



LITHUANIAN UNIVERSITY
OF HEALTH SCIENCE



LITHUANIAN
MEDICAL
TENNIS SOCIETY



WMTS
World Medical Tennis Society



95th anniversary

**49th World Medical Tennis Society (WMTS) congress:
International Congress of Preventive and Sports Medicine**

5-6 August 2019; Radisson Blu Hotel Lietuva; Vilnius

**BOOK OF
ABSTRACTS**

VILNIUS, LITHUANIA

2019

CONGRESS SCIENTIFIC COMMITTEE

Chair: Remigijus Žaliūnas

Members:

Jonas Girskis

Laimonas Šiupšinskas

Rimtautas Gudas

Skaidra Valiukevičienė

Olivija Gustienė

Raimondas Kubilius

Gintarė Šakalytė

Liutauras Labanauskas

Alma Kajėnienė

Renata Žumbakytė – Šermukšnienė

Aušra Piktuižytė

Algė Daunoravičienė

Vilma Tamulionytė

Ernesta Gurskienė

CONTENTS

Relative leukocyte telomere length in early AMD.....	7
<i>Mantas Banevičius, Alvita Vilkevičiūtė, Loresa Kriaučiūnienė, Rasa Liutkevičienė</i>	
Changes of the functional parameters of balance and lower extremity of adolescents runners after exercises of unstable surfaces	7
<i>Miglė Bielskytė, Toma Petkutė, Renata Žumbakytė – Šermukšnienė</i>	
A relationship between osteocalcin and acute myocardial infarction	9
<i>Rima Braukylienė, Martynas Jurėnas, Laura Zajančkauskienė, Ramūnas Unikas, Rasa Steponavičiūtė, Astra Vitkauskienė, Olivija Gustienė, R. Karaliūtė, Kamyar Hedayat, Diana Žaliaduonytė – Pekšienė</i>	
Site pain prevalence and management following percutaneous coronary intervention via radial artery access.....	10
<i>L. Brogienė, G. Bakšytė, A. Macas</i>	
The King-Devick test as a sideline screening tool for concussion in rugby union	11
<i>Victoria Campbell</i>	
Association of pai-1 rs2227631 variant and clinical factors with recurrent myocardial infarction in patients with coronary artery disease	11
<i>Ieva Eitminavičiūtė, Gabrielė Jablonskytė, Vacis Tatarūnas, Vaiva Lesauskaitė</i>	
New potential modulators of vascular inflammation: mir-24-3p and mir-34a-5p	12
<i>Dovydas Gečys, Vacis Tatarūnas, Audronė Veikutienė, Vaiva Lesauskaitė</i>	
Women’s who work standing jobs, posture, exhaustion, pain and life quality interrelations evaluation	13
<i>Ugnė Gečiūnaitė, Ernesta Gurskienė</i>	
The association between healthy people leukocyte telomeres length and TERT, TRF1 single nucleotide polymorphisms in different age groups.....	15
<i>Greta Gedvilaitė, Alvita Vilkevičiūtė, Loresa Kriaučiūnienė, Rasa Liutkevičienė</i>	
Tennis player injuries and understanding the kinetic chain model of biomechanical function	16
<i>Jonas Girskis</i>	
Significant shoulder injuries in the overhead (tennis) athletes	17
<i>Rimtautas Gudas, Laimonas Šiupšinskas</i>	
Implementing stemi care system in Lithuania: five years’ experience in one of pci centers.....	18
<i>Olivija Gustienė, Giedrė Bakšytė, Ieva Jonauskienė, Antanas Gasys</i>	
Evaluation of the disease course of elderly patients with acute ST segment elevation myocardial infarction (STEMI).....	19
<i>Olivija Gustienė, Antanas Gasys</i>	
Impact of physical activity on the risk of metabolic syndrome: results from a hapiee study	22
<i>V. Jasiukaitienė, D. Lukšienė, A. Tamošiūnas, R. Radišauskas, M. Bobak</i>	

Association between vitamin d deficiency and allergic symptom in pregnant women	23
<i>Kumiko T Kanatani, Yuichi Adachi, Kei Hamazaki, Kazunari Onishi, Tohshin Go, Kyoko Hirabayashi, Youichi Kurozawa, Hidekuni Inadera, Hiroshi Oyama, Takeo Nakayama</i> ²³	
Athletes and non-athletes adolescents' use of smart phones duration, habits and relationship between the upper cross syndrome.....	24
<i>Dalia Marčiulionytė, Algė Daunoravičienė, Aurelijus Domeika, Milda Dubosienė</i> ²⁴	
New data for determining platelet reactivity in patients with diabetes after acute coronary syndromes	26
<i>Ugnė Meškauskaitė, Nora Kupstytė, Vacis Tatarūnas, Vaiva Lesauskaitė</i> ²⁶	
Abca1 rs1883025 genotyp and haplotype evaluation in patients with age-related macular degeneration and it's anti-vegf inhibitory treatment.....	27
<i>Rūta Mockutė, Rasa Liutkevičienė, Vilma Jūratė Balčiūnienė, Alvita Vilkevičiūtė</i> ²⁷	
Retrospective analysis of clinical signs, complications and survival in patients with acute inferior myocardial infarction	28
<i>Gintarė Neverauskaitė-Piliponienė, Rasa Kūgienė, Žaneta Petrulionienė, Pranas Šerpytis</i> ²⁸	
Coronary physiology based versus angiography guided coronary artery bypass grafting.....	29
<i>R. Ordienė, J. Plisienė, A. Jankauskas, R. Žaliūnas, M. Adomaitytė, P. Jakuška, R. Benetis, R. Unikas</i> ²⁹	
Quality of life and self-care changes of the patients with heart failure after long term monitoring program	31
<i>R. Paleckienė, J. Macijauskienė, A. Kavoliunienė, D. Žaliaduonytė – Pekšienė, V. Grumuldytė, A. Mazutavičiūtė</i> ³¹	
Role of il6 rs1800795 and blk rs13277113 snps in laryngeal squamous cell carcinoma carcinogenesis	32
<i>Agnė Pasvenskaitė, Alvita Vilkevičiūtė, Rasa Liutkevičienė, Vykintas Liutkevičius, Virgilijus Uloza</i> ³²	
Histomorphometric differences between convexity and concavity of dilated ascending aorta	33
<i>Vaiva Patamsytė, Neringa Taparauskaitė, Serik Aitaliyev, Zita Stanionienė, Monika Biesevičienė, Jolanta Vaškelytė, Giedrius Žukovas, Rimantas Benetis, Vaiva Lesauskaitė</i> ³³	
Pilot project on improvement of cervical cancer screening coverage: efficacy of personal systematic invitation model in urban and rural areas.....	34
<i>Justina Paulauskienė, Janina Petkevičienė, Rugilė Ivanauskienė</i> ³⁴	
Diagnostic value of the left ventricular contractile reserve for the detection hemodynamically significant coronary artery stenosis.....	35
<i>Erina Pudžemytė, Monika Petrauskaitė, Eglė Tamulėnaitė, Arnas Karužas, Eglė Rumbinaitė, Jolanta Justina Vaškelytė</i> ³⁵	
Quantitative composition of quercetin glycosides in e. ciliata ethanolic extracts obtained from different plant parts	36
<i>Lauryna Pudžiuvelytė, Jurga Bernatoniė</i> ³⁶	
Correlation among pain intensity, disability and posture displacements in women with chronic neck and back pain	38
<i>Dominyka Pumputytė, Ernesta Gurskienė</i> ³⁸	

Photosensitivity and phototoxicity caused by drugs in outdoor athletes	40
<i>Laura Račkauskaitė, Gabrielė Vengalytė, Skaidra Valiukevičienė</i> 40	
A comparison of risk factors and diagnostic methods for patients with estimated intermediate pre-test clinical probability of ischaemic heart disease.....	41
<i>Laura Radionovaitė, Laura Zajančkauskienė, Jurgita Plisienė</i> 41	
Peculiarities of women's, working sedentary work, musculoskeletal system's status, fatigue and pain.....	42
<i>Laima Rimšaitė, Vilma Tamulionytė</i> 42	
Dynamical interrelation of electrocardiographic parameters in patient with paroxysmal and persistent atrial fibrillation during sinus rhythm	43
<i>Gabrielė Rudokaitė, Vytautas Zabiela</i> 43	
ACL graft diameter and knee joint's function parameters changes at 3rd, 6th and 12th month after arthroscopic ACL reconstruction	44
<i>Darius Ruočkus, Laimonas Šiupšinskas, Rimtautas Gudas</i> 44	
Relationship between self-reported and functional outcomes of physically active patients 6 and 12 months after anterior cruciate ligament reconstruction surgery	45
<i>Saulė Salatkaitė, Laimonas Šiupšinskas, Rimtautas Gudas</i> 45	
Interconnection between local earth magnetic field and acute myocardial infarction in two Lithuanian hospitals.....	47
<i>Vilmantas Smalinskas, Tautvydas Rugelis, Gediminas Jaruševičius, Alfonsas Vainoras</i> 47	
Cost of ticagrelor compared with clopidogrel therapy in the management of acute coronary syndromes in Lithuanian patients	48
<i>Mindaugas Stonis, Simona Ripkauskaitė, Gintarė Martinkutė, Vacis Tatarūnas, Vaiva Lesauskaitė</i> 48	
Evaluation of myocardial viability by different non-invasive cardiovascular imaging modalities	49
<i>Paulina Šimaitytė, Goda Maciulevičiūtė, Eglė Kazakauskaitė</i> 49	
Primary school pupils' concentration and academic achievements changes after physical exercises program application.....	51
<i>Agnė Uldinskė, Vilma Tamulionytė</i> 51	
Determination of rad51b rs8017304 variant in patients with laryngeal squamous cell carcinoma	52
<i>Paulius Vaičiulis, Alvita Vilkevičiūtė, Rasa Liutkevičienė, Vykintas Liutkevičius, Virgilijus Uloza</i> 52	
Rs1859430, rs2069870, and rs11741137 in AMD development	53
<i>Alvita Vilkevičiūtė, Loresa Kriaučiūnienė, Rasa Liutkevičienė</i> 53	
Comparative analysis of preoperative echocardiographic parameters in patients with postoperative atrial fibrillation or conduction disorders post tavi	54
<i>Mindaugas Zaikauskas, Laura Radionovaitė, Vaida Mizarienė</i> 54	
Delay effect of the local earth's magnetic field strength influence on admission due to acute myocardial infarction	56
<i>Greta Žiubrytė, Kamyar Hedayat, Rima Braukylienė, Gediminas Jaruševičius, Laura Zajančkauskienė, Martynas Jurėnas, Jean-Claude Lapraz, Alfonsas Vainoras, Diana Žaliaduonytė-Pekšienė</i> 56	

Acute coronary syndrome due to left main disease association with changes in local earth's magnetic field.....	57
<i>Greta Žiubrytė, Gediminas Jaruševičius, Mantas Landauskas, Rollin McCraty, Alfonsas Vainoras</i>	
Exercise capacity in patients with asymptomatic primary mitral regurgitation and preserved left ventricle systolic function	58
<i>Rūta Žvirblytė, Ieva Merkytė, Eglė Tamulėnaitė, Agnė Saniukaitė, Jolanta Justina Vaškelytė</i>	
New pathogenesis of tennis elbow: Lateral elbow impingement syndrome (LEIS).....	60
<i>Osamu Soejima, MD, PhD</i>	

Relative leukocyte telomere length in early AMD

Mantas Banevičius¹, Alvita Vilkevičiūtė², Loresa Kriaučiūnienė^{1,2}, Rasa Liutkevičienė^{1,2}

¹*Department of Ophthalmology, Academy of Medicine, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Neuroscience Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Telomeres cap chromosome ends and play a critical role for genomic stability. Telomeres are protective, repeat (TTAGGG) nucleotide sequences at chromosome endpoints: 2-20 kb man, which gradually shrink in each cell division cycle (about 25-200 bp at each split time) (1). Telomere length is associated with ageing and age-related diseases (2). The development of age-related diseases is increasingly being explored, and telomerase shortening is closely associated with age-related macular degeneration (AMD) (3). AMD is an ocular disease that involves the posterior aspect of the retina called the macula. Also, AMD is the leading cause of visual deterioration and legal blindness in patients over 60 years of age (4).

Research aim. The aim of our study was to determine the relationship between the relative leukocyte telomere length and early AMD development in Lithuanian subjects.

Research methods and organization. Our study enrolled 68 subjects with early AMD diagnosis, and 87 age and gender-matched healthy controls. DNA was extracted from peripheral venous blood by DNA salting-out method. The relative leukocyte telomere length (RLTL) were carried out using the real-time polymerase chain reaction method. Results were assessed using the statistical analysis software „IBM SPSS Statistics 20.0“.

Results. We determined relative leukocyte telomere length to all study subjects. Results revealed a significant association of RLTL and early AMD: patients with early AMD have longer telomeres than control subjects (0.673 (0.890) vs. 0.626 (0.496), $p=0.021$).

Conclusions. Our study revealed an association between RLTL and early AMD development. Also, extended studies are needed to explore the role of genetic variants in telomere length regulation and its associations with AMD development.

References list:

1. Klein R, Peto T, Bird A, Vannewkirk MR. The epidemiology of age-related macular degeneration. *Am J Ophthalmol.* 2004; 137:486–95.
2. Moon I, Jarstfer M. The human telomere and its relationship to human disease, therapy, and tissue engineering. *Frontiers in Bioscience.* 2007;12:4595–4620.
3. Weng X, Zhang H, Kan M, et al. Leukocyte telomere length is associated with advanced age-related macular degeneration in the Han Chinese population. *Exp Gerontol.* 2015; 69:36–40.
4. Klein R, Klein BE, Jensen SC, et al. The five years incidence and progression of age related maculopathy: the Beaver Dam Eye Study. *Ophthalmology.* 1997;104:7–21.

Changes of the functional parameters of balance and lower extremity of adolescents runners after exercises of unstable surfaces

Miglė Bielskytė¹, Toma Petkutė², Renata Žumbakytė – Šermukšnienė¹

¹*Lithuanian University of Health Sciences, Department of Sports Medicine, Kaunas, Lithuania*

²*Lithuanian University of Health Sciences, Department of Rehabilitation, Kaunas, Lithuania*

Introduction. Results from the studies indicated benefit of training on unstable surfaces to various populations. Commonly they are used in rehabilitation after injuries, some diseases or elderly people

(1,2). There are a lot of studies with basketball and football players, their rehabilitation and injury prevention programs effects using unstable surfaces (3,4). Drawing upon previous studies, we hypothesized that training on unstable surfaces helps runners to improve balance and lower extremity functional indicators (5,6).

Research aim. The aim of this study was to evaluate alterations in functional parameters of balance and lower extremities of adolescents' runners after training on unstable surfaces.

Research methods and organization. In study participated 20 adolescents Kaunas sport school "Startas" athletes, aged 12-13 years boys and girls running short and long distances. Training consisted of 20 minute long exercises on unstable surfaces and where performed 2 times a week for 5 weeks. The program consisted of exercises while standing on one or both feet on the unstable air-filled cushion. Exercises applied during training after warm-up before the main part of the workout. Participants had evaluation before and after applying program. Used tests: EUROFIT Flamingos test used to evaluate static balance, evaluating right and left leg separately; Y balance test – or modified star excursion test is used to evaluate dynamic stability. Test is used to evaluate postural control and make conclusion about athlete's reach while maintaining stable position; Calf muscle strength measurement with Lafayette dynamometer – muscle strength is expressed in kilograms. We measured foot plantar flexion and dorsal flexion muscles strength; Single Leg Hop Test (HOP) – these tests are performed to evaluate dynamic knee and ankle stability, lower extremities neuromuscular coordination and muscle strength. Evaluating right and left leg separately, there is no limitations for arms movements; T- test is used to evaluate lower extremities agility in four directions and body control, balance and do not lose the speed while changing direction of movement. Also test evaluates legs speed, strength and agility. Mathematical statistical analysis was performed using IBM SPSS 22 software. Qualitative variables are given in percent. Quantitative data are presented as median (xme), minimum value (xmin), maximum value (xmax) and arithmetic mean (\bar{x}) - xme (xmin; xmax; \bar{x}). The Wilcoxon Criteria was used to compare two independent samples, Mann-Whitney Criteria – two dependent samples. Differences when $p < 0.05$ are considered statistically significant.

Results. 1. a) Short-distance runners had better right leg dynamic balance in anterior direction Y balance test; b) For short-distance runners group after training program increased calf muscles strength, agility did not change. The results of knee and ankle dynamic stability evaluation were mixed. 2. a) Some of the dynamic balance indicators improved after exercises on unstable surfaces in long-distances running adolescents group (forward and posteromedial direction to the right leg, posterolateral direction in the left leg in Y balance test); b) For long-distance runners group after training program on unstable surfaces increased calf muscles strength, better agility. The results of knee and ankle dynamic stability evaluation were mixed. 3. Before and after exercises on unstable surfaces, the balance between the short and long distances runners groups did not differ. 4. a) The results of knee and ankle dynamic stability evaluation before and after exercises on unstable surfaces between groups did not differ; b) Before applying exercises on unstable surfaces, there was higher left foot plantar flexors power in short-distance runners group, also this group had better agility than long-distance runners groups; c) After applying exercises on unstable surfaces program short-distance runners agility remained better than long-distance runners groups.

Conclusions. After exercises on unstable surfaces adolescents running short- and long- distance improved some their balance and lower extremities functional indicators – calf muscle strength, agility, dynamic knee and ankle stability. Also short distance runners group had better agility than long distance runners group before and after training on unstable surfaces program. Based on the data received we recommend to include exercises on unstable surfaces to their training.

Reference list:

1. Huang PY, Chen WL, Lin CF, Lee HJ. Lower extremity biomechanics in athletes with ankle instability after a 6-week integrated training program. *Journal of Athletic Training*. 2014;49(2):163–72.
2. Lesinski M, Hortobágyi T, Muehlbauer T, Gollhofer A, Granacher U. Effects of Balance Training on Balance Performance in Healthy Older Adults: A Systematic Review and Meta-analysis. *Sports Medicine*. 2015 Dec 1;45(12):1721–38.
3. Boccolini G, Brazziti A, Bonfanti L, Alberti G. Using balance training to improve the performance of youth basketball players. *Sport Sciences for Health*. 2013 Aug 30;9(2):37–42.
4. Sharma S, Multani NK. Relationship of Dynamic Balance With Lower Extremity Muscular Strength and Endurance in Football Players. *Paripex - Indian Journal of Research*. 2017;6(11):3.
5. Knight AC, Holmes ME, Chander H, Kimble A, Stewart JT. Assessment of balance among adolescent track and field athletes. *Sports Biomechanics*. 2016 Apr 2;15(2):169–79.
6. Alonso J-M, Edouard P, Fischetto G, Adams B, Depiesse F, Mountjoy M. Determination of future prevention strategies in elite track and field: analysis of Daegu 2011 IAAF Championships injuries and illnesses surveillance. *British journal of sports medicine*. 2012 Jun;46(7):505–14.

A relationship between osteocalcin and acute myocardial infarction

Rima Braukylienė¹, Martynas Jurėnas¹, Laura Zajanjkauskienė¹, Ramūnas Unikas¹, Rasa Steponavičiūtė², Astra Vitkauskienė², Olivija Gustienė¹, R. Karaliūtė, Kamyar Hedayat³, Diana Žaliaduonytė – Pekšienė¹

¹*Department of Cardiology, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania*

²*Department of Laboratory Medicine, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania*

³*Co-President, Director of Research, Systems Biology Research Group, Chicago, USA*

Introduction. Physical (pain, myocardial necrosis, impaired heart muscle function) and psychological (fear of dying, helplessness and etc.) stress experienced during acute myocardial infarction (AMI) are activated neurohormonal systems in the early phase of acute coronary syndrome. Osteocalcin (OC) is a hormone and non-collagenous, vitamin K dependent peptide found in the mineralized matrix of bone. As a hormone, OC effects on energy metabolism regulation. Acutely ischemic heart is associated with dramatic alterations in cardiac energy metabolism.

Research aim. To assess the relationship between serum osteocalcin concentration and AMI.

Research methods and organization. One-hundred-twelve patients (mean age 63.9±11.6 years) admitted due to AMI with no previous history of acute coronary syndrome, revascularization, receiving all types of steroids and hypo- or hyperthyroidism between April 2017 and November 2017 have been prospectively included into our single centre study. AMI was defined according to the Universal Definition of Myocardial Infarction. Blood samples were drawn during admission. Blood was taken from patients 15 min after bed rest. Serum calcium was determined using UniCel DxC 800 Synchron Clinical System (Beckman Coulter Inc, Fullerton, USA) following manufacturer recommendations. Serum osteocalcin was measured using ELISA (enzyme – linked - immunoassay) kits (Micro Vue, Quidel, Hanover, Germany). Statistical analysis was conducted using SPSS version 21. Chi-squared, Spearman, and logistic regression tests were used for analysis.

Results. The OC level was normal in 79.7% (n = 98) patients, while it was elevated in 11.4% (n = 14) of the patients. The calcium level was normal in 65.9% (n = 81) of the patients, while decreased in 31.7%

(n = 39) of the patients, whereas increased in 1.6% (n = 2) of the patients. High levels of serum OC had weak significant correlation with low level of serum Ca (r = 0.214, p = 0.024).

We noticed elevated OC level in 69.2% (n = 9) of the patients with anterior wall AMI, and in 30,8 % (n = 4) of the patients with inferior wall AMI. In univariate logistic regression analysis, the anterior myocardial infarction was significantly associated with increased OC level (odds ratio, 3.346; 95% confidence interval, 1.0 to 11.6, p = 0.048).

Conclusions. If the OC level is high, the Ca level is low in the early phase of acute coronary syndrome. The anterior myocardial infarction was significantly associated with increased OC level.

Site pain prevalence and management following percutaneous coronary intervention via radial artery access

L. Brogienė¹, G. Bakšytė², A. Macas¹

¹*Lithuanian University of Health Sciences, Department of Anesthesiology, Kaunas, Lithuania*

²*Lithuanian University of Health Sciences, Department of Cardiology, Kaunas, Lithuania*

Introduction. Post procedural pain is underestimated problem that usually is overlooked. Only few articles reporting acute pain prevalence after PCI procedure (1,4). In several clinical cases reported pain complex regional syndrome that can lead to chronic pain state (2-4). Chronic pain syndrome is a disabling condition that worsens the quality of human life (5). One of the main risk factors for chronic pain to develop is time spent in acute pain setting (6).

Research aim. This study focus is the access-site pain prevalence and management after percutaneous coronary intervention (PCI) via radial artery access.

Research methods and organization. The Data of selected patients (n=161) 60.9% males and 39.1% females, who underwent elective PCI prospectively collected and analyzed in 2019. Patients were questioned according to the survey made by authors; other data was collected from medical notes. Verbal analogue scales were used to evaluate pain intensity after 2, 12, 24, 48h, 1 and 3 months after PCI. Data analysis was performed with SPSS 20.0, p<0.05.

Results. Acute site-access pain during the PCI procedure occurred in 29.8%. Only for 2.5% of patients' pain medication were given. In 17.4% of cases moderate pain was persisting immediately after the procedure. After 2, 12, 24, 48 hours pain was felt accordingly in 54%, 38.5%, 16.8%, 10.6% cases and it was moderate. Pain medication were given in less than 23% of cases. 1 week and 1 month after the PCI procedure 7.5% of patients felt strong site pain. Pain medication was given accordingly in 41% and 16.6% of cases. During the 3-month period site-access pain intensity was decreasing, chronic pain developed in 3.7% of patient and it was moderate. In most cases during 3-month period (>50%) pain medication relieved the pain.

Conclusions. During 3-month period of time patients site pain was not properly assessed and managed. Most patients experienced moderate pain. Despite that site pain intensity was decreasing, post-procedural chronic pain developed in 3.7% of patients after PCI.

Reference list:

1. Czarnecki ML, Turner HN, Collins PM, Doellman D, Wrona S, Reynolds J. Procedural Pain Management: A Position Statement with Clinical Practice Recommendations. *Pain Management Nursung J.* 2011; 12 (2): 95-11. <https://doi.org/10.1016/j.pmn.2011.02.003>
2. Papadimos TJ, Hofmann JP. Radial artery thrombosis, palmar arch systolic blood velocities, and chronic regional pain syndrome 1 following transradial cardiac catheterization. *Catheter Cardiovasc Interv.* 2002; 57:537–540.

