrauma occurred in 50 of all cases (94,3%). 75,5% of victims died at the scene of an accident ( $n=40$ ), while 24,5% ( $n=13$ ) were transported to the hospital and died later. The most common site of injury was rib cage (73,6%,  $n=39$ ) followed by the skull vault (41,5%,  $n=22$ ), brain (35,8%,  $n=35,8$ ), skull base (34%,  $n=18$ ), lower extremities (30,2%,  $n=16$ ), upper extremities (20,8%,  $n=11$ ), spine (17%,  $n=9$ ), pelvis (17%,  $n=9$ ). Among those, who died at the scene, 77,5% ( $n=31$ ) suffered rib cage fractures, 50% ( $n=20$ ) - skull vault fractures and 40% ( $n=16$ ) - skull base fractures. In addition to that, 45% ( $n=18$ ) were under the influence of alcohol. A significant correlation between skull vault fractures and death at scene was found ( $p=0,028$ ). In addition,  $\chi^2$  test of independence found significant association between driving under the influence of alcohol and death at the scene ( $p=0,015$ ).

## **Conclusions**

The most common sites of trauma among fatally injured motor vehicle occupant were rib cage and skull. Furthermore, skull vault fractures and driving under the influence of alcohol were associated with death at the scene.

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## Adipose-Derived Mesenchymal Stem Cells in Cartilage Tissue Regeneration in Osteoarthritis

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### Introduction

Tissue regeneration is the process of renewal and growth to repair or replace damaged or infected tissues<sup>1</sup>. Adipose tissue-derived stem cells are mesenchymal cells with the capacity for self-renewal and multipotential differentiation<sup>2</sup>. They provide a promising future in tissue regeneration due to their wide availability and ability to differentiate into other tissue types of the mesoderm<sup>3</sup>. In osteoarthritis, they prove to be effective in slowing down cartilage tissue degeneration.

### Aim

This study aims to systematically review the role of AdMSCs in cartilage tissue regeneration, particularly in osteoarthritis.

## Methods

We conducted a systematic review searching MEDLINE (PubMed) for all relevant articles dealing with AdMSCs in tissue regeneration published in the last five years. The search criteria being (((("tissue regeneration") OR ("regenerative medicine")) AND (("Adipose tissue") OR (AdMSCs) OR (Adipose-derived mesenchymal stem cells) OR (Adiposederived stromal cells) OR (ADSCs))) NOT ((Periodontal) OR (dental))).

## Results

We analysed 21 articles, and ten studies met the inclusion criteria. It is a relatively harmless procedure, and all results showed no serious adverse effects in using AdMSCs for regenerating cartilage tissues in OA<sup>5,8</sup>. There are no known complications. Knee function and pain levels (as measured by WOMAC) improved<sup>4,5,9</sup>, and there was no significant change in cartilage defect of OA in most patients<sup>9</sup>. However, during observation, the clinical outcomes deteriorated after a year for patients who received the low-medium dosage (0.5-5.0 x 10<sup>7</sup> AdMSCs) and after two years for patients given the high dosage (of about 5-100 x 10<sup>7</sup> AdMSCs)<sup>5,7,8,10</sup>. Other treatments (NSAIDs and corticosteroids) target symptoms, mainly pain relief. The option of surgery exists but is not advisable depending on factors such as age and activities- rehabilitation is also a point to reconsider as it is a long, painful process.

## Conclusions

Some studies showed no significant changes in the cartilage volume, whereas some showed that AdMSCs could potentially prevent OA progression by increasing the cartilage volume of the joint, as seen in MRI results<sup>5,6,8</sup>. However, there are concerns about the durability- after 1 or 2 years, the disease does not get worse, but it also does not get significantly better<sup>5</sup>.

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## **ERK5 AND H2AX EXPRESSION IN MONOCYTES AND MACROPHAGES EXPOSED TO NANOPARTICLES AND AIR POLLUTANTS; EXPERIMENTAL STUDY**

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### **Introduction**

Fine inhalable particulate matter (PM) triggers an inflammatory response in the airways. Unfortunately, the health risk of accumulated exposure cannot be predicted using physical monitoring systems. In experimental models, exposure of lung epithelial cells and monocytes to PM resulted in oxidative stress, DNA damage, and pro-inflammatory activation.

### **Aim**

Our study aimed to use the human monocyte-macrophage cell line (THP-1 cells) and assess the effect of PM on cell scatter within the binary fluorescence distribution system, specific for DNA damage and inflammation.

### **Methods**

The THP1 cells grown in ATCC-formulated RPMI 1640 medium were used in this study. Culture media supplemented with PMs were prepared using urban dust (UD),

nanoparticle carbon (NPCB), or coarse carbon black (CB) used as a reference. Particles were suspended in a cell culture medium at a concentration of 30  $\mu\text{g/mL}$  (24h). As a positive control (monocyte- macrophage transition inducer) phorbol-12-myristate-13-acetate (PMA, 200 ng/mL) was used. The transition was confirmed by CD11b/CD18, CD14, and CD68 expression. ERK5 and H2AX proteins were quantified by flow cytometry using specific rabbit monoclonal AlexaFluor 647 and 488 antibodies. Statistics were done with Statistica 6.0.

## Results

UD and NPCB but not CB increased oxidative stress, CD14, CD11a/CD18 expression, and highly stimulated PMA-induced activation, but was without effect on cell transition. Scatterplots of H2AK and ERK5 expression were shifted toward H2AX, mostly in polarised cells, binary distributed, and co-existed with oxidative stress.

## Conclusions

Our data indicate that UD and NACB can stimulate cell adhesion and, to some extent, also monocyte /macrophage transition and DNA damage.

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## **Toxic effects of alcohol on cells of the central nervous system**

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### **Introduction**

Alcohol is toxic to many different organs, but its effects of particular importance in the central nervous system (CNS) (1,2,3). According to one hypothesis, atrophy of the cerebral cortex and corpus callosum may result from the neurotoxic effects of alcohol therefore in alcoholics may develop permanent or transient cognitive deficits. Moreover ethanol exposure in brain results in disturbances in the structure of neuroglia, to impair diverse aspects of neuronal function (4).

### **Aim**

Due to the important role played by the cerebral cortex and the corpus callosum in CNS, it was decided to perform a morphological analysis of neurons and glial cells in the brains of people who abused alcohol.

## Methods

Sections of the cerebral cortex and corpus callosum from the brains of six adult men with alcohol addiction (there were concomitant diseases) were collected for the study. The comparison was a control group, derived from the brain sections of a person who died of natural causes. The collected material was subjected to the standard histological procedure. Observation of morphological changes and photographs were made in the Olympus BX43 light microscope.

## Results

Morphological changes were observed on the slides from cerebral cortex and corpus callosum in people in the research group. The comparison between the study groups was only qualitative. In the area of the corpus callosum on the slides, the pale color of the myelin was observed, which was associated with the disappearance of white matter. Moreover changes in the morphology and arrangement of oligodendrocytes were observed in the area of the corpus callosum. In cortex cerebri in the group of alcoholics, changes around the blood vessels, such as proliferation of endothelial cells, lesions of neurons and neuroglia with visible swelling and vacuolization were observed. Only in some samples in control group they could also be seen but were very rarely.

## Conclusions

The study concerned only morphological changes and the obtained results are consistent with the literature data. Ethanol causes direct injury to neurons and glial cells. Major consequences include impaired function of neuroglia, leading to neuronal pathology. White matter pathology ranges from dysmyelination, to demyelination to myelin degeneration, and it occurs in all forms of alcohol-related CNS pathology. The nature, severity, and distribution of CNS lesions vary with age, timing of exposure, and ethanol dose. We hope that the growing availability of knowledge on the effects of ethanol on the nervous system, combined with morphological and biochemical studies, will allow for a better assessment of the effects of ethanol on the nervous system.

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## **Urban dust cytotoxicity in human alveolar epithelial cells (A549) with depleted glutathione**

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### **Introduction**

Exposure to air pollutants causes many health problems including asthma, cardiopulmonary diseases, lung cancer, and birth defects, but the exact mechanisms remain unclear. To assess the effects of air pollutants on the lung epithelium, a human

lung epithelial cell line (A549 cells) was exposed to standardized urban dust in vitro.

## Aim

In this experiment, we concentrated on cytotoxicity (MTT test), oxidative stress (DCF/FC-Flow Cytometry), DNA damage (PI/FC), necrosis/apoptosis (FC), and autophagy (LC3 expression; WB/FC) triggered by urban dust(UD) in naïve a549 cells and cells with reduced glutathione (GSH).

## Methods

The A549 cells were grown in F12K/ FCS media supplemented with coarse carbon black (CB; Huber 990; 260 nm diameter; 200 ug/ml) or urban dust (UD; Standard Reference Materials; 200 ug/ml) for 24 h. To deplete intracellular glutathione (GSH), L-buthionine-(S, R)-sulfoximine (BSO; 100 mM; 24 h) was used. In some experiments, cells were double-stained and analyzed by flow cytometry to assess the co-incidence of changes.

## Results

Pre-treatment with BSO depleted the cellular GSH by about 30%. A similar effect was noticed after UD. The CB was without any effects on the parameters tested, except for LC3 expression (autophagy), which increased by about twofold. However, UD decreased cell viability by about 27%, decreased cell proliferation in BSO pre-treated cells, increased ROS production, and increased both Hsp70 and LC3 proteins by about twofold, but most changes were unrelated to ROS-mediated GSH depletion.

## Conclusions

UD increased oxidative stress and depleted GSH in A549 cells, however other mechanisms are also involved.

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## **Implications of miR-9 in cigarette smoke effects in naïve and desialylated human alveolarepithelial cells (A549)**

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### **Introduction**

Long-term exposure to cigarette smoke (CS) increases the risk for chronic obstructive pulmonary disease (COPD) and lung cancer but the mechanisms of CS-induced airway inflammation and biochemical pathways related to malignant transformation of respiratory system cells are unknown.

## **Aim**

The purpose of the study was to quantify miR-9 in naïve and desialylated.

## **Methods**

A549 cells grown in CS-conditioned medium under pro-inflammatory (LPS) and antiinflammatory (DEX) stimuli and analyze changes in miR-9 with cell proliferation. Cells were additionally treated with lipopolysaccharide (LPS) and/or dexamethasone.

## **Results**

Proliferation positively correlated with miR-9 levels in both naïve and desialylated cells. Cigarette smoke decreased miR-9 levels in both cell types by about three-fold but there was no significant correlation between both parameters. Dexamethasone was without substantial effect on cigarette smoke-induced changes in proliferation of naïve cells, but some normalization was observed in desialylated cells. Dexamethasone increased miR-9 levels in both cell types grown in cigarette smoke-medium but the effect was stronger in desialylated cells. LPS increased cell proliferation and miR-9 by more than six-fold only in naïve cells, while the correlation coefficient for both parameters in the cigarette smoke- LPS group was 0.41.

## **Conclusions**

Herein we identify miR-9 as the cigarette smoke (decrease) and LPS-responsive but dexamethasone- unresponsive microRNA. Increased miR-9 levels in naïve A549 cells treated with LPS may be related to the activation of Toll-like 4 receptors. Moreover, differences in cell response (both miR-9 and proliferation) to dexamethasone in naïve and desialylated cells may point to non-genomic dexamethasone effects.

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## **The efficacy of nusinersen treatment in spinal muscular atrophy: a systematic review**

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### **Introduction**

Spinal muscular atrophy (SMA) is an autosomal recessive neuromuscular disorder, with an incidence of approximately 1 in 10000 live births, caused by a deletion in exon 7-8 of SMN1 gene, located at chromosome 5q13. The absence of SMN protein leads to loss of motor neurons. SMA's presentation varies from early infantile death to weakness of the muscles progressing during adulthood. [1] A therapeutic agent nusinersen – an antisense oligonucleotide, targeting the SMN2 gene, is being used to increase the amount of functional SMN protein. [2] Based on numerous trials demonstrating the effectiveness of nusinersen in SMA – we performed a systematic review on the efficacy of treatment.

### **Aim**

To review the literature analyzing the efficacy of nusinersen in treating children and adults with SMA.

### **Methods**

This systematic review was conducted complying with PRISMA reporting standards. The PubMed database was used. Studies published from 2016-2021 were selected. We

identified 508 articles using specific key-words. We included retrospective and prospective studies that analyzed the clinical efficacy of nusinersen based on motor function (determined by particular assessment scales). We excluded ineligible trials, nonfull text articles, non-English articles, duplicates or articles focused on different topics, literature reviews and abstracts from conferences - 23 articles were included in this review.

## **Results**

In this study, we analyzed a total number of 977 children and adults with genetically confirmed SMA type 1-4. Interval of post-treatment follow-up – 6-36 months. We evaluated the improvement in motor function that was determined by positive slope changes in CHOP-INTEND, HMFSE, RULM, 6MWT, HINE-2 scales. Our systematic review showed a pattern of the level of improvement based on the diagnosed type of SMA. The strongest effect was exhibited in younger children, generally diagnosed with type-1. The impact was apparent on all of the performed age dependent motor function tests. Across SMA type 2-4 there were both children and adults being evaluated. [3,4] During the assessment, while the motor function scores vary, the use of nusinersen is still seen to have a positive response in both age groups. While in children improvements are undoubtful, in adults the results show the preservation of motor abilities and the advancement is minimal. [4]

## **Conclusions**

Nusinersen had a positive effect on the motor function of patients diagnosed with SMA across all types. The response to medication appears to be linked to the onset of the disease and treatment – best response exhibited in the youngest children, less apparent in adults.

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## **Impact of experimental hyperglycemia on blood lactate changes in healthy anesthetized swine**

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### **Introduction**

In biomedical sciences, swine is widely used as an animal model in preclinical research or experimental surgery. [1] Blood lactate and glucose intraoperative values are used as a monitoring tool, prognostic indicator [2;3] and strongly correlate with morbidity and mortality.[3;4] High blood lactate levels can result from tissue hypoperfusion (type A

hyperlactatemia), but could also rise with normal tissue perfusion (type B hyperlactatemia). [5] In this situation, hyperlactatemia may be related to hyperglycemia. [6] General anesthesia is associated with hyperglycemia which alters the finely regulated balance between hepatic glucose production and utilization. [3] Leading to the imbalance between lactate production, breakdown, and clearance are reflected in circulating lactate concentration. [7]

## Aim

The purpose of this study was to describe the relationship between experimental hyperglycemia and blood lactate changes in healthy pigs undergoing general anesthesia.

## Methods

The approval (No. G2-171) for the research, conducted in January 2021, was permitted by the State Food and Veterinary Service of Lithuania. This was an experimental study involving 10 clinically healthy female Lithuanian White crossbred (*Sus scrofa*) pigs of average age 45 days and weight 35 kg. Pigs were premedicated, intubated, and underwent general anesthesia with adequate mechanical ventilation. To induce hyperglycemia ( $>126 \text{ mg/dL}^{-1}$ ) [8] all swines received a continuous intravenous 20 % glucose solution (Glucose, Fresenius Kabi, Germany) administered 50 ml h. Blood lactate concentration range was set from 0.5 to 5.5 mmol L. [9] Venous blood samples were taken every hour throughout the experiment to analyze changes: T0 taken before glucose infusion, T1 after one hour, T2 after two hours, and finally at T3 after three hours of glucose infusion. T0 measurements of each pig were used to analyze the change of control and T1-3 as an experimental group. Data were presented to statistical analysis Pearson's r correlation test and t-test were performed to compare two different groups, the significant level was set at ( $p < 0.05$ ).

## Results

Hyperglycemia was induced in 10 out of 10 pigs. A significant increase in glucose levels was found in 90% of the blood samples from the experimental group ( $p = 0.00017$ ). Glucose values increased between  $123.5$  and  $341.1 \text{ mg dL}^{-1}$  with the start of glucose infusion compared to control measurements, which ranged between  $57.51$  and  $113.69 \text{ mg dL}^{-1}$ . After induced hyperglycemia, the blood lactate concentration increased by 86.67 %. In T1-T3 samples serum lactate levels increased by  $0.37 - 1.75 \text{ mmol L}$  compared to T0 values of  $0.44 - 0.86 \text{ mmol L}$  ( $p = 0.0064$ ). The study showed strong correlation between glucose and lactate values ( $0.78 \pm 0.1$ ) ( $p = 0.0000001$ ).

