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# 1. A DYING PATIENT IN INTENSIVE CARE UNIT – AN ETHICAL APPROACH

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*Background:* Our population is aging. Patients (pts) with advanced disease make up a large part of intensive care pts. The data on terminally ill pts approach to the continuity of their lives may help guide ICU palliative care.

*Purpose:* To assess the psychological conditions of terminally ill pts and their approach to death, if they seek to survive at any cost or prefer death to the serious conditions that have exhausted them.

*Methods :* Terminally ill patients (pts) have been randomly quizzed avoiding direct questions about death. The pts' behavior and their body language have been assessed, as well. In 1990-2015 2250 pts died in our ICU. 207(9,2%) of them died suddenly. 350(17%) of 2043 not-suddenly-died pts have been investigated. The average age of these pts was 76 years. The somatic pts have been compared with the suicidal pts. Within this period of time 362 suicidal pts have been treated. The average age of these pts was 35 years.

*Results:* Only 19(5, 4%) pts of 350 randomly selected terminally ill pts did not seek to extend life in any physical conditions. After the treatment 28(7, 7%) of 362 suicidal pts had certain intentions to commit suicide. The p- value of terminally ill somatic pts versus suicidal pts was 0,23 .No statistical difference was observed. Regardless of the reason of the disease, most pts (>90%) wanted to live.

## *Conclusions:*

1. The majority of terminally ill patients seek to prolong their lives by any means, even with very limited physical capability.
2. Even the ones committing suicide expect to be treated.
3. Active or passive assisted dying has very narrow limits for applications and extremely high abuse and disregard of human desire.

## 2. SECONDARY PREVENTION OF STABLE CORONARY HEART DISEASE ON THE BACKGROUND OF NON-ALCOHOLIC STEATOHEPATITIS

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*Background and aim:* Non-alcoholic fatty liver disease for today is not an isolated pathology, but there is next to the affection of other organs, including cardio-vascular system. It is proved that non-alcoholic steatohepatitis promotes progression of coronary heart disease that increases a cardiovascular mortality among the population all over the world [1]. It is known that liver disease of any etiology accompanied by increased hepatic fibrogenesis that leads not only to the restructuring of its parenchyma, but also to the violation of synthetic and metabolic functions [2]. Drug therapy should be indicated not only for progressive non-alcoholic steatohepatitis, but also for early-stage of the disease, that promotes the prevention of non-alcoholic steatohepatitis comorbidities progression [3]. The aim of the study was to assess the possibility of influence on the stable coronary heart disease progression by acting on the liver structural-functional state in patients with non-alcoholic steatohepatitis.

*Material and methods:* 51 patients with stable coronary heart disease and non-alcoholic steatohepatitis, who have had an acute coronary syndrome more than 3 months ago were observed. General clinical examination, electrocardiography, echocardiography, coronary angiography, liver elastography, aspartataminotransferase, alaninaminotransferase, gamma glutamyltransferase, serum lipids profile, type IV collagen, NT-pro BNP and C-reactive protein levels were performed. All patients were divided into 2 groups: Group I - received rosuvastatin 10 mg per day for 1 year, vitamin E 800 mg/d for 2 months (n=17); Group II - received rosuvastatin 10 mg per day for 1 year, ademetionine i/v 800 mg/d for 10 days, than orally 800 mg/d for 2 months and vitamin E 800 mg/d for 2 months (n=34). All patients received two courses of treatment per year. Examination of the patients was conducted at baseline and after 1 year of treatment.

*Results:* After treatment significant improvement of coronary heart disease course and liver structural-functional state were observed in Group II vs. Group I: a number of coronary heart disease destabilizations decreased by 58.8% and 35.3%; a frequency of anginal syndrome decreased in 64.7% and 47.1% patients; no signs of heart failure progression – in 73.5% and 35.3% patients ( $p<0.01$ ) respectively. Aspartataminotransferase, alaninaminotransferase and gamma glutamyltransferase levels normalized in 74.1% vs. 23.5% patients; total cholesterol levels decreased on 45.3% vs. 17.8%, triglycerides decreased on 34.7% vs. 16.4%, low-density lipoproteins cholesterol decreased on 35.8 vs. 14.6%; high-density lipoproteins cholesterol increased on 36.7% vs. 15.4% ( $p<0.02$ ) respectively. Serum type IV collagen levels decreased on 26.5% vs. 6.3%; NT-pro BNP levels decreased on 37.7% vs. 9.8% patients; C-reactive protein levels decreased on 32.3% vs. 7.5% ( $p<0.001$ ) respectively.

*Conclusions:* Inclusion of ademetionine and vitamin E to the complex treatment of two courses per year improves liver functional state, decrease dyslipidemia, inhibit fibrotic processes in the liver and myocardium that prevent progression of stable coronary heart disease in patients with non-alcoholic steatohepatitis.

### References:

1. LaBrecque Douglas R., Abbas Zaigham, Anania Frank et al. (2014) World Gastroenterology Organisation Global Guidelines: Nonalcoholic Fatty Liver Disease and Nonalcoholic Steatohepatitis. J. of Clin. Gastroenterol., 48(6): 467–473.
2. Fadyeyenko H.D., Chernyshov V.A. Comorbid diseases affecting the cardiovascular risk in postinfarction patients (2014) Ukr. Ther. J., 2: 11–20 (in Ukr).
3. EASL–EASD–EASO Clinical Practice Guidelines for the management of non-alcoholic fatty liver disease (2016) J. Hepatol., 64(6): 1388–1402.



### 3. ORAL ANTICOAGULANTS AFTER PULMONARY EMBOLISM: REAL – LIFE OUTCOMES AND DURATION OF TREATMENT

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**Introduction:** In patients with acute pulmonary embolism (APE), two classes of oral anticoagulants are recommended for long-term treatment – vitamin K antagonists (VKAs) and direct oral anticoagulants (DOACs). Clinical trials indicate that DOACs are non-inferior in terms of efficacy and possibly safer than VKAs, particularly in terms of major bleeding. At least three months of anticoagulation are recommended for unprovoked APE; three months for APE with transient risk factors; extended period for patients with APE and cancer. [1]

**Aim.** To compare all-cause mortality, bleeding rates and duration of therapy for different long-term oral anticoagulant treatment groups in real-life practice.

**Materials and methods:** The prospective cohort study was conducted to enrol patients from a single centre in time period of June 2014 till October 2016 presenting with symptomatic acute pulmonary embolism, who were followed-up at three months and one year. The APE was confirmed by CT angiography. The study population included 147 consecutive patients. Statistical analyses were conducted using IBM SPSS 23.0. Differences between categorical variables were tested by Pearson's chi-square test or Fisher's exact test, and survival analysis was performed using Kaplan-Meier estimator.

**Results:** 136 patients survived until discharge. Of these patients, 134 received oral anticoagulants as their long-term treatment. DOACs were prescribed to 92 (68.7%) and VKAs to 42 (31.3%) of them. Two patients received low molecular weight heparins. Three-month all-cause mortality was 9.1% (n=4) for VKAs and 2.2% (n=2) and for DOACs; the difference did not reach statistical significance (p=0.090). All-cause mortality was also similar at one year (13.8% vs 11.1%, p=1.000). No significant differences in bleeding episodes within three months (4.8% vs 3.3%, p=0.648) or one year (13.3% vs 13.0%, p=1.000) were found. Most cases were minor bleeding, only one episode of major bleeding was documented in each group. Most patients (93.1%) used VKAs or DOACs for more than three months, 62.2% and 44.6% used them for more than 6 months and one year, respectively. There was no statistically significant difference between patients who used VKAs or DOACs in one-year follow-up (p=0.690). No statistically significant difference for time of anticoagulant use during one-year follow-up was found between patients with transient risk factors, cancer or unprovoked APE. In unprovoked APE group, five patients (10.6%) of those who were followed up at one year had changed their class of oral anticoagulant (four switched DOAC to VKA, one – VKA to DOAC), whereas no treatment changes were made by patients with transient risk factors or cancer.

**Conclusions:** All-cause mortality and bleeding rates were similar for both types of oral anticoagulants. Contrary to guidelines, duration of treatment did not significantly differ between provoked (transient risk factors or cancer) and unprovoked APE. The length of treatment between VKA or DOAC users also did not differ.

#### References:

1. Konstantinides SV et al. 2014 ESC guidelines on the diagnosis and management of acute pulmonary embolism. Eur Heart J. 2014 Nov 14;35(43):3033-69, 3069a-3069k. doi: 10.1093/eurheartj/ehu283.

## 4. ASSOCIATION OF CLOT LOCATION WITH DIAGNOSTIC MARKERS AND OUTCOMES OF ACUTE PULMONARY EMBOLISM

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**Introduction:** The significance of clot location in outcomes and clinical decision making in patients with acute pulmonary embolism (APE) is unclear. Controversial results have been published regarding higher mortality for patients with centrally located emboli, which is defined as a clot in central or main pulmonary arteries. [1] Platelet-to-lymphocyte ratio has been shown to be an indirect indicator associated with adverse outcomes in APE, implying a more severe pro-thrombotic and pro-inflammatory process. [2] In this study a surrogate marker – platelet-to-leukocyte ratio – was used for assessment of association with clot location.

**Aim:** To evaluate the association of clot location in APE with demographic data, haemodynamic parameters, underlying diseases, laboratory values, echocardiography data, treatment decisions, and mortality. We aimed to investigate the importance of clot location to predict mortality and its impact on other diagnostic studies that are associated with adverse outcomes.

**Materials and methods:** The prospective cohort study included 182 consecutive patients from a single centre in time period from June 2014 till October 2016 presenting with symptomatic APE, confirmed by computed tomography pulmonary angiography. Central clot location was defined as presence of thrombi in central or main pulmonary arteries. Other locations were considered as peripheral. Patients were followed up at three months and one year. Statistical analyses were conducted using IBM SPSS 23.0. Pearson Chi-square test was used for comparison of categorical variables, independent samples t-test and Mann-Whitney U test was used for continuous variables for parametric and non-parametric data, respectively.

**Results:** Peripheral APE was diagnosed in 105 (57.7%) patients, whereas 77 (42.3%) cases were central. Age (mean years (SD): 65.6 (17.0) vs 65.8 (15.6)) and gender (male, n (%): 45 (42.9%) vs 28 (36.4%)) were similar in both groups ( $p>0.05$ ). Patients with central APE were more likely to have higher body-mass index (BMI) (mean (SD) (peripheral vs central): 28.7 (6.4) vs 30.5 (5.3),  $p=0.012$ ). Heart rate, systolic blood pressure and respiratory rate did not significantly differ in both groups. No present comorbidities were associated with clot location. Presence of symptoms – painful or swollen limb, dyspnoea, chest pain, syncope – was similar between groups. Higher D-dimer value was significantly associated with central APE (median (IQR): 6.1 (3.1-13.3) vs 13.2 (5.9-18.6),  $p<0.001$ ). Laboratory values that were associated with peripheral clot location were positive Troponin-I assay (85 (88.5%) vs 53 (76.8%) patients,  $p=0.045$ ) and higher platelet-to-leukocyte ratio (median (IQR): 25.0 (17.7-35.4) vs 20.5 (15.3-27.8),  $p=0.014$ ). In echocardiography, higher pulmonary artery pressure was observed for central APE (median (IQR): 36.5 (30-50) vs 45 (35-55),  $p=0.027$ ). No significant differences in 30-day, 90-day or one-year mortality were seen. Clot location was not associated with long-term anticoagulant selection.

**Conclusions:** Central clot location was associated with higher BMI, D-dimer value and pulmonary artery pressure. Peripheral clots were associated with abnormal Troponin-I value and higher platelet-to-leukocyte ratio. Clot location had no impact on the choice of anticoagulant treatment regimen and mortality in 30 days, 90 days or one year.

### References:

1. Jain CC, Chang Y, Kabrhel C, Giri J, Channick R, Rodriguez-Lopez J, Rosovsky RP, Fogerty A, Rosenfield K, Jaff MR, Weinberg I, Impact of Pulmonary Arterial Clot Location on Pulmonary Embolism Treatment and Outcomes (90 days), The American Journal of Cardiology (2017), doi: 10.1016/j.amjcard.2016.11.018.
2. Ozcan Cetin EH, Cetin MS, Canpolat U, Akdi A, Aras D, Temizhan A, Aydogdu S. Platelet-to-lymphocyte ratio as a novel marker of in-hospital and long-term adverse outcomes among patients with acute pulmonary embolism: A single center large-scale study. Thromb Res. 2016 Dec 10;150:33-40. doi: 10.1016/j.thromres.2016.12.006

## 5. THE EFFICIENCY OF TREATMENT BY BISOPROLOL IN PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY

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*Introduction:* Hypertrophic cardiomyopathy (HCM) is a congenital heart disease. It is the most common form of cardiomyopathies. The purpose of this research is to identify the influence and to estimate the effectiveness of treatment by Bisoprolol, which was prescribed for changing the parameters of early diastole in patients with HCM.

*Material and methods:* the research has involved 50 patients with HCM, which were performed ECG, echocardiography, cardiac MRI with postponed opacification. The patients were divided into 2 groups. Group 1 (18 patients) included patients with predominant hypertrophy of the interventricular septum, 2 group (32 persons) – patients with symmetrical concentric form of hypertrophy with thickening of the interventricular septum, anterolateral and posterior wall of the left ventricle. There were patients in each group with and without late enhancement of gadolinium signal in the zone of hypertrophy. Prescription of Bisoprolol 5 mg 1 time per day with titration of dose is for achieving the objective level of heart rate (60-65 BPM). After 6 months, patients were re-examined, re-ECG with estimating of diastolic function parameters and magnetic resonance imaging of the heart.

*Results:* According to the magnetic resonance images (MRI) the late enhancement of gadolinium signal in a heterogeneous pattern in the area column of hypertrophy was detected in 8 patients (44.4%) in first group that indicated the presence of a zone of intramyocardial fibrosis. As for the second group, it was detected in 6 patients (18.8%). In the subgroups with the late signal enhancement of gadolinium in both groups the indices of diastolic function were significantly higher than in patients without increased signal on MRI, due to an increased stiffness of the myocardium due to the presence of areas of fibrosis in the hypertrophied areas. In the analysis of efficiency of therapy by Bisoprolol reliable lower transmitral E/A was observed in the group with predominant hypertrophy of IVS (both subgroups,  $p=0.027$  and  $p=0.032$  respectively). The absence of certain decreasing of this index in the group with symmetric concentric of HCM is probably due to the significantly greater mass left ventricular mass index of left ventricle myocardium and the prevalence of passive diastole disorders.

*Conclusion:* To sum up, the results of research have shown the high efficiency of treatment by Bisoprolol for people suffering from hypertrophic cardiomyopathy and with primary lesions of the interventricular septum.

## 6. STATISTIC REVIEW OF PATIENTS WITH CARDIOLOGIC EVENTS WHO ARE USING ANTICOAGULANTS – TOTAL AMOUNT OF DAILY USED DRUGS AND WITHIN THE NUMBER OF DRUGS THAT CAN INTERACT WITH ANTICOAGULANTS

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*Introduction:* Cardiac patients use anticoagulants to prevent thromboembolic events. However, these patients often have comorbidities that require daily use of additional drugs. Several medications have mechanistic interactions with anticoagulants, caused by P450 CYP3A4 inhibition or P-glycoprotein inhibition. [1] Drug-drug interactions and different clinical factors impact anticoagulant plasma levels that can lead to both under-treatment or overtreatment. [2]

*Aim:* The aim of the study is to collect statistics about of total number drugs used by cardiac patients who use anticoagulants, and to identify within those the number of drugs that can interact with anticoagulants.

*Material and methods:* We performed analysis of 284 patients cases who used anticoagulants in Pauls Stradins Clinical University - Latvian Center of Cardiology between August 1, 2016 till January 4, 2017. The method used was patient's surveys.

*Results:* Out of 284 total patients 128 (45.1%) were women and 156 (54.9%) were men. Overall, 14 (4.9%) patients used 2 drugs daily, 29 (10.2%) used 3 drugs, 42 (14.8%) patients used 4 drugs, 56 (19.7%) used 5 drugs, 57 (20.1%) used 6 drugs, 34 (12.0%) used 7 drugs, 26 (9.2%) patients used 8 drugs, 14 (4.9%) patients used 9 drugs, and 12 (4.2%) patients used 10 drugs daily. Additionally, of the 284 surveyed patients, 61 (21.5%) used 1 medicament that has interaction with anticoagulants. 137 (48%) patients used 2 drugs that interact with anticoagulants, from which 95 (69.3%) used at least one excessive P-glycoprotein inhibitor ( $p<0.005$ ). 66 (23.2%) patients used 3 drugs that can interact with anticoagulants, from which 61 (92.4%) used at least one excessive P-glycoprotein inhibitor ( $p<0.005$ ). There were 15 (5.3%) patients who used 4 drugs with anticoagulant interaction, and all of them (100%) included at least 1 excessive P-glycoprotein inhibitor ( $p<0.005$ ). Respectively, 4 (1.4%) and 1 (0.4%) used 5 and 6 drugs that can interact with anticoagulants.

*Conclusion:* Cardiac patients who use anticoagulants used, on average, 4 additional drugs daily. 8 out of 10 cardiac profile patients use 2 or more drugs that can interact with other drugs. There is statistically significant data that patients who use 2-4 drugs with drug-drug interactions in majority of cases have at least one excessive P-glycoprotein inhibitor.