3. Sasano N, Tsuda T, Sasno H, et al. A case of complex regional pain syndrome type II after transradial coronary intervention. *J Anesth.* 2004;18(4):310–312.
4. Zwaan EM, Koopman AGMM, Holtzer CAJ, Zijlstra F, Ritt MJPF, Amoroso G, Moerman E, Kofflard MJM, IJsselmuiden AAJ. Revealing the impact of local access-site complications and upper extremity dysfunction post transradial percutaneous coronary procedures. *Neth Heart J.* 2015; 23:514-524.
5. Jang HJ, Kim JY, Han JD, et al. Numbness after transradial cardiac catheterization: the results from a nerve conduction study of the superficial radial nerve. *Korean Circ J.* 2016;46(2):161-168. <http://dx.doi.org/10.4070/kcj.2016.46.2.161>
6. Kanei Y, Kwan T, Nakra NC, et al. Transradial cardiac catheterization: a review of access site complications. *Catheter Cardiovasc Interv.* 2011;78(6):840-846. <http://dx.doi.org/10.1002/ccd.22978>

The King-Devick test as a sideline screening tool for concussion in rugby union

Victoria Campbell

University of Glasgow, Glasgow, Scotland

Introduction. Sports concussions have potentially serious consequences and may go unrecognized. Current assessment methods for concussion are subjective and time-consuming. The King-Devick (KD) test assesses eye movements and may have utility as a rapid, objective sideline assessment test. Screening for concussion may increase our detection rates and this study investigates the use of the K-D test as a routine screening tool for concussion in rugby union.

Research methods and organization. A prospective observational cohort study was carried out on an amateur rugby union team (n=21) during pre-season. Players completed two trials of the K-D to determine their baseline and underwent further K-D testing following all training sessions. Any players with a K-D score 3 seconds slower or greater than baseline were further assessed for concussion.

Results. No concussions were picked up through routine screening and no players were diagnosed with concussion. A learning effect was observed when establishing baseline K-D scores (47.46±9.39s vs 44.01±7.78s, p<0.001). K-D scores improved following all sessions (-5.98±4.11s; p<0.05).

Conclusions. The K-D test cannot be recommended as a screening tool for concussion based on this study as no concussions occurred to assess its sensitivity. We found that K-D score is not affected negatively by exercise induced fatigue as players showed significant improvements in score, emphasizing the need to assess players whose K-D is prolonged from their baseline. Further studies into the threshold at which this should occur and the effect of match intensity on K-D score need to be performed, before it can be recommended as an integral part of concussion assessment.

Association of pai-1 rs2227631 variant and clinical factors with recurrent myocardial infarction in patients with coronary artery disease

Ieva Eitminavičiūtė, Gabrielė Jablonskytė, Vacis Tatarūnas, Vaiva Lesauskaitė

Institute of Cardiology of Lithuanian University of Health Sciences, Kaunas, Lithuania

Introduction. There is a lack of studies explicating the increased risk of recurrent myocardial infarction (reMI). Unhealthy lifestyle and diabetes or insulin resistance are among those factors that have a significant impact on incidence of reMI. In patients with diabetes, circulating levels of plasminogen

activator inhibitor-1 (PAI-1) increase. It leads to the reduction of thrombus lysis. Studies also showed PAI-1 gene promoter rs2227631 (-844 G/A) was associated with increased PAI-1 plasma level.

Research aim. The aim of this study was to find the impact of clinical factors and PAI-1 rs2227631 variant on reMI in patients hospitalized due to acute coronary syndromes.

Research methods and organization. Clinical data and DNA samples were collected from study subjects hospitalized in the Department of Cardiology at the Hospital of Lithuanian University of Health Sciences (LUHS) in Kaunas. All patients (n=674) were hospitalized for percutaneous coronary intervention and stent implantation due to acute coronary syndromes (myocardial infarction or unstable angina). Genotyping procedures were carried out at the certified Laboratory of Molecular Cardiology, Institute of Cardiology, Lithuanian University of Health Sciences, Kaunas, Lithuania. A binary logistic regression model was used to identify independently associated clinical and genetic factors, which determine reMI.

Results. A total of 29.7% of the patients were hospitalized with reMI, which was documented in anamnesis. Diabetes and PAI-1 A allele were more frequently found in those patients with reMI who were older than 65 years (Pearson $\chi^2 = 6.307$, $p = 0.014$). Multivariate binary regression analysis revealed that male gender (OR 1.764, 95 %, CI: 1.106-2.815, $p = 0.017$), diabetes (OR 1.708, 95 %, CI: 1.029-2.834, $p = 0.038$) and A allele of PAI-1 rs2227631 (OR 3.373, 95 %, CI: 1.523-7.472, $p = 0.003$) increased the odds of reMI.

Conclusions. Multivariate regression analysis showed that in aged patients with acute coronary syndromes, the incidence of reMI is increased in males, in patients with diabetes and in PAI-1 rs2227631 A allele carriers.

New potential modulators of vascular inflammation: mir-24-3p and mir-34a-5p

Dovydas Gečys, Vacis Tatarūnas, Audronė Veikutienė, Vaiva Lesauskaitė
Institute of Cardiology, Lithuanian University of Health Sciences, Kaunas, Lithuania

Introduction. Micro-RNAs (miRNAs) are small (18-24 nt) non-coding RNAs which are involved in post-transcriptional gene expression regulation (1). It has been shown that miRNAs participate in development and progression of various pathological conditions, including cardiovascular diseases (2,3). It has been shown that expression of several miRNA genes fluctuate during coronary artery disease (CAD), however functional relevance of these molecules is not yet fully understood (4–6). MiRNAs may interact with bio-active fatty acid metabolism and induce inflammation and atherosclerosis.

Research aim. The aim of this pilot study was to investigate relative expression of miR-24-3p and miR-34a-5p in blood plasma of stable angina pectoris (AP) patients' and determine association between these molecules and arachidonic acid converting enzyme CYP4F2.

Research methods and organization. In total 47 subjects were included into this study: 32 patients with stable angina pectoris and 15 healthy volunteers. Patients were hospitalized and followed coronary artery bypass graft procedure (CABG). MiRNA gene expression analysis was performed on total RNA extracted from blood plasma, using quantitative real-time polymerase chain reaction. CYP4F2 enzyme levels were determined using commercial ELISA kit. A non-parametric Mann-Whitney U criterion was used to evaluate quantitative data between two patients and control subjects. To evaluate statistical dependence between relative expression of miR-24-3p, miR-34a-5p and CYP4F2 enzyme concentration, Spearman's rank order correlation was used. Results were regarded as statistically significant when $p < 0.05$.

Results. (i) Relative expression of circulating miR-24-3p and miR-34a-5p was upregulated by 4.4 ($p=0.0001$) and 3.8 ($p=0.005$) -fold respectively in stable AP patient's blood plasma compared to control subjects. (ii) Concentration of CYP4F2 enzyme in blood plasma was significantly lower in AP patients compared to control subjects (range 0.1-40.5, median 7.6 ng/ml, vs. range 7.9-33.7, median 16.0 ng/ml; $p=0.0001$). Male AP patients had lower CYP4F2 concentration by comparison to women (range 0.1-18.2, median 6.2 ng/ml vs. range 1.7-40.5, median 10.7 ng/ml, $p=0.012$). Sex had no significant impact on miR-24-3p and miR-34a-5p expression in both groups. Age also had no significant effect on miR-24-3p, miR-34a-5p expression and CYP4F2 levels in all subjects. Spearman rank order correlation test showed that circulating miR-24-3p was negatively associated with CYP4F2 enzyme levels (Spearman correlation coefficient rank $r = -0.32$; $p=0.03$). (iii) Patients, users of atorvastatin had a significantly 1.5 times ($p=0.04$) higher relative miR-24-3p expression in plasma. In addition, CYP4F2 concentration was not affected by concomitant use of this drug. Other medications had no significant impact on relative expression of circulating miR-24-3p, miR-34a-5p and CYP4F2 plasma levels.

Conclusions. Our data suggests that miR-24-3p and miR-34a-5p are a part of a complex inflammatory network. Mir-24-3p and miR-34a-5p might target and reduce CYP4F2 enzyme levels, decreasing metabolism of arachidonic acid derivatives and stimulating an inflammation and atherosclerosis. To determine the exact mechanism of miRNA-CYP4F2 interactions in vitro studies are necessary.

References list:

1. Bartel DP. MicroRNA Target Recognition and Regulatory Functions. *Cell*. 2009;136(2):215–233.
2. Giza DE, Vasilescu C, Calin GA. Key principles of miRNA involvement in human diseases. *Discoveries*. 2014;2(4):e34.
3. Papageorgiou N, Tousoulis D, Androulakis E, Siasos G, Briasoulis A, Vogiatzi G, et al. The Role of microRNAs in Cardiovascular Disease. *Curr Med Chem*. 2012;19(16):2605–2610.
4. Hoekstra M, van der Lans CAC, Halvorsen B, Gullestad L, Kuiper J, Aukrust P, et al. The peripheral blood mononuclear cell microRNA signature of coronary artery disease. *Biochem Biophys Res Commun*. 2010;394(3):792–797.
5. Taurino C, Miller WH, McBride MW, McClure JD, Khanin R, Moreno MU, et al. Gene expression profiling in whole blood of patients with coronary artery disease. *Clin Sci*. 2010;119(8):335–343.
6. Fichtlscherer S, De Rosa S, Fox H, Schwietz T, Fischer A, Liebetrau C, et al. Circulating microRNAs in patients with coronary artery disease. *Circ Res*. 2010;107(5):677–684.

Women's who work standing jobs, posture, exhaustion, pain and life quality interrelations evaluation

Ugnė Gečiūnaitė, Ernesta Gurskienė

Lithuanian University of Health Sciences, Department of Sports Medicine, Kaunas, Lithuania

Introduction. Nowadays, the benefits of standing work to the human body are becoming more and more common compared to a sitting job. Most often, employees are encouraged to stand more than sit, but long intervals of standing have risk factors: back pain; lower limb pain, (1); varicose veins (2); posture changes. One of the most frequent standing jobs in our noticeable environment is pharmacists working 7 to 8 hours a day. As information about the health of pharmacists are scarce, we have sought to clarify the fatigue, pain, quality of life components, peculiarities and interrelations of pharmacists.

Research aim. Evaluate interrelations between posture, fatigue, pain and quality of life of women working in a standing job.

Research methods and organization. The survey involved 17 employees from one pharmacy network who voluntarily agreed to participate in the study (minimum age 27; maximum age 62; 44.2 years; minimum length of service 5; maximum length of service 31; 18.2 years). Research methods: 1. Questionnaire survey. With the help of our questionnaire we tried to find out the age of the subjects, the length of service, and the swelling of the legs. 3. We used a numeric analog pain scale (SAS) to measure pain. The subjects had to evaluate the pain from 0 to 10, when 0 points mean - no pain experienced, 10 - the strongest pain. We also provide a pain map for the participants for locating the pain site, asking for the localization of pain. 4. To evaluate the fatigue experienced by the subjects, we have provided them with a “Multiple Fatigue Questionnaire (MFL-20L)”. After calculating the results of the fatigue questionnaire, we received information on general fatigue, physical fatigue, decreased activity, decreased motivation and mental fatigue. The assessment of fatigue is expressed as a percentage: the higher the percentage, the greater the incidence of disability. 5. We also submitted a short “Quality of Life Questionnaire (SF-36)” for the subjects. The questionnaire is divided into eight areas: physical activity; activity limitation due to physical ailments, pain, general health assessment, energy / vitality, social function, activity limitation due to emotional disorders, emotional state. Scales are rated from 0 to 100 points, the higher the points, the better the score. Statistical data analysis was performed using IBM 22.0 and Excel software. To determine the correlation relationship, the Spearman correlation coefficient was calculated. Correlation relationships according to the values of the correlation coefficient (r) obtained: r = 0 - no correlation; r = 0 - 0.2 - very weak correlation; r = 0.21 to 0.5 weak correlation; r = 0.51 - 0.7 - average correlation, r = 0.71 - 0.9 - strong correlation; r = 1 - very strong correlation. Statistically significant correlation was determined when $p < 0.05$.

Results. In our study, it was found that there is a statistically significant direct weak link between posture and activity limitations of working subjects due to physical ailments ($r = 0.505$; $p = 0.039$). The duration of the work experience and the swelling of the legs are statistically significant and an inverse average strength relationship was determined ($r = 0.590$; $p = 0, 013$). There was a statistically significant inverse moderate strength relationship between the length of service of the study participants and their posture ($r = -0.570$; $p = 0.017$). The subject's pain and physical activity were statistically significant, inverse weak correlation determined ($r = -0.491$; $p = 0.045$). There was a statistically significant reversed average strength relationship between the participants' pain in the lower limbs and their overall fatigue ($r = -0.513$; $p = 0.035$)

Conclusions. The study found that pharmacists working for more years are characterized by higher leg swelling and worse posture. Participants who have higher activity limitations due to physical ailments have worse posture. The greater the pain the participants felt the less were they physically active, overall exhaustion is correlated with the intensity of pain felt in lower limbs.

Reference list:

1. Baker R, Lee J, Coenen P, Erin H, Ann W, Leon S. Musculoskeletal and Cognitive Effects of a Movement Intervention During Prolonged Standing for Office Work. *Human Factors Journal the Humans Factors Ergonomics Society* 2018;60(7):947–61.
2. Waters TR, Dick RB. Evidence of Health Risks Associated with Prolonged Standing at Work and Intervention Effectiveness. *Rehabil Nurs.* 2014;40(3):148–165.

The association between healthy people leukocyte telomeres length and TERT, TRF1 single nucleotide polymorphisms in different age groups

Greta Gedvilaitė¹, Alvita Vilkevičiūtė¹, Loresa Kriaučiūnienė^{1,2}, Rasa Liutkevičienė^{1,2}

¹*Neurosciences Institute, Lithuanian University of Health Sciences, Medical Academy, Kaunas, Lithuania*

²*Department of Ophthalmology, Lithuanian University of Health Sciences, Medical Academy, Kaunas, Lithuania*

Introduction. Telomeres are nucleoprotein complexes at the ends of eukaryotic chromosomes. Progressive shortening of telomeres leads to senescence, apoptosis, or oncogenic transformation of somatic cells, affecting the health and lifespan of an individual. The activity of telomerase is inhibited by regulatory proteins, which limit telomere proliferation, and it is therefore thought that TERT and TRF1 polymorphisms are closely related to telomere length.

Research aim. To determine the relationship between the leukocyte telomeres length in healthy individuals and the single nucleotide polymorphisms of TERT and TRF1.

Research methods and organization. The study enrolled 104 healthy controls. Samples of DNA from peripheral blood leukocytes were purified by DNA salting-out method. The genotyping was carried out by the RT PCR. The results were assessed using the statistical analysis method of “IBM SPSS Statistics 23.0”.

Results. We found that the T/S of II age group (26-30 years) was statistically significantly higher than in the III (31-50 years) age group and IV (31-50 years) age group ($p=0.030$ and $p=0.040$). There was also a weakly negative but statistically significant correlation between the age of the subjects and the length of the telomeres ($p<0,001$). We found that TERT rs27396098 C/T and T/T genotypes and T allele were statistically significantly more frequent in subjects with short telomeres than with long telomeres ($p=0.006$ and $p=0.0003$).

Conclusions. T/S negatively correlates with age. TERT rs2736098 polymorphism is associated with telomere shortening (TERT rs2736098 T/T genotype compared to C/C genotype was associated with 2.3-fold increased odds of telomere shortening ($p=0.040$), C/T + T/T compared to C/C genotype was associated with by 2.9-fold increased odds ($p=0.004$), while the T/T genotype compared to C/C + C/T genotypes was associated with 4.6-fold increased odds of telomere shortening ($p=0.022$). We also have found that each T allele increases the odds of telomere shortening by 2.4-fold ($p=0.002$).

Reference list:

1. Oeseburg H., de Boer R. A., van Gilst W. H., van der Harst P. Telomere biology in healthy aging and disease. *Arch Eur J Physiol.* 2010;459(2), 259–268.
2. Gomez D. E., Armando, R. G., Farina, H. G., Menna, P. L., Cerrudo, C. S., et al. Telomere structure and telomerase in health and disease. *International journal of oncology.* 2012;41(5), 1561-1569.
3. Moyzis R. K., Buckingham J. M., Cram L. S., Dani M., Deaven L. L., et al. A highly conserved repetitive DNA sequence, (TTAGGG)_n, present at the telomeres of human chromosomes. *Proceedings of the National Academy of Sciences.* 1988;85(18), 6622-6626.
4. Tamura Y., Takubo K., Aida J., Araki A., Ito H. Telomere attrition and diabetes mellitus. *Geriatrics & gerontology international,* 2016;16, 66-74.
5. Sahin E., Colla S., Liesa M., Moslehi J., Müller F. L., Guo M., Maser R. S. Telomere dysfunction induces metabolic and mitochondrial compromise. *Nature,* 2011;470(7334), 359.
6. Shay J. Role of Telomeres and Telomerase in Aging and Cancer. *Cancer Discovery.* 2016;6(6), 584-593.

Tennis player injuries and understanding the kinetic chain model of biomechanical function

Jonas Girskis

Spine treatment center, Vilnius, Lithuania

Introduction. Injuries are common in tennis players of all ages and skill levels. Two-thirds of tennis injuries are due to overuse and the other one-third is due to trauma. Overuse injuries most often affect the spine, foot, ankle, shoulders, elbows and wrists. This report will introduce how the body's natural biomechanics need to be the foundation of tennis strokes. Only then we are able to avoid struggling against our own body and the laws of physics. Understanding the inherent demands placed on the body by the sport and how the body withstands these demands can help in evaluation, treatment and reduction of injuries. Key to this is an understanding of the kinetic chain. This is especially true for the treatment of musculoskeletal impairments. In this report I will introduce the kinetic chain model through the tennis serving technique and long-term musculoskeletal imbalances through lower back pain issues. I will provide a comprehensive review of the medical literature and the personal approach which I have developed over thirty years of treating patients with musculoskeletal system problems.

Aim of the report. This report outlines the role of biomechanics in tennis player injuries. Biomechanics is a cornerstone of not only treating patients with musculoskeletal issues, but it is particularly important for tennis player development, as all tennis strokes have a fundamental mechanical structure and tennis injuries primarily have a mechanical cause. Looking at the kinetic chain model of biomechanical function, I will integrate the three interrelated parts of the human movement system (muscular, nervous, and articular) and demonstrate them as a complex lever system of our body and try to understand them as one overall model. The main mistake I recognize in present day treatment of the musculoskeletal system is the application of general exercises instead of purposeful ones. When we look for imbalance in the musculoskeletal system we must primarily identify in what part of the kinetic chain muscles have lost their physical features and which joints have an increased or decreased range of motion. Only after this, we can evaluate what we have to restore in the musculoskeletal system. And that is the essence of treating and preventing sport injuries. If we do not restore lost features to muscles, we will never correct movement. The treatment of muscular imbalances consists in promoting a rebalancing of the muscular chains, lengthening what is shortened and strengthening what is weak. Therefore, I will also talk about fascia which transmits mechanical force, because the muscle-bone concept presented in standard anatomical descriptions gives a purely mechanic model of movement. Recent studies have been investigating how fascia contributes to movement, awareness, biomechanics, injuries and pain. Fascia is an amazing anatomical system of high importance to human movement. An understanding of biomechanics is also important for the reduction of the occurrence of injury in tennis player development as well as in patients with musculoskeletal issues.

Conclusion. The kinetic chain is the biomechanical system by which the body meets these inherent demands of tennis. It generates the required forces and helps to regulate and modify loads seen on the joints. Impaired performance and/or injury of tennis players can be associated with alterations in the kinetic chain. The breakage can occur at multiple locations throughout the kinetic chain. Therefore these impairments must be evaluated as part of the overall problem. Treat the source of dysfunction rather than the location of symptoms.

Reference list:

1. Mark S. Kovacs et. al. Complete conditioning for tennis, Human Kinetics, second edition 2016.
2. E.Paul Roetert, Mark S.Kovacs. Tennis anatomy. Human Kinetics, 2011.
3. Grant Grinnell. Tennis Strategy: How to beat any style player. Copyright 2015 Grant Grinnell tennis.

4. Hall M.C., Brody L.T. Therapeutic exercise. Lipincott Williams Wilkins, 2005.
5. Thomas W. Myers. Anatomy Trains. Churchill Livingstone Elsevier. Second ed., 2010.
6. Bruce C Elliott. Biomechanics and tennis. Article Literature Review in British Journal of Sports Medicine 40 (5):392-6 June 2006
7. Ben Kibler, USA. Understanding the kinetic chain in tennis performance and injury. <https://www.aspetar.com/journal/viewarticle.aspx?id=198#.XRZ8eOgzbb1>
8. Ben Kibler, USA. The kinetic chain in tennis: do you push or pull? <https://www.aspetar.com/journal/viewarticle.aspx?id=6#.XRZ-Dugzbb0>
9. Hugo Machado Sanchez, Eliane Gouveia de Morais Sanchez. Scapular dyskinesis: biomechanics, evaluation and treatment. International Physical Medicine & Rehabilitation Journal 2018;3(6):514-520.
- Marcus Hildebrandt et al. Correlation between lumbar dysfunction and fat infiltration in lumbar multifidus muscles in patients with low back pain. BMC Musculoskeletal Disord. Published online 2017 Jan 10, doi: 1186/s12891-016-1376-1 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5223418/>
10. Sherwin Nicholson. Save your back by treating your tight hip flexors and hamstrings? August 25, 2018 |SN Health Resources <https://lowbackpainprogram.com/hip-flexors-and-hamstrings/>

Significant shoulder injuries in the overhead (tennis) athletes

Rimtautas Gudas, Laimonas Šiupšinskas

Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Department of Orthopedics Traumatology, Sports Trauma and Arthroscopic Surgery Department, Department of Sports medicine, Kaunas, Lithuania

Research aim. Purpose – to present the most common shoulder complex pain and dysfunction characteristics of the overhead athletes and to present specific guidelines needed for successful return to sports.

Research methods and organization. The sample of the research included 8 overhead athletes. All patients underwent concomitant arthroscopic type II superior-anterior-posterior labrum (SLAP), partial thickness rotator cuff tear (PTRC) repairs together with distal clavicle resection and were available for review at a minimum of 2 year after surgeries. Every intraarticular shoulder pathology was recorded and related to the symptoms and dysfunction of the shoulder. All participants were assessed preoperatively and postoperatively. Postoperative measures were taken after 21.1 ± 1.2 months. Shoulder flexion ROM and shoulder IR and ER ROM at 90° of abduction were evaluated during standard procedure. Constant score was used for evaluation of the shoulder function's quality (Constant, 2008). Ability to restore preinjury activity level was recorded for every patient. The patients underwent standard rehabilitation process in acute healing phase including physical therapy and physical modalities. Gentle and protective physical exercises were used in acute phase after the surgery.

Summary of results. Significant difference was established after 2 years. The mean improvement of Constant score value in overhead athletes group was 27 point. Although the deficit of Constant score decreased, the mean value of Constant score after 2 years hadn't returned to optimal value. All possible shoulder pain and dysfunction reasons and treatment strategy will be discussed in the presentation.

Implementing stemi care system in Lithuania: five years' experience in one of pci centers

Olivija Gustienė¹, Giedre Bakšytė¹, Ieva Jonauskienė¹, Antanas Gasys²

¹*Department of Cardiology, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania*

²*Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Dramatical changes in ST-elevation myocardial infarction (STEMI) management strategy occurred over several decades from thrombolysis era in 1975-1980 to primary percutaneous coronary intervention (PCI), first performed in 1979, later - coronary artery stenting in 1991 and drug eluting stent implementation in STEMI in 1999. Mortality from STEMI has decreased significantly over the past few decades: in-hospital mortality rate in the middle of 20th century has decreased from 30% (1) to 27% after introduction of thrombolysis into routine hospital practice (2) and in the era of PCI in-hospital mortality of patients after STEMI undergoing primary PCI is from 3% to 14% (3,4). The pre-hospital management of STEMI patients is based on regional networks designed to deliver reperfusion therapy expeditiously and effectively, with efforts made to make primary PCI available to as many patients as possible (5). Specialized STEMI care system, established in 2014, involves five centers delivering a 24/7 primary PCI service in Lithuania. During a five year period significant changes took place in management and in-hospital mortality for patients with STEMI.

Research aim. To identify changes in STEMI logistical parameters, treatment quality and in-hospital mortality, complications after implementation of care system in Lithuania.

Research methods and organization. This study included 4267 STEMI patients treated with primary PCI (PPCI) who were analyzed in a retrospective study conducted in the Hospital of the Lithuanian University of Health Sciences, Kaunas Clinics from 1st January 2014 to 1st January 2019.

The groups were analyzed according to the presence of various demographic (age, gender), logistic (time from STEMI diagnosis till primary PCI, door-to-balloon time) and clinical data, coronary artery angiography findings and PCI. Statistical analyses were performed using the SPSS software version 23.0. Subsequently, normal distribution of the data was tested using the Kolmogorov-Smirnov test. Data were logarithmically transformed before analysis when distribution of the data was not normal. Group means for continuous variables were compared using independent-samples t test. Comparison of categorical values was carried out by the chi-square test. Logistic regression analyses were performed to assess the respective independent effects of several variables on in-hospital mortality, value of age, Killip class, LVEF and pain to balloon time. While the continuous data were expressed with mean \pm SD (standard deviation), the categorical data were expressed with percentage values. A p-value less than 0.05 was considered to be significant.

Results. We studied 4267 STEMI patients during a five years period (2014-2018): 935 patients in 2014, 892 patients in 2015, 780 patients in 2016, 894 patients in 2017, 766 patients in 2018.