## Conclusions

This study demonstrates a direct relationship between experimental hyperglycemia and blood lactate changes. However, induced hyperglycemia increased blood lactate concentrations in pigs to within clinical limits.

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# **Cardiology**

## **The heart failure patients' functional condition impact on the changes in cardiac biomarkers**

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### **Introduction**

In patients with heart failure (HF), long-term follow-up strategies after inpatient treatment could improve quality of life, laboratory findings, while reducing the frequency of visits to the emergency department and the requirement for re-hospitalization [1]. One of the main management strategies is the HF program. This management program includes different types of tests, emphasizes the importance of self-care, which is measured by the European heart failure self-care behavior scale [2]. Moreover, educating about HF has an impact on functional condition based off of the self-care on cardiac severity degree and the results of the NT-proBNP [3].

### **Aim**

The aim is to investigate the self-care behavior scale and NT-proBNP results before and after 4 visits of the HF program and the correlation between the scale and NT-proBNP.

### **Methods**

The study was approved by the Bioethics center of Lithuanian University of Health Sciences (Nr. BEC-MF-184). It included 99 patients with HF who had completed all 4

visits of the HF program. The data was retrospectively enrolled into the study from the first and last visits. Patients were divided into two groups ( $\geq 60$  years and  $< 60$  years). The results of the self-care behavior scale and their changes during the first and fourth visits were evaluated. Cardiac dysfunction was also analyzed according to NT-proBNP at the first and fourth visits. Additionally, the correlation between the questionnaire results and NT-proBNP was evaluated. The statistical analysis was performed with a statistical tool (SPSS version 28.0.1) and the result was stated as statistically significant at  $p < 0.05$ .

## Results

There were 99 participants overall, 56.6% ( $n=56$ )  $\geq 60$  year patients and 43.4% ( $n=43$ )  $< 60$  year patients. First visit self-care behavior scale median score in the  $< 60$  years age group was 30 (12-27 points - good, 28-43 points - sufficient, 44-60 points - bad self-care), it decreased significantly to 22 on the fourth visit ( $p < 0.05$ ). First visit self-care behavior scale median score in the  $\geq 60$  years age group was 29, it decreased significantly to 24 on the fourth visit ( $p < 0.05$ ). First visit NT-proBNP median score in the  $< 60$  years age group was 921.5pg/mL (norm  $< 125$ pg/mL), it decreased significantly to 614.5pg/mL on the fourth visit ( $p < 0.05$ ). First visit NT-proBNP median score in the  $\geq 60$  years age group was 1961pg/mL, it decreased significantly to 1526pg/mL on the fourth visit ( $p < 0.05$ ). Additionally, a weak correlation was found between self-care behavior scale and NT-proBNP result changes during 4 visits of the HF program in patients older than 60 years ( $r=0.29$ ,  $p < 0.05$ ).

## Conclusions

The relationship between the self-care questionnaire and NT-proBNP results at the first and last visits was found to be statistically significant in both age groups. Additionally, self-care behavior scale result changes weakly correlate with NT-proBNP changes in patients older than 60 years.

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## **Analysis of patients diagnosed with Covid 19 virus after cardiac surgery in HLUHS**

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### **Introduction**

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) had been declared a worldwide pandemic by the World Health Organization and had caused a large worldwide impact on health system work.(1-2) All patients before elective surgeries were tested by mandatory order and even though these precautions were strictly followed, it was impossible to prevent Covid 19 infection between patients after surgery.

## **Aim**

The purpose of this study is to compare non infected patients preoperative, intraoperative and postoperative data with those who got infected with Covid 19 after cardiac surgery in HLUHS.

## **Methods**

Retrospective study was performed by observing the patient's case history data: 95 men underwent cardiac surgery during the emergency quarantine period from 2020-11-06 to 2021- 02-25 and 14 of them became infected with Covid 19. Inclusion criteria were male gender, because there were no females infected with Covid-19 during our chosen period of time. The analysis included general characteristics, preoperative, intraoperative and postoperative data, Covid-19 infection clinical symptoms and treatment. Statistical analyses were performed using the SPSS 20.0 software. The value of  $p < 0.05$  was considered as statistically significant.

## **Results**

14 (14.7%) of 95 patients were diagnosed with the Covid 19 virus after surgery, the average time of diagnosis of the Covid- 19 virus was 13 days after surgery. Covid 19 infected patients mean age was  $67 \pm 7.7$  years. Preoperative and intraoperative data did not differ between Covid 19 infected and non-infected patients ( $p > 0.05$ ). Statistically significant differences between groups were found in the frequency of wound infection (3 (21.4%) vs 12 (14.8%),  $p = 0.013$ ), longer duration of hospitalization after surgery ( $26.4 \pm 20.4$  days vs  $15.3 \pm 8.9$  days,  $p = 0.008$ ) and requirement of re sternotomy due to bleeding (2 (14.3%) vs 0(0%),  $p = 0.018$ ). Infected patients had ordinary Covid 19 infection symptoms: 9 (64.2%) patients had temperature  $> 37.5^{\circ}\text{C}$ , 3 (21.4%) - dry cough, 6( 42.8%) patients required for extra oxygen. 3 (21.4%) patients were readmitted to ICU because of Covid 19 disease, 2(14.3%) of them were reintubated. Infected patients laboratory tests showed higher ferritin, LDH, white blood cells and CRB levels compared with non-Covid patients. 9 (64.2%) infected patients were treated with antibiotics, 6 (42.8%) - with dexamethasone or remdesivir. Donor plasma with antibodies was used for 1(7.1%) patient's treatment, who had a severe form of Covid-19 infection with pneumonia and acute respiratory failure as complications, but 67 days after surgery he died because of sepsis.

## **Conclusions**

Preoperative and intraoperative data did not differ between Covid 19 infected and non-



infected patients, it can be concluded that patients became infected with Covid 19 regardless of their health condition and comorbidities. Infected patients had mostly mild or moderate course of the disease. Covid 19 infected group was associated with higher rate of postoperative complications.

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## Assessment of the inhibitors of connexins-43 using Quantitative structure-activity relationship (QSAR) model

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## **Introduction**

Gap junctions (GJs) are transmembrane channels which enable electrical wave spread and are crucial for electrical interaction between cardiac myocytes as well as synchronized contraction in the heart [1]. GJs consist of connexin family proteins, connexin-43 (Cx43) is the most prevalent isoform expressed in human heart tissue [2]. The quantitative structure- activity relationship (QSAR) is one of the most widely used computational modeling method to detect connections between structural characteristics of chemical compounds and biological activities [3]. Activation or inhibition of Cx43 could be useful for the future treatment of cardiac arrhythmias and dysfunction [2].

## **Aim**

The aim is to find a method to assess the activity of the connexins-43 inhibitors using the QSAR model.

## **Methods**

We researched data bases for the studies about the inhibitory concentrations of various substances on GJs made of Cx43. We managed to find 13 different substances and their half maximal inhibitory concentrations ( $IC_{50}$ ) [4-7]. We used the Avogadro molecular editor program to construct 3D structures with molecular mechanics and PaDEL Descriptor program [8] to receive information about chemical and physical properties of those 13 substances. The information we calculated was mathematical representations of molecules' properties that are generated by algorithms. Those representations are numerical values and are called molecular descriptors. Then we used the QSAR model and managed to find correlation between those 13 molecules and their  $IC_{50}$  using Excel data analysis. The total of 1443 descriptors were obtained and 2 of them were chosen as they strongly correlated with the  $IC_{50}$  of the molecules we studied. We used multiple regression statistics in Microsoft Excel and calculated  $R^2$  values.

## Results

Descriptor-1 (nHBDOn\_Lipinski) value is counted as the number of nitrogen–hydrogen and oxygen–hydrogen bonds, descriptor-2 (nHeavyAtom) value is the count of all the atoms in the substance that are not hydrogen. The experimental  $IC_{50}$  was used from previous studies [4- 7] and converted into  $\text{Log}(IC_{50})$ . The predicted  $\text{Log}(IC_{50})$  was calculated using multiple linear regression equation:  $(x_1 \times \text{descriptor-1 value}) + (x_2 \times \text{descriptor-2 value}) + b$ , where  $x_1 = -0,425$ ,  $x_2 = -0,027$ ,  $b = 3,715$  ( $x_1$ ,  $x_2$  and  $b$  values counted from regression analysis). Linear regression between experimental and predicted  $\text{Log}(IC_{50})$  was calculated ( $R^2 = 0,809$ ). The study data represents that the substance which had the highest hydrogen bonds count (nHBDOn\_Lipinski) and heavy atoms count (nHeavyAtom) inhibited Cx43 with the lowest  $IC_{50}$  value (phorbol-12,13-dibutyrate) and vice versa.

## Conclusions

$IC_{50}$  of Cx43 inhibitors can be assessed by counting the number of nitrogen-hydrogen, oxygen-hydrogen bonds, heavy atoms and entering values into our predicted equation.

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## **Evaluation of cardiac conduction abnormalities and arrhythmia in patients with pulmonary hypertension**

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## Introduction

Pulmonary hypertension (PH) is a potentially devastating clinical condition [1] associated with remodeling and impairment of cardiac electric structures [2]. Conduction disorders and arrhythmia are common complications of the disease marking the deterioration of the condition and requiring intense managing [3].

## Aim

To evaluate the prevalence of conduction disorders and arrhythmia in pulmonary hypertension patients treated in the LUHS Kaunas Clinics during 1 year.

## Methods

Research was approved by the Lithuanian University of Health Sciences (LUHS) Bioethics center. Retrospective study included patients treated in the LUHS Kaunas Clinics in 2020 – 2021. Inclusion criteria were age  $\geq 18$  years, diagnosis of PH, performed echocardiography. Case histories were studied. Data was collected on prevalence of conduction disorders and arrhythmia, echocardiographic measurements and biometrics. Patients were divided into groups according to the etiology and mechanism of PH. Statistical analysis was performed using SPSS 22.6 software. P value  $< 0.05$  was considered significant.

## Results

Total of 81 patients were included, 61 (75.3%) female and 20 (24.7%) men. There was no statistically significant distribution of arrhythmias and conduction abnormalities between the genders. Mean age was  $64.14 \pm 15.209$  years. Most cases were idiopathic – 37 (45.7%), 25 (30.9%) were caused by pulmonary embolism, 8 (9.8%) by systemic scleroderma, 7 (8.6%) by Eisenmenger syndrome, 2 (2.5%) had atrial septal defect and 2 (2.5%) portopulmonary hypertension. The most common (28.4%) arrhythmia was atrial fibrillation (AF). It depended on mechanism of PH: 65.2% were in precapillary group, 37.9% were in postcapillary group ( $p=0.026$ ). Left atrium (LA) diameter (49.5 vs 38.8,  $p<0.001$ ) and left ventricle (LV) end – diastolic volume index (26.3 vs 23.8,  $p=0.018$ ) was higher in patients with AF, other measurements did not correlate significantly. The most common conduction disorder was right bundle branch block (RBBB) (42%). It did not correlate with the mechanism of PH ( $p>0.05$ ). It occurred in patients with a significantly enlarged right ventricles (RV) (49.0 vs 45.1,  $p=0.034$ ). Other arrhythmias were less prominent: 16 patients had ventricular and 10 patients had atrial extrasystols, 4 patients had atrial flutter although these did not correlate with the etiology or severity of the disease.

## Conclusions

The most common arrhythmia in the study population was AF. RBBB was the most common conduction disorder. Both conditions were associated with a significant cardiac remodeling in advanced stages of PH.

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# ***Internal Medicine***

## Long Covid-19 Syndrome: a systematic literature review

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### Introduction

Since scientists detected SARS- CoV-2 (CoV-2) in December 2019 in Wuhan, China, it has caused a worldwide pandemic with high hospitalization and mortality rates [1]. There are 351 million confirmed cases of CoV-2, and The World Health Organization stated that patients feel the impact of acute CoV-2 infection days or months after being considered covid-free [2,3]. Sources have indicated long-term symptoms after recovery that are now known as Long Covid Syndrome (LCS).

### Aim

To review the most common symptoms, risk factors, and diagnostic challenges of LCS.

### Methods

A systematic review using Cochrane methodology and PRISMA guidelines was conducted. The literature was searched in English and indexed in MEDLINE, ScienceDirect, and ClinicalKey databases. The search terms included terms related to Long Covid syndrome. Eligibility criteria: COVID-19 survivors experiencing symptoms for >4 weeks after recovery, age 18-65 y/o, study designs: observational/cohort studies, cross-sectional and case-control studies. The risk of bias was assessed with the RoBANS tool.



## Results

The research strategy identified 5976 results. After excluding duplicates (n=212), studies that did not meet inclusion criteria, and the research objectives (n=5680), only 49 were included for evaluation. After a thorough assessment, 15 publications were included [4–18]. The main symptoms were chronic fatigue (up to 68.0%), shortness of breath (up to 59.5%), dry cough, chest, and musculoskeletal pain. Most patients reported neurological symptoms which included headaches (up to 68.0%), anosmia, partial olfactory dysfunction, and vertigo. LCS usually manifests in psychiatric disorders, such as depression, anxiety, insomnia, and mood changes. Few studies determined possible risk factors, however, COVID-19 related such as hospitalization in ICU, intubation, and preexisting pathologies -smoking, obesity, diabetes and hypertension are some of the few confirmed.

The challenge of LCS lies in how to diagnose these patients. Studies suggest approaching diagnosis by ruling out processes unrelated to CoV-2 infection and pre-existing pathologies. Follow-ups with complimentary testing may be scheduled, so a physician could identify whether it is persisting LCS or not [19]. Studies suggest possible non-LCS-related issues should be investigated and referred to as per local guidelines. Face-to-face assessment including anamnesis, examination, and tests such as full blood count, renal markers, C-reactive protein, liver markers, thyroid function, hemoglobin A1c, vitamin D, magnesium, B12, folate, ferritin, and bone studies should be included [20]. No unified worldwide guidelines have been obtained so far.

## Conclusions

Studies have shown the most common LCS symptoms were chronic fatigue, dyspnoea, pain, and neuropsychological revelations. Risk factors may include smoking, obesity, hospitalization in ICU, intubation, and comorbidities. Currently, there are no guidelines or diagnostic protocols to differentiate LCS from other pathologies.

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## **Associations between dyspepsia and obesity in non-alcoholic fatty liver disease patients**

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### **Introduction**

The presence of obesity has been associated with upper gastrointestinal disorders, such as gastroesophageal reflux disease (GERD), functional dyspepsia (FD) and non-alcoholic fatty liver disease (NAFLD). NAFLD may be linked to GERD, as both diseases are frequently associated with metabolic syndrome and evidently obesity evaluated by the BMI is closely related to the severity of GERD in NAFLD patients. Clinical features of NAFLD along with obesity include intensity of disease course with a predominance of dyspeptic syndrome, therefore, it is essential to determine the link between obesity and dyspepsia in NAFLD patients

### **Aim**

The aim of this study was to determine the association between dyspepsia and obesity in patients with NAFLD.

### **Methods**

We performed a retrospective study including 186 patients diagnosed with NAFLD at the LUHS KC Department of Gastroenterology in 2020. Inclusion criteria were diagnosis of NAFLD and measured body mass index (BMI). The cause of dyspepsia was confirmed by upper digestive endoscopic and histological findings. Diagnosis of HP infection was based on the results of serum anti-HP IgG antibody test and histology. Statistical analysis was performed using IBM SPSS 28.0 Statistics software. Pearson's Chi-square and Fisher's exact tests were used to analyze data between

groups. Data differences were considered statistically significant at  $p < 0.05$ .

## Results

Out of 186 patients with NAFLD 77 (41,4%) were men and 109 (58,6%) were women. Mean age of the participants was 52,7 years (SD 13,1). We divided our population according to BMI: 1 patient was underweight (0,5%), 16 had normal weight (8,6%), 43 were overweight (23,1%), 66 had class I obesity (36%), 38 had class II obesity (20,4%), 22 had class III obesity (11,8%). In total, 168 patients with NAFLD had hypersthenic body type (90,3%) and the average BMI was  $32.6 \pm 6.2 \text{ kg/m}^2$ . 88 patients experienced dyspepsia (47,3%), which was caused by GERD in 52 (28,0%) patients, gastritis - 49 (26,3%), FD - 9 (4,8%), peptic ulcers - 2 (1,1%) and gastric carcinoma - 1 (0,5%); 45 patients (24,2%) had *Helicobacter pylori* infection. The prevalence of dyspepsia in NAFLD patients with hypersthenic body type was statistically significant - more patients with dyspepsia had higher BMI ( $p = 0,025$ ). BMI differed significantly among patients with dyspepsia ( $p = 0,005$ ), higher rates of patients with dyspepsia were among those, who were overweight and among those with class II-III obesity, additionally, more people without dyspepsia had normal weight. Among BMI classes and the cause of dyspepsia, only the prevalence of GERD varied significantly between BMI groups - although more patients without GERD were either overweight or obese, but none of the patients with GERD had normal weight ( $p = 0,004$ ).