[1] Graf L., Korte W. Direct oral anticoagulants and drug-drug interactions. *Ther Umsch.* 2015; 72(2):99-104  
Heidbuchel H et al. *Europace.* 2015; 17(10):1467-507.

[2] 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with ECATS. *Europace.* 2016;18(11):1609-1678

## 7. CHANGES OF LEFT VENTRICLE SYSTOLIC FUNCTION AND MECHANICS IN PRECAPILLARY PULMONARY HYPERTENSION: CMR FEATURE TRACKING STUDY

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**Objectives:** Pulmonary hypertension (PH) results in right ventricle (RV) dysfunction. Cardiac magnetic resonance (CMR) derived RV ejection fraction (EF) is a prognostic value in this condition [1]. However, left ventricle (LV) function could be affected in patients with RV failure as expression of ventricular interdependence [2,3].

**Aim:** The aim of this study was to evaluate LV systolic function by conventional CMR and LV mechanical parameters by CMR feature tracking (FT) in patients with precapillary PH (pPH).

**Methods:** CMR cine imaging data of 45 patients with confirmed pPH diagnosis on right heart catheterization (mean pulmonary artery pressure (mPAP) 55,89±15,64mmHg) and 17 patients as control group with normal mPAP on echocardiography were retrospectively analyzed. Patients with documented coronary and valvular heart disease also with atrial fibrillation were excluded from the study. LV and RV EF, indices of RV end diastolic and end systolic volume (EDVi and ESVi) were evaluated using conventional CMR software (syngo.via; Siemens Healthcare). LV global longitudinal and circumferential strain (LV-LS, LV-CS) and strain rate (LV-LSR, LV-CSR) were assessed on two, three, four chambers and short axis (basal, mid and apical) views using CMR FT software package (Medis Suite QStrain 2.0; Medis Medical Imaging Systems bv) and the average of global LS, LSR, CS and CSR were calculated. Independent Samples Mann-Whitney U test was used to compare distribution across categories and Spearman's correlation was performed. All data were presented as mean with standard deviation.

**Results:** The distribution of age and gender did not differ in pPH and control groups patients (54.36 ± 14.53 vs 46 ± 19.1 years, p=0,122; 70.6% vs 67% women, p=0,77). RV EF was decreased (38,27±13,24 vs 61,35±9,08 %, p=0,0001), EDVi and ESVi were increased (90.07±28.09 vs 58.65±14.31 ml/m<sup>2</sup> and 57.0±24.42 vs 22.88±9.19 ml/m<sup>2</sup>, p=0.0001) in patients with pPH compared to control group. LV EF was decreased in pPH group patients (54.16 ± 12.63 vs 62.50 ± 9,72%, p=0.019). The average of global LV-LS, LV-LSR, LV-CS and LV-CSR were reduced in patients with PH compared to control subjects (-17,04±5,87 vs -23,67±5,06%, -0,9±0,31 vs -1,17±0,41, -31,01±8,54 vs -38,93±7,2% and -1.76±0.68 vs -2.09±0,54, p<0.05). RV EF and RV EDVi significantly correlated with global LV longitudinal and circumferential strain and strain rate parameters: LV-LS, LV-LSR, LV-CS, LV-CSR (r=-0,57, r=-0,45, r=-0,57, r=-0,31, p<0.05 and r=0,33, r=0,28, r=0,41, r=0,22, p<0,05).

**Conclusions:** Increase in right ventricle volumes as well as decrease in right ventricle ejection fraction influence deterioration of left ventricular mechanics and systolic function in precapillary pulmonary hypertension.

### *References:*

1. Baggen VJM, Leiner T, Post MC, van Dijk AP, Roos-Hesselink J, Boersma E, et al. Cardiac magnetic resonance findings predicting mortality in patients with pulmonary arterial hypertension: a systematic review and meta-analysis. *Eur Radiol* 2016;26(11):3771-3780.
2. Knight DS, Steeden JA, Moledina S, Jones A, Coghlan JG, Muthurangu V. Left ventricular diastolic dysfunction in pulmonary hypertension predicts functional capacity and clinical worsening: a tissue phase mapping study. *J Cardiovasc Magn Reson* 2015;17(1):116.
3. Motoji Y, Tanaka H, Fukuda Y, Sano H, Ryo K, Imanishi J, et al. Interdependence of right ventricular systolic function and left ventricular filling and its association with outcome for patients with pulmonary hypertension. *The International Journal of*



## 8. LONGITUDINAL AND CIRCUMFERENTIAL DEFORMATION PARAMETERS DURING RECOVERY PHASE AFTER DOBUTAMINE SPECKLE TRACKING ECHOCARDIOGRAPHY IN ASSESING MYOCARDIAL ISCHEMIA FOR PATIENTS WITH SUSPECTED CORONARY ARTERY DISEASE

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**Introduction:** Dobutamine stress echocardiography has potential limitations surrounding image quality, dependence on expert observers and lack of quantitation. Global and regional deformation parameters are feasible and reproducible during all stages of dobutamine speckle tracking echocardiography (DSE). However, still little is known about the diagnostic value of longitudinal and circumferential strain/strain rate parameters during recovery phase of DSE.

**Purpose:** To compare the diagnostic value of global and regional longitudinal and circumferential deformation parameters ((peak strain (S), peak systolic (SR) during early recovery phase after DSE and conventional visual assesment of wall motion abnormalities (WMA) to predict significant coronary artery stenosis in patients with suspected coronary artery disease (CAD).

**Methods:** DSE and adenosine magnetic resonance imaging (AMRI) were perfomed to 118 patients with moderate or high risk of CAD. CAD was defined as >70% diameter coronary artery stenosis on invasive angiography or in the presence of intermediate stenosis (50-69%) validated as hemodynamically significant by AMRI. Global and regional longidutinal and circumferential peak S and peak systolic SR were analysed using 2D speckle tracking echocardiography (STE) during early recovery phase after DSE. For regional evaluation vessel-based analysis was performed. Patients were divided into two groups: non-obstructive CAD (-) n=67 (57 %) vs obstructive CAD (+) n=51 (43 %).

**Results:** There were no significant differences in clinical characteristics, conventional echocardiography, longitudinal and circumferential deformation parameters between the two groups at rest. All analysed regional and global S and SR parameters at recovery phase were significantly lower in patients with obstructive CAD ((global longitudinal strain (GLS)  $-21.24 \pm 4.5\%$  vs  $-17.1 \pm 3.7\%$ ,  $p=0.045$ ; regional LS  $-19.8 \pm 2.9\%$  vs  $-16.6 \pm 2.5\%$ ,  $p=0.00$ ; regional longitudinal SR  $-1.5 \pm 0.3 \text{ s}^{-1}$  vs  $-1.0 \pm 0.4 \text{ s}^{-1}$   $p=0.00$ , global circumferential strain (GCS)  $-23.92 \pm 5.4\%$  vs  $-17.67 \pm 3.87$ ,  $p=0.01$ ; regional CS  $-21.56 \pm 9.8\%$  vs  $-16.89 \pm 5.3\%$ , regional circumferential SR  $-1.6 \pm 0.6 \text{ s}^{-1}$  vs  $-1.1 \pm 0.5 \text{ s}^{-1}$ )). Wall-motion score index (WMSI) at recovery phase was higher in CAD (+) group ( $1.04 \pm 0.3$  vs  $1.26 \pm 0.4$ ,  $p=0.04$ ). Logistic regression and ROC curves analysis revealed that regional longitudinal SR at recovery phase had the greatest sensitivity and specificity for assessment of significant coronary artery stenosis (Table 1).

**Conclusions:** STE parameters at recovery phase are sensitive and specific in detecting hemodynamically significant coronary artery stenosis in patients with stable CAD. Regional STE parameters, especially longitudinal SR, are the most sensitive and specific parameters compared to conventional assessment of WMA and can be recommended for application into clinical practice.

**Table 1.** ROC analysis of STE parameters and WMSI at recovery phase for prediction of subsequent >70% coronary artery stenosis

| Variable  | Cut off level | Sens.(%) | Spec.(%) | AUROC | p value |
|---|---------------|----------|----------|-------|---------|
| <b>GLS (%)</b>                                      | -19.6         | 73%      | 65 %     | 0.714 | 0.043   |
| <b>Regional LS (%)</b>                              | -18.4         | 77%      | 69 %     | 0.758 | <0.001  |
| <b>Regional longitudinal SR (s<sup>-1</sup>)</b>    | -1.3          | 84%      | 76 %     | 0.812 | <0.001  |
| <b>GCS (%)</b>                                      | -19.9         | 69%      | 64 %     | 0.672 | 0.049   |
| <b>Regional CS (%)</b>                              | -19.0         | 75%      | 66 %     | 0.701 | 0.036   |
| <b>Regional circumferential SR (s<sup>-1</sup>)</b> | -1.5          | 80%      | 72 %     | 0.745 | <0.001  |
| <b>WMSI</b>   | 1.14          | 65%      | 58%      | 0,645 | 0.050   |

## 9. PRESSURE AND VOLUME OVERLOAD DIFFERENTLY AFFECT THE RELATIVE CONTRIBUTION OF LONGITUDINAL AND RADIAL COMPONENTS OF RIGHT VENTRICULAR WALL DISPLACEMENT TO GLOBAL RIGHT VENTRICULAR EJECTION FRACTION

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**Background:** Despite the right ventricle (RV) shows a quite complex mechanics, conventional echocardiography usually explores mainly its longitudinal function only. Therefore, the relative contribution of the different components of RV wall displacement (e.g. longitudinal and radial) to global RV ejection fraction (EF) in distinct loading conditions remains to be clarified.

**Purpose:** To compare the relative contribution of longitudinal and radial (transversal) components of RV wall displacement to global RVEF in patients with RV volume and pressure overload.

**Methods:** We obtained 3D transthoracic echocardiography from 29 patients with RV volume overload (severe pulmonary regurgitation in corrected Tetralogy of Fallot, ToF, mean age 22 ±7 years, 59% men), 28 patients with pressure overload (pulmonary hypertension, PH, mean age 58±13 years, 75% women) and 2 groups of 60 age and gender matched healthy volunteers (30 patients for ToF and PH group each). Dedicated 3D full-volume data sets of the RV were obtained using multibeam acquisitions. RV EF was measured using commercially available dedicated software packages. The longitudinal and radial displacements of the RV walls and their relative contribution to global RV ejection fraction were obtained from 3DE data sets using custom software.

**Results:** Both, ToF and PH groups, showed significantly lower 3D RVEF than controls (Table). ToF showed significantly smaller ratio of longitudinal EF to global RV EF (LEF/GEF) in comparison with the control group, but similar ratio of radial EF to global RV EF (REF/GEF) (Table). Conversely, PH patients demonstrated significantly lower REF/GEF than the control group, but similar LEF/GEF (Table).

**Conclusions:** Our results show that in pressure overload the relative contribution of the radial (transverse) RV wall displacement to global RV EF is impaired more than its longitudinal

shortening. Conversely, in RV volume overload the longitudinal component of RV wall displacement is more affected than the radial one. Thus, clarifying RV mechanical adaptations to different loading conditions and diseases may improve our understanding of the mechanisms leading to RV failure.

**Table.** Demographics, right ventricular function and mechanics in distinct loading conditions and in control groups.

| RV parameters                             | ToF (N=29) | Control-ToF (N=30) | PH (N=28) | Control-PH (N=30) |
|---|------------|--------------------|-----------|-------------------|
| Age (years)                               | 22 ±7      | 21±6               | 58±13     | 57±11             |
| Women (%)                                 | 41         | 37                 | 75        | 73                |
| End-diastolic volume (ml/m <sup>2</sup> ) | 131±32**   | 65±14              | 95±21**   | 58±13             |
| End-systolic volume (ml/m <sup>2</sup> )  | 72±19**    | 28±14              | 62±20**   | 24±6              |
| Ejection fraction (%)                     | 45±5**     | 58±6               | 37±8**    | 59±7              |
| LEF/GEF                                   | 39±9**     | 52±5               | 50±12     | 46±7              |
| REF/GEF                                   | 46±8       | 46±4               | 36±11**   | 48±7              |

\*p<0.05, \*\*p<0.0001.

# 10. IN PHYSIOLOGICAL CONDITIONS, THE RADIAL AND LONGITUDINAL COMPONENTS OF RIGHT VENTRICULAR WALL MOTION CONTRIBUTE EQUALLY TO GLOBAL RIGHT VENTRICULAR EJECTION FRACTION. A 3-DIMENSIONAL ECHOCARDIOGRAPHY STUDY

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**Background:** Despite the large surface of the right ventricular (RV) free wall, the relative contribution of radial component of RV wall displacement to global RV ejection fraction (RVEF) has been neglected and the longitudinal shortening has been considered the main contributor to global RVEF.

**Purpose:** To compare the relative contribution of longitudinal and radial (transversal) components of RV wall displacement to global RVEF in healthy volunteers and to evaluate the correlation of those components with RVEF and RV function parameters obtained by 2D echocardiography (2DE).

**Methods:** Dedicated 3D full-volume data sets of the RV were obtained using multibeam acquisitions from 173 healthy volunteers (44±14 years, 56% women). 3D RVEF was measured using commercially available dedicated software packages. The longitudinal and radial displacements of the RV wall and their relative contribution to global RVEF were obtained from 3DE data sets using custom software. Tricuspid annular plane systolic excursion (TAPSE) and fractional area change (FAC) were evaluated using RV focused 2DE apical 4-chamber views. RV free wall longitudinal strain (RVFWS) was calculated with 2D speckle tracking echocardiography.

**Results:** Overall, the ratio of longitudinal EF to global RVEF (LEF/GEF) and the ratio of radial EF to global RVEF (REF/GEF) (49±7% vs 48±6%,  $p>0.05$ ) were similar. Women showed smaller RV volumes and higher RVEF, RVFWS and FAC than men (Table). Accordingly, women showed significantly higher REF/GEF than men, but similar LEF/GEF. LEF/GEF demonstrated moderate correlation with RVFWS ( $r=0.404$ ,  $p<0.0001$ ), weak correlation with TAPSE ( $r=0.213$ ,  $p=0.005$ ) and RVEF ( $r=0.211$ ,  $p=0.005$ ). REF/GEF correlated closer with FAC than with 3DEF ( $r=0.300$ ,  $p<0.0001$  vs  $r=0.234$ ,  $p=0.002$ ).

**Conclusions:** In healthy volunteers, the relative contribution of the radial component of RV wall displacement to global RVEF is as important as its longitudinal shortening. Moreover, we found that the radial component of RV wall motion is higher in women than in men and this may explain higher 3DEF in women despite similar longitudinal shortening between the two genders. Ability to assess the relative contribution of radial and longitudinal displacement to global RV function may help in understanding RV mechanical adaptation in different pathologies.

**Table.** Demographics, right ventricular function and mechanics in healthy volunteers.

| RV parameters                             | Women (n=97) | Men (n=76) | p value |
|---|--------------|------------|---------|
| Age (years)                               | 46±14        | 41±15      | <0.05   |
| TAPSE (mm)                                | 22±3         | 22±4       | NS      |
| Fractional area change (%)                | 46±5         | 45±5       | <0.05   |
| Free-wall strain (%)                      | 30.4±4.1     | 29.1±3.5   | <0.05   |
| End-diastolic volume (ml/m <sup>2</sup> ) | 61±14        | 68±13      | <0.001  |
| End-systolic volume (ml/m <sup>2</sup> )  | 27±8         | 31±8       | <0.005  |
| Ejection fraction (%)                     | 56±6         | 54±4       | <0.05   |
| LEF/GEF                                   | 48±8         | 49±7       | NS      |
| REF/GEF                                   | 48±6         | 46±6       | <0.05   |

## 11. FACTORS INFLUENCING X-RAY EXPOSURE IN THE ELECTROPHYSIOLOGY LAB

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**Introduction:** The main disadvantage of fluoroscopy usage for catheter position tracking during procedure is the X-ray exposure of the patient and personnel. Exposure varies significantly due to various factors, like pathology, patient's anatomy and weight, physician's experience. Alternative systems for mapping catheter position are available, using either magnetic (i.e. CartoTM) or electrical fields (i.e. Ensite NavXTM), to reduce fluoroscopy time and radiation. However, fluoroscopy remains one of the most widely used method to track catheters during the procedure. [1-4]

**Aim:** To evaluate fluoroscopy time, dose area product (DAP) during electrophysiology procedures, assess factors attributing to their variation and to suggest possible ways to reduce X-ray exposure.

**Methods:** Data of 907 patients, undergoing treatment for atrioventricular nodal re-entrant tachycardia, atrial fibrillation, atrial flutter, concealed or manifesting Wolff–Parkinson–White syndrome, ventricular tachycardia, ventricular extrasystole, His bundle radiofrequency ablations, de novo CRT device implantation between 2015 and 2016 and performed by 4 physicians, were included in the analysis. Registered DAP, procedure outcome, fluoroscopy framerate and duration data were assessed. Continuous variables not normally distributed are expressed as means, medians. Categorical variables are expressed as absolute values, percentages. Comparison of independent samples was done using Kruskal–Wallis test. To evaluate categorical data differences Chi-squared test was used. Differences were considered statistically significant if p values < 0.05. SPSS 24 was used for statistical analysis.