Mortality rate in STEMI patients had tendency to decrease: before integrated system implementation in 2013 - 11 %, in 2014 - 7 %, 2015 - 11,6 %, 2016 - 8 %, 2017- 7,9 %, 2018 - 8,2 %. Our study data clearly illustrated that during a five years period primary PCI procedures rate in STEMI patients increased every year: in 2015 there were 892 patients and 702 (78,9 %) PCI procedures performed, in 2016 - 780 patients and 623 (79,8 %) PCI, in 2017 - 894 patients and 838 (93,7 %) PCI, 2018 - 766 patients and 726 PCI (94,7 %). Logistical data studied for patients delivering primary PCI: median time from first medical contact (FMC) till PCI - from 2014 till 2018 - 94 min, 78 min, 79 min, 80 min, 83 min. Door-to-balloon time during five years - 70 min, 52 min, 58 min, 61 min, 59 min. A more detailed

analysis of 776 patients was performed in 2017 comparing demographic and clinical parameters. 237 (30,5%) of the 776 STEMI patients were women. Women were older ($73,08 \pm 11,5$ vs $63 \pm 11,2$, $p < 0,001$) and diabetes mellitus was more common in women group (23,2% vs 14,2%, $p = 0,002$). Of 776 patients 61 (7,9%) died. No statistically significant relationship between longer ischemia time and mortality was found. More women died compared to men (10,5% vs 5%, $p = 0,004$). The mortality of the elderly was higher than in the younger patients group (8,9% vs 2,6%, $p < 0,001$). The mortality rate in the diabetes mellitus group was also higher (11,4% vs 5,4%, $p = 0,012$). The number of patients with multiple coronary artery disease (≥ 2 CAD) was statistically significantly higher among dead patients (72,3% vs 27,7%, $p < 0,005$).

Conclusions. In almost all patients time from FMC till primary PCI was < 120 min and door-to-balloon time < 60 min. During five years period STEMI management and in-hospital mortality improved. In-hospital mortality decreased to less than 10%. Higher mortality rate was associated with multiple CAD older age, female gender and diabetes mellitus.

Reference list:

1. Norris RM, Canghey OE, Mercer CJ, Scott PJ. Prognosis after myocardial infarction. Six year follow-up. British Heart Journal. 1974; 36:786-790.
2. Lowel H, Dobson A, Keil U. et al. Coronary heart disease fatality in four countries. Circulation. 1993; 88: 2524-2531.
3. S. Rasoul JP, Ottervanger MJ, de Boer JH, Dambrink JC et al. Predictors of 30-day and 1-year mortality after primary percutaneous coronary intervention for ST-elevation myocardial infarction. Coron Artery Dis, 20 (6) (2009), pp. 415–421.
4. Steg PG1, Goldberg RJ, Gore JM, Fox KA, Eagle KA, Flather MD, Sadiq I, Kasper R, Rushton-Mellor SK, Anderson FA. Baseline characteristics, management practices, and in-hospital outcomes of patients hospitalized with acute coronary syndromes in the Global Registry of Acute Coronary Events (GRACE). Am J Cardiol. 2002 Aug 15;90(4):358-63.
5. Ibanez B, James S, Agewall S, Antunes MJ, et al. ESC Scientific Document Group. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC). Eur Heart J. 2018 Jan 7;39 (2):119-177.

Evaluation of the disease course of elderly patients with acute ST segment elevation myocardial infarction (STEMI)

Olivija Gustienė¹, Antanas Gasys²

¹*Department of Cardiology, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania*

²*Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Ischemic heart disease (CHD) is the leading cause of death of nearly 9 million deaths worldwide (1,2). According to the data of 2017 and 2018, the mortality rate in Lithuania increased from 13.9% up to 17.8% among men and from 8.4% up to 10.9% among women (3,4). Older age is one of the most frequently mentioned risk factors leading to a worse outcome for STEMI patients: delayed referral to a physician (5,6) due to atypical clinics, which is more often accompanied by severe left ventricular failure (LVF) - cardiogenic shock (CS) or pulmonary edema. It is also more common that elderly patients have multiple coronary artery disease (CAD), longer hospital treatment, and higher hospital mortality (7).

Research aim. To assess the progression of older patients with STEMI who were treated with primary percutaneous coronary revascularization (PCI).

Research methods and organization. During this work were evaluated 771 patients with diagnosed STEMI who were treated with primary PCI in Hospital of Lithuanian University of Health Sciences. Retrospective analysis of these data was performed: Socio-demographical data: age, gender. Logistic parameters: time from the onset of the symptoms to first medical contact (FMC), time from FMR to revascularization (door-to-balloon time). Risk factors and comorbidities: diabetes mellitus (DM), previous myocardial infarction (MI). Data of echocardiography and coronary artery angiography (CAA). Lipid profile, cardiac troponin I (cTnI), C reactive protein (CRP). Complications: pneumonia, atrial fibrillation (AF), CS, acute renal failure (ARF). Patients were divided into two groups (<65 years (<65m) patients, 65 or over (≥65m) patients) and compared. Statistical methods: All analyses were performed with IBM SPSS (Statistical Package for the Social Sciences) 22.0 and Microsoft Excel 2010. Baseline characteristics are presented as counts with percentages (p-values from chi-square-tests), and means ± standard deviations.

Results. Of the all 771 STEMI patients there were 425 (55.1%) patients aged ≥65 years. Of these, 186 (43.67%) were women. The mean age of the ≥65m group was 74.96±6.8. Of the 771 subjects, 47 (6.1%) died. The mortality of the study group was higher than that of the control group (8.9% vs 2.6%, p<0.001). The time intervals were evaluated in the STEMI study group when symptoms lasted for up to 24 hours. Average time to onset of symptoms until first medical contact (FMC) (442±366 vs 382±362, p=0.005) and door-to-balloon time (198±602 vs 150±616, p=0.002) was significantly longer in patients over ≥65 years of age. Older patients more frequently had a history of previous MI (23.2% vs 12.2%, p<0.001) and more severe LVF by Killip III, IV- (19.1% vs 9.8%, p<0.001), however older age did not affect the incidence of DM (19.1% vs 14.8%, p=0.117). CAA data showed that older patients had a statistically significant more frequent in multiple CAD (≥ 2 CAD) (74.1% vs 67.1%, p=0.032). There was no statistically significant difference in the left main coronary artery (LMCA) injury assessment (14.6% vs 10.1%, p=0.063). It was found that older patients had a statistically significant higher incidence of more significant mitral valve regurgitation (MVR) (≥2) (56.7% vs 34.2%, p <0.001) and reduced ejection fraction (EF) (40.11±9.6 vs 42.02±9.2, p=0.005). Also it was found that older patients had higher CRP values and worse lipid profile rates. There was no statistically significant difference when comparing cTnI values. Complications such as CS (8.2% vs 2,9%, p=0,002), ARF (7,1 vs 2,9, p=0,009), AF (20,7% vs 7,2%, p=0,002) and pneumonia (8,7% vs 3,8%, p=0,006) during the STEMI treatment period were more common in the elderly. The duration of hospital treatment was longer in elderly patients group (8.53 ± 5.4 vs 8.18 ± 6.2, p=0.01) (Table 1).

Conclusions. Higher mortality in the senior group may have been due to longer duration of onset of ischemic symptoms to revascularization, more frequent complications during hospitalization, more frequent multiple CAD and more frequent past MI. It was also affected that older patients had more severe MVR, lower EF, worse lipid profile and CRP rates.

Table 1. Comparison of STEMI patients by the age.

Age	Group	≥65 years 425 (55.1%)	<65years 346 (44.9%)	p value
Women n (%)		186 (43.8%)	48 (13.9%)	<0.001
Age		74.96±6.8	55.01± 7.1	<0.001
In hospital mortality n, (%)		38 (8.9%)	9 (2.6%)	<0.001
Length of total hospital stay (day)		8.53±5.4	8.18±6.2	0.01
Time from onset of the symptoms to FMC, min		442±366	382±362	0.005

Door-to-balloon time, min	198±602	150±616	0.002
Previous MI n, (%)	98 (23.2%)	42 (12.2%)	<0.001
Diabetes mellitus n, (%)	81 (19.1%)	51 (14.8%)	0.117
Killip class III, IV, n (%)	81 (19.1%)	34 (9.8%)	<0.001
≥2 CAD, n (%)	315 (74.1%)	232 (67.1%)	0.032
LMCA injury, n (%)	62 (14.6%)	35 (10.1%)	0.063
MVR degree 2-4 n, (%)	241 (56.7%)	118 (34.2%)	<0.001
EF %	40.11±9.6	42.02±9.2	0.005
AF n (%)	88 (20.7%)	25 (7.2%)	0.001
ARF n (%)	30 (7.1%)	10 (2.9%)	0.009
Pneumonia n (%)	37 (8.7%)	13 (3.8%)	0.006
CS n (%)	35 (8.2%)	10 (2.9%)	0.002
cTnI, µg/l	29.6 ± 50.6	31.7 ± 50.2	0.532
CRP, mg/l	33.6 ± 42.5	26.5 ± 51	0.010
Cholesterol mmol/l	5.3 ± 1.3	5.1 ± 1.4	0.029
High density lipoprotein mmol/l	1.1 ± 0.3	1.2 ± 0.4	0.027
Low density lipoprotein mmol/l	3.5 ± 1.2	3.3 ± 1.2	0.045
Triglyceride mmol/l	1.7 ± 1.1	1.3 ± 0.7	<0.001

(FMC- first medical contact; CAD- coronary artery disease; LMCA- left main coronary artery; MVR- mitral valve regurgitation; EF- ejection fraction; AF-atrial fibrillation; ARF- acute renal failure; CS- cardiogenic shock; cTnI- cardiac troponin; CRP- C reactive protein;)

Reference list:

1. World Health Organisation. The top 10 causes of death [Internet]. Fact Sheet. 2014. p. 1–5. Available from: <http://www.who.int/mediacentre/factsheets/fs310/en/>
2. Ibanez B, James S, Agewall S, Antunes MJ, Bucciarelli-Ducci C, Bueno H, et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *European Heart Journal*. 2018.
3. Higienos institutas Sveikatos informacijos centras Mirties priežastys. 2017; Available from: www.hi.lt
4. Higienos institutas. Sveikatos informacijos centras. Mirties priežastys (išankstiniai duomenys). 2019; Available from: www.hi.lt
5. Mohan B, Varma S, Wander GS, Roy A, Dogra N, Bansal R, et al. Factors influencing prehospital delay in patients presenting with ST-elevation myocardial infarction and the impact of prehospital electrocardiogram. Vol. 70, *Indian Heart Journal*. 2018. p. S194–8.
6. Pilgrim T, Heg D, Tal K, Erne P, Radovanovic D, Windecker S, et al. Age- and gender-related disparities in primary percutaneous coronary interventions for acute ST-segment elevation myocardial infarction. Vol. 10, *PLoS ONE*. 2015.
7. Chua SK, Shyu KG, Hung HF, Cheng JJ, Lo HM, Liu SC, et al. Gender and age differences in short- and long-term outcomes following primary percutaneous coronary intervention for ST-elevation myocardial infarction. Vol. 30, *Acta Cardiologica Sinica*. 2014. p. 274–83.

Impact of physical activity on the risk of metabolic syndrome: results from a hapiee study

V. Jasiukaitienė¹, D. Lukšienė^{1,2}, A. Tamošiūnas^{1,3}, R. Radišauskas^{1,2}, M. Bobak⁴

¹*Laboratory of Population Studies of Institute of Cardiology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Environmental and Occupational Medicine, Public Health Faculty, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

³*Department of Preventive Medicine, Public Health Faculty, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

⁴*Department of Epidemiology and Public Health, University College London, London, United Kingdom*

Introduction. The 2018 Ageing Report which analyzed Europe policy challenges for ageing societies shows that fiscal costs linked to pensions, health care and long-term care are expected to rise over the coming decades, as Europe's population continues to age significantly (1). Thus if we want to achieve healthy ageing it is necessary to identify and understand determinants of human's health and disease, as well as risk factors for the disease over time (2). In Lithuania, the incidence and mortality rates of cardiovascular diseases (CVD) are higher than in most European countries (3,4). For this reason, it is very important to determine the major risk factors that may be associated with CVD. In previous studies we analyzed metabolic syndrome as risk factors of mortality from CVD (5). Thus is very important to analyze that risk factors cloud reduce metabolic syndrome rate in adult and elderly Lithuanian population.

Research aim. To investigate the impact of physical activity on the risk of the metabolic syndrome and its components in adult and elderly Lithuanian urban population.

Research methods and organization. The study presents data from the survey within the framework of the international project Health, Alcohol and Psychosocial Factors in Eastern Europe (HAPIEE). The study protocol was approved by the Ethics Committee at the University College London, UK and by the regional Ethics Committee at Lithuanian University of Health Sciences, Lithuania. A random sample of 4,257 participants (2076 men; 2181 women) aged 45-72 years were selected for statistical analysis. The diagnostic criteria for the metabolic syndrome by the Third Report of the National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III) definition are as the presence of three or more of the following risk determinants: 1) increased waist circumference (≥ 102 cm for men, ≥ 88 cm for women); 2) elevated triglycerides (≥ 1.7 mmol/L); 3) low HDL cholesterol (< 1.0 mmol/L in men, < 1.3 mmol/L in women); 4) arterial hypertension ($\geq 130/85$ mmHg); 5) impaired fasting glucose (≥ 6.1 mmol/L) [6]. Physical activity was determined by the mean length of time spent per week during leisure time in winter and summer for walking, moderate and hard work like gardening and other physical activities. The respondents were categorised into two groups according to their physical activity in leisure time: physically active (10 hours or more) and inactive (< 10 hours). Multivariable logistic regression analysis was performed to determine the independent associations between the physical activity and metabolic syndrome and its components expressed as odds ratio (OR) with 95% CI.

Results. Despite the fact that metabolic syndrome as the main factor of CVD was more prevalent in women compared to men (respectively 30.5% and 22.2%; $p < 0.001$), the mean values of metabolic syndrome components such as waist circumference, triglycerides were higher in men in comparison to women ($p < 0.01$). Also arterial hypertension was more prevalent in men in comparison to women (respectively 83.4% and 69.8%; $p < 0.001$). Women were more physically active compared to men (respectively 82.5 % and 68.8%; $p < 0.001$). After multivariable logistic regression analysis, the results show that an increase of physical activity level by one hour associated with lower risk of metabolic

syndrome by 2% among men (OR=0.98; 95% CI 0.98-0.99; p=0.001) and by 1% among women (OR=0.99; 95% CI 0.98-1.00; p=0.074). The physically active men had a lower odds of arterial hypertension (OR=0.70; 95% CI 0.54-0.91; p=0.008); and a lower odds of increased waist circumference (OR=0.78; 95% CI 0.63-0.97; p=0.023) and increased glucose level (OR=0.72; 95% CI 0.59-0.88; p=0.002) in comparison with physically inactive men. The physically active women had a lower odds of increased glucose level in blood (OR=0.78; 95% CI 0.62-0.99; p=0.046) in comparison with physically inactive women.

Conclusions. The physical inactivity is a strong predictor of metabolic syndrome, especially in men group.

Reference list:

1. 2018 Ageing Report: Policy challenges for ageing societies. https://ec.europa.eu/info/news/economy-finance/policy-implications-ageing-examined-new-report-2018-may-25_en
2. Courtin E, Jemai N, Mossialos E. Mapping support policies for informal carers across the European Union. *Health Policy* 2014;118:84-94.
3. Lithuanian Health Statistics. http://hi.lt/html/en/health_statistic.htm
4. Causes of death statistics, Eurostat 9/2018. http://ec.europa.eu/eurostat/statistics-explained/index.php/Causes_of_death_statistics#
5. Luksiene D, Baceviciene M, Jureniene K et al. All-cause and cardiovascular mortality risk estimation using different definitions of metabolic syndrome in Lithuanian urban population. *Prev Med* 2012;55:299-304.
6. Third Report of the National Cholesterol Education Program (NCEP) expert panel on detection, evaluation and treatment of high blood cholesterol in adults (Adult Treatment Panel III) final report. *Circulation* 2002;106:3143-421.

Funding. The HAPIEE study was funded by grants from the Wellcome Trust (grant no.081081/Z/06/Z), the US National Institute on Aging (grant no. 1R01 AG23522), and by the MacArthur Foundation (Health and Social Upheaval network). The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Association between vitamin d deficiency and allergic symptom in pregnant women

Kumiko T Kanatani^{1,2}, Yuichi Adachi³, Kei Hamazaki⁴, Kazunari Onishi⁵, Tohshin Go², Kyoko Hirabayashi², Youichi Kurozawa⁵, Hidekuni Inadera⁴, Hiroshi Oyama⁶, Takeo Nakayama¹

¹*Department of Health Informatics, Kyoto University School of Public Health, Kyoto, Japan*

²*Kyoto Unit Centre for Japan Environment and Children's Study, Graduate School of Medicine, Kyoto University, Kyoto, Japan*

³*Department of Pediatrics, Faculty of Medicine, University of Toyama, Toyama, Japan*

⁴*Department of Public Health, University of Toyama, Toyama, Japan*

⁵*Department of Public Health, Tottori University, Yonago, Tottori, Japan*

⁶*Department of Clinical Information Engineering, Health Services Sciences, School of Public Health, Graduate School of Medicine, the University of Tokyo, Tokyo, Japan*

Introduction. Vitamin D affects both innate, and acquired immunity with immune cells having the vitamin D receptors. The co-occurrence of the high prevalence of allergic diseases and vitamin D deficiency in recent decades, has presented a hypothesis on whether there is a reasonable association between them.

Research aim. To investigate the association between serum vitamin D deficiency and allergic symptoms.

Research methods and organization. Historical cohort. On a cohort study to investigate the association between desert dust exposure and allergic symptoms in 3,327 pregnant women during spring and fall in 2011-2013 in Japan conducted as an adjunct study to the Japan Environment and Children's Study, we promptly acquired subjects' daily allergic symptom scores by sending a web-based questionnaire to each participant on some days. Of the 29,434 answers provided by 3,327 participating pregnant women, we extracted 13,356 answers from 1,475 pregnant women that were answered within a 3-month period after blood samplings. And we measured 25(OH)D levels on those samples to investigate the association between their vitamin D deficiency (serum 25(OH)D < 20ng/mL) and the occurrence of any allergic symptom (allergic symptom score > 0) within 3 months.

Results. Serum 25(OH)D was less than 20ng/mL in 1,233 of 1,745 samples (70.7%). The adjusted odds ratio for occurrence of any allergic symptom in deficient cases compared with non-deficient cases was 1.33 (95% CI: 1.07 – 1.64, p=0.01). Further, vitamin D deficiency significantly enhanced the risk increase at desert dust events and at pollen exposure (p-values for interaction <0.1).

Conclusions. We confirmed the association between serum vitamin D deficiency and allergic symptoms in Japanese pregnant women.

Athletes and non-athletes adolescents' use of smart phones duration, habits and relationship between the upper cross syndrome

Dalia Marčiulionytė¹, Algė Daunoravičienė¹, Aurelijus Domeika², Milda Dubosienė³

¹*Lithuanian University of Health Sciences, Department of Sports Medicine, Kaunas, Lithuania*

²*Kaunas University of Technology, Department of Engineering Mechanics, Kaunas, Lithuania*

³*Kaunas University of Technology, Institute of Mechatronics, Kaunas, Lithuania*

Introduction. Nowadays, teenagers and children can use the phone anywhere, anytime, so the smartphone and bone systems of smart phone users can be overloaded by long-term use without changing position (1). Continuous load changes the curvature of the neck bones, which causes the upper cross syndrome due to a muscle model imbalance, muscle fatigue, which later causes a rounded shoulder posture and promote repetitive use of certain muscles, resulting in muscle fiber injury, cumulative damage from acute trauma, and myogenic tonus, which occur most often in the neck and shoulders (1, 2, 3).

Research aim. To determine the relationship between the duration and habits of using a smartphone of athletes and non-athletes adolescents.

Research methods and organization. This study was approved by the Bioethics Center of the Lithuanian University of Health Sciences. The study was organized between March 2019 and June at the "X" School and Kaunas University of Technology. The study involved students aged from 15 to 18 years old (n = 27). According to the responses of the questionnaire, the subject were selected without any structural posture changes: athletes adolescents (sports: basketball, volleyball) engaged in sports for at least 1 year, 3 times a week; non-athletes adolescents (visiting Physical Education Lessons). Distribution of adolescents in groups: athletes - 15 teenagers: 7 boys and 8 girls and non-athletes: 12 teenagers: 8 boys and 4 girls. Age distribution in groups of athletes (16.60±0.24), non-athletes (17.92±0.15). The questionnaire was based on the authors of Guan and others (2015) and Kalirathin and others (2017) (4, 5). Head and neck angle measurement using the "Wall" test: The angle of the head and neck of the subjects was measured in a sagittal plane by measuring the distance between the neck and the wall (6). Tape Measure Method was used to evaluate cervical spine flexion and extension. The

difference between initial and final measurements was the range of motion (7). Assessment of endurance and strength of deep neck muscles: while using deep neck muscle endurance test and stabilizer to evaluate the deep muscle strength of the neck (8, 9). Trapezius muscle electric activity was evaluated using electromyograph (Myotrace 400). The both side of upper trapezius muscle electric activity was measured at rest. Subjects were given the task of browsing the phone for 10 minutes as they are used to doing it normally. Immediately thereafter, the activity of the upper trapezius muscle was measured. The subjects were asked to use the smartphone again for 10 minutes and the activity of the upper trapezius electric muscle was measured again (2). Statistical data analysis was performed using Microsoft Office suite Excel 2013 and IBM SPSS Statistics 21.0 programs. The arithmetic mean of the quantitative variables and the standard deviation (\pm) were provided for the data analysis. The data is presented as median (Xme), minimum value (Xmin), maximum value (Xmax) and arithmetic mean (m) - Xme (Xmin; Xmax; m). Statistical significance for independent samples was assessed using the Mann - Whitney U criterion. Spearman correlation coefficient (r) was used to calculate the links. Data level for statistical significance was set at $p < 0.05$.

Results. When comparing athletes and non-athletes groups, it was found that 80% of athletes use a smart phone > 6 years, 13.3% > 3 and ≤ 6 years, 6.7% > 1 and ≤ 3 years, while non-athletes 75% > 6 years, 25% > 3 and ≤ 6 years. In the study of the use of the smartphone during the day, it was found that 13.3% of the athletes were using a smartphone > 5 hours, 40% > 3 and ≤ 5 hours per day, 46.7% > 1 and ≤ 3 hours, while non-athletes 25% used > 5 hours 16.6% > 3 and ≤ 5 hours and 58.3% > 1 and ≤ 3 hours per day. No statistically significant data were found for both groups ($p > 0.05$). While evaluating head position, head flexion, extension and deep neck muscles endurance and strength, there was no statistically significant result between groups: head position ($U = 57,5$; $p = 0,11$); head flexion ($U = 57,5$; $p = 0,11$); head extension ($U = 74,0$; $p = 0,46$); deep neck muscle endurance ($U = 53,5$; $p = 0,75$); deep neck muscle strength ($U = 54,0$; $p = 0,83$). When looking for the relationship between the results of the questionnaire, the assessment of the head position and the results of the strength and endurance of the deep neck muscles there was found a reversed, moderate strength relationship in the athlete's group, between the use of the daily smart phone and the upper limb injuries ($r = -0.59$; $p < 0.05$); a strong direct connection between felt fatigue, pain and other unpleasant sensations using a smart phone and endurance of deep neck muscles ($r = 0.72$, $p < 0.05$). In the non-athlete group, there was a direct, moderate relationship between the number of active days per week and the feeling of fatigue, pain, and other unpleasant sensations using a smart phone ($r = 0.59$; $p < 0.05$), and a reversed, moderate strength relationship between felt fatigue, pain and other uncomfortable sensations and using a smart phone ($r = -0.595$, $p < 0.05$). Comparing the strength of the left side maximal trapezoid muscle contraction of athletes and non-athletes, the results were statistically significant ($U = 45$; $p = 0.28$), the results were similar on the right, and the trapezoid muscle strength of both groups was statistically significant ($U = 46.5$; $p = 0.32$). By comparing the left-side upper trapezius muscle contraction force of the two groups after 20 minutes of use of the phone, the results were statistically significant ($U = 21.5$; $p = 0.0004$), analogous to the results obtained, and the upper trapezius muscle strength of both groups was statistically significant after 20 minutes differed ($U = 19.5$; $p = 0.0002$).

Conclusions. The head position, head flexion and extension were not statistically significantly different between athletes and non-athletes. The strength and endurance of the teenagers' deep neck muscles were not statistically significantly different between athletes and non-athletes. It was found that the upper left and right side of the upper trapezius muscle contraction force after 20 minutes of use of the phone were statistically significantly different between athletes and non-athletes. It is determined that the more teenagers spend their time sitting while using the smartphone the more the strength of deep neck muscles is getting worse.