## Conclusions

Almost 70% of patients with NAFLD are obese and nearly half of them suffer from dyspepsia. Hypersthenic body type and higher BMI is associated with dyspepsia in NAFLD patients. Higher BMI is also associated with GERD in NAFLD patients.

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## **Correlation between Health and Demographic Peculiarities of Patients Suffering from Chronic Rheumatic Diseases and Attitude towards Remote Consulting by Rheumatologists**

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### **Introduction**

Chronic rheumatic diseases require constant and continuous observation and treatment of patients [1]. Following the COVID-19 pandemic reducing the accessibility to health services, a need for remotely provided services has emerged [2;3]. Since the success of telemedicine is considered to be best assessed through the indicator of patient satisfaction with remote consultations [4], it is essential to identify

the key health and demographic factors that are related to positive and negative attitudes towards such consultations of patients [5].

## **Aim**

To investigate correlations between health and demographic characteristics of patients suffering from chronic rheumatic diseases, and positive and negative attitudes towards remote consulting by a rheumatologist.

## **Methods**

The sample of the study consists of 207 patients suffering from various chronic rheumatic diseases, mostly spondyloarthritis ( $n=83$ ) and diseases of connecting tissue ( $n=53$ ): 177 (85.5 %) women and 30 (14.5 %) men,  $M_{age}=39.4$ ,  $SD=11.76$ . An original questionnaire was designed for the study to assess the attitude towards remote consulting by rheumatologists. Descriptive statistics was used in the study and Mann-Whitney and Kruskal-Wallis tests were applied.

## **Results**

The study has shown that men select remote consulting more often than women ( $p \leq 0.05$ ). Patients experience greatest satisfaction when they describe their symptoms of the illness as weak, while least satisfaction is experienced when symptoms are of average severity ( $\chi^2=8.36$ ,  $p=0.016$ ). Analogous negative attitudes towards remote consulting were obtained: the greatest dissatisfaction is among patients experiencing average severity and least dissatisfaction is identified among patients experiencing weak symptoms ( $\chi^2=11.31$ ,  $p=0.003$ ). Patients suffering from diseases of connecting tissue experience greatest negative attitude and fears about remote consulting while patients with spondyloarthritis experience the smallest negative attitude ( $\chi^2=9.69$ ,  $p=0.021$ ). Demographic indicators show that subjects with higher non-university education experience the greatest distrust and fears about remote consulting, while subjects with a university degree experience the lowest degree of fears ( $\chi^2=13.60$ ,  $p=0.003$ ). The greatest fears of doctors not understanding the patient's complaints were observed in the age group of 37–40, while in the age group of 18–25 the said fears were the smallest ( $p=0.016$ ,  $\chi^2=15.7$ ).

## **Conclusions**

It has been found that the attitude of patients with rheumatic diseases towards

remote consulting is statistically significantly related with the peculiarities of the disease, e.g., strength of the symptoms, character of the disease, etc. and various demographic characteristics of patients, such as age, education, etc.

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## Changes in the mortality from peptic ulcer disease in Lithuania during 1985-2018

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## Introduction

Peptic ulcer disease (PUD) is associated with two main factors: *Helicobacter pylori* infection and the use of non-steroidal anti-inflammatory drugs (1). The main complications of PUD are perforation, gastric obstruction, penetration and bleeding, which in some cases can be fatal (1, 2). The risk of complications in patients with chronic PUD has decreased rapidly over the last two decades in the Western world due to the eradication of *H. pylori* and the widespread use of drugs that reduce gastric acid secretion (3). New and accurate information on the prevalence of *H. pylori* in Central and Eastern Europe is scarce, however a study conducted in Lithuania showed that the seroprevalence of *H. pylori* in students has decreased significantly over the last 25 years (4). Nevertheless, mortality trends over a long period of time in Lithuania have not yet been analyzed and compared with mortality trends in European Union (EU) Member States.

## Aim

The aim of this study was to examine trends in mortality from PUD over the period 1985-2018 and to compare Lithuanian data with mortality trends in the EU.

## Methods

A secondary data analysis was performed. Age-standardized data on mortality from gastric and duodenal ulcers per 100 000 population in Lithuania and EU countries over the period 1985-2018 were obtained from the World Health Organization (WHO) (5). Joinpoint regression was used to calculate the average annual percentage change (AAPC) and to identify changes in mortality trends in Lithuania and EU Member States, males and females (6).

## Results

In 2018, mortality rates for PUD in Lithuania were significantly higher than the EU average mortality rate, with a ratio of 4.1:1. In 1992, the age-standardized mortality rate in Lithuania exceeded the European mortality rate and has been higher than the EU average ever since throughout the study period. The mortality rate in Lithuania increased over the study period from 3.67 in 1985 to 6.5/100 000 in 2018, while in the EU Member States it decreased from 4.42 to 1.58/100 000. During 1985-2018, mortality rates in Lithuania increased by an average of 2.1% per year ( $p < 0.001$ ), while in the EU rates decreased by 3.1% per year ( $p < 0.001$ ). Over the entire study period, the mortality rate of men from PUD was higher than women both in Lithuania and

Europe (female to male ratio 1:2). However, in Europe there is a trend towards a decreasing gender gap, while in Lithuania the gender gap remains: in 2018, the gender gap in the EU was 1/100 000 and in Lithuania it was 5.8/100 000.

## Conclusions

The results show that mortality from PUD is steadily increasing in Lithuania, while in most other EU countries it is continuously decreasing. The main concern is the persistently high male mortality rate in Lithuania. However, the declining prevalence of *H. pylori* and daily clinical practice suggest that there may be inconsistencies in the coding of death causes in Lithuania, which is why the data provided by the WHO may not reveal the real situation in Lithuania.

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## THE VALUE OF METFORMIN IN PANCREATIC DUCTAL ADENOCARCINOMA TREATMENT

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### Introduction

Pancreatic ductal adenocarcinoma (PDAC) remains among the most aggressive forms of neoplastic diseases, having a dismal prognostic outcome. Metformin possesses beneficial effects in pancreatic cancer, including reducing the risk of developing the disease and enhancing survival in PDAC patients. Altogether, the recent findings provide that usage of metformin may serve as a promising chemotherapeutic agent which provides potentially superior oncological outcomes for PDAC patients.

### Aim

Herein we aimed to investigate the possible preventive and curative effect of metformin in combination with chemotherapy and targeted agents in pancreatic ductal adenocarcinoma.

### Methods

A systematic literature review was prepared based on PRISMA systematic review criteria by two independent authors. Computer bibliographic databases of medicine

(PubMed, MEDLINE) were selected for the review. The period of 2017 – 2022 was chosen for the articles' publication. "Pancreatic ductal carcinoma" or "PDAC" or "pancreatic cancer" and "metformin" were used as the main combination keywords, following MeSH Terms. Filters used in the database: English, humans. Correspondingly to the PICOS model of data selection the main clinical question, inclusion and exclusion criteria were formed.

## Results

During the search period 48 scientific articles were found. Based on PRISMA inclusion and exclusion criteria, 14 articles were included in the further analysis (9 literature review, 2 systematic review and meta-analysis, 3 observational studies). Literature review was conducted to systematically evaluate metformin significance for the treatment of pancreatic ductal adenocarcinoma. Since there is accumulating evidence that metformin inhibits epithelial mesenchymal transition and downregulates the mTOR pathway, metformin use was associated with favorable outcomes among pancreatic cancer patients.

## Conclusions

The current study shows that metformin adjuvant treatment is associated with survival benefit in pancreatic cancer as it inhibited PDAC metastatic potential and suppressed tumorigenic processes, suggesting a potentially promising option for the treatment. The perspectives of enhancing survival of pancreatic cancer patients by the usage of metformin deserve more attention in future research and clinical practice, thus further investigation is needed.

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## Thoracic endometriosis syndrome: a systematic literature review

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## **Introduction**

Endometriosis affects 10 – 15 % of reproductive-age women [1]. Thoracic endometriosis syndrome (TES) is a rare condition characterized by functional endometrium in lung parenchyma, pleurae and (or) diaphragm [2]. TES usually manifests between the age of 30 – 34; it is later than pelvic endometriosis, which is commonly diagnosed around 24 – 29. Studies show that 50 – 84 % of women with pelvic endometriosis are usually diagnosed with TES within 5 years. Because of these findings the pathogenetic association between these two conditions is undeniable [3]. However, the rarity of this syndrome leads to the late diagnosis and fewer scientific articles.

## **Aim**

To systematically review the latest scientific data concerning pathogenesis, clinic, diagnosis, and treatment of thoracic endometriosis.

## **Methods**

A systematic literature review was conducted obtaining articles of TES characteristics. The study was performed using online scientific databases (PubMed, Science Direct) with publications selected by keywords: “thoracic endometriosis”, “hemothorax”, “pathogenesis of endometriosis”, etc. An analysis of 28 articles was performed and duplicate or clinically irrelevant articles were removed. 22 full articles have been selected. Most of the studies have been published in the last 5 years, but the citation period was not limited.

## **Results**

Widely accepted theories of TES pathogenesis are Retrograde Menstruation, Coelomic Metaplasia, Lymphatic and Hematogenous Dissemination, Prostaglandin. Studies indicate that none of the theories fully explain the occurrence of foci of

endometriosis, hence, the development of TES is a multifactorial phenomenon [3 - 8]. TES manifests in four different forms depending on location of TES foci: pneumothorax and catamenial hemothorax (pleural lesions), hemoptysis and lung nodules (bronchopulmonary lesions) [3, 5, 9]. Gil et al. suggest that chest radiography and CT are used for diagnosing pneumothorax and hemothorax, while contrast-based CT and MRI are standard for pleural and diaphragmatic lesions diagnosis [10]. Video-assisted thoracoscopic surgery (VATS) is considered the gold standard [5]. In about half of the patients TES and pelvic endometriosis are found together, therefore some authors recommend combining VATS and laparoscopy for the best treatment results [5, 11]. The goal of postoperative medication therapy (GnRH agonists are the most commonly chosen) is to inhibit the production of ovarian steroid hormones and to reduce the recurrence rate of TES [11].

## Conclusions

The pathogenesis of TES is multifactorial. The most accepted explanation is Retrograde Menstruation Theory. The clinical symptoms can range from asymptomatic disease to catamenial pneumothorax as well as depend on the anatomical location of the foci of TES. For diagnosis VATS is considered the gold standard. There is no standard treatment for TES. Combined surgical and postoperative medications are the most commonly chosen. Treatment tactics may depend on the clinical manifestation of the syndrome.

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## **COVID-19 infection impact on urogenital system: a systematic literature review.**

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### **Introduction**

COVID-19 is accompanied by multiorgan disfunction [1]. Virus enters the target host cells via the angiotensin-converting enzyme 2 (ACE2) and causes viral pathogenicity and organ damage[2]. It is reported that ACE2 are expressed in kidneys and male genitalia organs [3,4].

### **Aim**

To review COVID-19 infection impact on male urogenital system.

### **Methods**

We performed a systematic literature study in Pubmed, Web of Science following the PRISMA guidelines. In the current narrative review databases were searched to identify all the related reports discussing the impact of COVID-19 on the urogenital field. Keywords: urogenital system, COVID-19, secondary damage. Analysis of 657 articles was performed. We excluded articles of children, female patients, non- English language, non-full text articles focused on other topics.

## Results

Titles and abstracts were screened of 657 publications. Selection criteria were applied and only 7 [5–11] publications were selected. One of the key points about COVID-19 impact on urogenital system is its effect on kidneys. Direct viral kidney injury occurs because virus-induced ACE2 infects glomerular endothelial cells, podocytes infection follows and the virus enters the tubular fluid, consequently binds to its receptors in proximal tubules. That can result in acute kidney injury (AKI). There are a few indirect kidney injury mechanisms. For example, cardiorenal syndrome - right ventricular failure secondary to COVID-19 pneumonia, might lead to kidney congestion and subsequent AKI. Similarly, cytokine release syndrome-induced cardiomyopathy and acute viral myocarditis may lead to low cardiac output, arterial underfilling, hypotension and renal hypoperfusion, contributing to a reduction in glomerular filtration rate, AKI in patients with COVID-19. Another key point is COVID-19 interferes with the protective function of ACE2. This could lead to infection, loss of protective effects, which can disrupt spermatogenesis and cause infertility. The blood-testis-barrier (BTB) is not efficient enough to limit the virus, it can disrupt normal BTB function, resulting in interference of spermatogenesis. Based on reference values the semen characteristics of recovered COVID-19 males were within the lower reference limits. Compared with age-matched healthy men recovered COVID-19 patients had a significantly lower sperm count and total motility. Patients with longer recovery time had a significantly lower total sperm count compared to those with shorter ones. Last study showed that COVID-19 patients had higher serum LH compared to the age-matched healthy men. Moreover, the ratio of T:LH was significantly lower in the study group. Elevated LH and decreased T:LH ratio can be caused by testes dysfunction.

## Conclusions

COVID-19 has a direct and indirect effect on urogenital system: can cause AKI via ACE2 infection or via secondary damage, disturb normal male gonad function by effecting spermatogenesis and sex-related hormone ratio. In these studies, a longer period of follow up is needed.

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## **Patients' knowledge about modifiable risk factors of GERD**

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### **Introduction**

Gastroesophageal reflux disease (GERD) is among the most common gastrointestinal disorders. Risk factors associated with GERD can be categorised into non-modifiable (e.g. age, sex, ethnicity) and modifiable (e.g. body weight, lifestyle and dietary habits) [1]. Lifestyle and dietary changes are commonly recommended as a first line treatment, therefore, patients' understanding of aforementioned modifiable risk factors is of particular importance [2].

### **Aim**

To evaluate GERD patients' knowledge about the modifiable risk factors of this disease.

### **Methods**

The study was conducted between 1st of December 2021 and 10th of March 2022 at the Hospital of Lithuanian University of Health Sciences Kaunas Clinics. It included adult patients with GERD who completed an original questionnaire on our considered modifiable risk factors for GERD, including nutrition and lifestyle aspects. Statistical analysis was performed using MS Excel and SPSS programmes. Chi-square and Wilcoxon signed-rank tests were used to compare answers between respondents.

Statistically significant findings were assumed with  $p < 0.05$ .

## Results

The study included 70 patients: 46 (65.7%) women and 24 (34.3%) men, mean age of respondents was 45.64 (SD=13.83) years. The majority of participants had higher education (64.3%). However, there was no significant dependence between educational status and patients' knowledge. 7 out of 10 recommended and 12 out of 17 non-recommended products were statistically significantly known in patients with GERD ( $p < 0.05$ ). Significantly more respondents (75.7%) were unaware that natural juice is recommended for patients with GERD ( $p = 0.001$ ). Even more respondents (80%) did not know that seafood should be avoided ( $p = 0.001$ ). The majority of patients were aware that lifestyle factors such as wearing tight clothing over a stomach ( $p = 0.001$ ), frequent use of NSAIDs ( $p = 0.001$ ), smoking ( $p = 0.001$ ) and lying down immediately after a meal ( $p = 0.001$ ) are not recommended, whereas frequent eating in small portions is considered to be beneficial ( $p = 0.001$ ). It has been known that lifestyle and dietary changes should be applied in conjunction with medication ( $p = 0.017$ ). Furthermore, significantly more participants did not know that physical activity 1 hour after a meal is not recommended ( $p = 0.001$ ). Also, respondents were not aware that abdominal obesity has negative impact on GERD ( $p = 0.001$ ). Patients' knowledge about diet was significantly better compared to knowledge about lifestyle recommendations ( $p = 0.001$ ). Most of the patients (65.7%) indicated that they obtained information about modifiable risk factors of GERD by searching on their own.