**Results:** 907 procedures were evaluated: 818 (90,2%) radiofrequency ablations, 32 (3,5%) cryoablations, 57 (6,3%) CRT device implantations. 792 (87,3%) procedures were considered as successful, 59 (6,5%) – having partial treatment effect, 56 (6,2%) – unsuccessful. A significant increase in DAP and fluoroscopy duration was observed in cases with unsuccessful outcome, table 1.

Table 1

|                          | DAP mean ( $\mu\text{Gy}\cdot\text{m}^2$ ) | Fluoroscopy duration mean (sek) |
|--------------------------|--|---------------------------------|
| Successful outcome       | 571,1 $\pm$ 32,9                           | 651 $\pm$ 20,7                  |
| Partial treatment effect | 681,5 $\pm$ 101,3                          | 925,6 $\pm$ 89,5                |
| Unsuccessful             | 1018,4 $\pm$ 266,8                         | 1022,1 $\pm$ 111,9              |

A significant difference in DAP was registered during data assessment of physician who used 3f/s framerate in 78,3% of the cases. Other physicians preferred 7,5f/s that resulted in higher exposure. Lower framerate did not result in increase of fluoroscopy duration, table 2.

Table 2

| Physician | Procedure count | DAP ( $\mu\text{Gy}\cdot\text{m}^2$ ): |        | Fluoroscopy duration<br>mean (sek) | Used framerate: |        |
|-----------|-----------------|--|--------|------------------------------------|-----------------|--------|
|           |                 | mean                                   | median |                                    | 3f/s            | 7,5f/s |
| 1         | 240, 26,5%      | 501,9 $\pm$ 65,7                       | 227    | 535,2 $\pm$ 34,3                   | 2,5%            | 86,7%  |
| 2         | 232, 25,6%      | 1156,5 $\pm$ 89,6                      | 741,5  | 966,9 $\pm$ 49,5                   | 0,4%            | 96,6%  |
| 3         | 255, 28,1%      | 497,1 $\pm$ 41,6                       | 256    | 702,4 $\pm$ 37,4                   | 0,8%            | 98%    |
| 4         | 180, 19,8%      | 188,9 $\pm$ 37,8                       | 79     | 530,8 $\pm$ 29,1                   | 78,3%           | 8,9%   |

A significant difference in DAP was registered during data assessment of physician who used 3f/s framerate in 78,3% of the cases. Other physicians preferred 7,5f/s that resulted in higher exposure. Lower framerate did not result in increase of fluoroscopy duration, table 2.

### *Conclusions:*

1. X-ray exposure is higher and mean fluoroscopy time is longer during unsuccessful procedures compared to successful ones. Mean fluoroscopy time of successful procedure evaluated as approximately 11 minutes could be used as criteria to abort procedure to limit X-ray exposure, or a switch between physicians could be considered as an alternative way.

2. Using 3f/s framerate significantly reduces DAP compared to 7,5f/s, at the same time having no significant effect on fluoroscopy duration. 3f/s framerate should be recommended as a default setting during electrophysiological heart procedures if it does not impede operator's accuracy.

### *References:*

1. Kenichiro Yamagata, Bashar Aldhoon, Josef Kautzner. Reduction of Fluoroscopy Time and Radiation Dosage During Catheter Ablation for Atrial Fibrillation. *Arrhythmia & Electrophysiology Review* 2016;5(2):144–9
2. Xianxian Jiang and Lukas RC Dekker. Observations and Considerations on Patient X-ray Exposure in the Electrophysiology Lab. *Arrhythmia & Electrophysiology Review* 2013;2(2):141–4
3. J.P. Joseph and K. Rajappan. Radiofrequency ablation of cardiac arrhythmias: past, present and future. *Q J Med* 2012; 105:303–314
4. Jonathan C Hsu, MD, Nitish Badhwar, MBBS, et al. Predictors of Fluoroscopy Time and Procedural Failure During Biventricular Device Implantation. *Am J Cardiol.* 2012 July 15; 110(2): 240–245.



## 12. EFFICACY OF PULMONARY VEIN ISOLATION USING A SECOND-GENERATION CRYOBALLOON FOR PATIENTS WITH ATRIAL FIBRILLATION

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*Introduction:* Catheter ablation is an effective second-line treatment method of restoring and maintaining sinus rhythm in patients with symptomatic paroxysmal, persistent, and probably long-standing persistent atrial fibrillation (AF) due to failure of or intolerance to antiarrhythmic drug therapy [1]. Pulmonary vein isolation (PVI) is achievable by radiofrequency or cryoballoon ablation. According to the latest clinical research, both procedures display similar treatment outcomes [2,3]. PVI was initially tested in patients with paroxysmal AF, but appears to be noninferior to more extensive ablation in persistent AF as well [4,5].

*Aim of the study:* We aimed to evaluate an atrial fibrillation treatment efficacy using a second-generation cryoballoon for pulmonary vein isolation.

*Materials and methods:* The study was designed as a retrospective data analysis of treatment outcomes of patients who were diagnosed and treated for AF with a second-generation cryoballoon ablation from December, 2014 to February, 2017 at our institution. The efficacy of treatment was evaluated 1, 3 and 6 months after the procedure. We have collected these patient data: demographic statistics, presence of concomitant diseases, chronic treatment, risk of bleeding and thrombosis, pulmonary veins' anatomy, PVI procedure's and follow-up data. Statistical analysis was performed using IBM SPSS Statistics 23.0 software. P values of  $\leq 0.05$  (two-sided) were considered as indicating statistical significance.

*Results:* Study group consisted of 76 (67.9%) male and 36 (32.1%) female patients. Mean age of the cohort was  $55.38 \pm 9.74$  years. 42 (37.5%) patients were diagnosed with paroxysmal, 67 (59.8%) with persistent and 3 (2.7%) with long-standing persistent AF. Mean duration of AF and EHRA score was  $65.49 \pm 46.02$  months and  $2.52 \pm 0.56$  respectively. Consistent SR was achieved in 64.7% of patients 6 months after the PVI. The effect of the procedure did not differ in patients with paroxysmal and persistent AF ( $p > 0.05$ ). Patients with unsustained SR presented with an initial EHRA score of 2.72, which improved to 2.22 six months after the procedure. No worsening of self-feeling during the episodes of PV was documented. These patients did not differ in terms of higher isolation temperatures, number of applications used, age, duration of AF before the procedure, number of comorbidities, AF type and area size of the left atrium. Groin hematoma ( $n = 9$ , (8,0%)) was the most frequent PVI complication.

*Conclusion:* Consistent SR was achieved in almost two thirds of patients 6 months after the intervention. Pulmonary vein isolation using a second-generation cryoballoon proved to be equally effective for patients with paroxysmal and persistent AF. EHRA score improved on average 0.5 classes for patients with unsustained SR after the PVI.

### References:

1. Kirchhof P, Benussi S, Kotecha D, Ahlsson A, Atar D, Casadei B, et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. *Eur Heart J*. 2016;37(38):2893–962.
2. Luik A, Radzewitz A, Kieser M, Walter M, Bramlage P, Hormann P, et al. Cryoballoon Versus Open Irrigated Radiofrequency Ablation in Patients With Paroxysmal Atrial Fibrillation: The Prospective, Randomized, Controlled, Noninferiority FreezeAF Study. *Circulation*. 2015;132: 1311–1319.
3. Kuck KH, Brugada J, Fumkrantz A, Metzner A, Ouyang F, Chun KR, et al. Cryoballoon or Radiofrequency Ablation for Paroxysmal Atrial Fibrillation. *N Engl J Med*. 2016;374:2235–2245.
4. McLellan AJ, Ling LH, Azzopardi S, Lee GA, Lee G, Kumar S, et al. A minimal or maximal ablation strategy to achieve pulmonary vein isolation for paroxysmal atrial fibrillation: a prospective multi-centre randomized controlled trial (the Minimax study). *Eur Heart J*. 2015;36:1812–1821.
5. Verma A, Jiang CY, Betts TR, Chen J, Deisenhofer I, Mantovan R, et al. Approaches to catheter ablation for persistent atrial fibrillation. *N Engl J Med*. 2015;372:1812–1822

### 13. RETROSPECTIVE AND PROSPECTIVE ANALYSIS OF ANTITHROMBOTIC STRATEGY AND COMPLICATIONS RATE AMONG PATIENTS WITH ATRIAL FIBRILLATION AFTER PERCUTANEOUS CORONARY INTERVENTION

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*Introduction:* Almost one third of patients with atrial fibrillation have concomitant coronary artery disease with the need of stent implantation [1-3]. The optimal anticoagulation and antiplatelet management for this patient population is under debate and current guidelines are based on limited evidence [4]. This study investigates anticoagulation and anti-platelet therapies in atrial fibrillation patients with the stent implantation and the relation to thromboembolic and bleeding complications.

*Aim of the study:* To evaluate complications rate and related factors dependence on antithrombotic strategy among patients with atrial fibrillation after percutaneous coronary intervention.

*Material and methods:* The study enrolled data of patients with atrial fibrillation and coronary artery disease (acute coronary syndromes or stabile angina) who underwent percutaneous coronary intervention in our hospital during 2012, 2013, 2015 years. The study was divided into a retrospective and prospective part. Follow-up data was found at the hospital's electronic patients' records system and contacting patients by telephone. Evaluation of outcomes included myocardial infarction, stroke, bleeding, peripheral embolization, stent thrombosis and mortality. Patients were divided into groups based on the antithrombotic strategy after percutaneous coronary intervention. Factors within the groups were compared using Chi-square test or a Fisher's exact test. For all tests, a  $p$  – value less than 0,05 was considered as significant.

*Results:* We enrolled 255 patients (204 were in the retrospective group, 51 – in the prospective). 63,5% of the subjects were male, the mean age was  $74,5 \pm 10,9$  years. Majority of subjects (182(71,4%)) had percutaneous coronary intervention due to acute coronary syndrome. Permanent atrial fibrillation was the most common (96(37,6%)) form. Mean CHA<sub>2</sub>DS<sub>2</sub>-VASc score was  $4,2 \pm 1,7$ , mean HAS-BLED score  $2,4 \pm 0,9$ . Triple antithrombotic therapy was prescribed for 121(47,5%) patients at discharge, mostly for those, who had permanent atrial fibrillation (68(56,2%)  $p < 0,001$ ). 19(7,45%) subjects had the bleeding during the hospitalization, only 5 (26,3%) of them had anticoagulant therapy before intervention. 6 patients suffered the bleeding at follow-up, 5 (83,3%) of them had triple antithrombotic therapy. One subject, with oral anticoagulation before intervention, had a hemorrhagic stroke after thrombolytic therapy during hospitalization period. 5(71,4 %) patients who suffered ischemic stroke did not use oral anticoagulants. There were 2(0,78%) peripheral embolization, 8(3,14%) stent thrombosis (all three at follow up were with triple antithrombotic therapy) and 9(3,53%) myocardial infarctions (one in hospital period, 8 at follow up) in our cohort. Women were more susceptible to bleeding, 15,1%(14) of women and 6,8%(11) of men had hemorrhage ( $p = 0,035$ ). None stent thrombosis occurred with drug eluting stents. Recurrent myocardial infarction was recorded in 8,2%(7) of non-ST elevation myocardial infarction patients and only in 1%(1) ST elevation myocardial infarction ( $p = 0,026$ ). 22(8,63%) patient died during the hospitalization and 2(0,78%) later at follow-up (one with triple antithrombotic therapy and HAS-BLED  $> 3$  suffered hemorrhagic stroke, another without oral anticoagulation and CHA<sub>2</sub>DS<sub>2</sub>-VASc  $> 7$  had ischemic stroke).

*Conclusion:* The choice of anti-platelet, anticoagulant strategy was not determined by CHA<sub>2</sub>DS<sub>2</sub>-Vasc or HAS-BLED scores. More than half of patients did not receive triple antithrombotic therapy despite guideline indications. Compliance with the treatment recommendations remains suboptimal.

#### *References:*

1. Lip GY, Laroche C, Dan GA, Santini M, Kalarus Z, Rasmussen LH, Oliveira MM, Mairesse G, Crijns HJ, Simantirakis E, Atar D, Kirchhof P, Vardas P, Tavazzi L, Maggioni AP. A prospective survey in European Society of Cardiology member countries of atrial fibrillation management: baseline results of EURObservational Research Programme Atrial Fibrillation (EORP-AF) Pilot General Registry. *Europace* 2014;16:308–19.
2. Kirchhof P, Ammentorp B, Darius H, De Caterina R, Le Heuzey JY, Schilling RJ, Schmitt J, Zamorano JL. Management of atrial fibrillation in seven European countries after the publication of the 2010 ESC Guidelines on atrial fibrillation: primary results of the PREvention of thromboembolic events—European Registry in Atrial Fibrillation (PREFER in AF). *Europace* 2014;16:6–14.

3. Lane D, Raichand S, Moore D, Connock M, Fry-Smith A, Fitzmaurice D. Combined anticoagulation and antiplatelet therapy for high-risk patients with atrial fibrillation: a systematic review. *Health Technol Assess* 2013;17:1–188.
4. Lip GYH, Windecker S, Huber K, Kirchhof P, Marin F, Ten Berg JM, et al. Management of antithrombotic therapy in atrial fibrillation patients presenting with acute coronary syndrome and/or undergoing percutaneous coronary or valve interventions: a joint consensus document of the European Society of Cardiology Working Group on Thrombosis, European Heart Rhythm Association (EHRA), European Association of Percutaneous Cardiovascular Interventions (EAPCI) and European Association of Acute Cardiac Care (ACCA) endorsed by the Heart Rhythm Society (HRS) and Asia-Pacific Heart Rhythm Society (APHRS). *Eur Heart J*. 2014 Dec 1;35(45):3155–79.

## 14. EXERCISE BASED CARDIAC REHABILITATION AFTER HEART SURGERY

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**Introduction:** Exercise-based cardiac rehabilitation (CR) leads to reduction in all-cause and cardiovascular mortality [1]. It may also improve functional capacity and quality of life in patients with coronary heart disease and myocardial infarction. [2] There are scarce data corresponding to exercise based CR for patients after heart surgery.

**Aim of the study:** To analyze the changes of functional capacity before and after exercise training based CR for patients after open-heart surgery.

**Methods:** Our investigation included 69 consecutive patients that were referred to Lithuanian University of Health Sciences hospital Kaunas Clinics branch Rehabilitation hospital of Kulautuva for 20 days inpatient CR. Patients performed 6 minute walking test (6MWT) and symptom-limited CPET on a bicycle ergometer with a ramp protocol of 15 W/minute at the start and after 3 weeks. Patients were randomly divided into two groups: 1) training group: patients had exercise based CR with everyday trainings with individually chosen training intensity on cycloergometer, 2) non-training group had a comprehensive CR with usual aerobic training. For the training group CR program consisted of cycling 5 times per week for 30 minutes in the morning. It included a warm-up and cool-down period and a 30-minute continuous training phase. The training intensity was aimed to be between 60% and 80% of peak VO<sub>2</sub> as assessed by CPET. The data was analyzed by using SPSS 20.0 package, nonparametric Mann – Whitney U Test and descriptive statistics was used. The data is expressed as average and standard deviation. Level of statistical significance was chosen as  $p < 0.05$ .

**Results:** The study population consisted of 46 (66%) males and 23 (34%) females, with a mean age of  $64 \pm 1.3$  years. There were 40 patients after CABG (Coronary artery bypass surgery) (57 %), 22 after isolated AoV prosthetic valve surgeries (31 %) and 5 underwent combined procedures (CABG and AoV) and 2 other surgeries (David and intraventricular septal myectomy). 39 patients were allocated to training group (57%) and 30 to non-training group (43%). There were more males in training group (24 (52%) vs. 22 (48%),  $p = 0.039$ ) and training group patients were younger ( $59 \pm 1.98$  years vs.  $68 \pm 1.48$  years  $p = 0.001$ ). Prevalence of risk factors and comorbidities between training and non-training groups statistically significantly did not differ ( $p > 0.05$ ). After 3 weeks of CR program, exercise tolerance improved as compared to baseline in training and non-training groups: 6MWT  $352.13 \pm 8.8$  vs.  $427.3 \pm 10.3$ , respectively ( $p = 0.001$ ) and peak VO<sub>2</sub>  $13.9 \pm 0.79$  vs.  $17.6 \pm 0.9$  mL/kg/min. ( $p = 0.001$ ). 6MWT results improved more in the training group compared to non-training group (change of 6MWT result after CR  $78.3 \pm 9.6$  vs  $64.3 \pm 10.5$ ,  $p = 0.008$ ). Nonetheless, the result of 6MWT was lower in training group before and after CR: before CR ( $340.35 \pm 12.5$  m. vs.  $417.8 \pm 39$  m,  $p = 0.06$ ), after CR ( $419.3 \pm 7.9$  vs.  $471.2 \pm 53.4$  meters,  $p = 0.039$ ). Results of peak VO<sub>2</sub> after 3 weeks of CR in training group was higher compared with nontraining group result ( $17.98 \pm 0.88$  ml/kg/min vs.  $15.68 \pm 1.7$  ml/kg/min,  $p > 0.05$ ), but there was no statistically significant difference.

**Conclusions:** Participation in CR program improves patient functional capacity, although better results were in training group with exercise based CR program.