Reference list:

1. Park J, Kim K, Kim N, Choi I, Lee S, Tak S, Yim J. A Comparison of Cervical Flexion, Pain, and Clinical Depression in Frequency of Smartphone Use International Journal of Bio-Science and Bio-Technology, 2015; 7(3); 183-190.
2. Kietrys David M, Gerg Michael J, Dropkin J, Gold Judith E. Mobile input device type, texting style and screen size influence upper extremity and trapezius muscle activity, and cervical posture while texting.. Applied Ergonomics. 2015; 98-104.
3. Yang S, Chen M, Huang Y, Lin C, Chang J. Association between smartphone use and musculoskeletal discomfort in adolescent students. Journal of Community Health. 2016, 42(3); 423 – 430.
4. Guan X, Fan G, Wu X, Zeng Y, Su H, Gu G, Zhou Q, Gu X, Zhang H. Photographic measurement of head and cervical posture when viewing mobile phone: A pilot study. European Spine Journal. 2015, 24(12); 2892-2898.
5. Kalirathinam D, Manoharlal M, Mei C, Ling C, Sheng T, Jerome A, Rao M. Association between the usage of Smartphone as the risk factor for the prevalence of upper extremity and neck symptoms among University students: A cross - sectional survey based study. Research. Journal of Pharmacy and Technology. 2017, 10 (4); 1184-1190.
6. Dorenbosch Heuft Liesbeth, Vosse Debby, Landewé Robert, Spoorenberg Anneke, Dougados Maxime, Mielants Herman. Measurement of spinal mobility in ankylosing spondylitis: comparison of occiput-to-wall and tragus-to-wall distance. The journal of rheumatology, 2004; 31:9.
7. Jordan Kelvin. Assessment of Published Reliability Studies for Cervical Spine Range-of-Motion Measurement Tools. Journal of Manipulative and Physiological Therapeutics. 2000; 23(3), 80-195.
8. Laura Smith, Thomas Ruediger, Bara Alsalaheen, Ryan Bean. Performance of high school football players on clinical measures of deep cervical flexor endurance and cervical active range of motion: is history of concussion a factor? Int J Sports Phys Ther. 2016; 11(2): 156–163.
9. Parazza S, Vanti C, O'Reill, C, Villafane H, Tricas M. The relationship between cervical flexor endurance, cervical extensor endurance, VAS and disability in subjects with neck pain. Chiropractic & Manual Therapies, 2014; 22(10), 1-7.

New data for determining platelet reactivity in patients with diabetes after acute coronary syndromes

Ugnė Meškauskaitė¹, Nora Kupstytė², Vacis Tatarūnas¹, Vaiva Lesauskaitė¹

¹*Institute of Cardiology of Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Cardiology of Lithuanian University of Health Science, Kaunas, Lithuania*

Introduction. The diabetic patients with coronary heart disease have higher rates of myocardial infarction (MI), stent thrombosis or even death than non-diabetic patients (1). However, current acute coronary syndrome (ACS) treatment guidelines only recommend the same treatment strategy for patients with diabetes and non-diabetic patients (2,3). Antiplatelet drug is prescribed irrespective of diabetes status (3).

Research aim. The aim of the current investigation was to determine the impact of clinical factors and 20-HETE concentration on platelet reactivity in patients with diabetes treated by dual antiplatelet therapy (DAPT) after acute coronary syndromes.

Research methods and organization. Clinical data and DNA samples were collected from study subjects hospitalized in the Department of Cardiology at the Hospital of Lithuanian University of Health Sciences (LUHS) in Kaunas. All patients (n = 667) were hospitalized for percutaneous coronary intervention and stent implantation due to acute coronary syndromes (myocardial infarction or unstable angina). Detection of 20-HETE in blood plasma was performed in collaboration of Laboratory of

Molecular Cardiology, Institute of Cardiology, Lithuanian University of Health Sciences and Institute of Pharmacy of Lithuanian University of Health Sciences in Kaunas, Lithuania. Higher than 30 %Agr levels of platelet aggregation after induction with adenosine diphosphate (ADP) were defined as higher platelet reactivity during antiplatelet therapy. The relationship between the higher platelet reactivity, clinical factors and 20-HETE concentration after induction with ADP were established by using multivariate binary regression analysis.

Results. Multivariate binary regression analysis demonstrated that female gender, insulin use and higher 20-HETE concentration increased odds for higher platelet reactivity (and lower antiplatelet activity) during initiation of antiplatelet therapy (OR: 1.855, 95% CI: 1.069-3.219, $p = 0.028$, OR: 2.665, 95% CI: 1.116-6.365, $p = 0.027$ and OR: 1.086, 95% CI: 1.034-1.140, $p = 0.001$, respectively), while ticagrelor use decreased odds for higher platelet reactivity (and lower antiplatelet activity) (OR: 0.112, 95% CI: 0.065-0.195, $p < 0.001$) in comparison to clopidogrel.

Conclusions. Results of this study demonstrated that patient gender, insulin use and 20-HETE increase the risk of higher platelet reactivity in diabetic patients receiving DAPT after ACS. Ticagrelor decrease the risk of higher platelet reactivity.

Reference list:

1. Windecker S, Kolh P, Alfonso F, Collet JP, Cremer J, Falk V, et al. 2014 ESC/EACTS guidelines on myocardial revascularization: the task force on myocardial revascularization of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS) developed with the special contribution of the European Association of Percutaneous Cardiovascular Interventions (EAPCI). *Eur Heart J.* 2014 Oct 1;35(37):2541-619.
2. Ibanez B, James S, Agewall S, Antunes MJ, Bucciarelli-Ducci C, Bueno H, et al. 2017 ESC guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: the task force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC). *Eur Heart J.* 2018 Jan 7;39(2):119-77.
3. Toth PP. Management of acute coronary syndromes in patients with diabetes. *J Fam Pract.* 2017 Dec;66(12).

Abca1 rs1883025 genotyp and haplotype evaluation in patients with age-related macular degeneration and it's anti-vegf inhibitory treatment

Rūta Mockutė¹, Rasa Liutkevičienė^{1,2}, Vilma Jūratė Balčiūnienė², Alvita Vilkevičiūtė²

¹*Department of Ophthalmology, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Neuroscience Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. The pathophysiology of the age-related macular degeneration (AMD) is complicated. It is a disease of multifactorial etiology arising due to the aginggenetics and environmental factors. Studied mechanisms of the disease mainly combines oxidative stress, immune system's dysregulation, and lipid/protein accumulation. Study is to find relation between exudative AMD genes controlling lipid metabolism and anti-VEGF treatment results.

Research aim. To determine the relation between ABCA1 rs1883025 gene polymorphisms and exudative AMD and it's anti-VEGF inhibitory treatment.

Research methods and organization. The study enrolled 104 patients with exudative age-related macular degeneration and 201 healthy person. Based on effect of anti-VEGF, the patients were classified in to groups; 86 responders and 18 non-responders. The From the subjects' venous blood leukocyte's ABCA1 rs1883025 genotypes were examined using the real-time polymerase chain reaction method. Retrospectively the primary and after 3 and 6 month during the treatment visual acuity (BCVA) data

collected from the outpatient cards and the central retina thickness (CRT) from the optical coherent tomography (OCT) device's (RS-3000 Advance) data base. Statistical data analysis were assessed using the computerized statistical analysis software "IBM SPSS Statistics 20.0".

Results. The analysis of ABCA1 rs1883025 gene polymorphism did not reveal any differences in the distribution of C/C, C/T, and T/T genotypes between the eAMD group and the control group (56.7%, 33.7%, and 3.87% in the eAMD group and 62.2%, 31.3% and 6.5%, in the control group, $p=0.397$, respectively). The T aleli was more frequent in non-responders eAMD compared to responders eAMD (41.7% vs. 21.1%; $p=0.009$).

Conclusions. Rs1883025 gene T aleli was more frequent in patients with non-responder eAMD compared to responder eAMD.

Retrospective analysis of clinical signs, complications and survival in patients with acute inferior myocardial infarction

Gintarė Neverauskaitė-Piliponienė¹, Rasa Kūgienė^{1,2,3}, Žaneta Petrulionienė^{1,2,3}, Pranas Šerpytis^{1,2}

¹*Faculty of Medicine, Vilnius University, Vilnius, Lithuania*

²*Clinic of Heart and Vessel Diseases, Institute of Clinical Medicine Faculty of Medicine, Vilnius University, Vilnius, Lithuania*

³*Vilnius University Hospital Santaros Klinikos, Vilnius, Lithuania*

Introduction. Right ventricular myocardial infarction accompanies around 30–50% cases of inferior wall myocardial infarction (1). Right ventricular myocardial infarction is associated with higher rates of cardiogenic shock, heart rhythm and conduction disorders, increased mortality rates (2,3,4). The topic requires a scientific update, as only a few studies have been made on right ventricular myocardial infarction during the past decade.

Research aim. We aimed to analyze the impact of right ventricular myocardial infarction on inferior myocardial infarction.

Research methods and organization. Retrospective study included 1240 patients with documented inferior myocardial infarction (with and without right ventricular myocardial infarction) between January 2013 and January 2016. Data on baseline characteristics, mortality, in-hospital complications: cardiogenic shock and rhythm and conduction disorders was collected.

Results. Inferior myocardial infarction with right ventricular myocardial infarction appeared in 32.9% of the cases and 67,1% cases were without right ventricle involvement. Basic characteristics did not differ between groups. Patients with right ventricular myocardial infarction had a higher rate of electrical complications than patients without right ventricle involvement: atrioventricular block (OR 3.8, 95% CI 2.0-7.1, $p<0.001$), atrial fibrillation (OR 1.6, 95% CI 0.9-2.9, $p=0.001$), cardiogenic shock (OR 2.7, 95% CI 1.8-3.8, $p=0.00013$). Mortality rates after 24-months were higher in RVMI groups (OR 1.7, 95% CI 1.2-3.8, $p=0.034$). No significant difference was found on in-hospital mortality.

Conclusions. Right ventricular involvement complicates inferior myocardial infarction. It is related to a higher incidence of in-hospital complications, especially I-III degree AV block and atrial fibrillation. However, influence on long-term mortality needs further investigation.

Reference list:

1. Albulushi A, Giannopoulos A, Kafkas N, Dragasis S, Pavlides G, Chatzizisis YS. Acute right ventricular myocardial infarction. *Expert Rev Cardiovasc Ther* 2018;16:455–64.
2. Goldstein JA. Pathophysiology and management of right heart ischemia. *J Am Coll Cardiol* 2002;40:841–53.

3. Goldstein JA. Acute right ventricular infarction. *Cardiol Clin* 2012;30:219–32.
4. Namana V, Gupta SS, Abbasi AA, Raheja H, Shani J, Hollander G. Right ventricular infarction. *Cardiovasc Revasc Med* 2018;19:43–50.

Coronary physiology based versus angiography guided coronary artery bypass grafting

R. Ordienė¹, J. Plisienė¹, A. Jankauskas⁴, R. Žaliūnas¹, M. Adomaitytė³, P. Jakuška², R. Benetis², R. Unikas¹

¹*Department of Cardiology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Cardiac, Thoracic and Vascular Surgery, Lithuanian University of Health Sciences, Kaunas, Lithuania*

³*Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

⁴*Department of Radiology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Coronary artery bypass grafting (CABG) remains the recommended revascularization strategy for multi-vessel coronary artery disease (MVD) (1,2,3). The selection of which vessels to bypass is usually at the discretion of the surgeon and based on angiographic imaging. Coronary physiology measurements is more accurate at determining the hemodynamic significance of coronary lesions and has been demonstrated to improve outcomes when used to guide percutaneous intervention (4,5,6). The use of intracoronary physiology has not been extensively studied or validated in patients undergoing coronary artery bypass grafting. Non-randomized single center registry studies have demonstrated that grafting vessels without haemodynamically significant stenoses predispose to graft failure (7,8). However, no study has prospectively assessed the role of physiology in determining which vessels should be grafted and how this approach compares to traditional methods.

Research aim. This pilot, blinded study is designed to prospectively compare graft patency and outcomes using a physiologically guided approach compared to standard angiographically guided CABG.

Research methods and organization. Study so far included 35 patients (pts.) (mean age 68±7 years) with multi-vessel coronary artery disease (MVD) when optimal revascularization method had been decided as CABG. Measurements of instantaneous wave-free ratio (iFR) was made in 105 vessels suitable for grafting according to standardized technique. Patients randomized to standard therapy underwent CABG with the number of grafted vessels dictated by the treating clinical team. Patients randomized to physiology-guided CABG only had grafts placed onto vessels that had been proven to have haemodynamically significant stenoses on a pressure wire measurement with an expectation with left internal mammary artery (LIMA) on left anterior descending artery (LAD). Post-surgery follow-up: grafts patency at 2 months were assessed using computer tomography (CT) coronary angiography. Clinic visit and quality of life questionnaires were recorded at 60 days and 6 months. Defined primary endpoint: composite of MACE (MI, Death, stroke, unplanned revascularization) and graft patency at early period – 2 months.

Results. Despite big amount of patients with MVD referred for CABG, many of them were excluded from the study because of low ejection fraction, severe comorbidities, atrial fibrillation or left main stenosis, which doesn't allow us to differentiate hemodynamically significant stenoses in each vessel. From 2018 December to 2019 June 50 patients were enrolled leaving 18 and 17 in iFR and angiographically guided groups respectively, because of different subjective reasons. Baseline characteristics of both groups (age, sex, preoperative morbidity) were similar. Grafts amount in both

groups didn't differ significantly (in iFR-guided group mean amount of grafts were $2,76 \pm 0,066$, in angiographically-guided – $3,22 \pm 0,88$, $p=0,91$). CT scan so far was assessed for 21 patients (11 vs. 10 in the iFR-guided and angiographically –guided groups, respectively). Graft failures were similar in both groups (10% vs. 6%, $p=0,667$). During 6 months from the start of the study, no MACCE were documented. All grafts diagnosed as failed were LIMA grafts. All iFR measurements of mentioned grafts were in grey zone (0,85-0,93).

Conclusions. According to multicenter iFR-SWEDEHEART study, we could suspect that negative iFR result can lead to early graft failure, but surprisingly grey zone measurements show early arterial graft patency loss too. However, despite negative iFR results, saphenous vein grafts failure were absent at early follow-up and no events related to calcified lesions but not significant iFR measurements were present. More data needs to be collected to have a significant difference or not between these two study groups.

Reference list:

- Gössl, M., Faxon, D.P., Bell, M.R., Holmes, D.R., Gersh, B.J., Clinic, M., Rochester, B, M.R., H, D.R., G, B.J., Cardiology, D. of, Hospital, W. and F, D.P. (2012) 'Complete versus incomplete Revascularization with coronary artery bypass graft or Percutaneous intervention in stable coronary artery disease', *Circulation: Cardiovascular Interventions*, 5(4), pp. 597–604. doi: 10.1161/CIRCINTERVENTIONS.111.965509.
- Sipahi, I., Akay, M., Dagdelen, S., Blitz, A. and Alhan, C. (2013) 'Coronary artery bypass grafting vs percutaneous coronary intervention and long-term mortality and morbidity in multivessel disease: Meta-analysis of randomized clinical trials of the arterial grafting and stenting era', *JAMA internal medicine*, 174(2), pp. 223–30.
- Brooks MM, Chaitman BR, Nesto RW, Hardison RM, Feit F, Gersh BJ, Krone RJ, Sako EY, Rogers WJ, Garber AJ, King SB 3rd, Davidson CJ, Ikeno F, Frye RL. Clinical, angiographic risk stratification differential impact on treatment outcomes in the Bypass Angioplasty Revascularization Investigation 2 Diabetes (BARI 2D) trial. *Circulation* 2012;126(17):2115 – 2124.
- Fearon, W.F. (2015) 'Invasive coronary physiology for assessing intermediate lesions', *Circulation: Cardiovascular Interventions*, 8(2), p. 1942. doi: 10.1161/CIRCINTERVENTIONS.114.001942.
- Zhang, D., Lv, S., Song, X., Yuan, F., Xu, F., Zhang, M., Yan, S. and Cao, X. (2015) 'Fractional flow reserve versus angiography for guiding percutaneous coronary intervention: A meta-analysis', *Heart*, pp. 2014–306578. doi: 10.1136/heartjnl-2014-306578.
- Nijjer, S.S., Sen, S., Petraco, R., Escaned, J., Echavarría-Pinto, M., Broyd, C., Lamee, R. Al-, Foin, N., Foale, R.A., Malik, I.S., Mikhail, G.W., Sethi, A.S., Bustami, M. Al-, Kaprielian, R.R., Khan, M.A., 7. Baker, C.S., Bellamy, M.F., Hughes, A.D., Mayet, J., Francis, D.P., Mario, D., Carlo, Davies, J.E.R., Kingdom, U., Institute, C., Carlos, H.C.S., Science, I. of C. and Di Mario, C. (2014) Pre-Angioplasty instantaneous wave-free ratio pullback provides virtual intervention and predicts Hemodynamic outcome for serial lesions and diffuse coronary artery disease. Available at: <http://interventions.onlinejacc.org/article.aspx?articleid=1974815#tab1> (Accessed: 1 April 2016).
- Parang, P. and Arora, R. (2009) 'Coronary vein graft disease: Pathogenesis and prevention', *Can J Cardiol*. 2009 Feb; 25(2): e57–e62., 25(2).
- Sabik, J.F. (2011) 'Understanding Saphenous vein graft Patency', *Circulation*, 124(3), pp. 273–275. doi: 10.1161/CIRCULATIONAHA.111.039842.

Quality of life and self-care changes of the patients with heart failure after long term monitoring program

R. Paleckienė¹, J. Macijauskienė², A. Kavoliunienė¹, D. Žaliaduonytė – Pekšienė¹, V. Grumulytė³, A. Mazutavičiūtė³

¹*Department of Cardiology, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Geriatrics, Lithuanian University of Health Sciences, Kaunas, Lithuania*

³*Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. According Hygiene Institute data, in 2018 in Lithuania, the incidence of heart failure (HF) was 9 000 cases, due to Cardiovascular diseases died 218669 patients (1). To prevent worsening of HF and the complications - patient's death it's important not only prescribe optimal medications treatment, but also to inform patient's how to recognize worsening HF, adjust modified risk factors (2,3). HF patient's education increases their attention to self-care (4). HF patient's self-management reduces hospitalization and mortality and improves their quality of life (5).

Research aim. To evaluate the changes on the self-care and the quality of life before and after the long-term monitoring program for patients with heart failure.

Research methods and organization.: The data of 83 patients (New York Heart Association class II–III symptoms), discharged from the Department of Cardiology of Lithuanian University of Health Sciences in 2017-2018 after worsening of HF (coded I50 according to ICD-10, chronic either decompensated or de novo cases) were analyzed. All patients participated in the long-term monitoring program and had four visits to cardiologist and participated in 4 training modules provided by a heart failure nurse. Sociodemographic, physical assessment data was collected using the Minnesota Living with Heart Failure Questionnaire (MLWHFQ). It contained 21 items using a 6-point (zero to five) Likert scale, with a maximum score of 105. Lower scores indicate better QOL. Patient's self-care was measured with the European Heart Failure Self-care Behavior Scale. The European Heart Failure Self-Care Behavior Scale (EHFScB scale), comprising 12 items rated on a 5-point scale between 1 (I completely agree) and 5 (I completely disagree). The lower the score, the better the patient's self-care: 12-27 points - good self-care, 28-43 points - satisfactory, 44-60 points - bad self-care. Data analyzed by using SPSS Campus Professional Desktop package. Data presented by using descriptive statistics including frequency, percentage, mean with standard deviation (SD). Chi square tests were used for categorical measures, Student t-test was used for normally distributed continuous measures. The chosen significance level of $p < 0.05$.

Results. Data from 83 HF patients were analyzed. The mean age of the study population was 60.79 ± 11.86 years. 72 (87.95%) persons were male. Arterial hypertension was presented in 60 (73.29%) patients, dyslipidemia in 48 (58.5%) patients. 31 (37.8%) patient had history of myocardial infarction, 14 (17.1%) - history of diabetes mellitus (DM), history of cerebrovascular stroke - 11 (13.25%) and atrial fibrillation and/or flutter was presented in 44 (53%) patients. 16 (19.5%) were smokers and 30 (36.6%) - alcohol users. Patient's self-care statistically significant improved through the follow-up period (after four outpatient consultations). Before training most patients evaluated their self-care as satisfactory - 48 (57.83%) mean 32.00 ± 8.43 , after training – as good - 59 patient (71.08%) mean – 23.02 ± 6.58 ($p < 0.0001$). Self-care evaluated between NYHA groups not change statistically significant before ($p = 0.144$) and after training ($p = 0.645$). During Visit I patients with DM statistically significant worse evaluated self-care (32.71 ± 2.13 vs 31.85 ± 1.05 , $p = 0.038$), after training did not statistically significant change ($p = 0.308$). Assessing the quality of life (MLHFQ) of patients with HF after follow-up period active monitoring program, quality of life statistically significant improved (58.30 ± 20.92 vs

37.92 ± 22.53) ($p < 0.0001$). Patients after training have improved their physical and psychological status ($p < 0.0001$). Men (13.39 ± 9.83) appreciated the quality of life better than women (17.8 ± 10.08, $p = 0.035$). Psychological condition during the last visit was statistically significantly more favorable in patients who do not consume alcohol (9.6 ± 1.32 vs 8.34 ± 0.9, $p = 0.048$). Quality of life during the last visit was statistically significantly worse in patients with DM (47.79 ± 6.78 vs 38.7 ± 2.59, $p = 0.097$).

Conclusions. Significant improvement of health status and quality of life of heart failure patient was observed after the period of 4 outpatient consultations, which were given by cardiologist and specialized HF nurse. Co-morbidities and harmful habits also influence the quality of life and self-care of patients with HF.

Reference list:

1. Higienos institutas https://stat.hi.lt/default.aspx?report_id=168
2. Dunbar SB, Reilly CM, Gary R, Higgins MK et al. Randomized clinical trial of an integrated self-care intervention for persons with heart failure and diabetes: quality of life and physical functioning outcomes 2015; 21(9):719. Epub 2015 May 29. <https://www.ncbi.nlm.nih.gov/pubmed/26028261>
3. Ziaecian B, Fonarow GC. The Prevention of Hospital Readmissions in Heart Failure. *Prog Cardiovasc Dis.* 2015;58(4):379–385. doi:10.1016/j.pcad.2015.09.004
4. Jonkman NH, Westland H, Groenwold R., et al. Do self-management interventions work in patients with heart failure? An individual patient data meta-analysis. *Circulation* 2016; 133 (12): 1189-1198.
5. McDonagh TA, Blue L, Clark A, et al. ESC Heart Failure association standards for delivering heart failure care. *European J Heart Fail* 2011; 13: 235-41.

Role of il6 rs1800795 and blk rs13277113 snps in laryngeal squamous cell carcinoma carcinogenesis

Agnė Pasvenskaitė¹, Alvieta Vilkevičiūtė², Rasa Liutkevičienė³, Vykintas Liutkevičius¹, Virgilijus Uloza¹

¹*Department of Otorhinolaryngology, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Neuroscience Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania*

³*Department of Ophthalmology, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Interleukin-6 (IL-6) is a cytokine that is important in regulation of cell proliferation, differentiation and inflammatory pathways (1). The BLK gene encodes a protein called tyrosine kinase and is involved in proliferation and differentiation of B cells (2). The relation of IL6 rs1800795 SNPs with lung, oral, liver cancer (3) and association of BLK rs13277113 SNPs with rheumatoid arthritis and lupus erythematosus (4) have been extensively analyzed. There are no susceptibility studies analyzing the effect of IL6 rs1800795 and BLK rs13277113 on LSCC carcinogenesis.

Research aim. To identify the role of IL6 rs1800795 and BLK rs13277113 SNPs in LSCC carcinogenesis.

Research methods and organization. Histologically verified LSCC patients (LSCC group) and healthy subjects (reference group) were included to this case-control study. DNA of all subjects was extracted from peripheral venous blood samples. Real-time polymerase chain reaction method was used to perform genotyping of IL6 rs1800795 and BLK rs13277113. Statistical analysis was performed using „IBM SPSS Statistics 20.0“.

Results. Our study involved 301 LSCC patients and 318 healthy subjects. Mean age in LSCC group was 64.1 years (SD-8.7), in reference group – 59.7 years (SD-16.7). 287 (95.3%) males and 14 females (4.7%) were included in LSCC group. Controversially, our reference group was composed of 97 male

(30.5%) and 221 (69.5%) female. LSCC group consisted of 87 (28.9%) I stage, 67 (22.3%) II stage, 52 (17.3%) III stage, 74 (24.6%) IV stage and 21 (6.9%) Ca in situ patients. Distribution of LSCC differentiation grade was as follows: G1-71 (23.3%) patients, G2-180 (59.8%), G3-29 (9.6%) and 21(7.3%) Ca in situ patients. In LSCC group statistical analysis revealed statistically significant differences in IL6 rs1800795 genotype (GG, GC and CC) distribution between LSCC and control groups: 28.6%, 47.2% and 24.2% vs. 19.6%, 50.2% and 30.2% respectively; $p=0.023$, were found. However, statistical analysis did not show any significant results following the adjustment for age and gender. No statistically significant differences of BLK rs13277113 genotype (GG, GA and AA) distribution in LSCC patients and controls: 54.4%, 38.7 % and 6.9 % vs. 54.5%, 40.5% and 5.0%, respectively; $p=0.576$, were found. We did not identify any significant correlations between stage and distribution of IL6 rs1800795 ($p=0.425$) and BLK rs13277113 genotypes in LSCC group ($p=0.833$).