## Conclusions

Our study revealed that GERD patients' knowledge about the investigated modifiable risk factors is not comprehensive. Patients know more about the recommended diet than about lifestyle aspects. Educational status did not affect participants' awareness. Evidently, more detailed counsel by the attending physician on the importance of diet and physical activity is needed.

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**Neurosciences**



## **The relation between cerebrospinal fluid oligoclonal bands status and disease related features in multiple sclerosis patients.**

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### **Introduction**

Multiple sclerosis (MS) has a highly variable disease course, from barely visible disability to severe changes in patients life [1]. While the global prevalence of MS is rising, a cure is still undiscovered and the etiology remains incompletely understood [2]. When MS is suspected, presence of oligoclonal bands (OCBs) together with clinical picture and magnetic resonance imaging (MRI) findings are considered to be the basis of MS diagnostics [3]. Positive cerebrospinal fluid (CSF) OCBs are found in up to 95% of MS patients. [4]. However, the relation between the presence of positive CSF OCBs and disease related features remains unclear [5].

### **Aim**

To establish the relation between cerebrospinal fluid oligoclonal bands status and features related to the disease and its onset in multiple sclerosis patients.

### **Methods**

A retrospective medical record data analysis was performed with patients hospitalized in LUHS (Lithuanian University of health sciences) Kaunas Clinics with multiple sclerosis from January 1, 2019 to December 31, 2020. Obtained data included patient

age, sex, course of the disease, Expanded Disability Status Scale (EDSS) scores and their change, MRI data and its change, CSFOCBs positivity status. Chi-squared test was used to compare categorical variables. MannWhitney U test and t-test were used for comparison between independent samples. The results were considered as statistically significant when  $p\text{-value} < 0.05$ . Bioethics approval Nr.BECMF-50 was obtained from LUHS Bioethics center.

## Results

A total of 100 patients were included in the study (71 (71%) female and 29 (29%) male). Positive CSF OCBs were found in 72 (72%) patients, the remaining 28 (28%) had negative CSF OCBs. Mean age at diagnosis was  $39.23 \pm 12.062$ , the mean age of first symptoms was  $32.83 \pm 11.639$ . Males were found to have positive CSF OCBs more often ( $n=25$ , 86.2%) when compared with females ( $n=47$ , 66.2%,  $\chi^2=4.089$ ,  $p=0.043$ ). No relations were observed between positive CSF OCBs and patient age at first symptoms ( $Z=-0.85$ ,  $p=0.933$ ) and at the diagnosis ( $t=0.004$ ,  $p=0.997$ ), course of the disease ( $\chi^2=0.573$ ,  $p=0.751$ ), EDSS score at the first visit ( $Z=0.183$ ,  $p=0.855$ ) and the last visit ( $Z=-0.605$ ,  $p=0.545$ ) and its change ( $\chi^2=0.079$ ,  $p=0.779$ ), MRI demyelinating lesions localisations (periventricular  $\chi^2=1.000$ ,  $p=0.317$ , callosal  $\chi^2=0.979$ ,  $p=0.323$ , brainstem  $\chi^2=3.636$ ,  $p=0.366$ , cerebellar  $\chi^2=0.219$ ,  $p=0.640$ , spinal cord  $\chi^2=0.921$ ,  $p=0.337$ , other  $\chi^2=0.038$ ,  $p=0.844$ ) and MRI data change ( $\chi^2=0.553$ ,  $p=0.457$ ). The distribution of age difference between first symptoms and diagnosis was different between OCBs positive (Median =3 (0-46) and negative (Median =4 (0-28) patients ( $Z=-2.075$ ,  $p=0.038$ ).

## Conclusions

Male patients were more likely to have positive CSF OCBs when compared with females. No relation was found between OCBs positivity status and patient age, course of the disease, EDSS scores and their change, MRI data. Patients with positive CSF OCBs were found to receive MS diagnosis earlier than OCBs negative patients.

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## **Oligoclonal bands in relation to paraclinical features in patients with the clinically isolated syndrome**

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### **Introduction**

Multiple sclerosis (MS) usually manifests as a clinically isolated syndrome (CIS).

Positive cerebrospinal fluid (CSF) oligoclonal bands (OCBs) is a well-established predictor of CIS conversion to MS and the latest 2017 McDonald Criteria defined it as a criterion for dissemination in time [1]. Given MS subtle and heterogeneous onset [2], it is usually diagnosed more than a year after its first clinical manifestation [3]. Delayed MS treatment results in higher rates of disability [4], therefore, establishing a clear association between positive OCBs and paraclinical features is crucial.

## **Aim**

To determine the relation between OCBs in CSF and paraclinical features among CIS patients.

## **Methods**

This study is a retrospective data analysis of medical records collected in the Hospital of Lithuanian University of Health Sciences (LUHS) Kaunas Clinics between 1st January 2015 and 1st January 2020. It included patients with ICD-10 (International Classification of Diseases Version 10) codes G37.8 (other specified demyelinating diseases of central nervous system) and G37.9 (demyelinating disease of central nervous system, unspecified), which are considered as CIS in a clinical setting. Prevalence of related to MS magnetic resonance lesions (MRI) lesions, findings of evoked potentials tests was determined and analyzed in relation to OCBs findings. Statistical analysis was performed using SPSS 24.0. Chi-squared test was employed for comparison between categorical variables. Independent-samples t-test was used for comparison between groups. Results were interpreted as statistically significant, when  $p\text{-value} < 0,05$ .

## **Results**

138 CIS patients were enrolled in the study: 92 (64.5%) females and 46 (35.5%) males. 49 patients converted to MS, 89 patients either remained with CIS diagnosis or were diagnosed with other diseases. Patients with non-specific brain MRI lesions were more likely to have negative OCBs in CSF ( $\chi^2 = 11.854$ ,  $p < 0.001$ ), whereas spinal lesions in MRI were associated with positive OCBs in CSF ( $\chi^2 = 6.134$ ,  $p = 0.013$ ). Patients with positive OCBs in CSF were also more likely to present with positive OCBs in blood serum ( $\chi^2 = 8.587$ ,  $p = 0.003$ ). Normal Brainstem Auditory Evoked Potentials (BEAP) findings were found to be linked with negative OCBs in CSF ( $\chi^2 = 5.045$ ,  $p = 0.025$ ).

## Conclusions

Spinal lesions in MRI and positive OCBs in the blood serum are linked with positive OCBs in CSF, whereas non-specific brain lesions in MRI and normal BEAP findings are associated with negative OCBs in CSF.

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## Suicide rates inside penitentiary institutions in Lithuania, the UK, the USA and Australia: a narrative literature review

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## **Introduction**

Suicide remains a major public health issue, resulting in 800 000 deaths every year; while it is the second main cause of death among adults aged 15 to 29, it is the most common reason of death in penitentiary institutions – suicide rates are three times higher for men and nine times higher for women, compared to the general population [1, 2]. Findings across various countries show increasing suicide rates in prisons [3, 4, 5, 6]. Causes for this could be unsatisfactory living conditions and poor psychological support [2]. Some studies, on the contrary, show decreasing suicide numbers. This study aims to investigate the changing suicide numbers in prisons and the reasons behind it, while also naming ways to battle increasing statistics.

## **Aim**

The goal of this review is to summarize the findings in selected up-to-date articles in order to identify causes that lead to suicide inside prisons in Lithuania and globally, while also identifying the reasons behind increasing or decreasing numbers over time in various countries and ways to improve statistics.

## **Methods**

Research material was gathered via PubMed indexing system; articles older than 2012 were excluded. Used keywords: “suicide”, “prison”, “penitentiary”. Out of 306 articles, the selected articles analyze suicidal tendencies in prisoners and comment on their shifting prominence over time.

## **Results**

Suicide primarily affects those who are most disadvantaged [7]. High suicide rates in prisons are attributed to overcrowding – 119 of 205 countries currently exceed their prison capacity – this results in lower staff engagement [2]. Research has drawn conclusions that prisoners display high rates of psychiatric disorders and violent tendencies – these conditions are linked with elevated suicide rates [8], and are rarely resolved due to aforementioned issues [9, 10]. According to the Lithuanian Prison department, suicide rates in prisons have increased from 2 in 2017, to 7 in 2020. This increase could be related to a decrease in psychologists in penitentiary institutions,

due to legal changes. A study performed in Switzerland showed similar tendencies – a 57% increase in suicide risk among incarcerated citizens; statistics in the US and UK show an increase in suicide numbers as well [5, 6]. The Australian Institute of Criminology display the opposite - while 50% of prison deaths from 1980 to 1998 were suicidal, since 2004 this number was reduced to a quarter. Reasons for this may be an increase in natural deaths and improvements in handling issues mentioned above [11].

## Conclusions

Suicide in penitentiary institutions is a prevalent issue - its increasing numbers in Lithuania, UK and the USA are associated to overcrowding, prevalent mental disorders and staff cuts, while the decrease in Australia is a result of dealing with said problems. Prison suicides are caused by synergistically interacting factors, hence, a comprehensive approach ought to be taken, namely controlling prison populations and promoting a healthier mental environment.

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## **Mental health literacy - definition, importance, associations with sociodemographic factors: a systematic literature review**

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### **Introduction**

Many persons with mental illnesses do not seek treatment, which leads to poor clinical and social results [1]. Current definitions of mental health literacy (MHL) are perceived as: an understanding of how to acquire and maintain positive mental health; understanding mental disorders and their treatment; reducing stigma associated with mental disorders; and increasing the efficiency of seeking help [2]. We find that research repeatedly reveal that the general population has a poor understanding of the signs of mental health issues and prefers self-help over standard medical therapy. Furthermore, we discover that MHL has age, gender, educational, urban-rural, and cross-cultural disparities, which may effect rates of help-seeking differently in various circumstances [3].

### **Aim**

The aim of this review is to determine the importance and definition of mental health literacy. Also to evaluate the associations between MHL and sociodemographic factors from available literature.

### **Methods**

Data search was conducted using PubMed database. Keywords used for the research:



mental health literacy, sociodemographic factors, mental disorder. Of the 2100 results, only those which specifically identified the definition of MHL, its importance and its relationship to certain sociodemographic factors were collected.

## Results

Mental health literacy research to date has shown that many people do not seek help due to a variety of personal and structural barriers, such as fear of stigma related to depression or other mental illness or inability to recognize symptoms [3]. Since the definition of MHL was first proposed, researchers have drawn considerable public attention to the latter's low levels of MHL and there is growing evidence that recognition of widespread mental disorders is low in various developed and developing countries. In the U.S., for example, depression is recognized by <50% of teens and college students [4]. There is also evidence to suggest that gender, race, age, education, and overall cognitive functioning at the beginning are significantly related to MHL levels. Male MHL scores were lower than women's, and African American population had lower MHL scores than Caucasian. Older participants had lower MHL scores than younger ones, while less educated participants had lower MHL scores than those with higher education [5]. Receiving more social support, having higher degrees of depression, and being married were all associated with a better mental health attitude among males [6].

## Conclusions

According to research, age, gender, race, level of education, general cognitive functioning are related to human MHL.

The ultimate goal of MHL education is a modern society in which people with mental disorders take urgent action to seek professional help from appropriate professionals (psychologists, psychiatrists, psychotherapists, etc.) to obtain and adhere to evidence-based treatment, take the necessary preventive actions to prevent mental illness.

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# **Nursing and Rehabilitation**

## Assessment of patient awareness and satisfaction

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### Introduction

In order for patients to make an informed decision, the information provided to them must be sufficient and comprehensible [1]. Research shows that improperly presented and/or understood information can increase the risk of medical errors and is associated with lower patient satisfaction [2]. Such practices also increase preoperative anxiety and adverse nocebo effects experienced by the patients, which directly complicates anesthesia and increases the risk of postoperative anesthesia complications [3,4,5,6]. Studies have shown that patient satisfaction is closely related to patient awareness and could be increased by providing them sufficient and appropriate information about anesthesia in the preoperative period [7,8,9,10].

### Aim

The purpose of this study was to assess patient awareness and satisfaction with general anesthesia.

### Methods

A one-time quantitative study was conducted between March and June of 2021 at the University Hospital's Department of General Surgery in Lithuania using a questionnaire survey and included 350 patients who underwent general anesthesia. The questionnaire was based on the scientific literature analysis and two other questionnaires: Patient satisfaction and experience with anesthesia (ASA) and Health literacy and anesthesia: patients' knowledge of anesthesiologist roles and information desired in the perioperative visit [11,12]. Results were calculated using arithmetic mean, standard deviation, median, minimum and maximum values, nonparametric Chi-square, ANOVA

and Bonferroni post-hoc tests. The significance level of  $p=0,05$  was used to form statistical conclusions.

## Results

The majority of women ( $n=178$ ; 74.8%) and men ( $n=90$ , 80.4%) indicated that health care professionals provided sufficient information about anesthesia during the preoperative period. All factors characterizing satisfaction with provided anesthesia services before and after the surgery were evaluated with relatively high scores, the overall quality of care in the institution ( $5.5 \pm 0.6$ ) was rated the highest, however the amount of information provided by anesthesia specialists ( $5,1 \pm 1,2$ ) and information on how patients would feel after the anesthesia ( $4,9 \pm 1,3$ ) were rated the lowest. Study results also indicated that patients who were older, male gender and patients who underwent a higher number of surgeries in the past were significantly more satisfied with anesthesia ( $p<0,05$ ). Patients who had more previous surgeries expressed a lower need for information related to anesthesia during the perioperative period (in all cases  $p<0,05$ ). The majority of women ( $n=157$ , 63.5%) and men ( $n=82$ , 59.9%) preferred to receive anesthesia-related information verbally.

## Conclusions

Although patients reported that they were provided with enough information, they were not sufficiently aware of the most common anesthesia-related adverse events. Even though the overall satisfaction with anesthesia services was high, patients were the least satisfied with information provision.

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## **A study of the experiences of loved ones involved in decision-making at the end of life**

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### **Introduction**

In most cases, the condition of patients in intensive care units is critical when no improvement is expected and the prognosis is poor. Relatives often experience waves

of hope associated with improvement, but at the same time there is a constant risk of deterioration and possible loss of the patient. In the end-of-life period, the decision-making process is critical from both a patient and loved one perspective. It is important to form a team based on mutual trust between doctors, nurses, the patient and / or the loved one, for the benefit of the patient.

## **Aim**

To evaluate the experience of patients' relatives involved in terminal patient care.

## **Methods**

Using a semi-structured interview, we enrolled 10 relatives who care about patients in terminal condition. A qualitative study was conducted in April – July, 2021. All interview data were recorded on audio tape (using a dictaphone) and, for accuracy, were recorded in the investigator's notes with the prior consent of the informants. The permission of the Lithuanian University of Health Science Bioethics Center to perform the study in the selected health care institution was obtained.

## **Results**

It is extremely difficult for relatives to accept the relative existence of a relative due to certain psychological factors, and it is extremely difficult to come to terms with the fact of death.

In addition, there was a lack of co-operation between nurses providing end-of-life care and relatives - relatives reluctantly or not at all involved in the care process. Some feel fearful, others refuse and distance themselves from hospital care, and sometimes distrust of relatives in health care hinders the effective care of terminal patients.

## **Conclusions**

Thus, the help of other people is important for the relatives in the care of the terminal patient, as well as the psychological factors that the relatives face.

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## **Nurses attitude to the safe administration of medicines during inpatient treatment.**

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### **Introduction**

The errors when administrating medicaments are one of the most common medical errors in a healthcare system [1, 2]. Globally, the cost associated with medicines errors has been estimated at \$42 billion annually [3]. According to the World Health Organization (WHO), medicines administration errors can occur at any stage of administration [4]. The existing procedures when administrating medicaments, the lack of responsibility from nurses and the risky environmental factors affects the safety of medicaments. However, nurses must ensure their safety. Therefore, it is important to know the factors that cause errors and also know the ways how to avoid this type of situations [5].

### **Aim**

The aim of research is to determine the attitude of nurses towards the safe administration of medicines during inpatient treatment.