### *References:*

1. Jong-Young Lee et al. Impact of exercise-based cardiac rehabilitation on long-term clinical outcomes in patients with left main coronary artery stenosis, European Journal of Preventive Cardiology 2016, Vol. 23(17) 1804–1813
2. Bernhard Rauch et al. The prognostic effect of cardiac rehabilitation in the era of acute revascularisation and statin therapy: A systematic review and meta-analysis of randomized and non-randomized studies – The Cardiac Rehabilitation Outcome Study (CROS) European Journal of Preventive Cardiology 2016, Vol. 23(18) 1914–1939

## 15. RISK FACTORS OF RECCURENCE OF STABLE CORONARY HEART DISEASE: OXIDATIVE STRESS AND DEPRESSION

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*Introduction:* Depression (D) is an independent risk factor for myocardial infarction, cardiovascular diseases and arterial hypertension [1]. D is one of the indicators, on the basis of which it is possible to make a negative outlook about the possible occurrence of somatic disorders [2] D is connected with current inflammatory reactions in the body, an increased amount of proinflammatory cytokines, and an increased level of lipid peroxidation. [3]. This neurogenic phenomenon effects on the neuronal plasticity, changing the genesis and maintenance of long-term potentiation, which leads to the disruption of the hippocampus-dependent memory. Oxidative stress (OS) and the production of oxygen free radicals also cause the toxic effects in the aging brain [4]. OS and inflammation are the main pathogenic reasons of degenerative diseases, including the cardiovascular [5]. Free oxygen radicals are involved in vascular cell dysfunction and lead to the development of atherosclerosis and other chronic cardiovascular diseases [6]. The accumulation of free radicals in blood vessels is responsible for the development of inflammatory reactions. Membrane phospholipids of neurons are particularly susceptible to oxidative damage [7]. Only 25% of the patients with coronary heart disease (CHD) are diagnosed the affective disorder. Only about half of them receive an adequate antidepressant therapy [8]. Understanding of the linkages and interaction, OS and D may be especially useful in the prevention and making a personalized approach in treating CHD. Objectives of the study: to identify and examine the relationship between the OS level and the severity of symptoms manifestations of D in patients with stable CHD and in patients with stable recurrent CHD.

*Methods:* A retrospective study of case-control. Group of patients: 50 patients of the cardiology department of the inpatient aged 45-65 years, with a stable recurrent CHD. The control group - 50 patients with an inpatient cardiology department of primary stable CAD, of the same age. It is assessed in both target groups: manifestations of stable CAD (using structured interviews); OS parameters in the blood (MDA, GPx); quality of life, pleasure and satisfaction (short form questionnaire Q-les-Q, the author is J.Endicott, Latvian version is valid); D severity (long 30-way form of Geriatric Depression Scale, the authors are J.A.Yesavage and others, the validity of the Latvian version of GDS-LAT).

*Results:* The hypotheses of this study lies in the fact that: 1. There is a relationship between the level D and the markers level of OS in the patients with stable CAD; 2. In the patients with relapsed and stable BSC and D, the level of OS markers in the blood will be higher than that, which is in the patients with primary stable BSC. The study is in its initial first stage, data are being processed and assessed. Currently assessed data of 26 patients and 21 control. Patients considered as depressed – 9 cases, control – 4 cases. Quality of life mean score reported 67.4% in patients and 71.2% in control. No significant differences in satisfaction of life between the two groups. Further results will be reported.

### *References:*

1. [http://apps.who.int/iris/bitstream/10665/41864/1/0965546608\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/41864/1/0965546608_eng.pdf) THE GLOBAL BURDEN OF DISEASE A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020 EDITED BY CHRISTOPHER J. L. MURRAY HARVARD UNIVERSITY BOSTON, MA, USA, Alan D. Lopez World Health Organization, Geneva, Switzerland.
2. <https://www.ncbi.nlm.nih.gov/pubmed/7498109> The impact of negative emotions on prognosis following myocardial infarction: is it more than depression? // Health Psychol. 1995 Sep;14(5):388-98. // Frasure-Smith N1, Lespérance F, Talajic M.
3. <https://www.ncbi.nlm.nih.gov/pubmed/?term=Vavakova%2C+2015> Markers of Oxidative Stress and Neuroprogression in Depression Disorder. // Oxid Med Cell Longev. 2015;2015:898393. doi: 10.1155/2015/898393. Epub 2015 May 20. // Vaváková M1, Ďuračková Z1, Trebatická J2.
4. <https://www.ncbi.nlm.nih.gov/pubmed/27719969> Inflammation and oxidation: predictive and/or causative factors // Rev Esp Geriatr Gerontol. 2016 Jun;51 Suppl 1:27-33. doi: 10.1016/S0211-139X(16)30140-8. // Fernández-Viadero C1, Jiménez-Sanz M2, Fernández-Pérez A3, Verduga Vélez R4, Crespo Santiago D3.
5. <https://www.ncbi.nlm.nih.gov/pubmed/27721914> Dietary Phytochemicals: Natural Swords Combating Inflammation and Oxidation-Mediated Degenerative Diseases. // Oxid Med Cell Longev. 2016;2016:5137431. Epub 2016 Sep 19. // Islam MA1, Alam F1, Solayman M2, Khalil MI3, Kamal MA4, Gan SH1.



6. <https://www.ncbi.nlm.nih.gov/pubmed/27717903> An isoflavonoid-enriched extract from *Pueraria lobata* (kudzu) root protects human umbilical vein endothelial cells against oxidative stress induced apoptosis. // *J Ethnopharmacol.* 2016 Dec 4;193:524-530. doi: 10.1016/j.jep.2016.10.005. Epub 2016 Oct 4. // Gao Y1, Wang X2, He C3.
7. [https://www.researchgate.net/publication/235433011\\_Vladimirs\\_Vladimirs\\_Voicehovskis\\_Gunta\\_Ancane\\_Julija\\_Genri\\_VoicehovskaGrigorijs\\_Orlikovs\\_Jurijs\\_Karpovs\\_Igors\\_Ivanovs\\_Andrejs\\_Skesters\\_Andrejs\\_Ancans\\_Alise\\_Silova\\_Tarass\\_Ivascenko\\_Janis\\_Micans\\_Normund\\_OXIDATIVE\\_STRESS\\_PARAMETERS\\_IN\\_POSTTRAUMATICSTRESS\\_DISORDER\\_RISK\\_GROUP\\_PATIENTS](https://www.researchgate.net/publication/235433011_Vladimirs_Vladimirs_Voicehovskis_Gunta_Ancane_Julija_Genri_VoicehovskaGrigorijs_Orlikovs_Jurijs_Karpovs_Igors_Ivanovs_Andrejs_Skesters_Andrejs_Ancans_Alise_Silova_Tarass_Ivascenko_Janis_Micans_Normund_OXIDATIVE_STRESS_PARAMETERS_IN_POSTTRAUMATICSTRESS_DISORDER_RISK_GROUP_PATIENTS). Proceedings of the Latvian Academy of Sciences. Section B, Vol. 66 (2012), No. 6 (681), pp. 20–30 // Vladimirs Vladimirs Voicehovskis, Gunta Ancāne, Julija Genri Voicehovska, Grigorijs Orlikovs, Jurijs Karpovs, Igors Ivanovs, Andrejs Šķesters, Andrejs Ancāns, Alise Silova, Tarass Ivaščenko, Jānis Micāns, Normunds Vaivads, and Larisa Umnova.
8. <http://www.aafp.org/afp/2001/0815/p641.pdf> Assessment and Treatment of Depression Following Myocardial Infarction // THOMAS P. GUCK, PH.D., MICHAEL G. KAVAN, PH.D., GARY N. ELSASSER, PHARM.D., and EUGENE J. BARONE, M.D., Creighton University School of Medicine, Omaha, Nebraska // *Am Fam Physician.* 2001 Aug 15;64(4):641-648.

## 16. ENPEP GENE'S VARIATION rs6825911 IS ASSOCIATED WITH RECURRENCE OF ATRIAL FIBRILLATION AFTER SINUS RHYTHM RESTORATION

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**Introduction:** Genetic aspect of atrial fibrillation (AF) has raised attention lately. The most significant association observed in meta-analysis is located in 4q25 locus [1]. Studies show that genetic variations located in 4q25 modulate function of two nearest genes – PITX2 and ENPEP [2]. The link between PITX2 and AF is already observed in multiple studies but there is no evidence of association of AF and ENPEP gene [3,4]. Aim. To investigate association of ENPEP gene variation rs6825911 and risk of AF development and recurrence after successful direct-current cardioversion (DCC).

**Material and methods:** 60 patients with persistent non-valvular AF were enrolled. Patients with coronary heart disease, cardiomyopathies, thyroid dysfunction, diabetes, pulmonary disease, chronic kidney disease were excluded. Participants underwent elective DCC and sinus rhythm was restored in all cases. Six months after DCC patients were interviewed by phone in order to assess recurrence of AF. Peripheral blood samples were obtained on admission. Blood samples of 98 healthy volunteers were available for analysis. DNA was extracted by commercially available kit innuPREP Blood DNA Mini Kit (Analytik Jena AG, Germany). ENPEP rs6825911 genotyping was performed by Taqman assay C\_29321008\_10 (ThermoScientific, USA). Differences in outcome variables were assessed by Pearson's Chi-Square test and binary logistic regression.

**Results:** Out of 60 patients 38 (63.3%) were males. Mean age of patients was 60.5±10.1 years. Antiarrhythmic drugs (AAD) on discharge were prescribed for 56 (93.3%) patients – amiodarone 69.6%, propafenone 14.3%, ethacizine 10.7%, sotalol 5.4%. Performing case control study, there were no association between rs6825911 genotypes and risk of AF development (OR=0.899; 95%CI 0.516-1.567, p=0.708). AF recurrence was observed in 22 (36.7%) patients one month after DCC and in 35 (59.3%) patients six month after DCC. No difference in outcome, depending on ADD prescription status, was observed (p=0.53 for one month and p=0.417 for six month outcome). In binary logistic regression only dominant model of inheritance (CC+CT vs. TT) predicts one month recurrence of AF (OR=3.360; 95%CI 1.111-10.166, p=0.032). After adjustment for left atrial volume index and presence of arterial hypertension, association remained statistically significant (OR=11.149; 95% CI 1.897-65.516, p=0.008). No association was found between rs6825911 and six months outcome (p=0.570) in our study. **Conclusions:** 1. Variation rs6825911 is not associated with risk of atrial fibrillation development. 2. Genotypes CC and CT at rs6825911 are associated with greater probability of atrial fibrillation recurrence one month after successful direct-current cardioversion. 3. Further research is needed to assess the influence of variant rs6825911 on long-time outcome after direct-current cardioversion.

### References:

1. Ellinor PT et al. Meta-analysis identifies six new susceptibility loci for atrial fibrillation. Nat Genet. 2012; 44(6):670-5
2. Aguirre LA et al. Long-range regulatory interactions at the 4q25 atrial fibrillation risk locus involve PITX2c and ENPEP. BMC Biol. 2015;13:26
3. Ferran A et al. Association between rs2200733 and rs7193343 genetic variants and atrial fibrillation in a Spanish population, and meta-analysis of previous studies. Rev Esp Cardiol. 2014; 67(10):822-9
4. Parvez B et al. Symptomatic response to antiarrhythmic drug therapy is modulated by a common single nucleotide polymorphism in atrial fibrillation. J Am Coll Cardiol. 2012;60(6):539-45

## 17. CORRECTION OF RESPIRATORY SYNDROME IN PATIENTS WITH ARTERIAL HYPERTENSION TREATED WITH ANGIOTENSIN – CONVERTING ENZYME INHIBITORS

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*Background:* The problem of respiratory syndrome is essential in the clinical picture of internal diseases [1, 2]. One of the most frequent side effects of ACE inhibitors is dry cough caused by swollen bronchial mucosa in response to inhibition of bradykinin decay. It is known that the antihypertensive effect of ACE inhibitors' use is the suppression of angiotensin II production that has adverse components leading to accumulation of large quantities of bradykinin, as well as renin and angiotensin I.

*The aim of the study* was to optimize treatment of patients suffering from stage II hypertension with left ventricular hypertrophy and diastolic dysfunction of the left ventricle by means of combination of ACE inhibitors and L-lysine aescinat and aescusan.

*Material and methods:* The study involved 120 patients with stage II hypertension, divided into two groups. Group I involved 60 patients with respiratory syndrome caused by the use of ACE inhibitors (enalapril, lisinopril, ramipril). Group II patients (60 individuals) were administered L-lysine aescinat and aescusan against the background of respiratory syndrome. Research methods: research study of endothelium-dependent and -independent vasodilation (measuring vascular luminal diameter, pulse wave velocity, "intima-media" complex thickness by means of Doppler ultrasonography); estimation of the blood levels of endothelin-1, bradykinin, atrial and brain natriuretic peptide (ELISA); EchoCG with the evaluation of diastolic heart function and pulmonary artery pressure.

*Results:* It has been established that the mechanisms of respiratory syndrome development in patients receiving ACE inhibitors correlate with the bradykinin and natriuretic peptide levels. The use of bradykinin inhibitors L-lysine aescinat and aescusan is accompanied by clinical management of respiratory syndrome.

*Conclusions:* Treatment of patients suffering from stage II hypertension with L-lysine aescinat and aescusan enables to increase the safety of ACE inhibitors' use and avoid respiratory syndrome and cough.

### *References:*

- Achilleos A. (2016) Evidence-based Evaluation and Management of Chronic Cough. *Med Clin North Am.*, 100(5): 1033–1045. 2. Poulouse V., Tiew P., How C. (2016) Approaching chronic cough. *Singapore Med J.*, 57(2): 60–63.

## 18. ENDOTHELIAL FUNCTION ASSESSED BY PERIPHERAL ARTERIAL TONOMOMETRY IS NOT RELATED TO CARDIOVASCULAR RISK SCORE IN HEALTHY SUBJECTS

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*Introduction:* Cardiovascular disease (CVD) remains the leading cause of death and disability worldwide. Although the main risk factors for developing CVD have been known for decades, risk prediction models need to be refined in order to improve their capacity in discriminating true high-risk from low-risk individuals. This is illustrated by the fact that most cases of first myocardial infarction stem from the large group of the population classified as intermediate- or low risk in any modern risk prediction calculator. Measurement of endothelial function is not part of routine risk assessment but as loss of endothelial integrity has a role in all stages of atherosclerosis it could be considered one of the first signs of CV disease. Peripheral arterial tonometry (PAT) is a non-invasive method to assess peripheral endothelial function that could potentially improve primary prevention of CVD.

*Purpose:* Investigate the relation of PAT results to CV risk factors and risk score in a healthy cohort.

*Methods:* PAT measurements were performed on 102 individuals, with no previous history of CAD, attending the Risk Preventive Clinic of the Icelandic Heart Association (IHA). Traditional CV risk factors were evaluated and integrated into a CV risk score calculator. It provides the absolute predicted likelihood of developing CV endpoints (myocardial infarction, percutaneous coronary intervention or bypass surgery) within the next ten years as well as relative risk. The relative risk is a ratio of predicted 10-year CVD risk compared to the mean value of physically active non-smokers of the same age and sex category. Statistical analysis was performed using R-studio. Linear regression was used to test the relationship of numeric variables to PAT results. T-test and ANOVA were used to test the relation of PAT results to categorical variables. Multivariate analysis was performed including all risk factors having a linear relation to PAT results.

*Results:* Fifteen percent of the 102 participants were defined as having peripheral endothelial dysfunction. The mean absolute 10-year risk of suffering a CV endpoint was 5.19%. The majority of subjects had low risk, the median being 3.06%. Twenty-five percent of the cohort had CV risk higher than 10% and were defined as high-risk individuals. Of these 23 were male and 1 was female. The mean relative risk was 2.00. PAT results of reactive hyperemia index (RHI) and augmentation index (AI) had no significant relation to risk score while baseline pulse amplitude was positively correlated with both absolute ( $p = 0.02$ ) and relative ( $p = 0.02$ ) 10-year risk of developing CVD. Among CV risk factors only heart rate was significantly associated with RHI ( $r = -0.24$ ,  $R^2 = 0.06$ ,  $p = 0.01$ ). AI and baseline pulse amplitude both correlated with several risk factors.

*Conclusions:* A low RHI value indicative of peripheral microvascular endothelial dysfunction was not associated with an increased risk of developing CVD within the next ten years. The relation between endothelial dysfunction and CV risk factors was limited. Further clinical end point studies are needed to fully comprehend the diagnostic and predictive value of PAT measurements in healthy subjects.

## 19. THE IMPACT OF GLYCAEMIC PARAMETERS, C PEPTIDE AND HOMA-IR INDEX ON CORONARY PLAQUE TISSUE CHARACTERISTICS ASSESSED BY iMAP-INTRAVASCULAR ULTRASOUND IN PATIENTS WITH PREDIABETES

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*Introduction:* Atherosclerotic plaque vulnerability is a major risk factor for acute cardiovascular events. Impaired glucose regulation is associated with vulnerable plaque composition and high risk of atherosclerosis progression in patients with diabetes mellitus. Increased risk of developing diabetes and impaired glucose regulation is observed in patients with prediabetes. However, data concerning the relation between glycaemic variables and plaque tissue characteristics assessed by iMAP-intravascular ultrasound (IVUS) in patients with prediabetes are lacking. Aim. This study was aimed to analyze coronary plaque tissue characteristics assessed by iMAP-IVUS and to evaluate the correlation with glycaemic parameters and C peptide in patients with prediabetes.