Conclusions. This study indicates association between IL6 rs1800795 SNP and LSCC carcinogenesis that might be a clinically significant predictor and may represent a target for cancer treatment. Further studies with a larger sample sizes including environmental risk factors are required to clarify possible associations between BLK rs13277113 SNP and LSCC development.

Reference list:

1. Giannitrapani L, Soresi M, Balasus D, Licata A, Montalto G. Genetic association of interleukin-6 polymorphism (-174 G/C) with chronic liver diseases and hepatocellular carcinoma. *World J Gastroenterol.* 2013; 9: 2449–2455.
2. Joshi N, Kannan S, Kotian N, Bhat S, Kale M. Interleukin 6 -174G>C polymorphism and cancer risk: metaanalysis reveals a site dependent differential influence in Ancestral North Indians. *Hum Immunol.* 2014;75: 901–908.
3. Smolinska MJ, Page TH, Urbaniak AM, Mutch BE, Horwood NJJ. Hck tyrosine kinase regulates TLR4-induced TNF and IL-6 production via AP-1. *J Immunol.* 2011;187(11):6043-51.
4. Fan Y, Tao JH, Zhang LP, Li LP, Ye DQ. Association of BLK (rs13277113, rs2248932) polymorphisms with systemic lupus erythematosus: a meta-analysis.

Histomorphometric differences between convexity and concavity of dilated ascending aorta

Vaiva Patamsytė, Neringa Taparauskaitė, Serik Aitaliyev, Zita Stanionienė, Monika Biesevičienė, Jolanta Vaškelytė, Giedrius Žukovas, Rimantas Benetis, Vaiva Lesauskaitė
Lithuanian University of Health Sciences, Kaunas, Lithuania

Introduction. Ascending thoracic aortic aneurysms may lead to aortic dissections and poor clinical outcomes in patients. Research studies try to elucidate the cause of rupture of pathological aortic tissue. Collagen and elastic fibres contribute to the toughness and tensile strength properties of aortic wall, therefore, microstructural changes of collagen and loss of elastic fibres could potentially contribute to aortic dissections.

Research aim. The study has investigated histomorphometric parameters of dilatative ascending aorta. We have evaluated collagen and elastic fibres of aortic media and compared them between concavity and convexity of aortic wall.

Research methods and organization. The study was performed using aortic wall specimens obtained during aortic reconstruction surgery for thoracic aortic aneurysm patients ($n=8$). Diagnosis of patients was approved by two-dimensional speckle-tracking echocardiography before surgery. Collected tissues were formalin fixed and paraffin embedded. Slices of 3 μm sections were cut using Leica microtome

and stained with Picro Sirius Red for collagen and elastic fibre visualisation. Histomorphometric analysis was performed by using Olympus BX51 Microscope and Image-Pro Plus 7.0 image processing software. For each specimen, five histological fields (0.15 mm² each) were selected from concavity and convexity separately, focusing on the middle part of aortic media. The number of elastic fibres was counted for each field and quantity of collagen (sparse and dense) was calculated as the amount of pixels of selected area.

Results. The number of pixels marked as dense collagen in selected fields on convexity (1468 ±394) was very similar to the concavity (1212 ±550) of dilated aortas and did not differ from each other (p=0.28). Interestingly, the amount of sparse collagen in selected fields differed significantly (p=0.02) between convexity (2166 ±670) and concavity (1243 ±667). There was no difference in the number of elastic fibres between convexity (20.15 ±2.5) and concavity (19.4 ±2.9) of dilated aortas (p=0.57).

Conclusions. There is difference in the quantity of sparse collagen between concavity and convexity of dilated ascending aorta. Further investigation of histomorphometric parameters of aortic wall with data of a two-dimensional echocardiography of dilatative ascending aorta will be used to assess the impact of histomorphometric parameters of aortic wall.

Pilot project on improvement of cervical cancer screening coverage: efficacy of personal systematic invitation model in urban and rural areas

Justina Paulauskienė, Janina Petkevičienė, Rugilė Ivanauskienė

Department of Preventive Medicine, Public Health Faculty, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania

Introduction. In Lithuania, cervical cancer (CC) is the 4th cause of female cancer and 2nd cause of cancer among women aged 15 to 44 years. A well-organized CC screening at the population level every 3 to 5 years can reduce the incidence of CC by 80%. In 2004, Lithuania started a Nationwide Cervical Cancer Screening Programme with a three years screening interval, targeted at women aged 25-60 years, however, screening is more opportunistic than population-wide and its coverage is still insufficient.

Research aim. To assess the efficacy of systematic personal invitation model for the cervical cancer screening coverage in the urban (Kaunas) and rural (Prienai) areas.

Research methods and organization. The study was carried out in an urban (Kaunas) and a rural (Prienai) primary healthcare centres (PHCC). Before the study women in Kaunas PHCC and in Prienai PHCC were invited to participate in the CC screening by a family doctor. In the first year of the study, all women aged 25-60 not having had Pap smear test within the last 3 years in Kaunas (n=1591) and in Prienai (n=1843) received a personal invitation letter to participate in the screening. In a year, the reminder letter was sent to the non-attendees (n=1042 in Kaunas and n=929 in Prienai). Women, who did not attend for screening after two letters, received a questionnaire aimed at identifying the barriers of non-attendance.

Results. Before the study, family doctors invited 35.1% of women in Kaunas PHCC and 17.7% in Prienai PHCC to participate in the CC screening. Only 9.6% of target population in Kaunas and 14.7% in Prienai attended. After the first invitation by letter, the participation rate in CC screening increased up to 24.6% in urban and 30.8% in rural areas (p<0.001). The lowest participation rate was in the youngest age group (25-34 years). The coverage after the reminder letter were also significantly higher in rural than in urban population, 22.2% and 16.9% respectively (p<0.001). Altogether 35.6% of women in Kaunas PHCC and 41.9% in Prienai PHCC participated in the screening (p<0.001). The frequency of

abnormal cytology made up 25.8% in Kaunas and 31.7% in Prienai after the first invitation letter ($p < 0.05$); 22.2% in Kaunas and 23.8% in Prienai after the reminder letter. The most common attitudinal and emotional barriers for the non-attendance in both areas were: intention to attend a Pap smear test but faces various obstacles; lack of time and worries that a Pap smear test might be unpleasant. The most common practical barriers for non-attendance in both areas were: long waiting time for doctors' appointments and the lack of interest to take a Pap smear test because of having regular preventive gynecological examination outside of screening programme.

Conclusions. Systematic personal invitation approach using an invitation letter with one reminder ensures a significantly higher uptake of screening compared to the verbal invitation by a family doctor. The participation rates were significantly higher in rural than in urban population. The findings on barriers associated with non-attendance for screening can be used to improve the screening programme and to increase the coverage.

Diagnostic value of the left ventricular contractile reserve for the detection hemodynamically significant coronary artery stenosis

Erina Pudžemytė¹, Monika Petrauskaitė¹, Eglė Tamulėnaitė², Arnas Karužas², Eglė Rumbinaitė², Jolanta Justina Vaškelytė²

¹*Faculty of Medicine, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Clinic of Cardiology, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania*

Introduction. Previous studies have shown that the value of left ventricular contractile reserve (LV CR) during stress echocardiography is an important prognostic indicator for heart failure (1). The diagnostic value of LV CR for the evaluation of haemodynamically significant coronary artery (CA) stenosis has so far been applied only in small sample studies and remains uncertain (2).

Research aim. To evaluate the diagnostic value of LV CR at rest and peak dobutamine dose, for the detection haemodynamically significant coronary artery stenosis, in patients with moderate probability of stable coronary artery disease (CAD).

Research methods and organization. Dobutamine stress echocardiography and adenosine stress magnetic resonance imaging were performed in 55 patients with a moderate probability of CAD. Patients were divided into two groups: the non-pathological group ($n = 30$; 54.55%), consisting of patients with no haemodynamically significant CA stenosis and a pathological group ($n = 25$; 45.45%) - patients with at least one haemodynamically significant CA stenosis. Haemodynamically significant CA stenosis was established when $\geq 50\%$ were detected during invasive coronary angiography (ICA) which haemodynamical significance was confirmed by the presence of perfusion defect during adenosine stress magnetic resonance test. LV systolic volume was evaluated in two-dimensional (2D) echocardiography images in two and four-chambers view. LV CR was calculated using the formula: $LV\ CR = (sBP / LV / LV\ systolic\ volume\ at\ maximum\ dobutamine\ load) / (sBP / LV / LV\ systolic\ volume\ at\ rest)$ where: sBP / LV - systolic blood pressure of left ventricle. Statistical data analysis was performed using IBM SPSS 25.0 software package. The diagnostic importance of LV CR was assessed using ROC curve analysis. Differences were considered statistically significant when $p < 0.05$.

Results. There were no statistically significant difference in patient's age and sex between pathological and non-pathological groups. No significant differences were observed in the estimation of LV ejection fraction ($p = 0.074$), systolic volume of LV ($p = 0.894$) and systolic blood pressure at rest ($p = 0.734$)

and at peak ($p = 0.086$) LV CR was statistically significantly lower for patients in the pathological group (2.26 ± 0.47 vs 1.82 ± 0.36 , $p = 0.001$). According to ROC analysis, the sensitivity of LV CR for significant CA stenosis was 86.7%, specificity - 76% (AUC 0.795).

Conclusions. 1. LV CR is significantly lower for patients with at least one haemodynamically significant CA stenosis. 2. LV CR is sensitive and specific for the determination of haemodynamically significant CA stenosis in patients with a moderate probability of coronary artery disease.

Reference list:

1. Ciampi Q, Carpeggiani C, Michelassi C, Villari B, Picano E. Left ventricular contractile reserve by stress echocardiography as a predictor of response to cardiac resynchronization therapy in heart failure: a systematic review and meta-analysis. *BMC Cardiovascular Disorders*. 2017;17(1).

2. Picano E, Bombardini T, Kovačević Preradović T, Cortigiani L, Wierzbowska-Drabik K, Ciampi Q. Left ventricular contractile reserve in stress echocardiography: the bright side of the force. *Kardiologia Polska*. 2019;77(2):164-172.

Quantitative composition of quercetin glycosides in *e. ciliata* ethanolic extracts obtained from different plant parts

Lauryna Pudžiuvėlytė^{1,2}, Jurga Bernatoniėnė^{1,2}

¹*Department of Drug Technology and Social Pharmacy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Institute of Pharmaceutical Technologies, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Herbs have been traditionally used to treat or prevent various illnesses. Plants accumulate bioactive compounds such as phenolics, alkaloids, terpenoids, and sulfur-containing compounds (1,2). Various studies have concluded that the supposed beneficial effects of polyphenols are frequently related to their antioxidant activity that could have preventive or therapeutic effects for cardiovascular diseases, neurodegenerative disorders, cancer, and obesity (2-6). *Elsholtzia ciliata* – an annual plant belonging to Lamiaceae family (7). Phenols belong to the largest group of secondary metabolites in plants, foremost of the family Lamiaceae, and they exhibit multidirectional biological activity (8).

Research aim. According to scientific literature, *E. ciliata* is a valuable bioactive source of natural antioxidants (9). The objective of this study was to determine the main phenolic compounds in the ethanolic extracts of *E. ciliata* leaves, stems, flowers, and whole herb.

Research methods and organization. *E. ciliata* (Thunb.) Hyl. flowers, leaves, stems and whole plant were purchased from „Zolynu namai“, Vilnius, Lithuania. All the plant parts were separated by hands and leave in a dry, dark place for 5 days to dry. Dried flowers, leaves, stems and whole herb separately were grounded in a laboratory mill. All the standards, reagents and solvents used through experiments were of analytical grade. Hyperoside, rutin, quercitrin, p-coumaric acid, caffeic acid, rosmarinic acid, and chlorogenic acid standards were purchased from Extrasynthese (Genay, France), avicularin from Chromadex (Santa Ana, USA). Acetic acid and acetonitrile and were obtained from Sigma-Aldrich GmbH (Buchs, Switzerland) and ethanol from Vilniaus degtine, AB (Vilnius, Lithuania). Powdered material of dried *E. ciliata* plant parts (each for 1 g) were extracted with 20 mL of 70% (v/v) (1:20) ethanol in a flask by ultrasound-assisted extraction performed in an ultrasonic bath (Bandelin electronic GmbH & Co.KG, Berlin, Germany) at 25 °C for 30 min. The samples were centrifuged for 10 min at $4200 \times g$, followed by decantation of the supernatant. The extracts were filtered through paper and PVDF membrane filters (pore size 0.22 μm) before HPLC analysis. The HPLC systems applied consisted of Waters 2695 Alliance solvent manager (Waters, Milford, USA) equipped with a Waters 996 photodiode

array detector. Chromatographic separations were carried out by using a YMC-Pack ODS-A (5 μm , C18, 250 \times 4.6 mm i.d.) column equipped with a YMC-Triart (5 μm , C18, 10 \times 3.0 mm i.d.) precolumn (YMC Europe GmbH, Dinslaken, Germany). The column was operated at a constant temperature of 25 $^{\circ}\text{C}$. The volume of the extract being investigated was 10 μL . The flow rate was 1 mL/min, and gradient elution was used. The mobile phase consisted of 2% (v/v) acetic acid in water (solvent A) and 100% (v/v) acetonitrile (solvent B). The following conditions of elution were applied: 0–30 minutes, 3–15% B; 30–45 minutes, 15–25% B; 45–50 minutes, 25–50% B; and 50–55 minutes, 50–95% B. The total duration of the analysis, including washing and reconditioning of the column, was 70 minutes. The confirmation of the chromatographic peak identity was achieved by comparing the retention times and spectral characteristics ($\lambda = 200\text{--}600\text{ nm}$) of the eluting peaks with those of reference compounds. For quantitative analysis, a calibration curve was obtained by injecting known concentrations (0.5 – 100 mg/mL) of different standard compounds. Statistical analysis was performed using one-way analysis of variance (ANOVA) followed by Tukey's test with the software SPSS Statistics 20.0 (IBM Corporation, NY, USA). All quantitative data were done in triplicate, and the results are presented as means \pm standard deviation. The value of $p < 0.05$ was taken as the level of significance.

Results. According to HPLC analysis results in all extracts from different plant parts were obtained four main quercetin glycosides. Rutin amount in four different extracts varied from $76.98 \pm 0.25 \mu\text{g/g DW}$ in leaves extract to $2286.85 \pm 230.12 \mu\text{g/g DW}$ in flowers extract ($p < 0.05$) (Figure 1). For the rutin amount, there was no significant difference between the leaves and the stems extracts ($p > 0.05$). Hyperoside amount varied from $17.73 \pm 0.47 \mu\text{g/g DW}$ in leaves extract to $233.52 \pm 26.84 \mu\text{g/g DW}$ flowers extract ($p < 0.05$). The highest amount of quercitrin was obtained in whole plant extract – $88.69 \pm 2.46 \mu\text{g/g DW}$ and the lowest in stems extract – $48.17 \pm 2.84 \mu\text{g/g DW}$ ($p < 0.05$). There was no significant difference in quercitrin amount between leaves, whole herb, and flowers extracts ($p > 0.05$). Avicularin amount ranged from $27.27 \pm 0.91 \mu\text{g/g DW}$ in stems extract to $481.37 \pm 212.35 \mu\text{g/g DW}$ in flowers extract. The predominant compound in leaves extract was avicularin, in stems, flowers, and whole plant extracts – rutin (Figure 1).

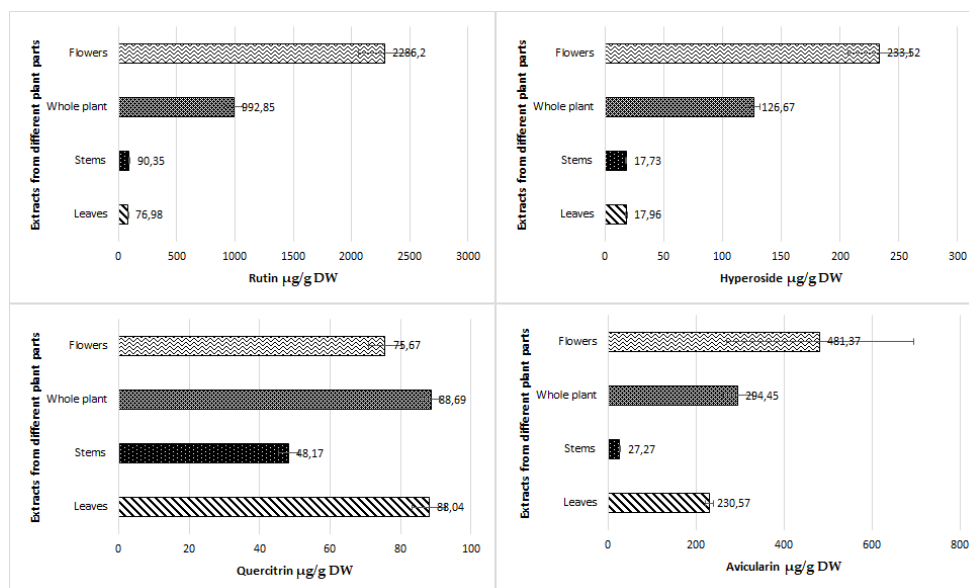


Figure 1. Amounts ($\mu\text{g/g DW}$) of rutin, hyperoside, quercitrin, and avicularin in *E. ciliata* ethanolic extracts obtained from different parts of the plant.

Conclusions. The results of this study will provide new knowledge about the composition and content of quercetin glycosides in different plant parts of *E. ciliata*. Rutin was determined as the predominant

compound in extracts obtained from stems, whole plant, and flowers. Avicularin was predominant in leaves extract. The highest amounts of hyperoside and quercitrin were obtained in flowers and whole plant extracts, respectively. Results show that *E. ciliata* plant grown in Lithuania are potential sources of polyphenols and may have the potential high antioxidant activity.

Reference list:

1. Guerriero, G.; Berni, R.; Muñoz-sanchez, J. A.; Apone, F.; Abdel-salam, E. M.; Qahtan, A. A.; Cantini, C. Production of Plant Secondary Metabolites: Examples, Tips, and Suggestions for Biotechnologists. *Genes*. 2018, 9(6), 309. <https://doi.org/10.3390/genes9060309>
2. Skendi, A.; Irakli, M.; Chatzopoulou, P. Analysis of phenolic compounds in Greek plants of Lamiaceae family by HPLC. *Journal of Applied Research on Medicinal and Aromatic Plants*. 2017, 6(October), 62–69. <https://doi.org/10.1016/j.jarmap.2017.02.001>
3. Cory, H.; Passarelli, S.; Szeto, J.; Tamez, M.; Mattei, J. The Role of Polyphenols in Human Health and Food Systems : A Mini-Review. *Front. Nutr.* 2018, 5(September), 1–9. <https://doi.org/10.3389/fnut.2018.00087>
4. Brglez Mojzer, E.; Knez Hrnčič, M.; Škerget, M., Knez Ž.; Bren, U. Polyphenols: Extraction Methods, Antioxidative Action, Bioavailability, and Anticarcinogenic Effects. *Molecules*. 2016, 21, 901.
5. Stankovic, M. S.; Niciforovic, N.; Mihailovic, V.; Topuzovic, M.; Solujic, S. Antioxidant activity, total phenolic content and flavonoid concentrations of different plant parts of *Teucrium polium* L. subsp. *polium*. *Acta Societatis Botanicorum Poloniae*. 2012, 81(2), 117–122. <https://doi.org/10.5586/asbp.2012.010>
6. Sicari, V.; Pellicanò, T. M.; Giuffrè, A. M.; Zappia, C.; Capocasale, M.; Poiana, M. Physical chemical properties and antioxidant capacities of grapefruit juice (*Citrus paradisi*) extracted from two different varieties. 2018, 25 (October), 1978–1984.
7. Petek, M.; Pintar, J.; Satovic, Z. Medicinal Plants of the Family Lamiaceae as Functional Foods – a Review. *Czech J. Food Sci.* 2016, 34: 377-390. <https://doi.org/10.17221/504/2015-CJFS>
8. Trivellini, A.; Lucchesini, M.; Maggini, R.; Mosadegh, H.; Villamarin, T. S. S.; Vernieri, P.; Pardossi, A. Lamiaceae phenols as multifaceted compounds: Bioactivity, industrial prospects, and role of "positive-stress." *Industrial Crops and Products*. 2016, 83, 241–254. <https://doi.org/10.1016/j.indcrop.2015.12.039>
9. Choi, M.S.; Choi, B.; Kim, S.H.; Pak, S.C.; Jang, C.H.; Chin, Y.; Kim, Y.; Kim, D.; Jeon, S.; Koo, B.; Essential oils from the medicinal herbs upregulate dopamine transporter in rat pheochromocytoma cells. *J. Med. Food*. 2015, 18, 1–9.

Correlation among pain intensity, disability and posture displacements in women with chronic neck and back pain

Dominyka Pumputytė, Ernesta Gurskienė

Lithuanian University of Health Sciences, Department of Sports Medicine, Kaunas, Lithuania

Introduction. Recently, the prevalence of chronic pain has increased. Chronic lower back pain occurs commonly, furthermore the number of chronic neck pain cases are also increasing. Despite the pain affecting an enormous percentage of the population, the reasons causing chronic lower back or neck pain prevalence are not well known yet. (1,2). Whilst investigating the causes of pain more and more correlations between pain and biomechanics (3), muscle imbalance (4) or postural displacements (5) are being discovered. However no specific position of parts or segments of the body are determined to be related with chronic pain (1).

Research aim. To determine the relationship between pain intensity, disability and posture displacements in women with chronic neck and back pain.

Subjects and methods: 29 female clients of a physical therapy center participated in this study. The inclusion criteria used were age (from 30 to 45 years old) and pain duration (at least 3 months), while

exclusion criteria used were pain intensity (more than 8 points according to Numeric Pain Rating Scale), history of spine surgery and consumption of analgesic medicines.

Research methods and organization. 1. Questionnaire. The questionnaire consisted questions about subjects age, pain duration, health history etc. 2. Evaluation of pain intensity. To evaluate lower back and neck pain intensity we used the Numeric Pain Rating Scale (NPRS) in which a respondent had to select a number from 0 to 10 that best reflects the intensity of their pain (0 – no pain; 10- worst possible pain). 3. Evaluation of disability. To assess the limitations of various activities of daily living caused by pain the Oswestry Disability Questionnaire was used. The Oswestry Disability Index (ODI) was derived from the questionnaire. The greater was the index, the lower was the level of function in activities of daily living. 4. Evaluation of posture. To evaluate posture displacements in frontal and sagittal planes, we used PostureScreen Mobile® - a photographic mobile application that calculates translations and angulations of body parts or sections. Statistical analysis was performed using IBM SPSS Statistics 23.0 and Microsoft Excel programs. Relationships between parameters were evaluated using Spearman correlation. The strength of relationship was evaluated according to r-value: 0,00 – no relationship; $\pm[0,01-0,19]$ – very weak relationship; $\pm[0,2-0,39]$ – weak relationship; $\pm[0,4-0,69]$ – moderate relationship; $\pm[0,7-0,89]$ - strong relationship; $\pm[0,9-0,99]$ – very strong relationship; ± 1 – linear dependence. The value of significance is 0,05.

Results. Lower back pain intensity showed moderate positive correlations with shoulder anterior ($r=0,395$; $p=0,034$) and posterior ($r=0,432$; $p=0,019$) translations. Furthermore, lower back NPRS also showed moderate positive correlations with ribcage anterior translation ($r=0,497$; $p=0,006$) and T12-L3 section posterior translation ($r=0,405$; $p=0,029$). Meanwhile the intensity of neck pain showed moderate positive correlations with T4-T8 section posterior angulation ($r=0,399$; $p=0,032$) and T8-T12 section posterior translation ($r=0,523$; $p=0,004$) and angulation ($r=0,494$; $p=0,006$). Evaluating relationships between ODI and posture displacements ODI showed moderate positive correlations with head anterior translation ($r=0,406$; $p=0,029$) and shoulder posterior translation ($r=0,408$; $p=0,028$). Also ODI and T8-T12 section posterior translation showed weak positive correlation ($r=0,377$; $p=0,044$).

Conclusions. Our study found that women with higher intensity of lower back pain had increased shoulder and ribcage translations and increased T12-L3 section angulation. Higher neck pain intensity was related with increased T4-T8 section translation and T8-T12 section translation and angulation. The more activities of daily living were limited by the pain, the more translation of head, shoulders and T8-T12 section increased. Our study showed that women with higher NPRS and ODI scores tend to have more displaced posture.