### **Methods**

Data for this research were collected by a quantitative research - anonymous questionnaire survey conducted in 2020 from January to February. A research subjects were 86 part - time nursing students from Lithuanian University of Health Sciences facing the administration of medicaments in their work practices. The rate of responses was 85,1%. The reliability of questionnaire is acceptable as described by measures of internal consistency ( $\alpha = 0,762$ ). Averages (M) and standard deviations (SD) were calculated for the data expressed on the five-point (0-4) Likert

scale. The Kruskal - Wallis H criterion was used to compare results between nurses with different experiences. Statistical significance  $p < 0,05$ . The protocol of research was approved by Committee on Bioethics at the Lithuanian University of Health Sciences.

## Results

The mean age of nurses was  $32,27(\pm 9,40)$ , the length of service was  $9,13(\pm 9,04)$  years. The results of the study revealed that the most common errors were the wrong dose of the medicines – average score  $2,74 (\pm 0,84)$ . Nurses with up to 2 years of experience were significantly more likely to report an incorrect dose to the patient than nurses with more experience ( $H=9,81$ ,  $p=0,020 < 0,05$ ). According to the nurses, errors occur because of the environmental stress  $3,74 (\pm 0,54)$ , high workload  $3,69 (\pm 0,49)$  and unclear prescription sheet  $3,48 (\pm 0,71)$ . Nurses with up to 2 years work experience were significantly more likely to report incorrect medicines calculations ( $H=12,26$ ,  $p=0,007 < 0,05$ ). The remaining errors in the administration of medicines were assessed similarly by nurses with shorter and longer experiences ( $p > 0,05$ ).

## Conclusions

Environmental stress, excessive workload, unclear doctor's prescription sheet are the main factors influencing the administration of medicines. The study found that nurses with up to 2 years work experience indicated an incorrect calculation of the medicines as the main cause of errors in the administration of medicines. The remaining causes of medicines administration errors were assessed similarly by nurses with shorter or longer experience.

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## **Effect of anti-fatigue mat on muscle electric activity in legs and gluteal region**

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### **Introduction**

Prolonged daily standing or sitting is involved in many professions such as health care workers, teachers, retailers. This static posture can cause a variety of health problems, such as discomfort and pain in legs, feet, and lower back, and can lead to more serious problems such as venous disorders. [1] Specific anti-fatigue mats have been invented to decrease discomfort caused by prolonged standing. Some studies have been carried out comparing the effectiveness of these mats, but the data obtained were not convincing. Some research showed that extremely soft mats cause higher discomfort than comparably harder mats. [2]

## **Aim**

The aim of the study was to investigate lower leg and gluteal muscle electric activity variations when standing on a hard floor compared to office and industrial anti-fatigue mats.

## **Methods**

The study involved 13 healthy volunteers aged 18-25 years. Participants worked with a computer placed on a height-adjustable table standing for 20 minutes on each of three different surfaces – a hard floor, an office anti-fatigue mat and an industrial anti-fatigue mat. Muscle tension was measured bilaterally on tibialis anterior, peroneal, and gluteus medius muscles by surface electromyography with wireless electrodes (BTS FREEMG 1000, BTS Bioengineering). Signal was processed in specialized computer program provided by the manufacturer. After 14 minutes, a 1-minute long sEMG recording was captured. Then a 20- second sEMG fragment without artifacts was excised, from which the data were analyzed in programs MS Excel and SPSS 26, using non-parametric statistical hypothesis Wilcoxon signed-rank test.

## **Results**

The lowest muscle activity was determined while standing on the floor. The mean frequency of electric activity in peroneal muscles was  $122.19 \pm 22.34$  Hz while standing on the floor,  $129.04 \pm 25.36$  Hz – standing on the industrial anti-fatigue mat ( $p=0.004$ ), but on the office anti-fatigue mat–  $135.68 \pm 17.98$  Hz ( $p=0.001$ ). While standing on the office anti-fatigue mat, muscle activity in lower leg muscles was the highest among surfaces. The mean frequency of tibialis anterior muscle was  $120.23 \pm 19.50$  Hz while standing on the floor, but on the office anti-fatigue mat–  $137.91 \pm 22.73$  Hz ( $p=0.002$ ). Comparing gluteus medius muscles, no statistically significant differences were found, but the tendency of higher muscle activity while standing on both of the anti-fatigue mats remained. The mean frequency of gluteus medius while standing on the floor was  $109.37 \pm 19.87$  Hz, standing on the industrial anti- fatigue mat–  $121.19 \pm 12.05$  Hz ( $p=0.016$ ), but on the office anti-fatigue mat–  $122.39 \pm 20.02$  Hz ( $p=0.019$ ).

## **Conclusions**

The study has shown that increased muscle activity while standing on an anti-fatigue mat is more prominent in lower leg muscles. In gluteal muscles, significant difference was not found, but a tendency for electric activity to be increased on soft surfaces still existed.

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## Nurse managers' emotional intelligence and leadership styles

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### Introduction

In today's complex, volatile, and unpredictable healthcare environment nurse managers are expected to influence registered nurses' job satisfaction, create a good work environment [1]. Nurse managers are involved in countless interactions requiring the display of leadership behaviour, including emotional intelligence [2]. Effective leadership of nurse managers is important for nurses' performance and educational, organizational, staff and patient outcomes [3]. Emotional intelligence is one of the predictors of nursing leadership and successful nursing management [4]. The concept of emotional intelligence might be an important factor for effective leadership in the nursing professions, especially in nursing management, and requires further exploration.

## **Aim**

The aim was to assess the relationship between emotional intelligence and leadership styles of nurse managers.

## **Methods**

The Profile of Emotional Competence (PEC) [5, 6] and Multifactor Leadership Questionnaire (MLQ) Form 5X [7] surveys were applied with the Likert scale format used for the items. Emotional intelligence and leadership styles of nurse managers were analyzed and compared using descriptive statistics with non-parametric correlation analysis to explore the relationship between specific variables. The study was conducted with 149 nurse managers at the Hospital of Lithuanian University of Health Sciences Kaunas clinics with the response rate of 67.7 %. The survey was conducted via Google Forms from October through November 2021.

## **Results**

A strong statistically significant positive relationships were found between transformative leadership style and global ( $r=0.643$ ), intrapersonal ( $r=0.609$ ), interpersonal ( $r=0.592$ ) emotional intelligence and interpersonal identification of emotions ( $r=0.525$ ) as well as between transactional leadership dimension contingent reward and global emotional intelligence ( $r=0.531$ ), interpersonal emotional intelligence ( $r=0.513$ ) and interpersonal use of emotions ( $r=0.523$ ). A weak statistically significant negative relationships were found between Laissez-faire and intrapersonal identification of emotions ( $r= -0.229$ ), interpersonal identification of emotions ( $r= -0.216$ ) and interpersonal expression of emotions ( $r= -0.265$ ). No statistically significant relationships were noted between emotional intelligence and the outcomes of leadership (extra effort, effectiveness and satisfaction).

## **Conclusions**

Emotional intelligence improves with the development of transformative leadership style and reduces with the development of laissez-faire leadership style. Nurse managers should focus on professional behaviour based on leadership and emotional intelligence to improve better nursing management performance.

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**Obstetrics  
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## Ovarian hyperstimulation syndrome and its relation to pregnancy

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### Introduction

Ovarian Hyperstimulation Syndrome (OHSS) is an iatrogenic complication manifested by supraphysiological ovarian stimulation. This syndrome is commonly related to assisted reproduction [1]. OHSS has been associated with an increased risk of miscarriage, multiple pregnancies, and more severe clinical course of the syndrome [2]. However, there are only few studies examining the relationship between OHSS and pregnancy, and more consistent studies are needed.

### Aim

To discuss manifestations and treatment of OHSS as well as its possible links with pregnancy complications.

### Methods

A systematic literature review was conducted. Articles examining ovarian overstimulation syndrome and its links with pregnancy were selected. The systematic literature review was performed using the PubMed (Medline) scientific database, selecting publications in English and Lithuanian while using keywords: “ovarian hyperstimulation syndrome“, “OHSS treatment“, “pregnancy“. An analysis of 40 articles was performed and duplicates have been removed as well as articles and summaries

that did not match the topic. The full texts of these publications have been examined and 23 articles have been selected. The effort was to focus on publications from the last 5 years, however, citation period was not limited.

## Results

Studies show that OHSS prevention is selected individually based on risk factors, anti-müllerian hormone concentration, and number of tertiary follicles [3,4]. It is indicated that the most common initial symptom of OHSS usually is bloating caused by increased measurements of ovaries [5]. More severe cases include symptoms such as renal failure or ascitis due to increased permeability of blood vessels [5]. Mild to moderate OHSS may regress spontaneously and treatment is not always necessary [6]. Patients who develop signs of severe OHSS should be hospitalized and treated conservatively and (or) surgically [7]. Nastri *et al.* suggest that in case of unclear pathogenesis of the disease, only symptomatic treatment is possible [6]. Despite the fact that IVF is considered a safe pregnancy measure, OHSS risk remains increased compared to natural conception [8]. Recent study, conducted in 2020, indicates a correlation between OHSS and an increased risk of miscarriage, preterm birth, gestational hypertension and low birth weight [2].

## Conclusions

OHSS is an iatrogenic complication that can occur at different stages and degrees due to variety of risk factors and prevention. Mild to moderate OHSS is often a transient condition, however, severe OHSS can be potentially life-threatening. Miscarriage and preterm birth are associated with OHSS. Links have also been found between this syndrome and gestational hypertension as well as low birth weight.

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## **Clinical Characteristics and Outcomes of Post-COVID-19 Multisystem Inflammatory Syndrome in Children: A Systematic Review**

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### **Introduction**

Pediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2

is a new, post-infectious hyper-inflammatory complication of SARS-CoV-2 infection in children [1]. In Europe, it has been reported in healthy children since April 2020 and the syndrome itself is clinically reminiscent of Kawasaki disease and toxic shock syndrome [2]. MIS-C is not common but a highly critical complication of COVID-19 infection in pediatrics resulting in life-threatening illnesses [3].

## **Aim**

The aim of this study was to determine the most common clinical features and treatment as well as severity of MIS-C post Covid-19 infection in relation to the number of patients requiring intensive care and their mortality.

## **Methods**

A systematic review was conducted according to the PRISMA guidelines by two independent researchers. Electronic search was carried out from 2020-2022 on PubMed and Science Direct platforms. Search keywords were “Multisystem Inflammatory Syndrome in Children”, “MIS-C”, “Covid-19”, “SARS-CoV-2”. Inclusion criteria: hyperinflammatory syndrome meeting the case definition of MIS-C in children with a temporal association with confirmed COVID-19, English language. Exclusion criteria: patients with incomplete MIS-C criteria, studies concerning adults or lacking necessary data. The risk of bias was assessed using the Cochrane Risk of Bias Tool [4].

## **Results**

After an initial search in electronic databases, 132 articles were shown, and 13 articles were included in this review with a total of 696 patients [1; 5-16]. The average days for hospitalization were 8.38 days. The most common clinical presentation was fever (90,7%), followed by gastrointestinal symptoms (81%), rash (41%) and conjunctivitis (40%). 62% of patients out of 9 articles experienced shock and 42% out of 11 articles - respiratory symptoms. Echocardiographic abnormalities were present in 40% of patients, the most common ones were coronary artery dilatation or aneurysm, left ventricle dysfunction and pericardial effusion. 73% of children were given IVIG and 57% received corticosteroids, 29% needed inotropic support, 25% required mechanical ventilation. Out of 549 children included in 10 studies, 67% were hospitalized in the PICU and required intensive care. The average length of stay in the intensive care unit were 6.1 days and we noticed that children treated in the PICU had significantly greater levels of troponin, NT-proBNP and D dimer as well as more arrhythmias and left ventricle dysfunctions. They also had lower numbers of albumin, hemoglobin, and

platelets. Mortality rate reached 16 out of 696 with more deaths occurring in the lower-income nations.

## Conclusions

Fever, gastrointestinal and respiratory symptoms, rash, conjunctivitis, and echocardiographic abnormalities are the most common symptoms in children with MIS-C. They must be carefully identified and monitored over time, as more than half of MIS-C patients go into shock, and are admitted to the PICU, and unfortunately, 2% of them die.

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## **An analysis of communication between obstetric specialists and primary care providers during postpartum care in Manitoba, Canada**

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### **Introduction**

Gestational diabetes mellitus (GDM) and hypertensive disorders of pregnancy (HDP) are known to increase the risk of adverse perinatal outcomes, and there is emerging data about possible long-term cardiovascular and metabolic health risks for these patients beyond pregnancy<sup>1,2</sup>. Yet little is known about access to primary care providers (PCPs) outside of pregnancy for these patients, especially since patients in Manitoba, Canada don't need a referral from a PCP to see an obstetrician. Moreover, the COVID-19 pandemic has affected patients' access to PCPs.<sup>3</sup>

### **Aim**

The overall goal of this study was to evaluate access to primary care for GDM & HDP patients, who are at high risk for long-term health complications outside pregnancy. Our secondary objectives were to determine if the COVID-19 pandemic had an influence on access to PCP for these patients.

### **Methods**

This was a cross-sectional study of pregnant patients delivering at Health Sciences Center Women's Hospital in Winnipeg, Canada (July 2019 to December 2020). Two time periods were compared: pre-COVID (July 2019-December 2019) and COVID (November 2020-December 2020). All pregnancies complicated by HDP and/or GDM and delivered at the regional referral center (~5500 births/year) were identified using delivery record books<sup>4</sup>. Information about maternal & neonatal characteristics was collected using

standardized data collection sheets. Electronic hospital discharge summaries were then reviewed for all post-partum patients with GDM and/or HDP to collate information about communication between specialist OB/Gyns and PCPs, access to PCPs, and recommendations for future pregnancy and long-term healthcare outside pregnancy. Descriptive and inferential statistics were used to evaluate outcomes between groups. Temporal trends were also evaluated between time periods.

## Results

453 pregnancies were eligible for inclusion; 360 in preCOVID & 93 in the COVID time period. About 50.5% of the patients had GDM, 36.4% had HDP, and 13.1% had both. There was a significant increase in the medical management of GDM pre-COVID (27.5%) compared to 16% during COVID ( $p=0.0274$ ). Overall, 32.6% of the high-risk patients did not have a PCP; 34.2% preCOVID vs 26% during COVID ( $p=0.139$ ). Only 12.9% of these high-risk patients were recommended to have closer postpartum follow-up and 4% were recommended to have outpatient investigations during the postpartum period. No discharge summaries mentioned future pregnancy complications or risk of long-term health complications for mothers or offspring.

## Conclusions

Almost one-third of the GDM & HDP patients with risk of long-term health complications following pregnancy do not have a PCP and for others, communication about these future risks is lacking. Access to care and communication between OB/Gyns and PCP needs to improve to promote better short and long-term health outcomes for mothers and offspring. The influence of the COVID pandemic on access to care also needs closer evaluation in these high-risk groups.

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## **Effect of delayed cord clamping on neonatal bilirubin levels, jaundice, phototherapy and polycythemia. Systematic review and meta-analysis**

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### **Introduction**

Hyperbilirubinemia is considered a potential disadvantage of delayed cord clamping (DCC). Due to increased volume of neonatal blood after DCC, the risk of neonatal jaundice and polycythemia increases too [1]. Because of that, The American College of Obstetricians and Gynecologists recommends delaying cord clamping at least 30 – 60 s after the birth under a well-established monitoring and treatment system for neonatal jaundice [2].

## **Aim**

To assess the effect of delayed cord clamping on bilirubin levels, neonatal jaundice, polycythemia and the necessity of phototherapy.

## **Methods**

The approval (No.: BEC-MF-201) for the research was granted by the Centre for Bioethics of Lithuanian University of Health Sciences. This systematic review and meta-analysis adhered to the PRISMA statement. Four electronic research databases were searched - PubMed, Cochrane Library, EMBASE and Oxford Academic Journals. Keywords included „delayed cord clamping“, „early cord clamping“, „bilirubin“, „jaundice“, „hyperbilirubinemia“, „polycythemia“. Randomized controlled trials, access to full-text articles were the inclusion criteria. Conference abstracts, systematic reviews, case reports, meta-analyses were not included in this review. Statistical analysis was performed using Review Manager version 5.4. Standard mean differences and fixed effect were selected for meta-analysis. Cochran's Q test and Higgins'  $I^2$  were used to assess the heterogeneity of the study.