*Methods and materials:* A total of 22 non diabetic patients with stable coronary artery disease and HbA1c 5.7-6.4 were included. Fasting blood was collected for glucose, HbA1c, C peptide, HOMA-IR index calculation and lipid profile assessment before percutaneous coronary intervention (PCI). During PCI lesions in the culprit artery were imaged by 40-MHz iMAP-IVUS. Plaque tissue characterization was done and the percentage of plaque fibrotic, necrotic, lipidic, necrolipidic and calcific tissue was determined in the most diseased non-culprit lesion proximal or distal to the stented segment. Data statistical analysis was performed with PSPP 0.8.5. software. Results with  $P < 0.05$  were considered statistically significant.

*Results:* Mean patient age was  $59.4 \pm 6.69$  years and weight  $97.05 \pm 23.22$  kg. Most of the patients (68.2%) had a history of previous PCI. Mean plaque length was  $10.46 \pm 3.42$  mm and volume  $73.92 \pm 35.30$  mm<sup>3</sup>. The mean percentages of each plaque tissue component was 81.0% for fibrotic, 4.3% for lipidic, 12.4% for necrotic, 16.2% for necrolipidic and 2.7% for calcific tissue. No significant correlations were found between plaque tissue characteristics and patient age, weight, body mass index, smoking status, lipid parameters, fasting glucose and HbA1c. The correlation between C peptide and HOMA-IR index with plaque necrotic and necrolipidic tissue volumes was  $r=0.45$ ;  $p=0.079$ ,  $r=0.46$ ;  $p=0.075$  for C peptide and  $r=0.46$ ;  $p=0.07$ ,  $r=0.46$ ;  $p=0.075$  for HOMA-IR index, respectively.

*Conclusions:* No statistically significant correlations were found between glycaemic parameters, C peptide, HOMA-IR index and plaque tissue characteristics. The correlations may not be conclusive due to the insufficient patient number. These preliminary results warrant further investigation in a larger patient population.



## 20. LOW CARDIOVASCULAR EVENT AND HIGH ATRIAL FIBRILLATION RECURRENCE RATE ON YEAR AFTER ELECTRIC CARDIOVERSION

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*Introduction:* Electric cardioversion is widely used to restore sinus rhythm in patients with atrial fibrillation. However, the long term clinical event and sinus rhythm maintenance rates following electrical cardioversion are variable among studies.

*Aim:* This study evaluated one year incidence and risk factors of cardiovascular events and atrial fibrillation recurrence in a single center practice.

*Methods and materials:* In a prospective study 188 patients with electrocardiographically confirmed atrial fibrillation who underwent electric cardioversion were enrolled. Patient follow up was done one year after cardioversion. Mean patient age was  $65.4 \pm 10.1$  years and weight  $93.6 \pm 20.1$  kg. Arterial hypertension was present in 89.1%, diabetes mellitus in 16.0% and congestive heart failure in 76.1% of patients. The proportion of patients with a history of stroke or transient ischemic attack (TIA) was 6.9% while 15.0% reported of having a myocardial infarction in their life. The proportion of patients whose atrial fibrillation paroxysm lasted less than 48 hours was 11.1%. The majority of patients (87.8%) underwent elective cardioversion with amiodarone and anticoagulation pretreatment. More than a half of study population (57.7%) had a history of electric (42.3%) or pharmacologic (15.4) cardioversion. According to CHA<sub>2</sub>DS<sub>2</sub>-VASc score, 81.4% of patients had  $\geq 2$  points. Data statistical analysis was performed with PSPP 0.8.5. software. Results with  $P < 0.05$  were considered statistically significant.

*Results:* The success rate after electric cardioversion was 90.4%. Anticoagulation therapy after cardioversion was prescribed in 98.9% patients and a year after cardioversion 66.2% of patients reported still being on anticoagulation therapy. Of those who stopped the use of anticoagulants, 81.1% had CHA<sub>2</sub>DS<sub>2</sub>-VASc score  $\geq 2$ . During a year after cardioversion one patient (0.6%) suffered myocardial infarction, three patients (1.9%) had a stroke/TIA, three patients (1.6%) died and three patients (1.9%) reported having a bleeding event that required hospitalization. The only factor that showed a tendency to increase the risk of the combined event rate of myocardial infarction, stroke/TIA and bleeding without reaching statistical significance was diabetes mellitus ( $P = 0.096$ ). At follow up 30.0% of patients reported having atrial fibrillation and during the year 62.2% had suffered at least one atrial fibrillation paroxysm. The proportion of patients who underwent additional cardioversions after the initial hospitalization was 32.5% of whom 83.0% underwent electric cardioversion. The factors that significantly increased the risk of atrial fibrillation relapse was history of stroke/TIA ( $P = 0.014$ ) and increased LAVI on echocardiography ( $P = 0.039$ ) while increased LA showed a tendency towards increased risk ( $P = 0.087$ ).

*Conclusions:* Cardiovascular event rate a year after electric cardioversion was low. Electric cardioversion had a high immediate success rate, however, maintenance of stable sinus rhythm during a year was low.

## 21. THE OUTCOMES OF THE INPATIENT TREATMENT OF THE CARDIAC PATIENTS, WHO HAS SURVIVED THE CLINICAL DEATH AND EXPERIENCED THE CORONARY ANGIOGRAPHY

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*Introduction:* The most frequent cause of the clinical death is the heart disease. [1] As the heart disease is most likely caused by a damage of the coronary artery (CA), coronary artery angiography (CAA) is used as diagnostic and treatment method. [2] Aim. To assess the demographic, clinical, angiographic and LV functional data and the treatment outcomes of the patients, who survived the clinical death.

*Methods:* Analyzed data of the 55 patients, who survived the clinical death, have been treated and experienced CAA in the Department of Cardiology of Lithuanian University of Health Sciences since March, 2012 to January, 2014. We analyzed the dependence of the treatment outcomes on the demographic, clinical, angiographic and LV functional data, as well as on the methods and terms of the inpatient treatment. Data was analysed using SPSS 20 statistical package. The chosen significance level of  $p < 0.05$ . Local Ethics committee approval was obtained for the study.

*Results:* The range age was from 37 to 84 years ( $62.1 \pm 11.4$  years). 65.5% were male, 74.5% had arterial hypertension (AH), 5.5% history of diabetes mellitus (DM), 67.3% set dyslipidemia, 40% smoked. At the hospital unconscious arrived 67.3%. LV ejection fraction (EF) was from 5 to 55%, Wall motion index (WMI) from 1.09 to 2.99. Inpatient treatment duration was  $11.2 \pm 8.4$  days. Percutaneous transluminal coronary angioplasty (PTCA) was performed for 74.5%, PTCA and coronary artery bypass graft surgery (CABG) was performed for 1.8%. Therapeutic hypothermia was applied to 20% of patients. 32.7% of patients died in hospital. A history of myocardial infarction (MI) had 16.4%, stroke or transient ischemic attack occurred in 10.9% of patients. The history of PTCA had 7.3%, CABG 7.3%, PTCA and CABG 1.8%. A significant impact on inpatient mortality have LVEF less than 40 % ( $p < 0.0001$ ), LV WMI  $\geq 1.5$  ( $p = 0.03$ ) and the presence of coma ( $p = 0.002$ ). The largest mortality rate is on 1-3 treatment day, survivors of this period death is rare ( $p = 0.0001$ ). During first day died 3 of 55 patients (5.5%), during the first 3 days - 9/55 (plus 11%), within 7 days - 11/55 (plus 3.6%), 14 days - 14/55 (plus 5.5%). The use of therapeutic hypothermia did not significantly affect the number of deaths.

*Conclusions:* More patients died in hospital who had more than 60 years, arrived in a coma, but sex, CD, AH, dyslipidemia had no impact for mortality rate. Inpatient mortality rate was affected by LV EF and WMI. The highest mortality rate was within the first three days.

### References:

- Aurore A, Jabre P, Liot P, Margenet A. Predictive factors for positive coronary angiography in out – of – hospital cardiac arrest patients. *European Journal of Emergency Medicine*. 2011; 18: 73 – 76 2. Myerburg RJ, Junttila MJ. Sudden cardiac death caused by coronary heart disease. *Circulation*. 2012; 125: 1043 – 1052.

## 22. LOW DOSE CARDIAC CTA IN OBESE PATIENTS

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*Introduction:* Coronary Computed Tomography Angiography (CCTA) is non invasive diagnostic tool for evaluating patients with suspected coronary artery disease. Advances in better protocols permit lower radiation dose cardiac imaging. In individuals with the suitable body size, a lower tube voltage setting may allow for a decreased radiation dose while maintaining diagnostic image quality.

*Aim:* Investigate the effect of low kilovoltage CCTA on qualitative and quantitative image quality parameters and radiation dose. *Methods* We sought to investigate feasibility of 80 kV CCTA in obese adult patients group (BMI 25-30 kg/m<sup>2</sup>) by comparing radiation doses and image quality versus standardized 100 kV protocols. CCTA was performed on 320 slices CT scanner. Typically bolus of nonionic iodinated contrast material (Iopromide 370 mg I/ml) was administered at a flow rate of 6 ml/s into antecubital vein. Twenty patients were examined using a tube potential of 80 kV (mean age 52.5±8.3 years, mean BMI 26.95±1.2). 31 patients (mean age 55.3±9.5 years, mean BMI 27.2±1.5) matched for body-mass-index, heart rate, heart rhythm were scanned with a tube potential of 100 kV and served as the control group. Qualitative and quantitative image quality parameters were determined in proximal and distal segments of the coronary arteries. Image quality was determined by two blinded readers using Likert scale. Quantitative assessment was determined by the contrast-to-noise ratio (CNR) and signal-to-noise ratio (SNR). The differences between the groups were compared using two-tailed Student's test. To determine inter-observer agreement for the qualitative image quality assessment, intra-class-correlation (ICC) and Spearman correlation coefficient were calculated. A p-value less than 0.05 was considered statistically significant.

*Results:* A total of 408 segments (160 segments [80 kV] versus 248 segments [100 kV]) were assessed qualitatively. At 80 kV, 156/160 segments and at 100 kV, 242/248 segments were deemed diagnostic. The comparison of qualitative image quality by two observers showed very good agreement with ICC of 0.91. The noise level in patients scanned with a tube 80 kV was higher compared to the patients scanned at 100 kV (70±16.1 versus 59.3±6.8 HU). The mean contrast-to-noise ratio (CNR) and signal-to-noise ratio (SNR) were higher at 100 kV versus 80 kV (CNR 9.8±3.2 [80kV] vs. 12.1 ±5.1 [100 kV], p<0.05 and SNR 11.1±3.4 [80 kV] vs.15.7±6.1 [100 kV], p<0.05). Significantly higher CNR and SNR values were observed in all coronary segments. In this study, we tested feasibility of 80 kV protocols and demonstrated a significant reduction of radiation dose of 56% versus 100 kV protocols (1.2 mSV [0.6-1.3] versus 2.7 [1.2-3.6]). Our data demonstrates that in obese patients, an ultra low dose protocol is feasible and results in radiation dose reduction of 56%. Image quality was found to be diagnostically acceptable in all cases.

## 23. STATISTIC REVIEW OF PATIENTS WITH CARDIOLOGICAL EVENTS WHO ARE USING ANTICOAGULANTS – TOTAL AMOUNT OF DAILY USED DRUGS AND WITHIN THOSE THE NUMBER OF DRUGS THAT CAN INTERACT WITH ANTICOAGULANTS

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*Introduction:* Cardiac patients use anticoagulants to prevent thromboembolic events. However, these patients often have comorbidities that require daily use of additional drugs. Several medications have mechanistic interactions with anticoagulants, caused by P450 CYP3A4 inhibition or P-glycoprotein inhibition. [1] Drug-drug interactions and different clinical factors impact anticoagulant plasma levels that can lead to both under-treatment or overtreatment. [2]

*Aim:* The aim of the study is to collect statistics about of total number drugs used by cardiac patients who use anticoagulants, and to identify within those the number of drugs that can interact with anticoagulants.

*Material and methods:* We performed analysis of 284 patients cases who used anticoagulants in Pauls Stradins Clinical University - Latvian Center of Cardiology between August 1, 2016 till January 4, 2017. The method used was patient's surveys.

*Results:* Out of 284 total patients 128 (45.1%) were women and 156 (54.9%) were men. Overall, 14 (4.9%) patients used 2 drugs daily, 29 (10.2%) used 3 drugs, 42 (14.8%) patients used 4 drugs, 56 (19.7%) used 5 drugs, 57 (20.1%) used 6 drugs, 34 (12.0%) used 7 drugs, 26 (9.2%) patients used 8 drugs, 14 (4.9%) patients used 9 drugs, and 12 (4.2%) patients used 10 drugs daily. Additionally, of the 284 surveyed patients, 61 (21.5%) used 1 medicament that has interaction with anticoagulants. 137 (48%) patients used 2 drugs that interact with anticoagulants, from which 95 (69.3%) used at least one excessive P-glycoprotein inhibitor ( $p<0.005$ ). 66 (23.2%) patients used 3 drugs that can interact with anticoagulants, from which 61 (92.4%) used at least one excessive P-glycoprotein inhibitor ( $p<0.005$ ). There were 15 (5.3%) patients who used 4 drugs with anticoagulant interaction, and all of them (100%) included at least 1 excessive P-glycoprotein inhibitor ( $p<0.005$ ). Respectively, 4 (1.4%) and 1 (0.4%) used 5 and 6 drugs that can interact with anticoagulants.

*Conclusion:* Cardiac patients who use anticoagulants used, on average, 4 additional drugs daily. 8 out of 10 cardiac profile patients use 2 or more drugs that can interact with other drugs. There is statistically significant data that patients who use 2-4 drugs with drug-drug interactions in majority of cases have at least one excessive P-glycoprotein inhibitor.

### *References:*

- [1] Graf L., Korte W. Direct oral anticoagulants and drug-drug interactions. *Ther Umsch.* 2015; 72(2):99-104  
Heidbuchel H et al. *Europace.* 2015; 17(10):1467-507 [2] 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with ECATS. *Europace.* 2016;18(11):1609-1678

## 24. FEATURES OF THE ELECTROPHYSIOLOGICAL REMODELING OF THE HEART IN PATIENTS WITH RHEUMATOID ARTHRITIS AND HYPERTENSION

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KSMU

*Introduction:* Rheumatoid arthritis (RA) is often accompanied by heart damage. However, often the doctors diagnose it at the stage of significant changes which can be detected on the ECG and 2D echocardiography. In practice, rheumatoid arthritis is frequently associated with arterial hypertension (AH) that can exacerbate changes in the myocardium.

*Aim:* to identify features in electrophysiological remodeling of myocardium in patients with rheumatoid arthritis in combination with arterial hypertension.

*Materials and methods:* the study involved 124 patients with rheumatoid arthritis in the developed and late stages, the average age of  $53.1 \pm 1.15$  years. 2 groups were identified: 1st group – 77 patients with RA without arterial hypertension, 2nd group – 47 patients with RA and AH 1-2 degree. Both groups were matched for age, sex and stages of rheumatoid arthritis; the study was not involved patients with severe concomitant pathology of other organs. According to the results of ECG and 2D echocardiography, significant pathology is not revealed. All patients in addition to the routine methods of research was conducted by vectorcardiography with the definition the square loop P, QRS, T, as well as the maximum vector (MV), MV-azimuth and MV- ascent. Statistical data processing was performed using Statistica 10.0 for Windows. To compare two independent groups on quantitative grounds used nonparametric methods and Mann-Whitney test. Differences were considered to be valid when  $p < 0.05$ . Data are shown as mean, minimum and maximum values.

*Results:* in the 1st group the mean value of the square loop P was 11.7 [3.21; 36.4] mV, square loop QRS – 870.8 [207.6; 2235] mV, square loop T – 52.2 [8.8; 149.9] mV, MV – 1574.5 [577; 3229]  $\mu$ V, MV-azimuth – 70.4 [20; 90]°, MV- ascent – 65 [34; 90]°. In the 2nd group the mean value of the square loop P was 10.6 [2.73; 37.7] mV, square loop QRS – 1169.4 [322.1; 3890.54] mV, square loop T – 66.6 [18.7; 271] mV, MV – 1769.5 [704; 3063]  $\mu$ V, MV-azimuth – 74.1 [46; 89]°, MV- ascent – 68.3 [37; 88]°. When comparing both groups revealed that in the 2nd group significantly higher value of the square loop QRS ( $p < 0.05$ ) than in the 1st group. It suggests that in patients with RA and AH, in which echocardiography revealed no myocardial hypertrophy, occurs electrophysiological remodeling of the left ventricle without involvement of the myocardium of the Atria.

*Conclusion:* the electrophysiological remodeling allows to predict the development of structural-geometric remodeling at the stage of the absence of significant changes in the myocardium. Early diagnosis enables to timely start prevention of myocardial dysfunction in patients with rheumatoid arthritis and hypertension.



## 25. THE EFFICIENCY OF TREATMENT BY BISOPROLOL IN PATIENTS WITH HYPERTROPHIC CARDIOMYOPATHY

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*Introduction:* Hypertrophic cardiomyopathy (HCM) is a congenital heart disease. It is the most common form of cardiomyopathies. The purpose of this research is to identify the influence and to estimate the effectiveness of treatment by Bisoprolol which was prescribed for changing the parameters of early diastole in patients with HCM.