Reference list:

1. Ribeiro RP, Sedrez JA, Candotti CT, Vieira A. Relationship between chronic non-specific low back pain with disability, static posture and flexibility. *Fisioter Pesqui.* 2018;25(4)
2. Stanton TR, Leake HB, Chalmers KJ, Moseley GL. Evidence of Impaired Proprioception in Chronic, Idiopathic Neck Pain: Systematic Review and Meta-Analysis. *Phys Ther.* 2016;96(6):876–887
3. Claeys K, Brumagne S, Deklerck J, Vanderhaeghen J, Dankaerts W. Sagittal evaluation of usual standing and sitting spinal posture. *J Bodyw Mov Ther.* 2016; 20(2):326-333
4. Kim SR, Kang MH, Bahng SY, An JK, Lee JY, Park SY, Kim SG. Correlation among scapular asymmetry, neck pain, and neck disability index (NDI) in young women with slight neck pain. *J Phys Ther Sci.* 2016;28(5):1508-1510
5. Kim DK, Cho ML, Park YH, Yang YA. Effect of an exercise program for posture correction on musculoskeletal pain. *J Phys Ther Sci.* 2015; 27:1791–1794

Photosensitivity and phototoxicity caused by drugs in outdoor athletes

Laura Račkauskaitė, Gabrielė Vengalytė, Skaidra Valiukevičienė

Department of Skin and Venereal Diseases, the Lithuanian University of Health Sciences, Kaunas, Lithuania

Introduction. Drug-induced photosensitivity or phototoxicity cause the development of skin disease due to the interaction between a given chemical agent and sunlight (1). The photosensitizers are processed by Langerhans cells, which activate T-cells and they migrate to the skin to execute an immune response (2). Phototoxic reactions are resulting from direct tissue injury involving oxidation process (3). Clinicians must consider the potential photoreaction when recommending drugs to outdoor athletes (4).

Research aim. To elucidate systemic drugs that have phototoxic and photosensitizing effect on outdoor athletes.

Research methods and organization. Based on PubMed search of the last 10 years texts using keywords such as “phototoxicity OR photosensitivity AND sport AND drug” we found 4 publications – 1 case report, 3 reviews. Exclusion criteria were publications describing photoreactions without skin damage, experiments in vitro or in vivo.

Results. Although athletes are generally healthy, many may be on multiple medications or supplements. At the Sydney Olympics, 545 athletes took 5 or more medicines and more than 50% of athletes took nonsteroidal anti-inflammatories (NSAIDs) or antibiotics (5,6). NSAIDs such as ketoprofen, ibuprofen or meloxicam are the most common photosensitizers (4,7). Other NSAIDs like diclofenac, piroxicam, indomethacin, sulindac may also potentially cause a photosensitivity reaction, which manifests as a papulovesicular eruption, pruritus or eczematous dermatitis. These drugs are often prescribed as analgesics but also for their anti-inflammatory properties. In ligament injuries of the ankle, NSAIDs allowed faster return to activity. In female athletes, photosensitivity may arise from combined oral contraceptive use; oral retinoid drugs for acne are prime offenders as well (5). Several other medications have been reported to cause phototoxic reactions. They resemble exaggerated sunburn and occur on exposed areas. These culprit drugs are tetracyclines, quinolones, sulfonamides, phenothiazines, antiarrhythmics, voriconazole, and diuretics that are often used among athletes to treat respiratory, skin, heart and blood vessel or urinary tract diseases (4,5,8). Concerning fluoroquinolones, there are a variety of mechanisms, including free radical formation and reactive oxygen species. The incidence of phototoxicity with ciprofloxacin is 1% to 4%, while levofloxacin carries a lower risk of 0.2%. Sulfonamides, especially sulfamethoxazole, can cause a number of cutaneous reactions, including photosensitivity and a more severe Stevens-Johnson syndrome. Moreover, tetracyclines are commonly prescribed for acne vulgaris and other common infections that occur in high school and college athletes. Noteworthy, doxycycline has the highest incidence of phototoxicity (20%) compared to other tetracyclines (8).

Conclusions. There are different medications associated with skin photosensitivity and phototoxicity, but no clinical studies about this important topic during last 10 years. Therefore, clinicians must take into consideration when prescribing drugs such as ketoprofen, diclofenac, ibuprofen or antibiotics - doxycycline, ciprofloxacin, and sulfamethoxazole because of their adverse reactions on skin.

Reference list:

1. Monteiro AF et al. Drug-induced photosensitivity: Photoallergic and phototoxic reactions. *Clin Dermatol.* 2016
2. Loh TY et al. Ketoprofen-induced photoallergic dermatitis. *Indian J Med Res.* 2016
3. Khandpur S et al. Drug-induced photosensitivity: new insights into pathomechanisms and clinical variation through basic and applied science. *Br J Dermatol.* 2017
4. Lampel HP et al. Acute phototoxic reaction in a century cyclist. *Clin J Sport Med.* 2015

5. Ciocca M. Medication and supplement use by athletes. Clin Sports Med. 2005
6. Tscholl PM, et al. High prevalence of medication use in professional football tournaments including the World Cups between 2002 and 2014: a narrative review with a focus on NSAIDs. Br J Sports M
7. Farhadian JA et al. Skin conditions of baseball, cricket, and softball players. Sports Med. 2013
8. Fayock K et al. Antibiotic precautions in athletes. Sports Health. 2014

A comparison of risk factors and diagnostic methods for patients with estimated intermediate pre-test clinical probability of ischaemic heart disease

Laura Radionovaitė¹, Laura Zajančauskienė², Jurgita Plisienė²

¹*Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Cardiology, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Some patients referred for evaluation of anginal symptoms and evidence of myocardial ischemia on noninvasive testing have angiographically normal epicardial coronary arteries or coronary arteries with mild disease. This condition was labeled as cardiac syndrome X due to uncertainty about its pathogenesis. The more appropriate term is microvascular angina. The true prevalence of microvascular angina in patients with chest pain and no significant epicardial coronary artery disease is not known. A 2015 study of about 1500 such individuals suggests that the prevalence may be as high as 67 percent (1). Patients with microvascular angina are younger at the time of diagnosis (mean age 49 years) and are more often female than those with atherosclerotic cardiovascular disease (2,3).

Research aim. The present study aimed to evaluate the differences of the risk factors, laboratory tests, visual and functional diagnostic methods' results in patients with intermediate pre-test probability of coronary artery disease (CAD) groups of obstructive and non-obstructive CAD.

Research methods and organization. This retrospective observational study, performed in 2017-2019, included 116 subjects with intermediate pre-test probability of CAD referred for testing during the period of 2013-2018. These patients underwent interventional coronary angiography or cardiac computed tomography angiography for the first time. According to the results, the patients were divided into two groups: non-obstructive CAD (stenosis <50%) and obstructive CAD (≥50%). Cardiovascular risk factors, comorbidities, used medication, echocardiographic and non-invasive functional testing results were assessed.

Results. Non-obstructive CAD was diagnosed for 87 (74,36%) patients, more frequently presented with atypical chest pain (p=0,041). The patients were significantly younger (57 (min. 40 – max. 83) vs. 65,5 (min. 47 – max. 79) (p=0,024)) and smoked more frequently (17 (19,5%) vs. 0 (0 %) p=0,035) compared to obstructive CAD group. No significant difference between the sexes in the groups was identified (p>0,05). Patients with obstructive CAD were more likely to have bronchial asthma (3 (15,8%) vs. 3 (3,4%) p= 0,035), use statins (8 (42,1%) vs. 13 (16%) p=0,012) and aspirin (11 (57,9 %) vs. 26 (32,1%) p=0,012). No significant differences of the laboratory test results were determined (p>0,05). Left anterior fascicular block (5 (26,3%) vs. 7 (8%) p=0,023) and atrial fibrillation (5 (26,3%) vs. 7 (8%) p=0,023) were more common in patients with obstructive CAD. Lower echocardiographic findings: left ventricular mass (178 ± 6,02 vs. 204,92 ± 10,28 g p=0,021), mass index (82,7 (min. 48,9 – max. 148,42) vs. 96,4 (min. 68 – max. 134,1) p=0,01), interventricular wall thickness (10,5 (min. 7 – max. 12,5) vs. 12 (min. 8,2 – max. 15) p=0,01) and TAPSE (20 (min. 19 – max. 23) vs. 22 (min. 22 – max. 23), p=0,002) were estimated in patients with non-obstructive CAD. Patients with no evidence of obstructive CAD were more likely to present with normal diastolic function while 2nd degree diastolic dysfunction was frequently diagnosed in the group of obstructive CAD (p=0,03). Non-invasive functional tests were performed on 97 (83,4 %) patients. The most common result in non-obstructive CAD group was limiting

(threshold) ($p < 0,05$). There were 5 (5,15 %) false negative non-invasive testing results in the group of obstructive CAD.

Conclusions. Most patients with estimated intermediate pre-test probability had no evidence of obstructive CAD. Patients in the non-obstructive CAD group were younger, more frequently presented with atypical chest pain and smoked more. Among the patients with obstructive CAD bronchial asthma, left anterior fascicular block, atrial fibrillation, usage of statins and aspirin were more common. Lower values of echocardiographic findings (LV mass, mass index, interventricular wall thickness and TAPSE) were measured in the non-obstructive CAD group as well as normal diastolic function. Obstructive CAD group patients were more likely to have 2nd degree diastolic dysfunction. Non-invasive testing results were frequently found to be limiting (threshold) in the non-obstructive CAD group.

Reference list:

1. Sara J, Widmer R, Matsuzawa Y, Lennon R, Lerman L, Lerman A. Prevalence of Coronary Microvascular Dysfunction Among Patients With Chest Pain and Nonobstructive Coronary Artery Disease. *JACC: Cardiovascular Interventions*. 2015;8(11):1445-1453.
2. Panza J, Laurienzo J, Curiel R, Unger E, Quyyumi A, Dilsizian V et al. Investigation of the Mechanism of Chest Pain in Patients With Angiographically Normal Coronary Arteries Using Transesophageal Dobutamine Stress Echocardiography. *Journal of the American College of Cardiology*. 1997;29(2):293-301.
3. Sullivan A, Holdright D, Wright C, Sparrow J, Cunningham D, Fox K. Chest pain in women: clinical, investigative, and prognostic features. *BMJ*. 1994;308(6933):883-886.

Peculiarities of women's, working sedentary work, musculoskeletal system's status, fatigue and pain

Laima Rimšaitė, Vilma Tamulionytė

Lithuanian University of Health Sciences, Department of Sports Medicine, Kaunas, Lithuania

Introduction. Prolonged static sitting may cause development of different musculoskeletal systems' disorders (1). Prolonged sitting, especially in nonergonomic workplace, often causes fatigue, permanent muscle tension, increasing load on the spinal discs, changing of posture and deep back muscles functional state (2). So it's very important to assess such changes on time.

Research aim. To evaluate peculiarities of women's, working sedentary work, musculoskeletal system's status, perceived fatigue and pain.

Research methods and organization. Twenty two women, working sedentary work, participated in the study. The mean age of participants was 52.2 (range 35-65) years and the mean work experience of participants was 15.1 (range 2-40) years. 77% of subjects stated that they spend 7-8 hours/day at work in sitting position, 23% - 4-6 hours/day. Research methods: body posture was assessed using digital photography (craniovertebral angle), observation and palpation methods (shoulder posture) and hand grip strength was estimated with hand-held dynamometer. Sociodemographic characteristics and perceived pain were collected using survey questionnaire, fatigue assessment was performed using The Multidimensional Fatigue Inventory (MFI-20). Data analysis was performed using IBM SPSS Statistics 22. Data are presented as mean (\bar{x}), minimum (min), maximum (max) and standard deviation (SD) - \bar{x} (min; max; SD); or as percents (%).

Results. The mean value of participants' craniovertebral angle was 44.05 (25; 60; 9.7) degree. In 73% of subjects craniovertebral angle was greater than 40 degrees. The sharper the craniovertebral angle, the greater the head shift forward. 91% of subjects had asymmetric posture of shoulders. Mean value of left

hand strength was 24.55 (8; 36; 6.93) kg, right hand – 23 (8; 34; 6.06) kg. 86% of subjects had sufficient hand strength but hand strength of 14% subjects was assessed as too low.

The mean value of The Multidimensional Fatigue Inventory results was 44.5 (5; 67; 15.07) %. The mean value of General fatigue was 46.95 (6; 88; 21.09) %, Physical fatigue – 34.23 (0; 69; 18.19) %, Mental fatigue – 28.18 (0; 81; 20.78) %. 91% of subjects felt muscle fatigue after work day. 68% of subjects felt fatigue in their neck, 50% - in their shoulders, 46% - in their upper back, 27% - in their legs, 23% - in their head area, 18% - in their low back, 18% - in their hands and 14 % - in their pelvic area.

73% of subjects felt pain after work day. Analyzing the localization of perceived pain, it was estimated that 36% of subjects felt pain in their neck, 36% - in their upper back, 32% - in their shoulders, 18% - in their legs, 9% - in their head area, 9% - in their low back, 9% - in their pelvic area and 6% - in their hands. 64% of subjects have been using medication to relieve pain after work day.

Conclusions. 1. 73% of women, working sedentary work, had the craniovertebral angle greater than 40 degrees. 86% of subjects had sufficient hand strength. 2. 91% of women, working sedentary work, felt muscle fatigue after work day. Most of subjects felt fatigue in their neck, shoulders and upper back. More often subjects referred it as general fatigue. 3. 73% of women, working sedentary work, felt pain after work day. Most of subjects perceived pain in their neck, upper back and shoulder.

Reference list:

1. Zemp R, Taylor WR, Lorenzetti S. In vivo spinal posture during upright and reclined sitting in an office chair. 2013;2013:2–6.

2. Janwantanakul P, Pensri P, Jiamjarasrangsi V, Sinsongsook T. Prevalence of self-reported musculoskeletal symptoms among office workers. 2008;(June):436–8.

Dynamical interrelation of electrocardiographic parameters in patient with paroxysmal and persistent atrial fibrillation during sinus rhythm

Gabrielė Rudokaitė, Vytautas Zabiela

Hospital of Lithuanian University of Health Sciences Kauno klinikos, Department of Cardiology, Kaunas, Lithuania

Introduction. Atrial fibrillation (AF) is the most common arrhythmia, increases with age, and presents with a wide spectrum of symptoms and severity. The absence of symptoms is leading to delayed diagnosis of AF thus embolic complications can be the first clinical manifestation of AF.

Research aim. Our study was aimed to analyze differences of ECG parameters dynamical interrelations in patients with paroxysmal and persistent atrial fibrillation (AF) during sinus rhythm and healthy individuals.

Research methods and organization. 55 patients with AF and 40 healthy subjects who met inclusion and had no exclusion criteria were involved to the study. 12 lead signal parameters averaged ECG were registered and analyzed using the program „Load-Kaunas”. 5 minutes ECG recordings were made for each participant of the study. The value of aP, dP, QRS, JT, RR intervals in II lead of each cardiac cycle were measured. Matrix analysis was performed to calculate the value of discriminant (Dsk) and determine strength of dynamical interrelations between ECG parameters. 10 different Dsks were calculated: Dsk(aP;dP), Dsk(aP;JT), Dsk(aP;RR), Dsk(aP;QRS), Dsk(dP;JT), Dsk(dP;RR), Dsk(dP;QRS), Dsk(RR;JT), Dsk(RR;QRS), Dsk(QRS;JT). Every 30 seconds of the ECG recording, 10 seconds ECS intervals were selected and values of aP in 12 leads were correlated with aP values of the previous cardiac cycle and so on throughout 10 seconds ECG intervals. The average correlation of aP in 12 lead ECG ($\bar{K}aP$) was evaluated. Data were analyzed using “SPSS 25.0” Shapiro-Wilk, Kruskal-

Wallis, Student's t and Mann-Whitney U tests. Results with values of $p < 0.05$ were considered statistically significant.

Results. Dsk(aP;dP), Dsk(aP;RR) were significantly lower in patients with AF than healthy individuals. Dsk(aP;JT), Dsk(dP;QRS) were significantly higher in patients with AF than control group. There was no significant difference between Dsk(QRS;JT), Dsk(RR;QRS), Dsk(dP;RR) and Dsk(RR;JT) in patient with AF and healthy individuals. Patients who did not use AAD had lower Dsk(aP;dP), Dsk(aP;JT), Dsk(dP;RR), Dsk(dP;JT), Dsk(RR;QRS) than patients who used AAD. Patient with AF had significantly lower $\bar{K}aP$ than healthy subjects ($0,847 \pm 0,014$ vs. $0,913 \pm 0,001$). None of the controls had $\bar{K}aP$ less than 0,9.

Conclusions. Patients with AF had significantly stronger dynamical aP interrelations with dP and RR intervals than healthy subjects. Patients who did not use AAD had significantly stronger dP interrelations with aP, JT and RR intervals than those who used AAD. Patients with AF had significantly lower $\bar{K}aP$ values than healthy individuals. $\bar{K}aP$ values less than 0,9 had high specificity for AF.

ACL graft diameter and knee joint's function parameters changes at 3rd, 6th and 12th month after arthroscopic ACL reconstruction

Darius Ruočkus¹, Laimonas Šiupšinskas¹, Rimtautas Gudas^{1,2}

¹Department of Sports Medicine, Lithuanian University of Health Sciences, Kaunas, Lithuania

²Department of Orthopaedics and Traumatology, Hospital of Lithuanian University of Health Sciences Kauno Klinikos, Kaunas, Lithuania

Introduction. The anterior cruciate ligament (ACL) is an important stabilizing ligament of the knee that is frequently injured by athletes and trauma victims. There are between 100,000 and 200,000 ACL ruptures per year in the United States alone (1,2). Patients with ACL tear are told to expect a return to full activity and sports between 8 and 12 months following surgery, depending upon their baseline function, sport, and compliance with a rehabilitation program (3). In some cases, 18 months or longer may be required for a graft to be fully incorporated, and rehabilitation of the affected extremity to be completed (3). Novel approaches to anterior cruciate ligament (ACL) rehabilitation develop continually (3). ACLR autograft laxity and knee stability are two parameters that influence rehabilitation strategy and return to previous physical activity. During this study we were interested in autograft diameter impact on two previously mentioned characteristics.

Research aim. To determine impact of autograft diameter on reconstructed ACL laxity and functional stability. We hypothesized that thicker autograft will lead to faster ACLR function recovery and lower risk of functional instability.

Research methods and organization. All subjects (N=46) had ACL reconstruction with autograft formed out of t.m. semitendinosus and t.m. gracilis. They were divided into 2 groups: group A (N=27) patients, who had visits at sports medicine doctor 3 and 6 months after ACL reconstruction and group B (N=19) respectively 6 and 12 months after ACL reconstruction. All patients were tested by GenourobTM arthrometer at each visit for ACLR function evaluation. We evaluated targeted and opposite knees ACL laxity S (mm), difference between knees in laxity (D) and functional knee instability risk (Slope P2). Then ΔD and $\Delta Slope P2$ values were found, these values describe the change of D and Slope P2 during certain period. Statistical analysis was performed using SPSS 17.0. Shapiro-Wilk test for normality of distributions and nonparametric Mann-Whitney U test was used for the comparison of two independent

samples. Pearson correlation coefficient for the linear correlation between two variables was calculated. The level of $p < 0.05$ was considered statistically significant.

Results. There was no statistically significant difference between both groups means of autograft diameter, age, BMI, gender, ΔD , Δ Slope P2. Group A: D3month average 1.1 (± 1.6) mm, D6month average 0,46 ($\pm 1,71$) mm, Slope P23month average 5.67 (± 4.73), Slope P26month average 5,23 ($\pm 3,98$). ΔD average was -0,64 ($\pm 2,02$) mm, Δ Slope P2 average was -0,45 ($\pm 5,2$). Group B: N=19. D6month average 0,29 ($\pm 1,16$) mm, D12month average 0,12 ($\pm 1,05$) mm, Slope P26month average 4,81 ($\pm 5,1$), Slope P212month average 5,63 ($\pm 5,36$). ΔD average was -0,17 ($\pm 1,01$) mm, Δ Slope P2 average was 0,82 ($\pm 4,32$). In both observed groups there was no statistically significant relationship found between autograft's diameter and operated knee's ACL laxity change during certain time period (ΔD). Although, weak negative (Group A: $R = -0,35$) and moderate negative (Group B: $R = -0,44$) Pearson's correlations with p values of 0,08 and 0,06 respectively, suggests there could be potential link among autograft's diameter and ACL function change during investigated periods, though further studies with bigger sample size are necessary. In both observed groups there was no statistically significant relationship found between autograft's diameter and operated knee's instability risk value change during certain time period (Δ Slope P2). Weak negative Pearson's correlations was found in both groups (Group A: $R = -0.02$, $p = 0,93$; Group B $R = -0.25$, $p = 0,3$). Certain time period after ACL reconstruction had no significant relation to operated knee's function and stability, although, it's worth to mention, that a value of ΔD average in group A was lower by -0,47 mm in comparison to group B, which means group A autograft's laxity value got closer to healthy knee's ACL laxity value by average of 0,47 mm more than in group B. This result suggest that earlier periods after ACL reconstruction could be clinically more important for autograft integration and rehabilitation processes.

Conclusion. There was no statistically significant relationship between ACLR autograft diameter, laxity and functional instability. Time of recovery after the surgery had no significant impact on reconstructed ACL laxity.

Reference list:

1. Gordon MD, Steiner ME. Anterior cruciate ligament injuries. In: Orthopaedic Knowledge Update Sports Medicine III, Garrick JG (Ed), American Academy of Orthopaedic Surgeons, Rosemont 2004. p.169.
2. Albright JC, Carpenter JE, Graf BK, et al. Knee and leg: soft tissue trauma. In: Orthopaedic Knowledge Update 6, Beaty JH (Ed), American Academy of Orthopaedic Surgeons, Rosemont 1999. p.533.
3. Ryan P. Friedberg, Karl B Fields, Jonathan Grayzel, FAAEM. Anterior cruciate ligament injury. Uptodate (accessed on Sep 26, 2018)

Relationship between self-reported and functional outcomes of physically active patients 6 and 12 months after anterior cruciate ligament reconstruction surgery

Saulė Salatkaitė¹, Laimonas Šiupšinskas¹, Rimtautas Gudas^{1,2}

¹*Lithuanian University of Health Sciences, Medical Academy, Department of Sports Medicine, Kaunas, Lithuania*

²*Hospital of Lithuanian University of Health Sciences, Kaunas Clinics, Sports Trauma and Arthroscopic Unit, Kaunas, Lithuania*

Introduction. ACL reconstruction aims to get rid of functional instability, thereby decreasing the incidence of subsequent injuries (1). Return to pre-injury activity level involves physical factors and psychological factors (2). "Function" is an outcome important to patient satisfaction after ACL reconstruction. However, there are various tools that can be used to measure function, and measurements

used to determine return to play may be different than those ultimately used to determine surgical outcome (3).

Research aim. To evaluate patients' subjective opinion about operated knee function and their relationship with HOP tests.

Research methods and organization. Seventy patients, 44 males (age 25.44 ± 8.14 years, height 186.31 ± 9.84 cm, weight 87.22 ± 12.51 kg, BMI 25.03 ± 3.14) and 26 females (age 24.10 ± 5.87 years, height 170.85 ± 10.43 cm, weight 63.67 ± 9.77 kg, BMI 21.74 ± 2.02), who had undergone an ACL reconstruction were tested. The operated patients were tested 6 or 12 months after surgery. They underwent the 4 single leg (hop for distance, crossover hop for distance, triple hop for distance and 6 m timed hop) HOP tests (4) and completed the IKDC 2000. The best trial for each leg in each test was used for data analysis. According to the HOP tests limb symmetry index (LSI) results, patients were divided into two groups: first group $LSI \geq 90\%$ and second group $LSI < 90\%$. Then groups' results were compared with each other. Statistical analysis was performed with SPSS 22 Software. The degree of statistical significance was set at $p < 0.05$. Differences were assessed using Mann-Whitney test. A Pearson's correlation was run to determine the relationship between HOP tests and IKDC 2000 questionnaire. LSI was calculated as the hop distance of the healthy leg divided by the hop distance of the operated leg multiplied by 100. Results are presented in means \pm standard deviation.

Results. The first group consisted of 9 females and 20 males, second group – 17 females and 24 males. The IKDC 2000 results were significantly higher in first group (87.82 ± 11.58 vs 78.24 ± 9.89 ; $p = 0.0001$). There were significant differences between groups in HOP for distance (96.53 ± 5.15 vs 85.78 ± 7.16 ; $p=0.0001$), crossover HOP for distance (98.02 ± 5.28 vs 85.98 ± 8.35 ; $p=0.0001$) and triple HOP for distance (98.23 ± 4.32 vs 86.17 ± 6.78 ; $p=0.0001$). Comparing results of 6 m timed HOP test between groups there was no statistically significant differences (98.37 ± 4.71 vs 96.23 ± 10.74 ; $p=0.128$). We have found that there was statistically significant correlations between IKDC 2000 questionnaire results and HOP for distance ($r=0.418$; $p=0.002$), crossover HOP for distance ($r=0.517$; $p=0.0001$) and triple HOP for distance ($r=0.462$; $p=0.001$).