## **Results**

21 articles that met the criteria were found [1,3-22]. Most of the trials included healthy women (except 1 trial with HIV-positive women and 2 with diabetes mellitus) with both mature and premature pregnancies. Results show that DCC increases the levels of bilirubin (SMD -0.06, 95% CI -0.09 to -0.03,  $P < 0,00001$ ), increases the risk of neonatal jaundice (SMD 1.57, 95% CI 1.40 to 1.75,  $P < 0,0001$ ) and polycythemia (SMD 3.03, 95% CI 2.38 to 3.84,  $P < 0,0001$ ). However, there is no significant difference in the need for phototherapy between groups (SMD 1.07, 95% CI 0.98 to 1.17,  $P = 0,14$ ).

## **Conclusions**

DCC increases the levels of bilirubin, the risk for it to result in hyperbilirubinemia and the number of neonatal jaundice cases. However, even with the increased number of jaundice cases, DCC does not increase the need for phototherapy. It makes DCC a reasonably safe method to use in the prevention of newborns anemia. Although, DCC also increases the risk of polycythemia, so neonathologists should be aware of performed DCC.

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## **The effect of melatonin on ovarian function and IVF outcomes: a systematic literature review**

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### **Introduction**

It is known that reactive oxygen species (ROS) are generated within the follicles naturally [1]. However, the overproduction of ROS is a significant cause of poor oocyte quality and, therefore, poor outcomes in assisted reproductive technologies [2-4]. Melatonin (MT), due to its oxygen scavenging and antioxidant properties, plays an important role in preventing cellular damage [5-7]. Produced by the granulosa cells, MT exists in the follicular fluid (FF) taking a part in ovarian function in various mammals, including humans [6, 8-13]. Research with animals has proven the beneficial effect of exogenous MT on ovarian function, thereby suggesting it may be useful in the management of human infertility [9, 10, 7, 13, 14].

### **Aim**

To present the latest research on the effect of MT on ovarian function and IVF outcomes.

## Methods

This review was done according to PRISMA guidelines. A search in Pubmed and Researchgate was conducted using keywords “melatonin AND fertility” and filters “human, female”. In order to provide the most up-to-date information, studies older than 5 years were not included. Most significant studies were selected, of which backward and forward citations were inspected. A total of 11 studies were included in the analysis. The results presented were considered statistically significant at  $p < 0.05$ .

## Results

Following results were obtained by oral MT supplementation (3 mg once daily before sleep) or by evaluating MT concentrations in FF or MT-containing media. Higher MT levels in FF are linked to increased follicle size and antral follicle count [15, 16]. Also, MT concentration positively correlates with higher mean follicular count [16]. Administration of MT increased the average number of retrieved and fertilized oocytes [14-18]. On the contrary, according to Fernando et al. (2018), MT did not affect oocyte and embryo count [19]. In terms of oocyte quality and maturation, MT successfully decreased ROS levels in FF, protecting the oocytes from oxidative stress [14, 20]. Also, MT improves oocyte quality by raising estradiol levels [16, 17, 21]. MT promoted oocyte maturation and early embryo development by increasing clathrin-mediated endocytosis [22]. Five studies proved MT's ability to significantly improve embryo quality [16-18, 21, 23]. Therefore, more embryos were suitable for transplantation [14, 18]. MT was able to increase progesterone levels, influence the balance of luteotrophic and luteolytic factors and improve corpus luteum function [24]. Positive correlation between follicular MT and serum anti-Müllerian hormone level was found, making follicular MT a relevant biomarker of ovarian reserve [16, 18]. Lastly, higher MT levels in the FF correlated with higher IVF success rates [14, 18].

## Conclusions

MT levels in the FF have positive correlation with IVF outcomes. This can be explained by MT's antioxidant and ROS scavenging properties, also by its ability to improve follicle, oocyte, and embryo quality. Also, intrafollicular MT may be used as an ovarian reserve marker.

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## **Impact of gestational thrombocytopenia on prevalence of postpartum hemorrhage and blood transfusion**

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### **Introduction**

Gestational thrombocytopenia is the second most common hematological pathology in pregnancy after anemia, affecting approximately 9 million women each year [1]. The American Society of Hematologists define gestational thrombocytopenia as a condition directly related to pregnancy when the platelet count of the pregnant woman is  $< 150 \times 10^9/l$  and other conditions causing thrombocytopenia are excluded [2]. There are three degrees of thrombocytopenia: mild (platelet count  $150-100 \times 10^9/l$ ), moderate ( $100-50 \times 10^9/l$ ), and severe ( $< 50 \times 10^9/l$ ) [3]. Blood loss during a caesarean section is usually greater compared to vaginal delivery, which may be further increased in the case of severe thrombocytopenia. The risk of spontaneous bleeding is increased if the platelet count is  $< 20 \times 10^9/l$  [4].

## Aim

To compare prevalence of postpartum hemorrhage and blood transfusion between women with gestational thrombocytopenia and control group.

## Methods

The case-control study analyzed 402 case-histories of women who delivered in the Hospital of LSMU Kaunas Clinics in the period of 2010–2020. The case group (G1) contained 181 women who had gestational thrombocytopenia (GT) and the control group (G2) consisted of 221 randomly selected women. Patients were selected based on the prevalence of GT diagnosis from the Delivery department register database (bioethics approval No. BEC-MF- 69). Inclusion criteria for case group - platelet count  $<150 \times 10^9/l$  and no thrombocytopenia- related syndrome or disease. 18 women initially placed in control group based on the absence of GT diagnosis had platelet count  $<150 \times 10^9/l$  and were excluded from the study. For statistical analysis, Chi-square and Student T test were used. Data analysis was performed using SPSS version 26.0. Results were considered significant at  $p < 0.05$ .

## Results

There were a total of 35400 deliveries in the Hospital of LSMU Kaunas Clinics during the study period. The average age of women (G1  $29,36 \pm 5,30$  vs. G2  $29,90 \pm 5,54$ ;  $p=0.320$ ), gestational age (G1  $38,88 \pm 1,9$  vs. G2  $38,72 \pm 2,12$ ;  $p=0.343$ ), newborn weight (G1  $3486.59 \pm 629.98$  vs. G2  $3591.52 \pm 2378.381$ ,  $p=0.753$ ) did not differ in both groups. Twin pregnancies were statistically more common in G1  $p=0.021$ . There were no cases of polyhydramnios. Postpartum hemorrhage occurred in 12 women in G1 (1 in mild, 11 in moderate, 0 in severe degree) and 7 - in G2  $p=0.155$ . In the analysis of the causes of postpartum hemorrhage, uterine atony was similar in both groups ( $p=1.00$ ), placental abruption occurred only in the G2 ( $p < 0.05$ ). Misoprostol was used statistically significantly more frequently for prophylaxis and treatment of postpartum hemorrhage in the G1 (G1 20.1% ( $n=36$ ) and G2 9.0% ( $n=20$ ),  $p=0.002$ ). Blood transfusions were performed for 8 (4.42%) women in G1 (0 in mild, 7 in moderate, 1 in severe degree) and 0 (0%) in G2,  $p=0,02$ .

## Conclusions

There was no statistically significant difference between the groups regarding postpartum hemorrhage, however blood transfusion, treatment with misoprostol was performed more frequently in G1.

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# **Odontology & Maxillofacial Surgery**

## **Orthodontic malocclusions and craniocervical posture: a systematic review**

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### **Introduction**

Increased number of body posture changes in growing children is found, it causes deviations in craniocervical posture. Clinical trials are performed to evaluate the relationship between head and neck posture and orthodontic malocclusions, however, the results vary (1,2).

### **Aim**

The purpose is to analyze the relationship between craniocervical posture and Class I, II and III orthodontic malocclusions.

### **Methods**

The systemic review was carried out according to protocol and PRISMA statement. The electronic search by 3 independent researchers was performed from 16 October till 16 December 2021 in databases: PubMed, Wiley Online Library and Cochrane Clinical Trials Register. Following keywords were used: craniocervical posture, head posture, cephalometry, orthodontic malocclusion, Class II malocclusion. Inclusion criteria for the articles were: published less than 5 years ago, written in English, subjects human beings, craniocervical posture was evaluated performing cephalometric analysis.

Exclusion criteria were the following: case reports, systemic or literature reviews, meta-analysis, studies with patients, having craniofacial syndromes or clefts, previous surgical, orthodontic, or physical therapy treatment.

## Results

After an initial search in electronic databases, following an examination of 438 initially identified articles 17 articles were assessed for eligibility and after applying the selection criteria 6 studies were included. Three studies were retrospective, two cross sectional and one pilot randomized controlled trial. In total 421 patients aged from 8 to 16 were involved. Studies (3,4) showed significant differences in OPT-SN (this angle shows postero- superior point and postero-inferior point of odontoides proportion with skull base line) (Class II ( $100.80^{\circ} \pm 11.10$ ) > Class I ( $94.06^{\circ} \pm 1.81$ ) and Class III ( $94.59^{\circ} \pm 1.80$ ),  $p < 0.05$ ) and CVT-SN (Class II ( $106.00^{\circ} \pm 8.10$ ) > Class III ( $101.52^{\circ} \pm 7.18$ ),  $p < 0.05$ ; Class I ( $103.03^{\circ} \pm 7.77$ ), n.s.) angles. One (5) of two (5,6) studies found a significant increase in OPT-SN angle in untreated Class II subjects ( $p \leq 0.05$ ), while both studies found no significant difference in OPT-SN and CVT-SN in treated Class II subjects. Two studies (7,8) that evaluated oral and nasal breathers reported that subjects with higher values of ANB angle showed higher OPT-SN and CVT-SN angles, however, it was not statistically significant.

## Conclusions

Based on a present systematic review, patients with class II orthodontic malocclusion tend to have higher craniocervical angles than patients with class III orthodontic malocclusion. Class II orthodontic treatment may have a positive impact on craniocervical posture. Nasal and oral breathers show no significant differences in their craniocervical posture and interjaw relationship.

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## **Morphological features of impacted maxillary central incisors: a systematic review**

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## **Introduction**

The prevalence of impacted maxillary central incisors (ICI) is approximately 0.03-2.1% of the human population [1-3]. Missing front teeth significantly affect facial aesthetics, function, speech, and self-esteem [4,5]. Affected incisors tend to have different morphological characteristics such as crown length, root length and root dilaceration compared to normally erupted contralateral central incisors (CCI). Evaluating impacted maxillary central incisors' localization and morphology is crucial for rational treatment planning, appropriate therapeutic timing and protocol, as well as the possibility of a spontaneous eruption [6,7].

## **Aim**

This systematic review aims to assess and compare the morphology of impacted maxillary central incisors and unimpacted contralateral incisors.

## **Methods**

The systematic review was conducted according to the PRISMA guidelines and registered in PROSPERO. Literature search was carried out using PubMed, ProQuest, Cochrane Library, Web of Science, and Science Direct electronic databases with no publication date restrictions up to July 2021. Medical Subject Headings (MeSH) terms used were "impacted maxillary central incisors" combined with "crown length", "root length", "root morphology", "root dilaceration". Randomized, prospective, and retrospective studies that presented records of patients diagnosed with unilateral impaction of maxillary central incisors were included. Data assessing morphology of unilaterally ICI evaluated with CBCT was extracted and quality of studies was evaluated using the Newcastle-Ottawa Scale. Crown length, root length, and root dilaceration of ICI were compared with equivalent measurements of CCI.

## **Results**

Database search yielded 287 articles. Selection criteria were applied and 21 articles were selected for full-text analysis. Four retrospective studies with 205 patients were included in the systematic review [8-11]. Results of the studies revealed a slight crown length reduction of ICI in comparison to their contralaterals (0.15-0.56 mm) [8,10]. In



contrast, root lengths of ICI were significantly shorter compared to CCI from 2.13 mm [10] to 3.22 mm [8]. None of the included studies analysed the dilaceration measurements of contralateral incisors, therefore the comparison was not possible. However, the size of dilaceration angle was considerably larger by  $32.75^\circ$  in the early dental age group in comparison to the late dental age group [10]. Lyu et al. [11] indicated the differences in dilaceration angle among nasal, labial and palatal impaction groups. The highest dilaceration angle was found in labially impacted incisors. A link between dilaceration incidence and patient age was observed: half of the early dental age group were presented with dilacerations while in the late dental age group they were twice as frequent (95.5%) [10].

## Conclusions

The impacted maxillary central incisors' root lengths were considerably shorter compared to contralateral incisors. Root dilaceration frequency and severity increased as dental age increased.

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## **Comparison of students' and dentists' knowledge of the impact systemic diseases have on the dental extraction procedure**

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### **Introduction**

Students are confident to perform dental extraction procedures (DEP) on healthy patients, but they do not feel prepared to treat patients with systemic diseases (SD) [1, 2, 3]. This may result in increased numbers of referrals to secondary care, with most treatments performed within oral surgery departments considered to be routine oral surgery [1]. It is crucial to be aware of SD while performing invasive procedures as

postoperative bleeding, delayed wound healing and hypoglycemic shock are some of the most common complications encountered in some patients [4].

## **Aim**

The aim of the study was to assess and compare the knowledge of dental students and practitioners of the influence SD have on DEP.

## **Methods**

A survey was presented to a voluntary response sample of 4<sup>th</sup> year and 5<sup>th</sup> year Lithuanian dentistry students and dental practitioners. It was not possible to distribute the survey by hand as the Covid-19 pandemic led to restricted access to university facilities. We collected responses of all 4<sup>th</sup> and 5<sup>th</sup> year students who were accessible electronically. We collected a similar amount of dentists' responses electronically on voluntary basis.

Type of study: cross-sectional survey research.

Statistical data analysis was performed using IBM SPSS Statistics 23. The threshold for statistical significance was set at  $p \leq 0.05$ . Student's t, Shapiro – Wilk tests, Bonferroni adjustment, Kolmogorov-Smirnov criteria were used for data analysis.

## **Results**

A total of 184 people participated in the study. The knowledge of the 5<sup>th</sup> year students on the influence of hypertension and diabetes on DEP was significantly better than 4<sup>th</sup> year students' ( $p = 0.0002$ ). Students' knowledge of the influence of diabetes on DEP was significantly better than dentists' ( $p = 0.0372$ ). The knowledge of dentists about the influence of hypertension on DEP was significantly better than students' ( $p = 0.041$ ). The knowledge of dentists with 0-5 years of experience was significantly better than those with 16-20 years of experience ( $p = 0.001$ ). Students' knowledge was found to be better than dentists' who have graduated before 2005 ( $p = 0.04$ ). The knowledge of students and dentists who indicated further interest in oral surgery by attending conferences, training courses or by reading scientific literature at least once a year was significantly better than those students' and dentists' who did not ( $p_{\text{students}} = 0.017$ ,  $p_{\text{dentists}} = 0.014$ ). 96% of respondents claimed the need for practical guidelines to perform DEP on patients with SD.

## Conclusions

5<sup>th</sup> year students' knowledge about some systemic diseases impact on DEP was significantly better than 4<sup>th</sup> year students', while the knowledge of dentists' was similar regardless of the years of practice. Showing further interest in surgical interventions contributed to better respondents' knowledge. Respondents expressed the need for practical guidelines on this topic. The results obtained from this study could be applied when reviewing study programs across Lithuanian dental schools.

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## Evaluation of microleakage of light-curing composite used in orthodontic after thermal cycles. An in vitro study.

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### **Introduction**

During orthodontic treatment with fixed appliances, one of the main problems is bracket detachment, because several factors affect the bond strength of orthodontic composite to tooth enamel [1-3]. However, a little research has been done on the effect of the thermal cycles on the microleakage of orthodontics composite.

### **Aim**

To evaluate the effect of a thermal cycles on the microleakage of a composite used for bonding brackets.

### **Methods**

Bioethical approval was obtained from the University's Bioethical Committee, No. BEC-OF-05. 40 recently extracted first molars, were randomly divided into two groups of 20: experimental group (affected by thermal cycles) and control group. Buccal surface of each tooth was polished, etched with 37% phosphoric acid, coated with primer and bonded with a layer of light-curing composite (HIGH-Q-BOND BRACKET) (length 3mm, width 4 mm, thickness 1mm). According to study protocol, before the experiment all samples were tested with a stereomicroscopy (ZEISS Stemi 2000-CS) with camera (ZEISS AxioCam MRc 5) and submerged into 37°C saline for 24h until the start of the experiment. The experimental group teeth were dipped 2,000 times in saline at 5°C and at 55°C (immersion time in each bath was 30s, transfer time 2-3s). Temperatures were selected according to ISO agreements as such thermal changes are detected while eating [4]. The control group was kept throughout the study in 37°C saline. Before the test with stereomicroscopy all teeth were immersed in saline with dye and divided bucco-lingually through the centre of the composite. Penetration depths of dye between the tooth and the light-curing composite were divided into 4 group (0-no penetration, 1-penetration  $\frac{1}{4}$  of distance, 2-penetration  $\frac{1}{2}$  of distance, 3-penetration  $\frac{3}{4}$  of distance, 4-penetration all of distance. Statistical analysis was performed with the SPSS. Chi-square test was used to calculate and compare the results.