*Material and methods:* the research has involved 50 patients with HCM, which were performed ECG, echocardiography, cardiac MRI with postponed opacification. The patients were divided into 2 groups. Group 1 (18 patients) included patients with predominant hypertrophy of the interventricular septum, 2 group (32 persons) – patients with symmetrical concentric form of hypertrophy with thickening of the interventricular septum, anterolateral and posterior wall of the left ventricle. There were patients in each group with and without late enhancement of gadolinium signal in the zone of hypertrophy. Prescription of Bisoprolol 5 mg 1 time per day with titration of dose is for achieving the objective level of heart rate (60-65 BPM). After 6 months, patients were re-examined, re-ECG with estimating of diastolic function parameters and magnetic resonance imaging of the heart.

*Results:* According to the magnetic resonance images (MRI) the late enhancement of gadolinium signal in a heterogeneous pattern in the area column of hypertrophy was detected in 8 patients (44.4%) in first group that indicated the presence of a zone of intramyocardial fibrosis. As for the second group it was detected in 6 patients (18.8%). In the subgroups with the late signal enhancement of gadolinium in both groups the indices of diastolic function were significantly higher than in patients without increased signal on MRI, due to an increased stiffness of the myocardium due to the presence of areas of fibrosis in the hypertrophied areas. In the analysis of efficiency of therapy by Bisoprolol reliable lower transmitral E/A was observed in the group with predominant hypertrophy of IVS (both subgroups,  $p=0.027$  and  $p=0.032$  respectively). The absence of certain decreasing of this index in the group with symmetric concentric of HCM is probably due to the significantly greater mass left ventricular mass index of left ventricle myocardium and the prevalence of passive diastole disorders.

*Conclusion:* To sum up, the results of research have shown the high efficiency of treatment by Bisoprolol for people suffering from hypertrophic cardiomyopathy and with primary lesions of the interventricular septum.

## 26. IS UNDER-USE OF THE MINERALOCORTICOID RECEPTOR ANTAGONISTS AFTER THE HOSPITALIZATION DUE TO ACUTE HEART FAILURE ASSOCIATED WITH WORSE CLINICAL OUTCOMES?

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**Introduction:** Treatment with the mineralocorticoid receptor antagonist (MRA) reduces cardiovascular mortality and morbidity in patients with heart failure (HF) as well as with acute myocardial infarction complicated by HF and left ventricular systolic dysfunction [1,2]. MRA is one of the cornerstones of therapy for the vast majority of patients. Studies provided evidence that MRA therapy significantly increases the incidence of serious hyperkalemia [3,4]. Treatment advances have increased the life expectancy of patients with HF [4]. Noncompliance with the designated medical treatment plan is one of the key factors for the progression of HF symptoms, worse outcome and increased risk of hospitalization [5].

**Aim:** To evaluate the association of MRA usage with the short-term mortality and re-hospitalizations in patients presenting with acute HF (AHF).

**Methods:** A prospective two-center observational cohort study enrolled consecutive patients admitted to the emergency department with acute dyspnea. Data of 350 patients with adjudicated diagnosis of AHF were included in the analysis. Information about HF treatment at discharge was registered on the standardized study form. Treatment compliance was evaluated by 1- year follow-up phone call. The all-cause death rate was assessed after 1-year follow-up period by Cox Regression analysis.

**Results:** The mean age in analyzed cohort was 69.3±12.4 years, 200 pts. (57.1%) were male. The data analysis revealed that 107 (30.6%) patients were prescribed by MRA on discharge and during the follow-up period. In the total cohort, 50 patients (14.3%) died. During 1-year follow-up of patients, who used to take the MRA after the hospitalization due to the AHF, in total 6.5% patients died comparing to 17.7% of those who have not been prescribed by MRA, p=0.04. Furthermore, the re-hospitalizations occurred significantly less frequently in patients who were using MRA than the others: 63 (18.0%) vs. 81 (23.1%) (p<0.01), respectively. Renal function was significantly worse in patients with adjudicated diagnosis of AHF who have been treated MRA compared to the others (97.60±27.36μmol/l vs. 116.35±47.42μmol/l, p=0.031), meanwhile the frequency of other clinical findings (LVEF, electrolytes) did not differ between the both groups (p>0.05).

**Conclusion:** Patients with acute heart failure who had not been treated with mineralocorticoid receptor antagonist discharge and in the follow-up period demonstrated significantly worse clinical outcomes with the higher rate of deaths and re-hospitalizations during the 1-year follow-up as well as worse renal function.

### References:

1. Rossignol P, Ménard J, Fay R, Gustafsson F, Pitt B, Zannad F. Eplerenone survival benefits in heart failure patients post-myocardial infarction are independent from its diuretic and potassium-sparing effects. Insights from an EPHEsus (Eplerenone Post-Acute Myocardial Infarction Heart Failure Efficacy and Survival Study) substudy. J Am Coll Cardiol. 2011 Nov 1;58(19):1958-66.
2. Olivier A, Pitt B, Girerd N, Lamiral Z, Machu JL, McMurray JJ, Swedberg K, van Veldhuisen DJ, Collier TJ, Pocock SJ, Rossignol P, Zannad F, Pizard A. Effect of eplerenone in patients with heart failure and reduced ejection fraction: potential effect modification by abdominal obesity: Insight from the EMPHASIS-HF trial. Eur J Heart Fail. 2017 Mar 16.
3. Ho TH, Caughey GE, Shakib S. Guideline compliance in chronic heart failure patients with multiple comorbid diseases: evaluation of an individualised multidisciplinary model of care. PLoS One. 2014;8;9(4):e93-129.
4. Corrêa AD, Makdisse M, Katz M, Santana TC et al. Analysis Treatment Guideline versus Clinical Practice Protocol in Patients Hospitalized due to Heart Failure. Arq Bras Cardiol. 2016, 26.
5. Schwinger RH. The aldosterone antagonist spironolactone prolongs the survival of chronic heart failure patients. The results of the RALES study. The Randomized Aldactone Evaluation Study. Dtsch Med Wochenschr. 1999 Aug 27

## 27. PATIENTS WITH ACUTE MYOCARDIAL INFARCTION AND HEART FAILURE: DATA FROM ESTONIAN NATIONAL REGISTRY OF MYOCARDIAL INFARCTION

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**Introduction:** In the Western world, coronary artery disease is the most common cause of heart failure (HF), with HF often developing after an acute myocardial infarction (AMI) [1-2]. Both pre-existing HF and development of *de novo* HF as a complication of AMI are associated with worsened short- and long-term outcome [3-5].

**Methods:** This study was collecting data from the Estonian National Registry of Myocardial Infarction, and included patients with diagnosis of AMI who were admitted in 2-year period (1 Jan 2012 – 31 Dec 2014). If a patient with one event was registered several times, only the first event was included in the analysis. Mortality data were obtained for in-hospital period. Drug prescriptions at discharge were analysed for patients who survived hospitalization.

**Results:** Altogether, 6246 patients were included. In all patients, echocardiographic measurements were performed and patients were divided into 2 subgroups according to left ventricular ejection fraction: with EF>40% and EF≤40% (Table 1).

**Table 1.** Clinical characteristics and in-hospital treatment of patients with EF>40% and with EF≤40%.

| Characteristic                                   | EF>40% (N=4410) | EF≤40% (N=1836) | P value      |
|--|-----------------|-----------------|--------------|
| STEMI/LBBB                                       | 2029 (46.0%)    | 965 (52.6%)     | <0.001       |
| NSTEMI   | 2381 (54.0%)    | 871 (47.4%)     | <0.001       |
| Recurrent AMI                                    | 15,2%           | 27,7%           | <0.001       |
| Mean age (years)                                 | 69.1±12.6       | 71.7±12.0       | <0.001       |
| Males  | 2610 (59.2%)    | 1146 (62.4%)    | 0.017        |
| Mean heart rate on admission (bpm)               | 78.4            | 88.5            | <0.001       |
| Mean systolic blood pressure on admission (mmHg) | 141.2           | 131.5           | <0.001       |
| Heart failure in history                         | 1500 (34%)      | 928 (50.5%)     | <0.001       |
| Atrial fibrillation                              | 11.5%           | 21%             | <0.001       |
| Former stroke (%)                                | 9,3             | 13,5            | <0.001       |
| Previous PCI (%)                                 | 9.6             | 13.4            | <0.001       |
| Previous CABG (%)                                | 3,7             | 6.9             | <0.001       |
| Current smoking (%)                              | 29.7            | 25.4            | <0.001       |
| Diabetes (%)                                     | 23.5            | 30.3            | <0.001       |
| Dyslipidaemia (%)                                | 63.4            | 52.0            | <0.001       |
| During hospitalization (%):                      |                 |                 |              |
| -PCI   | 68.2            | 57.6            | <0.001       |
| -Positive inotropic drug                         | 11.0            | 29.2            | <0.001       |
| -Diuretic  | 43.2            | 77.4            | <0.001       |
| -Beta-blocking agent                             | 85.4            | 89.0            | <0.001       |
| -ACE inhibitor/Angiotensin receptor blocker      | 71.3/13.3       | 70.9/9.2        | 0.797/<0.001 |
| -Statin  | 83.3            | 74.5            | <0.001       |

The clinical course of AMI during hospitalization was more complicated in the subgroup with EF≤40%. When compared to those with EF>40%, patients with EF≤40% had more frequently cardiac arrest (13.3% vs 3.2%), cardiogenic shock (6.5% vs 1.6%), pulmonary oedema (9.8% vs 3.2%), new AMI (0.8% vs 0.3%), stroke (1.4% vs 0.7%), mechanical complications (4.1% vs 3.1%), with p>0.05 for all variables. In comparison to subgroup with EF>40%, in-hospital death rate was higher in patients with EF≤40%, (12.0% vs 2.7%, p<0.001).

**Conclusions:** According to the data of the Estonian National Registry of Myocardial Infarction, patients with severely reduced left ventricular EF differed significantly from patients with more preserved EF by several variables. In this study, AMI-patients with more compromised left ventricular function presented a high-

risk subgroup for in-hospital complications and in-hospital mortality. In general, hospitalized AMI patients constitute a jeopardized population for complications and mortality strengthening the importance of both acute clinical care and secondary prevention in improving the long-term prognosis in this setting.

*References:*

- J Am Coll Cardiol 2015;3:234-42.
- Circ Cardiovasc Qual Outcomes 2012;5:532-540.
- J Am Med Assoc 2011;305:1677-84.
- Eur Heart J 2012;33:562-3.
- J Intern Med 2008;263: 636-43.

## 28. RIGHT VENTRICULAR SYSTOLIC AND DIASTOLIC DEFORMATION IN PATIENTS WITH ISCHEMIC MITRAL REGURGITATION AFTER INFEROPOSTERIOR MYOCARDIAL INFARCTION

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**Introduction:** Functional mitral regurgitation (MR) developed after inferoposterior myocardial infarction (MI) may result in pulmonary hypertension (PH) and potentially leading to RV systolic and diastolic impairment. However, patients with left ventricular (LV) heart failure and functional MR and without RV dysfunction may have initial hyperkinetic response to increased afterload [1, 2].

**Aims:** We aimed to assess RV systolic and diastolic deformation parameters in patients with ischemic MR after inferoposterior MI.

**Methods:** 78 patients with acute first ever inferoposterior MI, single vessel coronary artery disease and no structural cardiac valve abnormalities were included in the study. All patients underwent emergency percutaneous coronary intervention (PCI) within the first 12 hours of presentation and two-dimensional (2D) transthoracic echocardiography (TTE) within 48 hours of presentation. Forty five patients wrote consent for cardiac magnetic resonance (CMR). Mitral regurgitation was assessed by quantitative PISA method. 45 patients had no or mild (grade 0-1) MR (control (NMR) group) and 33 patients had grade  $\geq 2$  ischemic MR (IMR group). Offline 2D speckle-tracking imaging (STE) analysis was performed with GE EchoPAC software.  $\chi^2$  test was used for the descriptive data, and Student t test (for normally distributed data) and Man Whitney test (for non-normally distributed data) for comparison between variables.  $P < 0.05$  was considered as statistically significant.

**Results:** Mean age ( $61.1 \pm 1.8$  vs  $62.5 \pm 1.9$  years), did not differ between the IMR and NMR groups. LV ejection fraction (NMR  $52.2 \pm 1.1\%$ ; vs IMR  $53.1 \pm 1.7\%$ ) and basal RV diameter (RVD1) (NMR  $30.7 \pm 0.9$  mm; vs IMR  $32.9 \pm 1.2$  mm) also did not differ between groups. Tricuspid annular plane systolic excursion (TAPSE) was significantly higher in IMR group than in NMR group (IMR  $23.2 \pm 5.4$  mm vs NMR  $20.1 \pm 4.6$  mm,  $p = 0.011$ ). RV EFCMR was also higher in IMR group, however without significant difference (IMR  $48.6 \pm 11.1\%$  vs NMR  $43.6 \pm 8.9\%$ ,  $p = 0.102$ ). RV global longitudinal strain (GLS), basal and medial longitudinal strains (BLS, MLS) were significantly higher in IMR group than in NMR group (IMR  $-24.94$  vs NMR  $-21.67$   $p = 0.006$ , IMR  $-26.09$  vs NMR  $-19.73$   $p < 0.001$ , IMR  $-27.27$  vs NMR  $-23.39$ ,  $p = 0.006$ , respectively). Tricuspid E/A ratio did not differ between patient groups (NMR  $0.85 \pm 0.1$ , IMR  $0.76 \pm 0.1$ ,  $p = 0.713$ ). Meanwhile, IMR group E/A ratio was  $< 0.8$  (impaired relaxation). Early global longitudinal peak diastolic strain rate (GLPDSr) was significantly higher in IMR group (IMR  $1.57$  vs NMR  $1.31$   $p = 0.011$ ), but late global longitudinal peak diastolic strain rate (GLPDSr) did not differ between both patients groups (IMR  $1.64$  vs NMR  $1.55$ ,  $p > 0.05$ ). In both MR groups, late GLPDSr was significantly higher than early GLPDSr ( $p < 0.001$ ).

**Conclusion:** Ischemic MR was associated with higher RV global longitudinal strain, regional basal and medial longitudinal strains, and early global longitudinal peak diastolic strain rate.

### References:

1. Yalonetsky S, Eden H, Lessick J, et al. Impact of Functional Mitral Regurgitation on Right Ventricular Function and Outcome in Patients With Right Ventricular Infarction. Am J Cardiol. 2014;114:36-41.
2. Efthimiadis GK, Parharidis GE, Dourvas IN, et al. Doppler echocardiographic evaluation of right ventricular diastolic function in patients with mitral regurgitation. J Heart Valve Dis. 2004;13:46-52.



## 29. THE IMPACT OF CLINICAL AND AGIOGRAPHIC FACTORS ON PERCUTANEOUS CORONARY ANGIOPLASTY OUTCOMES IN PATIENTS WITH ACUTE ST-ELEVATION MYOCARDIAL INFARCTION

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*Introduction:* Percutaneous coronary intervention (PCI) outcomes are depended on some clinical (most important of them are age, renal function, and left ventricular function) and anatomical complexity of coronary artery disease [1]. The impact of modifiable cardiovascular disease (CVD) risk factors on PCI outcomes is still controversial due to existence of phenomenon “obesity, smoking, and cholesterol paradox”, when mortality rate after PCI are lower in these CVD risk groups [2].

*Aim:* The aim of the study was to evaluate the impact of clinical and angiographic factors on PCI outcomes for patients with acute ST-elevation myocardial infarction (STEMI).

*Methods:* Age, gender, CVD risk factors, Killip class and culprit coronary artery (CA) localization, total CA occlusion, initial and post procedural Thrombolysis in Myocardial Infarction (TIMI) flow grade, thrombus aspiration characteristics were assessed in 188 consecutive patients with STEMI who underwent primary PCI within 24 hours of the initial symptoms. Spearman’s rho test was performed to assess hospital stay correlations and logistic regression was applied to identify predictors of distal embolization (DE), in-hospital worsening of heart failure (WHF), and in-hospital mortality rate. Local Ethics committee approval was obtained for the study.

*Results:* Average age of patients was  $65.32 \pm 12.33$  years. CVD risk factors frequencies were as follows: 79.3% of patients had arterial hypertension, 14.9% - diabetes, 78.2% - dyslipidemia, 35.6% - smoked. DE occurred in 12 (6.4%) of patients. In-hospital WHF was diagnosed to 16 (8.5%) patients. Twelve (6.4%) patients died in hospital. Median of hospital stay was 8.95(1;34) days. Age had positive weak correlation with hospital stay ( $r = 0.256$ ,  $p = 0.001$ ) and was independent predictor of DE (odds ratio (OR) 1.04, 95% (confidence interval) CI 0.99-1.09,  $p = 0.001$ ), in-hospital WHF (OR 1.07, 95% CI 1.02-1.12,  $p = 0.008$ ), and in-hospital mortality rate (OR 1.09, 95% CI 1.03-1.16,  $p = 0.004$ ). Killip class (OR 5.83, 95% CI 2.58-13.17,  $p < 0.001$ ), left main CA stenosis ( $> 50.0\%$ ) (OR 4.98, 95% CI 1.06-23.48,  $p = 0.042$ ), and post procedural TIMI flow grade 1 (OR 35.87, 95 % CI 1.59-86.22,  $p = 0.024$ ), 2 (OR 7.75, 95% CI 0.95-63.34,  $p = 0.002$ ) were other predictors of death at hospital. Dyslipidemia was associated with lower risk of in-hospital WHF (OR 0.16, 95% CI 0.05-0.49,  $p = 0.001$ ) and in-hospital mortality rate (OR 0.09, 95 % CI 0.02-0.38,  $p = 0.001$ ).