Conclusions. 1. Persons who HOP tests score were less than 90% also had lower subjective opinion about their operated knee function. 2. Subjective knee joint assessment is related to objective jump tests. The better patients evaluate function of operated knee joint, the greater results of the jump tests are.

Reference list:

1. Nebelung W, Wuschech H. Thirty-five years of follow-up of anterior cruciate ligament-deficient knees in high-level athletes. *Arthroscopy*. 2005;21(6):696-702. DOI: 10.1016/j.arthro.2005.03.010
2. Novaretti JV, Franciozi CE, Andrea Forgas A, McNeill Ingham SJ, Abdalla RJ. Quadriceps strength deficit at 6 months after ACL reconstruction does not predict return to preinjury sports level. *Sports Health*. 2018; 10(3):266-271. DOI: 10.1177/1941738118759911
3. Reinke EK, Spindler KP, Loring D, Jones MH, Schmitz L, Flanigan DC, et al. Hop tests correlate with IKDC and KOOS at minimum of 2 years after primary ACL reconstruction. *Knee Surg Sports Traumatol Arthrosc*. 2011; 19(11): 1806–1816. DOI:10.1007/s00167-011-1473-5.
4. Logerstedt D, Grindem H, Lynch A, Eitzen I, Engebretsen L, Risberg MA, et al. Single-legged hop tests as predictors of self-reported knee function after anterior cruciate ligament reconstruction: the Delaware-Oslo ACL cohort study. *Am J Sports Med*. 2012; 40(10):2348–56. DOI: 10.1177/0363546512457551

Interconnection between local earth magnetic field and acute myocardial infarction in two Lithuanian hospitals

Vilmantas Smalinskas¹, Tautvydas Rugelis², Gediminas Jaruševičius^{2,3}, Alfonsas Vainoras^{1,3}

¹*Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Cardiology, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania*

³*Cardiology Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Studies conducted by different investigator groups suggest that changes in the local Earth magnetic field (geomagnetic field) can affect various human organ systems and affect their function, affect human cardiovascular homeostasis, and the exposure patterns can vary. There are researches that geomagnetic field has an influence on the regulatory mechanism of human and can act the periodicity of myocardial infarction (1-6).

Research aim. Researcher's aim was to estimate the coherence between the changes of local geomagnetic field and cases of MI in Lithuania. We seek to clarify the characteristics of geomagnetic field which influence on MI sickness rate, besides to evaluate the influence in different subgroups.

Research methods and organization. Our team retrospectively analyzed the cases of myocardial infarction (MI) in Lithuania. There was a total of 1234 participants in the study with a diagnosis of new myocardial infarction event during the period of 2016 year, who attended the Cardiology Department of University Hospital at Lithuanian University of Health Sciences and Siauliai Republican Hospital. The number of MI was grouped by weeks and months and that data was analyzed according due to local geomagnetic field and Pearson correlation coefficient was calculated with IBM SPSS 22.0 statistics program. Statistical significant level was $p < 0,05$. The local time varying magnetic field intensity was measured using a local magnetometer located in Lithuania which is part of the Global Coherence Monitoring Network. Patients were investigated by the variations of Schumann resonance intervals: SDelta [0; 3,5] Hz, STeta [3,5; 7] Hz, SAlfa [7; 15] Hz, SBeta [15; 32] Hz, SGama [32; 65] Hz.

Results. 694 patients were analyzed in Cardiology Department of University Hospital at Lithuanian University of Health Sciences and 540 patients in Siauliai Republican Hospital. There were 731 males (59,2%) and 503 females (40,8%). High significant positive correlation ($r = 0,79$, $p = 0,000$) was observed in comparing the amount of MI in both hospitals each week. Our team identified a significant relationship between number of acute MI cases in different frequency ranges spanning a time of one week and the average weekly geomagnetic field strength in different frequency ranges.

We found light negative correlation coefficients in P1 (SDelta [0; 3,5] Hz), ($r = -0,14$, $p = 0,31$), P2 (STheta) [3,5; 7] Hz, ($r = -0,31$, $p < 0,05$), P3 (SAlpha) [7; 15] Hz, ($r = -0,27$, $p < 0,05$) and P4 (SBeta) [15; 32] Hz, ($r = -0,22$, $p = 0,064$). Negative correlations are associated with decrease of MI cases.

Light significant positive correlation in P5 (SGamma) [32; 65] Hz, ($r = 0,16$, $p < 0,05$) was found, it means in cases when 32-65 Hz magnetic field is higher, chance of MI becomes bigger. Our team did not found significant correlation in P6 (SGama [32; 65] Hz).

Conclusions. 1. High positive correlation was observed between Kaunas and Siauliai hospitals MI numbers in every week. 2. Lower number of myocardial infarction cases has negative correlation with the changes in local geomagnetic field (SDelta, STheta, SAlpha, SBeta frequency ranges). 3. SGamma [32; 65] Hz local magnetic field has positive correlation with the number of MI. 4. Additional studies can help to evaluate the influence of local Earth magnetic field to different groups of MI patients.

Reference list:

1. Alabdulgader A., McCraty R., Atkinson M., Vainoras A., Berškienė K., Mauricienė V., Daunoravičienė A., Navickas Z., Šmidkaitė R., Landauskas M. Human heart rhythm sensitivity to earth local magnetic field fluctuations. *J. Vibroeng.* 2015;17:3271–3278.
2. Jaruševičius, G., Rugelis, T., McCraty, R., Landauskas, M., Berškienė, K., & Vainoras, A. (2018). Correlation between changes in local earth's magnetic field and cases of acute myocardial infarction. *International journal of environmental research and public health*, 15(3), 399.
3. Stoupele E., Tamoshiunas A., Radishauskas R., Bernotiene G., Abramson E., Israelevich P. Acute myocardial infarction (AMI) (n-11026) on days of zero geomagnetic activity (GMA) and the following week: Differences at months of maximal and minimal solar activity (SA) in solar cycles 23 and 24. *J. Basic Clin. Physiol. Pharmacol.* 2012;23:5–9. doi: 10.1515/jbcpp-2012-0001.
4. Live Data—HeartMath Institute. [(accessed on 1 September 2017)]; Available online: <https://www.heartmath.org/research/global-coherence/gcms-live-data/>
5. Alabdulgader A., McCraty R., Atkinson M., Dobyns Y., Vainoras A., Ragulskis M., Stolc V. Long-Term study of heart rate variability responses to changes in the solar and geomagnetic environment. *Sci. Rep.* 2018;8:2663. doi: 10.1038/s41598-018-20932-x.
6. Timofejeva I., McCraty R., Atkinson M., Joffe R., Vainoras A., Alabdulgader A.A., Ragulskis M. Identification of a group's physiological synchronization with earth's magnetic field. *Int. J. Environ. Res. Public Health.* 2017;14:998. doi: 10.3390/ijerph14090998.

Cost of ticagrelor compared with clopidogrel therapy in the management of acute coronary syndromes in Lithuanian patients

Mindaugas Stonis¹, Simona Ripkauskaitė¹, Gintarė Martinkutė^{1,2}, Vacis Tatarūnas³, Vaiva Lesauskaitė³

¹*Faculty of medicine, Medical academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Cardiology, Hospital of Lithuanian University of Health Sciences Kauno Klinikos, Kaunas, Lithuania*

³*Laboratory of Molecular Cardiology, Institute of Cardiology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. The treatment of ACS is funded by health care system funds. Based on the latest ACS treatment guidelines, dual antiplatelet therapy with aspirin and ticagrelor or prasugrel or clopidogrel is recommended for patients after the onset of ACS (1). However, effective treatment with these drugs in different ACS patients is not the same and is still under discussion.

Research aim. The aim was to determine the factors which according to pharmacoeconomic model influence ACS treatment costs in patients receiving clopidogrel or ticagrelor antiplatelet therapy.

Research methods and organization. In total, 42 patients were included in the retrospective study. All the patients were hospitalized in 2014 for percutaneous coronary interventions (PCI) and stent implantation due to acute coronary syndromes (myocardial infarction or unstable angina) in the Department of Cardiology at Hospital of Lithuanian University of Health Sciences (LUHS) in Kaunas, Lithuania. Dual antiplatelet drug loading dosages with aspirin (300 mg) and ticagrelor (180 mg) or clopidogrel (600 mg) were prescribed to patients before PCI according to European Society of Cardiology (ESC) guidelines. All patients received standard treatment with statins, angiotensin-converting enzyme inhibitors (or angiotensin receptor I blockers) and β -adreno-blockers. Clinical characteristics of the patients were collected from the case histories. Genotyping of CYP4F2 rs2108622 was done in the Laboratory of Molecular Cardiology of Institute of Cardiology of Lithuanian University of Health Sciences in Kaunas, Lithuania. To estimate the costs of treatment in clopidogrel and ticagrelor

patients groups a pharmacoeconomic modelling was performed. The components of ACS treatment costs were: the cost of ACS treatment during hospitalization, the cost of treatment during 12 months of out-patient period (and the costs of re-hospitalization). Data are expressed as medians and range. Quantitative parameters were evaluated using a nonparametric Kruskal–Wallis test. Pearson χ^2 analysis was used for categorical variables. A multivariate binary regression analysis was used to determine the factors which had a significant effect on higher cost of treatment. Statistically significant data was considered when $p < 0.05$.

Results. The clopidogrel group consisted of 24 patients (57 %) and ticagrelor group of 18 patients (43 %). Treatment costs per 12 months of treatment were higher in ticagrelor receiving patients (range 1980-7845, median 4269 Eur) than in clopidogrel (range 1594-6172, median 3883 Eur) treated patients ($p = 0.0001$). No significant differences in treatment costs were observed in males vs females ($p = 0.483$). However, females received clopidogrel more frequently than males ($p = 0.03$), as females were older ($p = 0.012$) (Clopidogrel is usually recommended for elderly patients and females (2, 3)). More detailed analysis confirmed, that ticagrelor was more frequently prescribed to younger than 65 years of age patients ($\chi^2 = 2.925$, $p = 0.081$), but treatment costs in these patients and in older ones was the same ($p = 0.689$). There were 25 (60%) patients who required less than 4000 Eur per 12 months and 17 (40%) patients who required more than 4000 Eur per 12 months for treatment of ACS, respectively. After evaluating multiple factors which were included in binary regression model, it was found that male sex (OR 14.053, 95 %, CI: 1.470-134.379, $p = 0.022$), smoking (OR 10.516, 95% CI: 1.328-83.291, $p = 0.026$), and CYP4F2 rs2108622 A allele (OR 3.966, 95% CI: 1.019 - 15.438, $p = 0.047$) increased the odds of 4000 Eur or higher cost for treatment of the patients.

Conclusion. Data from this pilot study showed that higher cost of antiplatelet therapy might be related to male gender, cigarette smoking and CYP4F2 rs2108622 A allele.

Reference list:

1. Valgimigli M, Bueno H, Byrne RA, et al. 2017 ESC focused update on dual antiplatelet therapy in coronary artery disease developed in collaboration with EACTS: The Task Force for dual antiplatelet therapy in coronary artery disease of the European Society of Cardiology (ESC) and of the European Association for Cardio-Thoracic Surgery (EACTS). *Eur Heart J* 2018;39:213-260.
2. D'Ascenzo F, Bertaina M, Fioravanti F et al. Long versus short dual antiplatelet therapy in acute coronary syndrome patients treated with prasugrel or ticagrelor and coronary revascularization: Insights from the RENAMI registry. *Eur J Prev Cardiol* 2019 Mar 12:2047487319836327.
3. Grodecki K, Huczek Z, Scislo P et al. Gender-related differences in post-discharge bleeding among patients with acute coronary syndrome on dual antiplatelet therapy: A BleeMACS sub-study. *Thromb Res* 2018 Aug;168:156-163.

Evaluation of myocardial viability by different non-invasive cardiovascular imaging modalities

Paulina Šimaitytė¹, Goda Maciulevičiūtė², Eglė Kazakauskaitė²

¹*Faculty of medicine, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Cardiology, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Evaluation of myocardial viability allows to determine the likelihood of reversibility of myocardial function after revascularization (1-3), as confirmed by the European Society of Cardiology Guidelines on Myocardial Revascularization in 2018 (4). Myocardial viability can be determined by

different non-invasive methods, and the selection of the most appropriate one can become a challenge (5-7), so this study aims to compare the different non-invasive radiological methods.

Research aim. Compare different non-invasive radiological methods (single photon emission computed tomography (SPECT), positron emission tomography/computed tomography (PET/CT), cardiac magnetic resonance imaging (CMR)) by assessing myocardial viability.

Research methods and organization. A prospective study involving 30 patients examined and treated at the Hospital of Lithuanian University of Health Sciences Kaunas Klinikos Department of Cardiology in 2016-2018 was conducted. The main inclusion criteria were myocardial infarction, followed by a marked decrease in left ventricular ejection fraction (LVEF <40%), and severe coronary artery lesions, which benefit of revascularization being questionable due to formed scar lesions in the myocardium. Patients were selected with reference to the clinical diagnosis (coronary artery disease (CAD), heart failure (HF)) and examined by different non-invasive radiological examinations (echocardiography, SPECT, PET/CT and CMR) over a few days to assess myocardial viability. In order to assess objectively, the heart segments were numbered consecutively from the top to the basal part in ascending order (1-16). During echocardiography, myocardial viability was assessed by its motility, using SPECT and PET methods myocardial segments were assessed as non-viable if less than 50% radioactive material (^{99m}Tc-MIBI) or glucose analogue (¹⁸F-FDG) were accumulated. CMR verified myocardium to be completely non-viable when the scar was transmural. The data obtained was analyzed by the IBM SPSS statistics 25. Whether the data satisfy the conditions of the normal section, it was verified using the Kolmogorov-Smirnoc and Shapiro-Wilk tests. Assessment of different myocardial segments viability among the studies was compared using the Pearson-Chi-square test. To assess if other radiological methods match the PET/CT ("gold standard") the value of kappa (κ), Spearman correlation coefficient and McNemar test were calculated. Observed differences between indications were considered statistically significant when the calculated significance level (p-value) was lower than the selected significance level ($\alpha = 0.05$).

Results. No inequalities were found by assessing myocardial viability with different non-invasive cardiovascular modalities (echocardiography, SPECT, PET/CT, CMR) in thirteen of the sixteen segments, but in other three segments (lower apex, septum apex and lateral apex) statistically significant differences were detected ($p < 0.05$). By assessing the coincidence of other radiological studies with the "gold standard" PET/CT was observed that in the lateral basal and frontal, lateral and lower apex segments the congruence was insufficient. In the lateral basal segment neither echocardiography nor SPECT were accurate enough compared to a PET/CT (1 lesions observed with echoscope, PET/CT – 3, SPECT – 4), $\kappa < 0.20$ (compared to echocardiography $\kappa = -0.05$, compared to SPECT $\kappa = -0.13$), analogous results were found in the lateral apex segment (McNemar <0.05). In the frontal and lower apex segments insufficient coincidence was detected between echocardiography and PET/CT ($\kappa = 0.05$, McNemar <0.05). PET/CT and CMR results are the most similar, because the Spearman correlation coefficient in most segments (11 out of 16) and κ values (10 out of 16 segments) are closest to one. Most statistically significant differences were found in the segments of the heart apex and it shows that by assessing myocardial viability in these segments with echocardiography, SPECT and CMR the results might be unreliable.

Conclusions. Summarizing the results, it can be concluded that there is no complete correlation between echocardiography, SPECT, PET/CT and CMR for myocardial viability and PET-¹⁸F-FDG remains the „gold standard“ with 92-93% sensitivity (8,9), by comparing CMR is the most congruent method. The evaluation of myocardial viability allows identify patients who will improve after revascularization, but the ultimate decision should be based also on patient clinical expression and co-morbidities.

Reference list:

1. Beanlands SB, Erthal F, Wiefels C, Promislow S, Kandolin R, Stadnick E, et al. Myocardial Viability: From PARR-2 to IMAGE HF-Current Evidence and Future Directions. *Int J Cardiovasc Sci*. 2019;
2. Ker W dos S, Nunes THP, Nacif MS, Mesquita CT. Practical Implications of Myocardial Viability Studies. *Arq Bras Cardiol*. 2018;
3. Löffler AI, Kramer CM. Myocardial Viability Testing to Guide Coronary Revascularization. *Interventional Cardiology Clinics*. 2018.
4. Neumann F-J, Sousa-Uva M, Ahlsson A, Alfonso F, Banning AP, Benedetto U, et al. 2018 ESC/EACTS Guidelines on myocardial revascularization. *Eur Heart J*. 2018;
5. Giannopoulos AA, Gaemperli O. Hybrid Imaging in Ischemic Heart Disease. *Rev Española Cardiol (English Ed)*. 2018 May;71(5):382–90.
6. Elfigih IA, Henein MY. Non-invasive imaging in detecting myocardial viability: Myocardial function versus perfusion. *IJC Heart and Vasculature*. 2014.
7. Kazakauskaitė E, Žaliaduonytė-Pekšienė D, Rumbinaitė E, Keršulis J, Kulakienė I, Jurkevičius R. Positron emission tomography in the diagnosis and management of coronary artery disease. *Medicina (Lithuania)*. 2018.
8. Ker W dos S, Nunes THP, Nacif MS, Mesquita CT. Practical Implications of Myocardial Viability Studies. *Arq Bras Cardiol*. 2018;
9. Bonow RO, Maurer G, Lee KL, Holly T a., Binkley PF, Desvigne-Nickens P, et al. Myocardial Viability and Survival in Ischemic Left Ventricular Dysfunction. *N Engl J Med*. 2011.

Primary school pupils' concentration and academic achievements changes after physical exercises program application

Agnė Uldinskė, Vilma Tamulionytė

Lithuanian University of Health Sciences, Department of Sports Medicine, Kaunas, Lithuania

Introduction. In the current society, the cult of physical activity is growing, and it is particularly important to include passive and low physical activity children. Physical activity is a great tool not only for obesity prevention, but more and more attention is paid to the relationship between physical activity and better academic achievements and cognitive functions (1,2). Despite these advantages, the physical activity of children's is low (by WHO).

Research aim. To evaluate primary school pupils' concentration and academic achievements changes after physical exercises program application.

Research methods and organization. The study was approved by LUHS Bioethics Center. Primary school students were invited to participate in the study. Fifteen healthy primary school students (8 girls and 7 boys) participated in the study. The average age of participants was 7.13 (6; 10; 1.06) years. The subjects and their parents (guardians) were introduced to the purpose and organization of the research and filled in the forms of informed consent. Research methods: Questionnaire for parents. The survey included information about age, gender, physical activity, health complaints, motivation to do homework, focusing on homework assignments, academic achievements. A physical exercises program was applied to all subjects. The exercises program was applied for 9 weeks, 3 times per week, one session lasting 30-40 minutes. The main purpose of the exercises program was to improve physical fitness and to form correct posture. Program included stretching exercises, balancing exercises and exercises to strengthen the muscles of the torso and lower limbs. Data analysis was performed with IBM SPSS 22.0 and Microsoft Office Excel 2007 programs. Nonparametric Wilcoxon criteria was used. Data are presented as percent, mean (x), minimum (min), maximum (max) and standard deviation (SD). The difference, when $p < 0.05$, was considered statistically significant.

Results. According to parents' opinion, 46.66% of research participants were physically active before exercises program application. In our study, the attention of children while performing regular tasks at home after exercises program improved ($Z = -3.000$, $p = 0.003$). 60% of participants concentrated more easily on a variety of tasks at home. We observed no statistically significant changes of motivation to do school homework after exercises program ($Z = -0.557$, $p = 0.564$). After a physical exercises program, motivation to do school homework in 80% primary school students have not changed, and in 20% participants motivation to do school homework declined due to higher fatigue after exercises program. We found no significant changes in academic achievements of children after exercises program application ($Z = -1.13$, $p = 0.257$).

Conclusions. 1. A regular exercises program can help primary school pupils to concentrate more easily on a variety of tasks at home, although it didn't change the motivation to do homework. 2. Regular application of physical exercises program for primary school pupils does not have a statistically significant influence on academic achievements at school.

References list:

1. Utesch T., Dreiskamper D., Naul R., Geukes K. Understanding physical (in-) activity, overweight, and obesity in childhood: Effects of congruence between physical self-concept and motor competence. *Scientific Reports*. Vol 8: 5908, 2018.
2. Álvarez-Bueno C, Pesce C, Caverro-Redondo I, Sánchez-López M., Garrido-Miguel M., Martínez-Vizcaíno V. Academic achievement and physical activity: a meta-analysis. *Pediatrics*. 2017;140(6): e20171498.

Determination of rad51b rs8017304 variant in patients with laryngeal squamous cell carcinoma

Paulius Vaičiulis¹, Alvita Vilkevičiūtė², Rasa Liutkevičienė³, Vykintas Liutkevičius¹, Virgilijus Uloza¹

¹*Department of Otorhinolaryngology, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Neuroscience Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania*

³*Department of Ophthalmology, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. RAD51B is a protein involved in the homologous recombination repair pathway of double-stranded DNA breaks arising during DNA replication or induced by DNA-damaging agents (1). Recently some variants in RAD51B region have been associated with breast and nasopharyngeal carcinoma risk (1-4). However, there are no susceptibility studies of variants in RAD51B and laryngeal squamous cell carcinoma (LSCC).

Research aim. To evaluate the associations between RAD51B rs8017304 variant and development of LSCC.

Research methods and organization. This case-control study consisted of 154 histologically verified LSCC patients (stage from I to IV) and 305 healthy subjects as a reference group. DNA samples of the represented population were extracted from peripheral venous blood. Genotyping of RAD51B (rs8017304) was performed using the real-time polymerase chain reaction method. Statistical analysis was performed using „IBM SPSS Statistics 20.0“.

Results. Statistical analysis did not revealed any differences in RAD51B rs8017304 genotype (CC, CT and TT) distribution between LSCC and control groups (74.4 %, 23.6 % and 2 % vs. 74.7 %, 23.4 % and 1.9 %, respectively; $p=0.998$). On the other hand, TT genotype was determined more frequently in males with LSCC compared to control males, but logistic regression analysis did not reach statistical significance after controlling for age (OR=1.015; 95 % CI:0.122; 8.436; $p=0.989$).

Conclusions. No association between RAD51B rs8017304 variant and LSCC development was found in our series. However, further studies with larger sample sizes are required.

Reference list:

1. Thomas G, Jacobs KB, Kraft P, Yeager M, Wacholder S, Cox DG, et al. A multistage genome-wide association study in breast cancer identifies two new risk alleles at 1p11.2 and 14q24.1 (RAD51L1). *Nat Genet.* 2009; 41: 579–584.
2. Orr N, Lemnrau A, Cooke R, Fletcher O, Tomczyk K, Jones M, et al. Genome-wide association study identifies a common variant in RAD51B associated with male breast cancer risk. *Nat Genet.* 2012; 44: 1182–1184.
3. Michailidou K, Hall P, Gonzalez-Neira A, Ghoussaini M, Dennis J, Milne RL, et al. Large-scale genotyping identifies 41 new loci associated with breast cancer risk. *Nat Genet.* 2013; 45: 353–361.
4. Qin H-D, Shugart YY, Bei J-X, et al. Comprehensive Pathway-Based Association Study of DNA Repair Gene Variants and the Risk of Nasopharyngeal Carcinoma. *Cancer Research.* 2011; 71(8):3000-3008. doi:10.1158/0008-5472.CAN-10-0469.

Rs1859430, rs2069870, and rs11741137 in AMD development

Alvita Vilkevičiūtė¹, Loresa Kriaučiūnienė^{1,2}, Rasa Liutkevičienė^{1,2}

¹*Neuroscience Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Ophthalmology, Academy of Medicine, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Age-related macular degeneration (AMD) is a severe ocular disease affecting mainly elderly people, and is a major cause of blindness in people older than 50 years in developed countries (1). Although the pathophysiology of AMD is not well understood, genetic variation, living environment and lifestyle have certain influence on the pathogenesis and progression of AMD (2). Previous studies assessing systemic C-reactive protein (CRP), an inflammation marker, have shown that inflammation plays a role in the pathogenesis and progression of AMD (3,4). Interleukins help mediate many of the effector phases of immune and inflammatory responses. Single nucleotide polymorphisms (SNPs) in cytokine genes have been described and demonstrated to influence gene transcription, leading to interindividual variations in cytokine production (5-8).

Research aim. to determine if there is an association between rs1859430, rs2069870, and rs11741137 in IL-9 gene and early AMD development.

Research methods and organization. Our study enrolled 77 subjects with early AMD diagnosis, and 72 age and gender-matched healthy controls. DNA was extracted from peripheral venous blood by DNA salting-out method. The genotyping of SNPs (rs1859430, rs2069870, and rs11741137) in IL-9 gene was carried out using the real-time polymerase chain reaction method. Results were assessed using the statistical analysis software „IBM SPSS Statistics 20.0“.