## Results

Before the experiment no micro lesions were observed on composite surfaces in both sample groups. After thermal cycles in the composite surface of experimental group the micro lesions were detected. No micro lesions were observed on composite surfaces in all teeth of the control group. 20 control group teeth (100%) had no penetration of dye. Evaluating composite surface of the experimental group, the results were the following: 2 teeth (10%) had  $\frac{1}{2}$  of distance penetration, 8 teeth (40%) had penetration of dye  $\frac{3}{4}$  of distance, 10 teeth (50%) had dye penetrate all of distance.

Comparing the results of the test in experimental group and control group, statistically high significance was found ( $\chi^2=40$ ;  $df=3$ ;  $p<0.001$ ). Thermal cycles have a significant effect on the frequency of microleakage between the tooth surface and the composite.

## Conclusions

Thermal cycles increase the risk of microleakages in the composite used in orthodontic. This study shows that thermal cycles damages the surface of the orthodontic composites, which can impact on adhesion of the brackets to the tooth surface.

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## **Force degradation of latex and non-latex orthodontic elastics: systemic review**

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### **Introduction**

One of the disadvantages of elastics used in orthodontics is that the elasticity of force decreases over time, so it is important that the force of elastic is sufficient for the orthodontic movement of the tooth [1-5]. However, little is known about the force degradation of the rubber and latex orthodontic elastics.

### **Aim**

To determine the degradation of latex and non-latex orthodontic elastics force.

### **Methods**

Systematic review was conducted in compliance with PRISMA requirements. An electronic search with keywords: “orthodontic elastics”, “force”, “degradation”, “loss”, “decay”, “in vitro”, “strength” was performed up to February 10, 2022 in PubMed, Science Direct, Wiley Online Library, The Cochrane Library, Medline. The inclusion criteria were: full text, trials in vitro, written in English language, randomized controlled, prospective and retrospective studies published from 2012 to 2022, studies that assessed the force loss of rubber and latex orthodontic elastics. The articles were included with the consent of 2 authors, if opinions differed, the final decision was made by the third.

## Results

After initial search in electronic databases and applying selection criteria 265 articles were displayed, after duplicate removal 205 were left, after analyzing full-texts 9 articles were included in this review. All studies were performed in vitro. In all studies 2795 orthodontic elastics were included. Elastics were divided by material: latex [1-5,7-9] and non-latex [2-3,5-7]. Studies were performed in dry conditions [1-2,4,6,8], artificial saliva [1-4,6-7,9], distilled water [5,8]. Studies [4,9] including latex and studies [3,7] including non-latex elastics found the biggest loss of force after 12h ( $p<0,05$ ). Studies [1,3,7] including latex and studies [5-6] including non-latex elastics mention that the biggest loss of force was seen after 24h and later ( $p<0,05$ ). One study [5] found the biggest loss of latex elastics force after 1h ( $p<0,05$ ). Studies [1,3,5-7] found no statistically significant difference in force degradation in latex and non-latex elastics after 48h ( $p>0,05$ ). Studies [2,5,7] showed greater force loss in non-latex elastics in comparison to latex elastics ( $p<0,05$ ). One study [3] found greater force degradation in latex elastics when compared to non-latex elastics ( $p<0,05$ ). Studies [1,2,4] found that more significant changes in force decay were in wet environment ( $p<0,05$ ). The degradation rate of latex elastics with large diameter was slower than that of elastics with smaller diameters [3-5,9]. Smallest diameter-1/8" - recorded smallest force decay, the biggest force decay was in the - 5/16" [1].

## Conclusions

The tensile force of latex and non-latex elastics decreases over time. Latex elastics have better mechanical performance than non-latex elastics. The force loss of the elastics was greater in wet than in dry environment. The larger diameter of the elastic the slower the force decayed.

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## **Relationship between orthodontic malocclusion and fingerprints: systematic review**

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## **Introduction**

Dermatoglyphics and craniofacial structures form from the same embryonic tissues (ectoderm) during the same embryonic period (the fingerprints form in the sixth week of pregnancy, dental development begins in the sixth week of intrauterine life) [1-3]. Thus, this might indicate a possible association between fingerprints and malocclusions, leading to earlier initiation of prophylactic treatment and possible development of lesser form or overall avoided orthodontic anomaly.

## **Aim**

To evaluate relationship between orthodontic malocclusion, fingers pattern and preventative treatment need.

## **Methods**

Systematic review was conducted in compliance with PRISMA requirements. An electronic search with keywords: “fingerprints”, “finger marks”, “dermatoglyphics”, “finger pattern”, “occlusion”, “malocclusion”, “Angle class”, “orthodontic” was performed up to February 3, 2022 in PubMed, Science Direct, Wiley Online Library, The Cochrane Library, Medline. The inclusion criteria were: full text, clinical trials with humans, written in English, randomised controlled studies, prospective and retrospective studies published from 2012 to 2022, studies that assessed the relationship between fingerprints and orthodontic malocclusion.

The articles were included with the consent of 2 authors, if opinions differed, the final decision was made by the third.

## **Results**

After initial search in electronic databases 639 articles were displayed, after duplicate removal 311 were left, after applying selection criteria 13 articles were included in this review.

In all studies 2216 patients were included, age between 6-40.

Fingerprints were recorded using graphite powder [2], ink and roller method [3,5-8,10-11,13], fingerprint scanner [1,4,9,12]. Patients were divided into two [6,10], three [1-2,4,6,10-11,], four [3,8,12-13] or six groups [7] according to Angle's classification. In

two studies, slight differences in fingerprints of different malocclusions were found ( $p>0,05$ ) [1-2]; nine studies showed significant difference in some fingerprints of different malocclusions [3-11]; two studies showed statistically significant difference in all three groups of malocclusion [12-13].

In an ideal I class occlusion most common fingerprints found are arch form [9-10] or loop [4,13] ( $p<0,05$ ). In I class malocclusion-arch form [5,11-12] or whorl [8,11,13] ( $p<0,05$ ). In II class malocclusion-whorl form [4,6-7,12] or loop [3,10-11,13] ( $p<0,05$ ). In III class malocclusion-loop form [3,5,7-8,12] or arch [6,13] ( $p<0,05$ ). Better part of analysed studies concluded possible indicated need for early prophylactics or orthodontic treatment based on fingerprint types [3-13].

## Conclusions

Most of studies showed that the need for prophylactic treatment at an early age can be determined by the type of fingerprint, as there is a significant association between fingerprints and the type of malocclusion. The difference found between the type of fingerprints and the malocclusion could be due to the fact that the studies were carried out in different countries.

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## **Porcelain Veneers Fracture Resistance Systematic Review**

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### **Introduction**

Porcelain veneers show excellent aesthetic results and predictable longevity of the treatment. Based on unequivocal properties, comparably low costs and ease of fabrication, porcelain is currently the preferable material for veneers. Ceramic possesses outstanding optical features, acquired by their high translucency rate, also excellent adhesion to resin cement and high mechanical strengths. Determining properties such as resistance to fracture have a prominent influence on its usage in prosthetic dentistry. The selection of materials also plays a crucial role in the lifespan of restorations, as each material has its unique composition and properties.

### **Aim**

To review scientific literature and analyse its findings on ceramic materials that are used for laminate veneers manufacturing in regard to their fracture resistance properties.

### **Methods**

This article follows the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement. The literature search was performed in PubMed, Wiley Online Library and ScienceDirect databases. Articles were published between 2016 and 2021 in English language. Search was conducted by using different combinations

of specific keywords. 481 publications were found. After first and secondary screening 349 and 119 publications were excluded out of which 13 were identified as relevant to the topic. Included studies were evaluated for the risk of bias following a pre-established criterion.

The titles and abstracts were analysed by the authors, followed by the selection of complete articles for reviewing and analysis according to the eligibility criteria.

## **Results**

There was a noticeable relation between the choice of restoration materials and fracture resistance. After analysis none of the selected studies have shown high risk of bias, 8 showed some concerns while 5 studies indicated low risk of bias. Regardless of differing thermomechanical aging cycles and compressive load it was possible to summarise that zirconia-lithium disilicate exhibited the most favourable results in fracture resistance and so did resin nanoceramic veneers. Ceramic materials, such as zirconium, were used more frequently, due to their superior aesthetic appearance and ability to withstand high functional mastication forces. When comparing with composite, the main difference was the number of sessions as ceramic restorations require more time and precision during situating and cementation stages. Additionally, other factors such as tooth preparation depth, ceramic thickness and cementation material also had an effect on the durability of laminate veneers.

## **Conclusions**

Zirconia-reinforced lithium silicate veneers showed the most favourable outcomes when analysing their resistance to fracture.

The risk of veneering restoration material fractures increases significantly, when anterior veneer preparations are less or equal to 0.5 mm.

Ceramic veneer restoration materials are more prone to fractures, when the preparations include medium to high dentine portions ( $\geq 50\%$ ).

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## **Evaluation of the efficacy of osseodensification in enhancing primary and secondary stability of dental implants**

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### **Introduction**

Restoration of missing teeth using a fixed implant is a reliable option for treatment of partially and fully edentulous patients [1]. The bone quality and quantity, surgical technique (conventional drilling (CD), over- or under- drilling, osteotome, osseodensification (OD), piezosurgery), implant design can influence both primary and secondary stability of dental implants [2-7]. OD technique improves the local bone quality in poor density alveolar ridges, and increases the density of the adjacent bone [8]. Therefore, it was decided to review the efficacy of OD to implant stability.



## **Aim**

To evaluate the OD technique for implant site preparation and its effect on enhancing primary and secondary stability of dental implants.

## **Methods**

A systematic review was performed according to the PRISMA guidelines [9]. According to PICO, the focus question was: Does the OD technique increase the primary and secondary stability of dental implants compared to CD? Electronic databases used: PubMed Medline, ScienceDirect, The Cochrane Library. Search keywords: “osseodensification”, “dental implant”, “stability”. Inclusion criteria were: clinical trials with humans published less than 10 years ago, written in the English language. Studies involving patients with immediate implantation or augmentation before implantation were excluded as well as animal studies.

## **Results**

73 publications were found. Selection criteria were applied, and 17 studies were selected for full-text analysis. 5 articles were included in this review in which a total of 240 implants were placed in 111 patients. All 5 studies evaluated implant stability values immediately after implantation (primary stability) [7, 10-13]. Implant stability quotients (ISQ) were used in 4 of 5 articles: from  $70.5 \pm 1.12$  to  $76.00 \pm 6.41$  in the OD group, while in the CD group results were from  $56.22 \pm 2.21$  to  $78.88 \pm 7.18$ . However, a statistically significantly higher stability in the OD group was stated in 3 studies ( $P < 0.001$  [7, 10],  $P < 0.05$  [11]), while one study stated a statistically insignificant difference between groups ( $P > 0.05$ ) [12]. Selected publications provide a follow-up period for secondary stability from 2 weeks to 6 months. A statistically significant difference of ISQ values between OD and CD groups were observed at 6 weeks ( $P < 0.05$ ) [10, 12] and 4 months post-placement ( $P < 0.001$ ) [7, 11]. The secondary stability was found slightly higher 6 months after surgery in the OD group compared with the CD group, nonetheless, there was no statistically significant difference ( $P > 0.05$ ) [13].

## **Conclusions**

Most studies confirm that the improvement in the primary implant stability is observed using the OD technique compared to the CD technique. The effect on secondary stability remains questionable, as not all studies report a statistically significant enhancement, and there is a lack of studies with longer follow-up periods.

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## **Teriparatide administration as an adjunctive treatment in BRONJ patients: a systemic literature review**

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### **Introduction**

Teriparatide (TPTD) is a synthetic version of the human parathyroid hormone and is currently the only anabolic agent approved by FDA, that directly stimulates bone formation [1]. Findings have reported that TPTD is a clinically viable approach to increase bone regeneration against bone defects and fractures [2]. Several trials have investigated the efficacy of TPTD administration to treat BRONJ (bisphosphonate related osteonecrosis of jaw) and disclosed favourable outcomes.

## Aim

Determine whether administration of TPTD as an adjunct improves bone regeneration in patients diagnosed with BRONJ.

## Methods

Protocol of the review has been executed by using PRISMA approach and was submitted to PROSPERO (registration number: CRD42021242796). Electronic search was carried out in Medline, ScienceDirect, The Cochrane Library and LILACS databases using a combination of following keywords: "BRONJ", "TPTD", "treatment". To be included, the study had to be published less than 10 years ago and written in English. Publications that involved patients who had prior treatment with radiotherapy of head/neck region were excluded, as well as patients who were treated with glucocorticosteroids. The electronic search showed 2096 articles and eventually 8 articles were included. Number of patients in the included studies varied from 6 to 34 (a total of 139 patients in 8 studies) with patients mean age being 75,47 years. 90.5 % of patients received oral BPs, while 9.5 % received intravenous.

## Results

1. According to studies by Sim et al. and Kim et al., TPTD was statistically significantly associated with a greater BRONJ lesion resolution, compared to control group ( $p < 0.05$ ) [3,4]. However, the study by Sim et al. showed no significant difference in proportion of resolved lesions ( $p = 0.478$ ). The case report that consisted of 8 patients showed that the administration of TPTD led to complete recovery of BRONJ lesions in 7 patients, while exhibiting coverage of the exposed bone by mucosa [5].
2. Regarding the effectiveness of TPTD treatment according to administration frequency, daily injection group showed no significant changes in the clinical stage of BRONJ, no difference in the percentage of bone formation on patients osteolysis, compared to weekly injection group [6].
3. Regarding bone resorption/regeneration markers, four of the included studies [1, 3, 4, 7] evaluated s-CTX levels, three of the included studies [1, 4, 7] measured s-OC values. All studies showed that bone resorption markers significantly increased after 3 month TPTD administration. In a multivariate analysis using age, BMI, duration of BP usage, the difference in s-OC values after 3 months of the treatment between TPTD and non-TPTD groups was significant ( $p < 0.05$ ).

## Conclusions

Study results have shown that administration of TPTD has a promising effect for BRONJ patients. Administration of TPTD improves resolution of BRONJ lesions, reduces bony defects, increases bone volume and bone resorption/regeneration marker values.

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# **Public Health**

## Change of electrical injuries in Lithuania in 2016-2020

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### Introduction

Although electrical injuries are not common, yet these injuries are severe and account for approximately 0.04-5% of all burn injuries in developed countries and up to 27% in developing countries [1]. Electrical injuries are divided into high (> 1000 volts) and low (<1000 volts) voltage injuries. High-voltage electrical injuries are rare, but cause major injuries such as cardiac arrhythmias and deep myonecrosis [2]. Local tissue damage caused by electrical traumatic burns is often deep and severe, which traumatize tendons, nerves, blood vessels, bones, and joints, making the treatment of such wounds extremely difficult [3]. Although electrical injuries are rare among children, but they are considered to be one of the most devastating injuries [4]. Electrical injuries in the adult population primarily affect men and are most often work-related. Furthermore, they are the 4th leading cause of work-related traumatic deaths [1].

### Aim

To evaluate the change of the number of victims that suffered from electrical injuries in Lithuania from 2016 to 2020.

### Methods

Data of study was used from the Health Information Center of the Institute of Hygiene and was calculated from the State Health Insurance Fund under the information system SVEIDRA of the Ministry of Health of Lithuania. Statistical methods - electrical injuries were analyzed and percentage was calculated each year during the study period. A comparison was made using the Chi-square criteria between the percentage distributions of electrical injuries during the study period. For verification of significance level,  $p < 0.05$  was chosen.