*Conclusions:* Age was independent predictor of DE, in-hospital WHF, and in-hospital mortality. Other independent predictors of in-hospital mortality rate were Killip class, left main CA stenosis ( $> 50.0\%$ ), and post procedural TIMI flow grade 1, 2. Our study highlighted “cholesterol paradox” to in-hospital WHF and mortality in hospital.

### References:

1. Chen SL, Chen JP, Mintz G, et al. Comparison between the NERS (New Risk Stratification) score and the SYNTAX (Synergy between Percutaneous Coronary Intervention with Taxus and Cardiac Surgery) score in outcome prediction for unprotected left main stenting. *J Am Coll Cardiol Interv.* 2010; 3:632-41.
2. Bundhun PK, Wu ZJ, Chen MH. Impact of Modifiable Cardiovascular Risk Factors on Mortality After Percutaneous Coronary Intervention: A Systematic Review and Meta-Analysis of 100 Studies. *Medicine (Baltimore).* 2015;94:e2313.

### 30. THE RATES OF ASPIRIN AND STATIN THERAPY IN PATIENTS WITH NON-OBSTRUCTIVE CORONARY ARTERY DISEASE

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**Introduction:** Non-obstructive coronary artery disease (CAD) significantly increases the risk of myocardial infarction and all-cause mortality [1]. Previous studies revealed that statin therapy significantly reduces the rate of mortality in patients with non-obstructive CAD [2]. Aspirin therapy also lowers the risk of mortality, but only in high risk patients with non-obstructive CAD [3]. However, non-obstructive CAD patients are less likely to receive secondary prevention therapy than patients with obstructive CAD [4].

**Aim:** To evaluate the implementation of pharmacological secondary prevention with statins and aspirin in patients with non-obstructive coronary artery disease.

**Methods:** The study included 296 patients with stable angina who underwent coronary computed tomography angiography (CCTA) in the Hospital of Lithuanian University of Health Sciences and were diagnosed with non-obstructive coronary artery stenoses (<50%) in the period between 2013 to 2015. Non-obstructive coronary stenoses were categorized according to CAD-RADS (Coronary Artery Disease Reporting and Data System) classification: 0 - (0%, absence of CAD), 1 - (1-24% - minimal non-obstructive CAD), 2 - (25-49%, mild non-obstructive CAD). Telephone survey was conducted to identify the type of chest pain, the incidence of major coronary events (MACE) and the rates of statins and aspirin therapy. Statistical analysis was performed with SPSS v.20; Chi square and Pearson correlation tests were used for comparison between categorical variables. The significance level was <0.05.

**Results:** The mean age of study population was 61.1±10.1 years and the majority of patients were female (65.2%). Mean follow-up was 3±0.6 years. 114 (35.5%) patients had no plaques or stenoses. Minimal non-obstructive CAD was diagnosed in 45 (15.2%) of patients and mild non-obstructive CAD in 137 (46.3%) patients. Typical anginal chest pain was identified in 123 (41.6%) patients, atypical chest pain in 52 (17.6%), and non-anginal chest pain in 120 (40.5%) patients, respectively. Aspirin was used more frequently than statins 158 (53.4%) vs 61 (20.6%). 40 (13.5%) patients received combination of statin and aspirin therapy. Statin therapy and combined statin and aspirin therapy were significantly more prevalent in CAD-RADS 2 group compared to CAD-RADS 0 or 1 group (statin: 13.2%, 15.6%, 28.5% CAD-RADS 0,1,2 respectively, p=0.008; combined therapy: 7.9%, 11.1%, 19.0% CAD-RADS 0,1,2 respectively, p=0.033). Aspirin therapy was also more frequent in CAD-RADS 2 group, however, the difference was not statistically significant (44.7%, 55.6%, 59.9%, for CAD-RADS 0,1,2 respectively; p=0.06). Aspirin was more frequently introduced in patients with more severe stenoses both in patients with typical (CAD-RADS 1 -12.1% vs. CAD-RADS 2 – 45.5%, p=0.049) or atypical (CAD-RADS 1 -15.6% vs. CAD-RADS 2 – 53.1.5%, p=0.026) angina.

**Conclusions:** Regardless the provision of Clinical Practice Guidelines on Stable Angina and Cardiovascular Disease Prevention, only half of patients with stable angina were on aspirin therapy while statins were administered only to one fifth of patients. The reason of those discrepancies might lay in the uncertainty of the physicians in the mechanisms of angina in this cohort of patients and the lack of scientific evidence of statin and aspirin therapy on outcomes in patients with non-obstructive CAD.

#### References:

1. Maddox TM, Stanislawski MA, Grunwald GK, et al. Nonobstructive Coronary Artery Disease and Risk of Myocardial Infarction. JAMA. 2014;312:1754-1763.
2. Chow BJ, Small G, Yam Y, et al. Prognostic and therapeutic implications of statin and aspirin therapy in individuals with nonobstructive coronary artery disease: results from the CONFIRM (CORonary CT Angiography EvaluationN For Clinical Outcomes: An InteRnational Multicenter registry) registry. Arterioscler Thromb Vasc Biol. 2015;35:981-9.
3. Hwang IC, Jeon JY, Kim Y, et al. Association between Aspirin Therapy and Clinical Outcomes in Patients with Non-Obstructive Coronary Artery Disease: A Cohort Study. PLoS One. 2015;10:e0129584.
4. Maddox TM, Ho PM, Roe M, et al. Utilization of secondary prevention therapies in patients with nonobstructive coronary artery disease identified during cardiac catheterization: insights from the National Cardiovascular Data Registry Cath-PCI Registry. Circ Cardiovasc Qual Outcomes. 2010;3:632-41.

# 31. CHARACTERIZATION OF LEFT VENTRICULAR MORPHOLOGY AND MECHANICS IN SEVERE AORTIC STENOSIS WITH PULMONARY HYPERTENSION: THE ROLE OF CARDIOVASCULAR MAGNETIC RESONANCE IMAGING

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**Background:** The development of pulmonary hypertension (PH) in patients with severe aortic stenosis (AS) is associated with clinical deterioration and poor outcomes. Therefore, it is important to define the causes of PH. Quantification of left ventricular (LV) geometry, morphology and function changes that leads to elevated pulmonary artery pressures in AS by cardiovascular magnetic resonance imaging (CMR) may offer additive value to predict PH in this group of patients.

**Aim of study:** The objective of our study is to determine the clinical value of LV fibrosis and strain analysis by CMR in patients with isolated severe aortic stenosis and pulmonary hypertension.

**Materials and methods:** We prospectively enrolled 27 patients with isolated severe AS (aortic valve area < 1 cm<sup>2</sup>), who underwent Doppler-echocardiography and CMR evaluations before aortic valve replacement. Patients with documented coronary heart disease or chronic obstructive pulmonary disease, atrial fibrillation and mitral regurgitation were excluded from the study. Pulmonary hypertension was estimated using Doppler echocardiography and defined as pulmonary systolic pressure (PSP) ≥ 45 mmHg. CMR protocol included cine imaging in two, three, four chamber and short axis views, phase contrast velocity encoding, late gadolinium enhancement (LGE). Left ventricle end-diastolic and end-systolic volumes (EDV, ESV), LV mass and ejection fraction (EF) were calculated using a semi-automatic Syngovia analysis marking endocardial and epicardial borders. Fibrosis quantification was evaluated using fibrosis and LV mass ratio. This was performed by marking areas of LGE manually and dividing to LV myocardial mass (Slice thickness in all images was equal). LV feature tracking analysis was performed using Medis program. LV global longitudinal and circumferential strain and strain rate (GLS, CS, GLSR, CSR, respectively) were quantified from standard cine images. Statistical analysis was performed using Microsoft Excel and "SPSS for Windows 23.0" programs.

**Results:** Data of 27 patients were analysed. Patients were classified into group A (AVA < 1 cm<sup>2</sup>, PSP ≥ 45 mmHg) (n=7), group B (AVA < 1 cm<sup>2</sup>, PSP < 45 mmHg) (n=20). The distribution of age and gender did not differ between groups. The indices of LV end diastolic and systolic volumes, LV myocardial mass (123,94 ± 10,4g/m<sup>2</sup> vs. 103,29 ± 7,64g/m<sup>2</sup>) were not different between groups (p > 0,05), as well as LV EF 50,4 ± 5,32% vs. 59,77 ± 2,68% (p > 0,05). LV strain and strain rate didn't differ between groups (LV GLS (-15,9 ± 3% vs. -17,78 ± 1,26%), LV CS (-30,56 ± 4,76% vs. -35,76 ± 2,17%, p > 0,05), GLSR (-0,8 ± 0,2% vs. -0,67 ± 0,35%, p = 0,35), CSR (-1,8 ± 0,6% vs. 1,6 ± 0,9%, p = 0,64)). LV fibrosis area and myocardial mass ratio were significantly higher in group of patients with AS and PH, compared with AS group without PH (1,94 ± 2,22 mm<sup>2</sup>/g vs. 0,68 ± 0,95 mm<sup>2</sup>/g, p = 0,05).

**Conclusions:** The extent of left ventricular fibrosis, not left ventricular strain and strain rate, detected by CMR, has impact on pulmonary hypertension in patients with isolated severe aortic stenosis.

## 32. PREVALENCE AND CHARACTERISTICS OF NON-LIPID RISK FACTORS OF PATIENTS WITH FAMILIAL HYPERCHOLESTEROLEMIA IN LATVIA

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*Background:* Although lipid levels are crucial for development of early atherosclerosis in FH patients, presence of other risk factors strongly influences the outcome.

*Aim:* To evaluate prevalence of non-lipid risk factors in FH patients of the Latvian Registry of Familial Hypercholesterolemia (LRFH) founded in February 2015.

*Materials and Methods:* Patients with FH were evaluated for smoking, arterial hypertension (AH), diabetes mellitus (DM) and obesity (body mass index, BMI >30 kg/m<sup>2</sup>) or overweight (BMI >25 kg/m<sup>2</sup>). The physical activities were evaluated based on self-reported hours per week of moderate (3-6 MET) and intensive (>6 MET) physical activity. Dietary habits will be reported separately

*Results:* In total, 110 patients with clinical FH diagnosis were included in the study (81 index cases and 29 first degree relatives). Arterial hypertension was present in 52 (47%) and DM in 6 (4%) FH patients. Overweight and obesity was diagnosed in 33 (27%) and 24 (20%) patients, respectively. Sixteen (15%) patients had been smoking (11 men and 5 women) up to the day of inclusion in the registry (mean pack years of 21.6±11.5). Ten (9 %) smokers had history of coronary artery disease (8 men and 2 women) including 5 (4.5 %) individuals with a history of myocardial infarction (all in men before age of 55).

The average duration of physical activities was 7.1±10.4h of moderate intensity and 1.94±5.2h of high intensity hours per week. Only 54 (49%) patients (18 men and 36 women) were having adequate regular physical activity defined as moderate intensity at least 2.5 hours per week or high intensity at least 1.5 hours per week. Mean PREDIMED score was 5.8±2.6 points (5.9±2.6 in probands and 5.4±2.5 in relatives, p=0.402).

*Conclusion:* The results reveal high prevalence of non-lipid factors in patients with FH in Latvia, especially arterial hypertension. In addition to lipid-lowering therapies there is a high potential for risk reduction in these high and very-high risk patients with lifestyle changes. Findings of lifestyle assessment parameters emphasize need for more focused commitment to dietary and physical habits of FH patients.

*Acknowledgement:* The LRFH is funded by the Latvian National Research Programme Biomedicine for Public Health (BIOMEDICINE) 2014 – 2017



### 33. BIOCHEMICAL DIAGNOSTIC METHODS AS EARLY PREDICTORS OF CHEMOTHERAPY INDUCED ECHOCARDIOGRAPHIC CHANGES

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**Background:** As a result of chemotherapy-induced myocardial damage heart failure may develop. Echocardiographic monitoring and biochemical indicators, such as troponin I (TnI), creatine kinase MB (CK-MB) blood concentrations, may help identify patients at risk.

**Aim:** To detect early biochemical changes suggestive of myocardial damage in patients receiving anthracycline based chemotherapy, in order to predict heart function worsening on echocardiography at follow-up.

**Materials and Methods:** First-time oncological patients with indications to anthracycline based chemotherapy, at least 3 courses, without echocardiographic abnormalities were enrolled. Transthoracic echocardiography was performed before the start of chemotherapy, after the first and fourth courses, three weeks, three and six months after the end of chemotherapy. Global longitudinal strain (GLS) of the left ventricle (LV) was analysed using PHILIPS QLAB software. Before and day after chemotherapy course, three weeks, three and six months after the end of chemotherapy TnI with ADVIA Centaur XP TnI-Ultra (99th percentile 40 ng/l) or ARCHITECT Stat High Sensitive TnI test (99th percentile for women 15.6 ng/l), CK-MB with ADVIA Centaur XP CK-MB (normal range till 5 ng/ml) or CK-MB with ARCHITECT Stat (normal range for women till 3.4 ng/ml) was analysed. TnI test results were standardized to 99th percentile, and CK-MB to the upper normal range. For the data statistical analysis SPSS Statistics 22 version was used. For normal distribution parameters parametric T test, for abnormal distribution parameters nonparametric tests (Wilcoxon signed-rank, Mann-Whitney), for predictors identification multiple linear regression were used.

**Results:** Thirty-eight patients were enrolled (23 completed chemotherapy, 13 continue, 2 excluded after the second course because of chemotherapy change). Included patients were 35-74 years old, women 97.4%. TnI concentration next day after first chemotherapy course ( $0.16 \pm 0.02$ ) predicted GLS decrease at 3 weeks ( $p=0.004$ ) and at 3 months ( $p=0.017$ ) after the end of chemotherapy (21.0% vs 23%). Decrease of GLS ( $9.84 \pm 1.78\%$ ) at 3 months after the end of chemotherapy correlated with: TnI concentrations before ( $p=0.034$ ) and the next day after ( $p=0.038$ ) the fifth chemotherapy course ( $0.35 \pm 0.06$  and  $0.4 \pm 0.08$ , consequently) and CK-MB concentration increase next day after the first ( $p=0.019$ ), second ( $p=0.004$ ), before ( $p=0.021$ ) and next day after ( $p=0.004$ ) third chemotherapy course, 3 weeks after last chemotherapy course ( $p=0.043$ ), ( $0.26 \pm 0.04$ ,  $0.29 \pm 0.05$ ,  $0.23 \pm 0.04$ ,  $0.28 \pm 0.07$ ,  $0.30 \pm 0.06$  consequently). TnI next day after the third chemotherapy course predicted left atrium volume index (LAVI) increase 3 weeks after the end of chemotherapy ( $26.78 \pm 6.57$  vs.  $20.86 \pm 5.98$  ml/m<sup>2</sup>,  $p=0.014$ ). TnI concentration next day after first chemotherapy course ( $p=0.049$ ) and CK-MB concentration before ( $p=0.007$ ) and next day after ( $p=0.003$ ) the third chemotherapy course predicted LAVI increase 3 months after the end of chemotherapy ( $26.32 \pm 5.1$  vs.  $20.86 \pm 5.98$  ml/m<sup>2</sup>). TnI concentration before the second ( $0.21 \pm 0.02$ ) and third ( $0.24 \pm 0.02$ ) chemotherapy course ( $p=0.002$  and  $p=0.003$ , consequently) and CK-MB concentration before ( $0.22 \pm 0.03$ ) and the day after ( $0.29 \pm 0.05$ ) the second chemotherapy course ( $p=0.01$  and  $p=0.008$ , consequently) predicted increase of the end diastolic diameter (EDD) of LV [ $44.0$  (IQR 41.0-48.0) vs.  $42.0$  (IQR 39.5-48.0)] 3 months after the end of chemotherapy.

**Conclusions:** Rise of TnI and CK-MB concentrations as early as after the first chemotherapy course predict decrease of GLS at 3 weeks and 3 months after the completion of chemotherapy. Enlargement of LA and LV at the follow-ups up to 3 months can also be predicted with myocardial damage markers during the chemotherapy.



# 34. COMPARISON OF DIETARY HABITS OF PATIENTS WITH FAMILIAL HYPERCHOLESTEROLEMIA AND PATIENTS WITH ESTABLISHED CORONARY ARTERY DISEASE: DATA FROM TWO LATVIAN COHORTS

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**Background:** The most acknowledged diet to reduce cardiovascular risk is Mediterranean diet as shown in PREDIMED (Prevención con Dieta Mediterránea) study. [1 - 3] Until now dietary habits of familial hypercholesterolemia (FH) patients in Latvia have not been studied.

**Aim:** To evaluate differences in dietary habits of patients with clinical FH from Latvian Registry of Familial Hypercholesterolemia (LRFH) and patients with established coronary heart disease (CHD) based on methodology of PREDIMED study.

**Materials and Methods:** In the first cohort patients with clinical FH (81 index cases and 29 their eligible first degree relatives) from LRFH were included. In second cohort patients from cross-sectional study with increased cardiovascular risk who underwent coronary angiography at the Latvian Center of Cardiology were included. All included patients were interviewed according to PREDIMED questionnaire (score range 0 to 13) on the day of inclusion.