Results. Statistical analysis revealed that rs1859430 was associated with 2-fold decreased odds of early AMD development under dominant (OR=0.472; 95 % CI: 0.230-0.970; p=0.041) and additive (OR=0.500; 95 % CI: 0.262-0.955; p=0.036) models; rs11741137 was also associated with about 2-fold decreased odds of early AMD development under additive (OR=0.477; 95 % CI: 0.244-0.933; p=0.030) model. Analysis of genotypes and alleles of rs2069870 did not revealed any statistically significant results.

Conclusions. Our study showed protective role of rs1859430 and rs11741137 in early AMD development.

Reference list:

1. Jager RD, Mieler WF, Miller JW. Age-related macular degeneration. *N. Engl. J. Med.* 2008;358:2606–2617. doi: 10.1056/NEJMra0801537.
2. Chen M, Xu H. Parainflammation, chronic inflammation, and age-related macular degeneration. *J. Leukoc. Biol.* 2015;98:713–725. doi: 10.1189/jlb.3RI0615-239R.
3. SeddonJM, GeorgeS, RosnerB, et al. Progression of age-related macular degeneration: prospective assessment of C-reactive protein, interleukin 6, and other cardiovascular biomarkers. *Arch Ophthalmol.* 2005;123:774–782.
4. SeddonJM, GenslerG, MiltonRC, et al. Association between C-reactive protein and age-related macular degeneration. *JAMA.* 2004;291:704–710.
5. TurnerDM, WilliamsDM, SankaranD, et al. An investigation of polymorphism in the interleukin-10 gene promoter. *Eur J Immunogenet.* 1997;24:1–8.
6. FishmanD, FauldsG, JefferyR, et al. Novel polymorphisms in the interleukin-6 gene: their effect on IL-6 transcription, plasma IL-6 levels and an association with systemic-onset juvenile chronic arthritis. *J Clin Invest.* 1998;102:1369–1376.
7. KroegerKM, CarvilleKS, AbrahamLJ. The –308 tumor necrosis factor-alpha promoter polymorphism effects transcription. *Mol Immunol.* 1997;34:391–399.
8. WarleMC, FarhanA, MetselaarHJ, et al. Are cytokine gene polymorphisms related to in vitro cytokine production profiles. *Liver Transpl.* 2003;9:170–181.

Comparative analysis of preoperative echocardiographic parameters in patients with postoperative atrial fibrillation or conduction disorders post tavi

Mindaugas Zaikauskas¹, Laura Radionovaitė¹, Vaida Mizarienė²

¹Faculty of Medicine, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania

²Department of Cardiology, Hospital of Lithuanian University of Health Sciences Kauno klinikos, Kaunas, Lithuania

Introduction. Transcatheter Aortic Valve Implantation (TAVI) has emerged as an alternative effective treatment for high risk patients with severe aortic stenosis (1). However, TAVI is associated with high risk of AV block and left bundle branch block post procedure – up to one third of the patients develop these complications (2,3). New onset AF is observed in up to 10% of the patients post TAVI (4).

Research aim. The aim of the study was to evaluate the frequency of atrial fibrillation and conduction disorders as complications post TAVI and to compare specific echocardiographic parameters in patients with these complications and those without them.

Research methods and organization. The studied population consisted of 58 patients who underwent Transcatheter Aortic Valve Implantation (TAVI) in the Hospital of Lithuanian University of Health Sciences (LSMU) Kauno klinikos between 2011 and 2018. Every patient of the studied population was operated due to severe aortic stenosis. Complete transthoracic echocardiography was performed before TAVI evaluating both morphological and functional parameters. The evaluated parameters were as following: left ventricular end-diastolic diameter (LVEDD), left ventricular end-diastolic diameter index (LVEDDi), interventricular septal thickness (ST), left ventricular mass (LVM), left ventricular mass index (LVMI), posterior wall thickness (PWT), left ventricular ejection fraction (EF), relative wall thickness (RWT), right ventricular diameter and left atrial diameter. Patients were attributed to having atrial fibrillation (AF) or any particular conduction disorder (first, second and third degree atrioventricular (AV) block, left/right bundle branch block) as a complication of TAVI if any of these disorders were diagnosed postoperatively and there was no evidence of AF and/or conduction dysfunction prior TAVI. All of the data is presented as median (minimum – maximum). The value of

$p < 0.05$ was considered as statistically significant. Comparative analysis was performed using Mann-Whitney test on IBM SPSS.

Results. Mean average age of the patients was 81.24 ± 4.51 years. 46.6% of the studied population were males while 53.4% were females. New onset AF was found in 9 patients (15.5%). AV block was found in 10 patients (17.2%) of which 5 patients have developed first degree block, 1 patient – second degree block and 4 patients have developed third degree block. Left bundle branch block (LBBB) was diagnosed to 11 patients (19%) and right bundle branch block (RBBB) was found in 1 patient (1.7%) post TAVI. In those patients who did not develop AF LVEDD was 48mm (33 – 63) vs 48.5mm (36 – 52) in patients who developed AF post TAVI. Accordingly, LVEDDi was 25.4mm/m² (18.78 – 41.47) vs 26mm/m² (21.4 – 32.9); ST - 13.85mm (10 – 18.5) vs 13mm (11 – 16); LVM - 245.64g (159 – 445) vs 224g (130 – 309); LVMi -125.36g/m² (83.3 – 218.1) vs. 129.33g/m² (77.4 – 177.59); RWT - 0.51 (0.29 – 0.97) vs. 0.46 (0.44 – 0.63); EF - 50% (16 – 60) vs 50% (25 – 55); right ventricular diameter was 36.5mm (26 – 57) vs 37mm (29 – 42). All of the before mentioned parameters did not differ statistically significantly in patients without AF and with AF post TAVI. However, PWT (11mm (11 – 12.5) vs 12mm (9 – 19) ($p=0.027$)) and left atrial diameter (41mm (39 – 51) vs 47mm (33 – 65) ($p=0.032$)) were observed to be different between patients without AF and with AF post TAVI. Analysis between the patients who developed any kind of AV block and those without this complication showed that only LVEDD (48mm (33 – 62) without AV block vs 51mm (40 – 63) with AV block ($p=0.031$)), LVEDDi (25.26mm/m² (18.78 – 41.47) vs 29.23mm/m² (21.7 – 32.98) ($p=0.024$)) and ST (14mm (11 – 18.5) vs 12.25mm (10 – 15) ($p=0.026$)) differed significantly between these groups. However, there was no observed difference in echocardiographical parameters between patients with new onset any kind of bundle branch block and those without ($p > 0.05$).

Conclusions. New onset AF was found in 15.5%, while AV block was observed in 17.2%, LBBB – in 19% and RBBB – 1.7% of all the patients. Patients that developed AF had a larger LAD and PWT than those that did not. Moreover, patients with AV block post TAVI had higher values of LVEDD, LVEDDi and relatively lower ST compared to patients that did not develop this complication. Finally, echocardiographical parameters did not differ significantly between patients with new onset bundle branch block of any type and those patients without it.

Reference list:

1. Svensson LG, Tuzcu M, Kapadia S, Blackstone EH, Roselli EE, Gillinov AM, et al. A comprehensive review of the PARTNER trial. *J Thorac Cardiovasc Surg.* 2013 Mar;145(3):S11–6.
2. Houthuizen P, van der Boon RMA, Urena M, Van Mieghem N, Brueren GBR, T. Poels T, et al. Occurrence, fate and consequences of ventricular conduction abnormalities after transcatheter aortic valve implantation. *EuroIntervention.* 2014 Feb;9(10):1142–50.
3. Schroeter T, Linke A, Haensig M, Merk DR, Borger MA, Mohr FW, et al. Predictors of permanent pacemaker implantation after Medtronic CoreValve bioprosthesis implantation. *Europace.* 2012 Dec 1;14(12):1759–63.
4. Yoon Y-H, Ahn J-M, Kang D-Y, Ko E, Lee PH, Lee S-W, et al. Incidence, Predictors, Management, and Clinical Significance of New-Onset Atrial Fibrillation After Transcatheter Aortic Valve Implantation. *Am J Cardiol.* 2019 Apr;123(7):1127–33.

Delay effect of the local earth's magnetic field strength influence on admission due to acute myocardial infarction

Greta Žiubrytė¹, Kamyar Hedayat², Rima Braukylienė³, Gediminas Jaruševičius^{3,4}, Laura Zajankčauskienė³, Martynas Jurėnas³, Jean-Claude Lapraz⁵, Alfonsas Vainoras⁶, Diana Žaliaduonytė-Pekšienė³

¹*Faculty of Medicine, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Director of Research, Systems Biology Research Group, Chicago, USA*

³*Department of Cardiology, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania*

⁴*Cardiology Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania*

⁵*Director of Scientific Outreach, Systems Biology Research Group, Chicago, USA*

⁶*Department of Sports Medicine, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Acute myocardial infarction (AMI) is one of the leading causes of disability and death worldwide (1). Possible changes in local Earth's magnetic field (TVMF) intensity influence on occurrence of AMI have been defined in previous studies (2-5). Furthermore, it has been hypothesized that cardiac events occur after a default period of fluctuation in magnetic field intensity, not immediately afterwards.

Research aim. To define the length of magnetic field delay effect on the onset of AMI.

Research methods and organization. One-hundred-twenty-seven patients admitted due to AMI with no previous history of ischemic heart disease (IHD) between 25th April 2017 and 20th November 2017 have been prospectively included into our single centre study. The TVMF intensity was observed in five frequency intervals [Hz]: SDelta [0-3.5], STheta [3.5-7], SAlpha [7-15], SBeta [15-32], SGamma [32-65]. Data was collected from local magnetometer situated in Lithuania, which is a part of the Global Coherence Monitoring Network. Weekly averaged and calculated for one-day, two-days and three-days before admission TVMF intensity was compared with weekly cases of AMI. For more precisely analyses study period was divided into two parts as magnetic field intensity differs in both halves of the year. SPSS 20.0 was used for statistical analysis. The level of significance $p < 0.05$.

Results. Analyses of correlation between admissions due to AMI and changes in magnetic field have shown weakening of correlation coefficients and decreasing significance with increasing number of days before admission in male especially in SGamma range $r = -0.405$, $p = 0.024$ vs. $r = -0.262$, $p = 0.154$ vs. $r = -0.243$, $p = 0.187$, respectively one-day vs. two-days vs. three-days before admission. Stunning results were revealed after analyses of days with more than 2 AMI cases per day. There were found moderate to strong correlation coefficients in STheta ($r = 0.579$, $p = 0.08$ vs. $r = 0.572$, $p = 0.84$ vs. $r = 0.604$, $p = 0.064$); SAlpha ($r = 0.675$, $p = 0.032$ vs. $r = 0.699$, $p = 0.025$ vs. $r = 0.716$, $p = 0.020$); SBeta ($r = 0.651$, $p = 0.041$ vs. $r = 0.700$, $p = 0.04$ vs. $r = 0.705$, $p = 0.023$) and SGamma ($r = 0.550$, $p = 0.048$ vs. $r = 0.650$, $p = 0.042$ vs. $r = 0.648$, $p = 0.043$) ranges, respectively one-day vs. two-days vs. three-days before admission. It was revealed that correlations between magnetic field intensity changes and onsets of AMI increase with increasing number of days before admission. Moreover, magnetic field changes in frequency range between 7 and 65 Hz have the strongest impact on prevalence of AMI. The strongest correlations were found on the 2nd - 3rd day before admission.

Conclusions. The local Earth's magnetic field Delay Effect is evident in current study. The medium length of this effect lasts between 2 and 3 days. We may presume that the highest possibility of occurrence of myocardial infarction lays in 48-72 hours after changes in local Earth's magnetic field strength especially in high frequency ranges which are dominant in Lithuania.

Reference list:

1. World health organization website: <https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death>, connected on 2019 04 10
2. Jaruševičius G, Rugelis T, McCraty R et al. Correlation between Changes in Local Earth's Magnetic Field and Cases of Acute Myocardial Infarction. *Int J Environ Res Public Health*. 2018, 15: 399
3. Žiubrytė G, Jaruševičius G, Landauskas M et al. The local earth magnetic field changes impact on weekly hospitalization due to unstable angina pectoris. *Journal of Complexity of Health Sciences*. 2018; 1(1):16-25
4. Stoupe E, Tamosiunas A, Radishauskas R, Bernotiene G, Abramson E, Israelevich P. Acute myocardial infarction (AMI) (n-11026) on days of zero geomagnetic activity (GMA) and the following week: differences at months of maximal and minimal solar activity (SA) in solar cycles 23 and 24. *J Basic Clin Physiol Pharmacol*. 2012;23(1):5-9. doi: 10.1515/jbcpp-2012-0001.
5. Botoeva NK, Khetarugova IG, Rapoport SI. [A comprehensive analysis of incidence of myocardial infarction in Vladikavkaz depending on solar and geomagnetic activity]. *Klin Med (Mosk)*. 2013;91(10):28-34.

Acute coronary syndrome due to left main disease association with changes in local earth's magnetic field

Greta Žiubrytė¹, Gediminas Jaruševičius^{2,3}, Mantas Landauskas⁴, Rollin McCraty⁵, Alfonsas Vainoras⁶

¹*Faculty of Medicine, Academy of Medicine, Lithuanian University of Health Sciences, Kaunas, Lithuania*

²*Department of Cardiology, Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Kaunas, Lithuania*

³*Cardiology Institute, Lithuanian University of Health Sciences, Kaunas, Lithuania*

⁴*Department of Mathematical Modelling, Kaunas University of Technology, Kaunas, Lithuania*

⁵*HeartMath Institute, California, USA*

⁶*Department of Sports Medicine, Lithuanian University of Health Sciences, Kaunas, Lithuania*

Introduction. Ischemic heart disease (IHD), manifesting as acute coronary syndrome (ACS), affects younger and increasing number of patients worldwide (1-2). The most life threatening is ACS caused by left main (LM) disease resulting in severe cardiac damage (3). Despite many studies, there are some unclear aspects of development of ACS, as sometimes multiple cases occur. Recent studies have suggested the hypothesis of local Earth's magnetic field (TVMF) intensity changes provoking cardiac events (4-6).

Research aim. To evaluate correlation between acute coronary syndrome due to left main disease and changes in local Earth's magnetic field intensity.

Research methods and organization. In total 68 patients (22 female and 46 male) admitted to the Cardiology Department of Hospital of Lithuanian University of Health Sciences Kaunas Clinics due to ACS caused by LM disease between 1 January 2016 and 31 December 2016 were included into the study. One-year period was analyzed as whole and divided into two halves of the year. The TVMF intensity was observed in five frequency intervals [Hz]: SDelta[0-3.5], STheta[3.5-7], SAlpha[7-15], SBeta[15-32], SGamma[32-65]. Data was collected from local magnetometer located in Lithuania, which is a part of the Global Coherence Monitoring Network. Weekly averaged TVMF intensity was compared with weekly averaged cases of ACS due to LM disease. SPSS 20.0 was used for statistical analysis. The level of significance $p < 0,05$.

Results. Analyses of the whole year model have shown significant positive moderate correlation coefficients in male: (SDelta) [0; 3.5] ($r = 0.353$, $p = 0.01$), (STheta) [3.5; 7] ($r = 0.366$, $p = 0.008$), (SAlpha) [7; 15] ($r = 0.339$, $p = 0.014$), (SBeta) [15; 32] ($r = 0.357$, $p = 0.009$). Meanwhile, in female it was found a single positive moderate correlation in (SGamma) [32; 65] ($r = 0.430$, $p = 0.001$). After

dividing study period into two halves of the year, analyses have shown the same tendencies in the first half of the year with a bit increased p-value due to lower number of cases. Statistically significant moderate correlation coefficients were found in (SDelta) [0; 3.5] ($r = 0.3754$, $p = 0.05$) and (STheta) [3.5; 7] ($r = 0.3814$, $p = 0.05$) in male, while in female the tendencies remain the same with not decreased statistical significance in (SGamma) [32; 65] ($r = 0.5106$, $p = 0.008$).

Conclusions. Stronger magnetic field in SDelta, STheta, SAlpha and SBeta ranges is associated with higher number of acute coronary syndrome caused by left main disease in male. It seems, female is more sensitive to magnetic field fluctuations in SGamma range and the stronger magnetic field in this range is potentially associated with higher rate of hospital admission due to left main disease caused acute coronary syndrome.

Reference list:

1. Pelletier R, Khan AN, Cox J et al. Sex Versus Gender-Related Characteristics: Which Predicts Outcome After Acute Coronary Syndrome in the Young? *Am Coll Cardiol* 2016;67:127–35
2. Chen TS, Incani A, Butler TC et al. The demographic profile of young patients (<45 years-old) with acute coronary syndromes in Queensland. *Heart Lung Circ.* 2014 Jan;23(1):49-55
3. Kobayashi A, Misumida N. Percutaneous coronary intervention in left main disease: 10-year follow-up. *Ann Transl Med.* 2019 Mar;7(5):85.
4. Jaruševičius G, Rugelis T, McCraty R et al. Correlation between Changes in Local Earth's Magnetic Field and Cases of Acute Myocardial Infarction. *Int J Environ Res Public Health.* 2018, 15: 399
5. Žiubrytė G, Jaruševičius G, Landauskas M et al. The local earth magnetic field changes impact on weekly hospitalization due to unstable angina pectoris. *Journal of Complexity of Health Sciences.* 2018; 1(1):16-25
6. Stoupele E, Tamoshiunas A, Radishauskas R, Bernotiene G, Abramson E, Israelevich P. Acute myocardial infarction (AMI) (n=11026) on days of zero geomagnetic activity (GMA) and the following week: differences at months of maximal and minimal solar activity (SA) in solar cycles 23 and 24. *J Basic Clin Physiol Pharmacol.* 2012;23(1):5-9. doi: 10.1515/jbcpp-2012-0001.

Exercise capacity in patients with asymptomatic primary mitral regurgitation and preserved left ventricle systolic function

Rūta Žvirblytė, Ieva Merkytė, Eglė Tamulėnaitė, Agnė Saniukaitė, Jolanta Justina Vaškelytė
Lithuanian University of Health Sciences, Medical Academy, Department of Cardiology, Kaunas, Lithuania

Introduction. Stress echocardiography is used for evaluation of regurgitation severity, symptoms, exercise capacity, functional changes of left ventricle (LV) and right ventricle (RV), pulmonary hypertension and may help in timing of surgery for patients with asymptomatic mitral regurgitation (MR). Patients with reduced exercise capacity during stress have more adverse outcomes and poorer prognosis*.

Research aim. The aim of the study was to evaluate the changes of physiological parameters during stress and exercise capacity in patients with moderate asymptomatic primary MR.

Research methods and organization. Resting and stress (veloergometry as per protocol 25 + 25 W) echocardiography were performed in 63 asymptomatic patients (age 56.12±13.97 years) with preserved left ventricle (LV) ejection fraction (EF; >50%). Subjects were divided into two groups: MR group (39 (61.9%) patients with moderate (grade 2-3) MR) and control group (24 (38.1%) patients without significant heart valves disease). Exercise variables including workload achieved in metabolic equivalents (METs) and Watts, total exercise time were recorded. Heart rate (HR) reserve as index of

chronotropic response was calculated $(\text{peak HR} - \text{baseline HR}) \times 100 / (220 - \text{age} - \text{baseline HR})$. Statistical analyses were performed using the SPSS 20.0 software. The value of $p < 0.05$ was considered as statistically significant.

Results. There were no significant differences in clinical characteristics, changes of heart rate and blood pressure during stress between the groups (Table 1). Total exercise time ($p=0.680$), maximal workload achieved (METS ($p=0.251$) and Watts ($p=0.217$)) as well as parameters of LV function - LV EF ($p=0.97$) and global longitudinal strain ($p=0.055$) at rest did not differ significantly between the groups. However heart rate reserve used during stress was significantly higher in MR group ($59.25 \pm 23.55\%$ vs. $42.29 \pm 19.85\%$; $p=0.023$). Recovery time (time from peak stress till the moment when the heart rate became similar as it was at rest) was significantly shorter in controls ($04:20 \pm 1:15$ min. vs. $05:49 \pm 1:56$ min.; $p=0.007$). Higher systolic pulmonary artery pressure during peak stress was significantly related to lower achieved heart rate ($p=0.043$).

Table 1. Physiological parameters in MR and control groups during stress

	MR group	Control group	p value
At rest			
Heart rate (beats/min)	72.08±13.05	72.57±10.15	0.880
Systolic ABP (mmHg)	138.24±19.81	136.96±20.88	0.811
Diastolic ARB (mmHg)	82.51±14.65	84.17±14.41	0.669
During minimal stress (25 W)			
Heart rate (beats /min)	96.54±13.85	98.00±13.99	0.702
Systolic ABP (mmHg)	160.12±21.30	157.09±24.07	0.624
Diastolic ARB (mmHg)	89.38±15.09	91.32±13.57	0.628
During peak stress			
Heart rate (beats /min)	119.00±26.52	122.91±23.62	0.571
Systolic ABP (mmHg)	171.49±29.64	172.86±33.67	0.869
Diastolic ARB (mmHg)	92.08±18.19	89.27±14.30	0.536
Recovery			
Heart rate (beats /min)	80.51±11.77	79.55±15.31	0.786
Systolic ABP (mmHg)	141.26±17.95	136.64±19.33	0.365
Diastolic ARB (mmHg)	79.24±13.08	77.64±12.73	0.654

ABP – arterial blood pressure

Conclusions. Heart rate, systolic and diastolic blood pressure did not differ between the groups at all stages of stress. Patients with MR and preserved LV systolic function used higher heart rate reserve and had longer recovery time.

Reference list:

1. Naji P, Griffin BP, Bar T et al. Importance of Exercise Capacity in Predicting Outcomes and Determining Optimal Timing of Surgery in Significant Primary Mitral Regurgitation. *J Am Heart Assoc.* 2014 Oct; 3(5): 001010
2. Naji P, Griffin BP, Asafahan F et al. Predictors of long-term outcomes in patients with significant myxomatous mitral regurgitation undergoing exercise echocardiography. *Circulation.* 2014 Mar 25;129(12):1310-9

New pathogenesis of tennis elbow: Lateral elbow impingement syndrome (LEIS)

Osamu Soejima, MD, PhD

Department of Orthopaedic Surgery, Fukuoka Sanno Hospital . School of Medicine, International University of Health and Welfare, JAPAN

Objective: The pathologic entity of recalcitrant tennis elbow (lateral epicondylitis of the elbow: LEC) would be the impingement syndrome of the lateral elbow related to the radial head abutment during supino-pronation as the impingement syndrome of the shoulder. We hypothesize that the radial head of patients with LEC has poorer mobility. Thus, it is critical to release the tension of the radial head, therefore both the capsule and a part of the annular ligament must be resected during the surgery.

Methods: 71 elbows in 68 recalcitrant LEC patients (26 males and 42 females) who underwent mini-open modified Boyd's procedure were evaluated clinically, ultrasonographically, MRI findings, and histologically. Average follow-up period was 14.2 months.

Results: JOA-JES score was improved from 33.9 to 92.2. From the ultrasonographic analysis, the severe LEC group had poorer radial head mobility than the mild LEC group. From the MRI and histological evaluations, degree of the MRI signal changes and histological character were correlated but the histological changes (e.g. fibrosis or angiogenesis) were randomize.

Conclusions:

- The abutment of the radial head to the ECRB origin during the supino-pronation were confirmed, and the decrease of the elasticity in the ECRB origin and the inhibition of the normal radial head motion were observed in the ultrasonographic evaluations.
- Degree of the MRI signal changes and histological character were correlated but the histological changes (e.g. fibrosis or angiogenesis) were randomize.
- Recalcitrant LEC has a progress cycle (micro tear → angiogenesis → remodeling → fibrosis). As this cycle progresses, the decrease of the elasticity in the ECRB origin and the inhibition of the normal radial head motion would occur like as the impingement syndrome of the shoulder (Lateral elbow impingement syndrome: LEIS).
- Thus, the key-point of the surgical concept for the recalcitrant tennis elbow is not only the debridement of the degenerative tissue at the ECRB origin but also the decompression of the peri radial head at the lateral elbow (Peri radial-head decompression: PRD).

References:

1. Soejima O, Iwamoto R, Matsunaga A: Surgical treatment of lateral epicondylitis; Results of arthroscopic versus open procedure. *FESSH*, 2014
2. Muraoka K, Soejima O: Pathogenesis of the lateral epicondylitis; Ultrasonographic analysis. *ASSH*, 2016
3. Soejima O: New pathologic entity of tennis elbow: Lateral elbow impingement syndrome (LEIS). *ASSH*, 2017
4. Soejima O: New pathologic entity of tennis elbow: Lateral elbow impingement syndrome (LEIS).

FESSH, 2018



49th World medical tennis society (WMTS)
congress: international congress of preventive and
sports medicine / LSMU Sporto medicinos klinika

Autorius: LSMU Sporto medicinos klinika

Leidėjas: Lietuvos sveikatos mokslų universiteto
Leidybos namai

Išleidimo vieta: Kaunas

ISBN 978-9955-15-620-8