## Results

Analyzing the general trend of changes in electrical injuries during the study period, a decrease in the total number of electrical injuries is being observed from 23.38% up to 14.93% ( $p > 0.05$ ). In the age group of 0 to 17 years, a clear trend of a decrease in the total number of electrical injuries from 27.06% to 11.76% is being observed. In the group of girls, the number of electrical injuries decreased from 31.58% up to 13.16%. The number of electrical injuries in the group of boys decreased from 23.40% up to 10.64%. No statistically significant difference was found between genders ( $p > 0.05$ ). In the age group of 18 and more years, a clear trend of a decrease in the total number of electrical injuries from 22.22% up to 15.93% is also being observed. In the group of women, the number of injuries decreased from 28.30% up to 16.98%. In the group of men, the number of injuries decreased from 20.74% up to 15.67%. No statistically significant difference was found between genders ( $p > 0.05$ ).

## Conclusions

After analyzing the change in the number of electrical injuries in Lithuania from 2016 to 2020, it can be stated that a decrease in the number of electrical injuries is being observed. The reduction of electrical injuries is smaller in adults than in children. Preventing potential morbidity and mortality from electrical injuries can be achieved by strengthening safety compliance and raising social awareness.

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## **Impact of comorbidity on quality of life among hypertensive patients in LUHS KC Family Medical Clinic**

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### **Introduction**

Chronic diseases have a major influence on person's well-being and quality of life (QoL), and depending on chronic disease, it affects different aspects of life [1,2]. Increasing number of chronic conditions with arterial hypertension (AH) contribute to significant decrease in QoL [3]. Evaluated separately, heart failure (HF) lowers QoL more than other heart diseases [4], meanwhile non-complicated diabetes mellitus (DM) patients do not state any health problems [5], but complications [6] and comorbidity with three or more chronic conditions worsens QoL more than DM alone [7].

### **Aim**

To evaluate if hypertensive patients' quality of life depends on concomitant chronic disease and what aspects of life are affected the most.

### **Methods**

A cross-sectional study was carried out in LUHS Kaunas Clinics, Family Medical Clinic, where patients answered EQ-5D-5L questionnaire, which involves five dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) [8]. Patients

evaluated their health out of 100 using Visual Analog Scale (EQVAS) and different dimensions out of 5 (where 1 stands for no problems, 5 indicates extreme problems). Inclusion criteria – patients that have AH and either DM (type 2) or HF, age 45-80. Total of 93 patients with AH and DM and 70 patients with AH and HF were involved in this study. Statistical analysis performed using IBM SPSS 27.0 and MS Excel, Man-Witney, Kruskal Wallis and Kolmogorov-Smirnov tests were applied. Study approved by bioethics committee.

## Results

Evaluating their health in EQVAS, AH with DM mean score was 62.42% (SD 16.17) and AH with HF - 57.24% (SD 15.26). Selfcare is the least affected dimension in both groups of patients whereas pain and discomfort dimension is affected the most. There was no statistical significance for patients OoL in 4 out of 5 dimensions comparing patients with DM and without ( $p>0.05$ ), on the contrary, patients with HF had lower OoL in 4 out of 5 dimensions ( $p=0.00$ ). Results show that patients with more than 2 comorbidities evaluate their health statistically significant worse than patients with only 2 comorbidities (AH and DM) ( $p=0.001$ ). There was no significant difference between working patients and unemployed patients EQVAS score or affected dimensions, and education did not influence OoL ( $p>0.05$ ). Although still working retiree were statistically significant less affected in self-care dimension that unemployed retirees in both: AH with CD and AH with CF patients ( $p=0.04$ ;  $p=0.00$ ). The age over 65 years significantly worsens AH with DM patients' mobility ( $p=0.02$ ) and overall health ( $p=0.01$ ) comparing with patients under 65 years old, but the same significance was not found in HF patients.

## Conclusions

Multimorbidity worsens OoL and pain or discomfort is the most significant factor. AH combined with HF lowers patients' OoL significantly, whereas the age of the patient is significant factor for worse mobility and overall health when concomitant disease is DM.

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## **Conspiracy theories and opinions about the origin of pandemic in the student population of Latvia during the COVID-19 outbreak**

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**Introduction**

During the pandemic fear and uncertainty about the future is a factor that can contribute to the development and belief in conspiracy theories about the origin of virus. Conspiracy theories have the potential to alter public opinion and can negatively impact opinion on health issues and preventive measures (1). Few studies have been conducted to show thoughts about the origin of the COVID-19 and belief in conspiracy theories in the student population.

**Aim**

The aim of this study was to identify the existence of conspiracy theories about the origin of the virus among the student population in Latvia during COVID-19 outbreak.

**Methods**

In this cross-sectional study, Latvian university and college students from various educational institutions and study programs, were asked to fill the self-report questionnaire electronically on a voluntary basis. Students' were classified into three groups depending on their studies, group A included health and biological sciences, group B technical sciences, group C arts, literature, education and related sciences (2). Study is based on a questionnaire developed as part of an international study. The questionnaire was developed to acknowledge students' thoughts and opinion about the origin of the pandemic and other health and public issues. Data were analysed using SPSS Statistics. Descriptive statistical analysis was used to evaluate the results.

**Results**

In total 1047 students filled the questionnaire; 79,08% (n=828) of the respondents were women, 20,25% (n=212) were men, 0,67% (n=7) of the respondents did not want to indicate their gender. The results show that 45,08% (n=472) of the students' believe that COVID-19 was created in a laboratory. Data reveal that 33,14% (n=347) of

respondents think that COVID-19 was created to be used as a biochemical weapon. Data indicate that 19,58% (n=205) of respondents think the recommended measures are an attempt to restrict human rights and lead to dictatorship. Numbers show that 52,54% (n=550) of students believe that many important pieces of information are deliberately hidden from the public for reasons of interest and 21,01% (n=220) of respondents think that vaccines in general are dangerous and should be avoided.

## Conclusions

The present findings confirm that students tend to believe in conspiracy theories about pandemic. Almost one third of the respondents thought that COVID-19 was created as a biochemical weapon, about half of the respondents thoughts that government is hiding information about virus, such beliefs can escalate feeling of threat that the solutions introduced by the government may limit civil rights. A categorical stance against vaccines among students can be a coping mechanism against fear and uncertainty about the future. Further research to find out reasons and correlations why students believe in conspiracy theories about the pandemic needs to be done.

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## **The influence of sleep duration and quality on athletes: a systematic literature review**

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### **Introduction**

Sleep is an integral part of recovery and adaptation processes, and its prolonged duration and improved quality are associated with improved athlete performance and more successful competition in their field [5,11]. Longer and better sleep can reduce athletes' risk of injury and illness and help them participate more effectively in training and competition. Nevertheless, many studies show that athletes do not get enough recommended sleep, thus putting their health and sports performance at risk [4].

### **Aim**

To review the most relevant publications on the effects of sleep duration and quality on athletes.

### **Methods**

Systematic literature review was performed in PubMed databases published between years 2010 and 2021. During this period, interest in the subject grew and more research was made. MeSH was used for indexing articles with these keywords: Sleep deprivation+athletes. This systematic analysis reporting was adhered to the PRISMA Statement. 260 potentially important articles were identified and reviewed. Unavailable full articles were rejected, as well as those that investigated the effects of sleep deprivation on athletes only as one of the many factors influencing performance. After evaluating the titles and summaries of the articles, 11 articles were included in this study.

## Results

The sleep requirement of adults is 7-9 hours, but 9-10 hours of sleep is recommended for athletes due to the need for complete recovery after training [3]. However, research reveals that the sleep of professional athletes is shorter and of poorer quality compared to the general population [1,9]. Lack of sleep causes the production of anti-inflammatory cytokines, which impairs the function of the immune system, prevents muscle recovery, leads to autonomic imbalance, resulting in slower and less accurate cognitive function as a decision-making [2,5]. Impaired neurocognitive function is perhaps the most important effect of poor sleep on an athlete's performance in competitions where quick decisions must be made. Impairment of response time and cognitive function after lack of sleep may predispose to acute injury [7].

Simple sleep hygiene can prolong the sleep time of athletes and increase sleep productivity [6,10]. If the athlete is unable to get enough sleep at night, a changeover sleep the next day may be helpful [7]. If sleep deprivation is anticipated, "sleep accumulation" (intentional prolongation of sleep due to anticipated sleep deprivation) is recommended to improve an athlete's performance [8]. Based on current research, most agree that an optimal sleep prolongation is 2 hours [9].

## Conclusions

Prolonging sleep and optimizing its quality improves reaction time, accuracy, endurance. The effects on anaerobic capacity, strength, and sprint speed are less clear and remain an important area for future research. Sports medicine physicians and training staff should prioritize proper scheduling, travel protocols, sleep hygiene, as this improves the overall health and performance of athletes.

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## **Trends in esophageal cancer mortality in Lithuania, 2001-2020**

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## **Introduction**

Over the last few decades, the incidence of esophageal cancer has increased dramatically in the Western world (1). According to GLOBOCAN 2018 data, esophageal cancer is the ninth most common cancer worldwide and the sixth most deadly (2). Esophageal cancer is characterized by high mortality, poor prognosis at diagnosis (5-year overall survival is only about 10%) and local variability (3). However, mortality trends by sex, age and place of residence in Lithuania have not been analyzed in detail so far. This type of research is useful for increasing the vigilance of doctors when examining at-risk individuals, as well as for assessing and reducing health inequalities between counties.

## **Aim**

The aim of this study was to assess the mortality from esophageal cancer by sex, age and the place of residence in Lithuania during 2001-2020.

## **Methods**

A secondary data analysis was performed. Age-standardized data on esophageal cancer mortality (ICD-10 code C15) per 100 000 inhabitants in Lithuania during 2001-2020 were obtained from the Institute of Hygiene, where data were systematized from the Compulsory Health Insurance Information System. Changes in mortality trends by sex, age and the place of residence were assessed using Joinpoint regression (4). Data analysis was conducted using SPSS Statistics 25.0. The correlation between age and mortality was estimated with Spearman correlation ( $\rho$ ).

## **Results**

In 2020, the overall mortality rate for esophageal cancer in Lithuania was 7.84/100 000 population. Over the entire study period, men had a higher mortality rate than women, although the difference has slightly decreased over the last two decades: the ratio between men and women has decreased from 9.8:1 in 2001 to 6.6:1 in 2020. However, mortality rates are increasing in both sexes, with an average increase of 2.7% per year in men ( $p < 0.001$ ), and 4.1% per year ( $p < 0.001$ ) in women. The highest mortality rate for

men was in the 65-84 age group (average 16.3/100 000), while the highest mortality rate for women was in the 85+ age group (average 6.7/100 000). The study showed that older age was positively correlated with higher mortality ( $\rho = 0.9$ ;  $p = 0.037$ ). In 2020, the highest mortality rates for esophageal cancer were in Tauragė, Telšiai and Marijampolė districts, and the lowest in Vilnius, Panevėžys and Alytus districts. During 2001-2020, the highest increase in mortality was observed in Tauragė (7.85% p.a.), Telšiai (5.04% p.a.) and Marijampolė (4.53% p.a.),  $p < 0.001$ , the growth was slightly lower in Klaipėda, Kaunas, Šiauliai and Panevėžys ( $p < 0.001$ ), while no significant changes were observed in Vilnius, Alytus and Utena,  $p > 0.05$ .

## Conclusions

The results show that mortality from esophageal cancer is much higher in men than in women, although the gender gap has narrowed slightly in recent years due to a faster increase in female mortality. Also, it was observed, that higher mortality was positively correlated with older age and mortality is steadily increasing in most districts of Lithuania.

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## **Screening tools for child abuse used in primary health care: a systematic literature review**

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### **Introduction**

Child abuse is a widespread public health problem that involves physical, emotional abuse, sexual assault, and neglect against children [1,2]. Considering that early detection can stop child abuse and help to limit long-term effects, primary health care physicians are thought key figures in recognizing it [3,4]. There are different screening tools for child abuse; however, there is no consensus on the best screening method. This review focus on presenting different child abuse screening methods used in primary health care.

### **Aim**

To appraise the variety of children under 18 years old abuse screening tools used in primary health care.

### **Methods**

A systematic literature review was performed according to the PRISMA guidelines. Electronic databases used: PubMed, Science Direct. A combination of keywords: child abuse, child maltreatment, child neglect, screening tools, instrument, screening, measurement, tool, scale, questionnaire, primary health care, general practitioner, were

used. Keywords were confirmed by the Medical Subject Headings dictionary and possible synonyms for the keywords were found. The inclusion criteria: full-text articles in the English language, screening tools designed for use by primary healthcare professionals, research subjects - children under 18 years old screened for abuse. Studies published before 2012, meta-analysis, systematic or literature reviews, case reports were excluded. 6464 articles were found. Selection criteria were applied and 56 studies were selected for full-text analysis, 9 of them were included in this review. Last search date-2022 02 10. The COSMIN checklist was used to conduct the literature review, and GRADE was adopted to evaluate the quality of evidence of the measurement properties and formulate results.

## Results

Articles were first screened independently by 2 researchers. 9 publications met the inclusion criteria, and 9 screening tools were selected for further analysis [5-13]. The scales used in the 9 studies consisted of 5-31 questions. Almost all tools are designed to screen physical abuse, minority-for emotional abuse screening. The first group of screening tools is focused on interviews, physical examination, visual findings, the mechanism of injury. Tools assigned into this category: INTOVIAN, BuRN-Tool, Escape, CST risk factor questions, and SPUTOVAMO-R [5-9]. The second group of screening tools (ERPANS, PedHITSS, IPARAN) might be characterized as assessing the parental risk: self- reporting behavior, diseases, or evaluation of home environment [10-12]. The last group is similar to the first one but instrumental examination takes part in injury mechanism evaluation (FIND) [13].

## Conclusions

- 1) 9 child abuse screening tools were used in studies in 2012-2022.
- 2) Most of the scales are relatively short-up to 10 questions.
- 3) Child abuse screening tools focusing on physical abuse and neglect; there is a lack of emotional and sexual assault screening tools; however one tool appropriate for all types of abuse screening not detected.

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## **Association between study load of the high school graduates and subjective mental health during the COVID-19 pandemic**

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### **Introduction**

Studying in schools during the COVID-19 quarantine took place through remote connection. Studies show that quarantine can affect not only academic performance but also emotional and mental health [1]. There are high prevalence rates of mental health symptoms between students which are associated with social isolation, lack of information about mental health, and symptoms compatible with COVID-19 [2]. We carried out a study on the association between the study load of the high school graduates and subjective mental health problems during the COVID-19 pandemic.

## **Aim**

The aim of the study was to evaluate the association between the learning load and subjective mental health of the fourth-grade students in two gymnasiums of Ukmerge.

## **Methods**

A survey was conducted from December 2020 to January 2021. Fourth-grade students in two schools of Ukmerge were interviewed using an anonymous questionnaire. The permission was granted by the school principals as well as the bioethics committee. During this time lessons took place remotely, so the questionnaires were distributed by the school principals via digital school diary. 172 students were invited to participate in the study. A total of 119 questionnaires were filled out by the students, of which 87 questionnaires were suitable for the study (response rate – 72%) - 67.8% of the respondents were female, 32.2% were male. Mental health was evaluated using questions from the Behavioural Risk Factor Surveillance System and Eysenck Personality questionnaires. Data analysis was performed using the SPSS (Statistical Package for the Social Sciences) version 24.0. The chi-square ( $\chi^2$ ) criteria, the z-criteria, and the Spearman correlation coefficient ( $r$ ) were calculated.

## **Results**

The workload of students after school is too high, on average students spend from 16 to 22 hours per week on homework. However, the difference in the time spent doing homework between female and male students was not statistically significant. Most students name their study load after school as moderate (40.2%) or high (46%). In addition, the mental health of the students was observed. Stress and anxiety, felt by the female students over a 2-week period distributed to 3–4 days (23.7%), 5–6 days (27.1%), and 7 or more days (23.7%), while male students over the 2-week period experienced stress and anxiety 3–4 days (21.4%) and 7 or more days (42.9%). Lastly, the association between study load and subjective mental health (feeling depressed, stressed, tired) was evaluated and the results showed a statistically significant, moderate correlation between study load and the following: feeling depressed ( $r = 0.314$ ), stressed, or anxious ( $r = 0.42$ ), tired ( $r = 0.393$ ),  $P < 0.05$ .

## Conclusions

The study load of students after school is higher than recommended. Respondents often feel stress, anxiety at school. There was a statistically significant moderate correlation between study load during the COVID-19 period and subjective mental health derangements.

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