**Results:** Mean PREDIMED score in FH group (n=110) was 5.78±2.58 points, while in CHD group (n=300) mean PREDIMED score was 5.41±2.11 (p=0.187). Mean score of PREDIMED in both groups was higher in women compared to men (5.94±2.21 and 5.14±2.23, respectively, p<0.001). Differences of dietary habits in both groups are summarized in the Table.

*Table. Dietary habits according to PREDIMED in FH and CHD patients.*

|  | FH group | CHD group | P value |
|--|----------|-----------|---------|
| Olive oil as a main culinary fat   | 47.2%    | 41%       | 0.299   |
| At least 4 table spoons of olive oil per day   | 12.4%    | 18.3%     | 0.187   |
| At least 2 servings of vegetables per day (200g each)  | 44.9%    | 81.3%     | <0.001  |
| At least 3 fruit units per day   | 53.9%    | 72%       | 0.001   |
| Less than 1 serving of red meat, hamburger or meat products per day (1 serving = 100 – 150g) | 64%      | 32%       | <0.001  |
| Less than 1 serving of butter, margarine or cream per day (1 serving = 12g)                  | 64%      | 23.3%     | <0.001  |
| Less than 1 serving of sweetened and carbonated beverages per day                            | 71.9%    | 73%       | 0.839   |
| At least 7 glasses of wine per week  | 10.1     | 3%        | 0.005   |
| At least 3 servings of legumes per week (150g each)  | 15.7%    | 33%       | 0.002   |
| At least 3 servings of fish per week (100 – 150g each)                                       | 24.7%    | 32.3%     | 0.171   |
| Commercial sweets less than 3 times per week   | 59.6%    | 53.7%     | 0.327   |
| At least 3 servings of nuts per week (30g each)  | 30.3%    | 36%       | 0.324   |
| Preference of fowl over pork   | 61.8%    | 43.7%     | 0.003   |

**Conclusion:** Although FH patients have similar mean PREDIMED score, they are less likely to consume adequate amount of vegetables, fruits and legumes, while more likely to restrict saturated fat, red meat and choose fowl over pork. The most observed principle of Mediterranean diet in both groups was restriction of sweetened and carbonated beverages and the least followed principle was wine consumption. Both FH and CHD patients have low adherence to Mediterranean diet. The findings emphasize need for more focused dietary advice in these high-risk patients.

**Acknowledgement:** The study was funded by the Latvian National Research Programme Biomedicine for Public Health (BIOMEDICINE) 2014 – 2017.

*References:*

1. Sofi F, Abbate R, Gensini GF, Casini A. Accruing evidence on benefits of adherence to the Mediterranean diet on health: an updated systematic review and meta-analysis. *Am J Clin Nutr* 2010;92:1189-1196
2. Serra-Majem L, Roman B, Estruch R. Scientific evidence of interventions using the Mediterranean diet: a systematic review. *Nutr Rev* 2006;64:S27-S47
3. de Lorgeril M, Salen P, Martin JL, Monjaud I, Delaye J, Mamelle N. Mediterranean diet, traditional risk factors, and the rate of cardiovascular complications after myocardial infarction: final report of the Lyon Diet Heart Study. *Circulation* 1999;99:779-785

## 35. PSYCHOLOGICAL DISORDERS IN CARDIOVASCULAR PATIENTS: A PILOT STUDY

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**Introduction:** It is known, that cardiovascular risk (CVR) increases when individual has certain risk factors (RF), such as arterial hypertension, dyslipidemia, smoking, but today an additional group of psychological risk factors (PRF) has been recognised [1]. PRFs such as depression, anxiety and stress (DAS) tend to cluster together and co-occur with traditional RFs of cardiovascular disease (CVD), and there appears to be a bidirectional interaction between PRFs and the CV system [2]. CVD is the most prevalent cause of hospitalization and death (55% of all death events) in Latvia. Despite the decrease of premature mortality rate from CVD during last years, it is still three times higher in Latvia than the average European Union rate, and is the highest of the Baltic States [3]. There are no initiated purposeful systematic screenings and evaluations of PRFs in patients with CV diseases Latvia.

**Objective:** To evaluate psychological disorders (depression, anxiety and stress) in patients with acute coronary syndrome, stable angina, atrial fibrillation/atrial flutter.

**Methods:** We report the first results of a cross-sectional study in which we included CVD patients admitted to two major hospitals of Riga. They filled PHQ-9, PSS-4, HADS-A questionnaires, which measured DAS levels, respectively. In addition, patients completed self-assessment questionnaires (depression, anxiety, happiness, satisfaction, and others), recorded general social-economical and other status. SPSS 22 statistical programme was used for data processing.

**Results:** There were 109 patients included: 34 women (31.2%) and 75 men (68.8%). Out of 157 patients screened, 42 (26.8%) refused to participate, 6 (5.3 %) failed in cognitive screening MoCA test that excludes participants with moderate or severe cognitive deficit (MoCA<21). The age of participants was 39-80 years, mean age 63.4±9.27 years. The mean result for MoCA was 24.96±2.58, and 49 (44.95%) were found to have no psychological disorders, while 17 (15.6%) had all three (DAS) in moderate or severe level. Sixty patients (55.1%) had depression (light to severe), 24 (22.0%) anxiety (subclinical and significant) and 41 (37.6%) stress (moderate to high). There was a positive correlation between depression, anxiety and self-assessment of depression and anxiety (p<0.001), negative correlation between evaluation of happiness and satisfaction with life in general and all psychological disorders (p<0.001). There was significant correlation between depression, anxiety and stress (p<0.001), and no associations observed between cognitive functions, subjects age, gender, educational level and psychological disorders.

**Conclusion:** A considerable number of patients with CVD were found to have at least one psychological disorder. Self assessment questions seem to be usable tool for prediction of depression and anxiety. Further investigation should confirm these findings.

### References:

1. Piepoli MF, Hoes AW, Agewall S, et al. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J. 2016;37(29):2315-2381. doi:10.1093/eurheartj/ehw106.
2. Pogosova N, Saner H, Pedersen SS, et al. Psychosocial aspects in cardiac rehabilitation: From theory to practice. A position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation of the European Society of Cardiology. Eur J Prev Cardiol. 2015;22(10):1290-1306. doi:10.1177/2047487314543075.
3. Dzerve Vilnis. Structure of Health Care Country Report Latvia – August 2014.; 2014. [http://www.escardio.org/static\\_file/Escardio/Subspecialty/EACPR/latvia-country-report.pdf](http://www.escardio.org/static_file/Escardio/Subspecialty/EACPR/latvia-country-report.pdf). Accessed March 7, 2017.

## 36. EFFECTS OF ROSUVASTATIN ON PULSE WAVE VELOCITY AT THREE MONTH OF TREATMENT

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**Background:** Arterial stiffness measured by pulse wave velocity (PWV) is an independent non-invasive risk marker of increased cardiovascular morbidity and mortality. Statins are lipid-lowering agents with described other vascular benefits. Limited data are available on association between arterial stiffness and statin treatment.

**Purpose:** To evaluate whether rosuvastatin is able to modify central blood pressure and aortic stiffness, measured from aortic pulse wave velocity (PWV), after a 3-month treatment.

**Materials and Methods:** This is an ongoing open-label, one-center prospective study. Non-hypertensive patients with hypercholesterolemia matching high or very high cardiovascular risk criteria were included in the study. Any blood-pressure lowering agent was an exclusion criterion. All patients were scheduled to receive daily treatment with rosuvastatin 40 mg for 12 months. Central and peripheral systolic and diastolic blood pressures (cSBP, cDBP, SBP and DBP, respectively) and PWV were measured with Mobil-o-Graph device at baseline (V1) and at the follow-up after one week (V2) and three months (V4).

**Results:** Eleven from fifteen patients had completed the study per protocol up to three months. Respective PWV at V2 and V4 was  $8.255 \pm 1.46$  m/s and  $7.918 \pm 8.26$ , compared to  $8.318 \pm 1.40$  at baseline (p values 0.370 and 0.269, respectively). No significant changes were observed in cSBP (from  $112.73 \pm 7.86$  to  $109.36 \pm 6.04$ , mmHg,  $p=0.282$ ), cDBP (from  $82.64 \pm 7.23$  to  $77.45 \pm 6.41$ , mmHg,  $p=0.104$ ), augmentation pressure ( $p=0.849$ ), SBP (from  $121.64 \pm 8.70$  to  $118.36 \pm 5.92$ ,  $p=0.322$ ) un DBP (from  $81.64 \pm 7.02$  to  $76.73 \pm 7.21$ ,  $p=0.087$ ). Total vascular resistance decreased significantly (from  $1.416 \pm 1.30$  to  $1.30 \pm 1.12$ ,  $p=0.003$ ).

**Conclusions:** The interim analysis found no significant reduction of PWV, SBP, DBP, cSBP or cDBP with rosuvastatin early after onset of treatment up to three months, although there was a trend towards lower PWV and BP values. The present results support the possibility that rosuvastatin at high dose may reduce total vascular resistance. The interim analysis supports further study continuation with longer follow-up up to 12 months in a larger group of patients.

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### 37. IMPACT OF LEFT VENTRICULAR DIASTOLIC DYSFUNCTION AND ELEVATED LEVELS OF BIOMARKERS TO PULMONARY HYPERTENSION IN PATIENTS WITH SEVERE AORTIC STENOSIS AND PRESERVED LEFT VENTRICULAR SYSTOLIC FUNCTION

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**Background:** Pulmonary hypertension complicating severe aortic stenosis is associated with poor outcomes. The relation between left ventricular diastolic dysfunction parameters and increased plasma biomarkers (NT pro BNP and GDF-15) levels with pulmonary hypertension in aortic stenosis is controversial and not well defined.

**Objectives:** The aim of this study was to investigate prospectively the association between Doppler-echocardiographic parameters of left ventricular diastolic dysfunction, NT pro BNP and GDF-15 levels with systolic pulmonary artery pressure in patients with severe aortic stenosis and preserved left ventricular ejection fraction.

**Methods:** Sixty patients with severe aortic stenosis (aortic valve area < 1 cm<sup>2</sup>) were prospectively enrolled into the study. Two dimensional transthoracic Doppler echocardiography was performed to evaluate pulmonary systolic pressure (PSP), left ventricular ejection fraction, indices of left ventricular diastolic and systolic dimensions, LV mass index and parameters of left ventricular diastolic function (ratio of transmitral flow velocity [E] to mitral annular diastolic velocity [e'], E/A ratio, mitral valve deceleration time [MV DT] and left atrial [LA] volume). Pulmonary hypertension was defined as an estimated PSP ≥ 45 mmHg. NT pro BNP and GDF-15 measurements were performed before the aortic valve replacement. Patients with documented coronary heart disease or chronic obstructive pulmonary disease, atrial fibrillation and mitral regurgitation were excluded from the study. Statistical analysis was performed using Microsoft Excel and "SPSS for Windows 23.0" programs.

**Results:** 21,7 % of the patients had pulmonary hypertension with PSP ≥ 45 mmHg (58,5 ± 11,22 mmHg). Patients in both groups were similar in terms of age, sex, and body mass index (p>0,05). There were no group differences in the prevalence of comorbidities such as arterial hypertension, diabetes mellitus, renal insufficiency (p>0,05). All the study patients were with preserved left ventricular ejection fraction (50,16 ± 8,54%), that was not related to an elevated PSP (p > 0,588). LV myocardial mass index did not differ between groups (p=0,374). The parameters of left ventricular diastolic dysfunction (MV DT <177,5 ms (OR: 9,314, CI: 2,064 to 41,140, p=0,001), LA volume >100ml (OR: 9,706, CI: 1,921 to 49,038, p=0,002), E/E' ratio >14 (OR: 6,000, CI: 1,413 to 25,481, p=0,009)) and two biomarkers (NT-pro BNP >4060 ng/l (OR: 12,542, CI: 2,809 to 55,997, p<0,001) and GDF-15 >3393 pg/ml (OR: 18,33, CI: 2,394 to 140,391, p=0,001)) were found to be robust predictors of pulmonary hypertension in severe aortic stenosis patients.

**Conclusions:** The parameters of left ventricular diastolic dysfunction (LA volume, MV DT, E/E' ratio) and elevated biomarkers (NT-pro BNP and GDF-15) levels are significant predictors of pulmonary hypertension in patients with severe aortic stenosis and preserved left ventricular systolic function.



## 38. TWO-YEARS EXPERIENCE OF THE LATVIAN REGISTRY OF FAMILIAL HYPERCHOLESTEROLEMIA

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**Introduction:** Familial hypercholesterolemia (FH) is an inherited disease leading to high risk of premature cardiovascular disease. Until recently FH has been underdiagnosed in Latvia.

**Aim of the study:** To characterize the profile of patients and relatives included in the Latvian Registry of Familial Hypercholesterolemia (LRFH) in order to improve timely recognition and proper management of FH in the country.

**Materials and methods:** The registry was founded in February 2015, and individuals with suspected FH were referred by physicians from the whole country. Dutch Lipid Clinic Network (DLCN) criteria were used in index cases as FH probability evaluation tool. Clinical cascade screening of the first-degree relatives was performed in probands with definite or probable FH. Clinical FH was defined in relatives with LDL-C levels above age- and gender-specific 95th percentile.

**Results:** Two hundred thirty adult patients were included in LRFH by February 2017. Majority (n=183, 80%) were index cases, of whom 40 (22%) had definite, 41 (22%) probable and 74 (40%) possible FH. In cascade screening of eligible relatives clinical FH was found in 29 of 47 relatives (62%). Thus, 110 patients were diagnosed with clinical FH in total (mean age 54.4±11.2 years in probands and 41.4±17.8 years in first-degree relatives).

Mean (SD) highest-ever LDL-C was 7.2±1.6 mmol/l and 6.1±1.4 mmol/l in index cases and relatives, respectively. At the time of inclusion mean LDL-C was 5.4±2.3 mmol/l and 5.6±1.4 mmol/l in index cases and relatives, respectively. Only 54 probands (67%, mean LDL-C at inclusion 4.5±1.9 mmol/l) and 7 relatives (24%, mean LDL-C at inclusion 5.5±1.7 mmol/l) were on lipid lowering therapy, of whom 21 (39 %) patients received maximal statin doses (18 probands and 3 relatives) including 2 (4%) in combination with ezetimibe. At inclusion, LDL-C goal had been reached in 7 (9%) probands and none of relatives.

Fifty of 81 (62%) probands and 8 of 29 (28%) relatives had known premature atherosclerotic disease: 26 (52%) cases of coronary artery disease, 14 (28%) of brachiocephalic artery disease and 10 (20%) had both localisations in probands. In relative the respective prevalence of premature atherosclerosis was 4 (50%), 3 (37%) and 1 (13%). At the time of inclusion 20 (18%) out of 110 patients with clinical FH had already had MI, which was premature in 17 (85%) of MI cases.

**Conclusions:** During the first 2 years of LRFH we have identified at least 1.4% of estimated 8000 FH patients in Latvia. The first results call for an urgent need to further develop the registry in order to facilitate timely diagnosis and effective management of FH in Latvia as the most of patients were under-diagnosed and undertreated before involvement in the registry. The planned measures to tackle the challenges should include: continued efforts to raise public and professional awareness, initiatives for better reimbursement of treatments, coverage of genetic testing and long-term follow-up in collaboration with general practitioners.

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## 39. IMPACT OF HYPERTRIGLYCERIDEMIA ON ARTERIAL FUNCTION PARAMETERS

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**Introduction:** Metabolic syndrome is increasing in many countries. Hypertriglyceridemia plays a significant role in metabolic syndrome. However, several decades the role of hypertriglyceridemia in cardiovascular risk was not well established. Recent studies have shown, that triglycerides are associated with atherogenic remnant particles, could activate inflammation and inactivate endothelial nitric oxide synthase. All these factors are associated with the development of atherosclerosis and increased cardiovascular events. Other studies showed, that atherosclerosis could be observed by measurements of arterial stiffness and endothelial dysfunction even in subclinical stages.

**Aim:** The aim of this study was to assess the parameters of the vascular structure and function in patients with metabolic syndrome and different degree of hypertriglyceridemia.

**Design and methods:** All patients included in the study were recruited from the Lithuanian High Cardiovascular Risk (LitHiR) primary prevention program. The inclusion criteria were: men and women between 40 and 65 years without overt cardiovascular disease, diagnosed with MetS. Patients were defined into three groups according to triglyceride levels: severe hypertriglyceridemia – triglycerides  $>5.6$  mmol/l, moderate hypertriglyceridemia – triglycerides between 2.3 and 5.6 mmol/l, and a control group – triglycerides  $<1.7$  mmol/l. Non-invasive assessment of vascular parameters (aortic augmentation index adjusted for a heart rate 75 bpm (AIxHR75), pulse wave velocity (PWV), flow-mediated dilatation (FMD), common carotid artery intima media thickness (CCA IMT) and mean arterial pressure (MAP)) were performed. Statistical analysis was accomplished with Student's t-test, Mann–Whitney U tests and one-way ANOVA.

**Results:** Among the 1938 patients analyzed, 1041 had hypertriglyceridemia. Moderate hypertriglyceridemia was observed in 90.40% ( $n=941$ ), while severe hypertriglyceridemia - in 9.6 % ( $n=100$ ) of patients. Patients with severe hypertriglyceridemia were significantly younger, had bigger waist circumference, were more likely to smoke, and had higher total cholesterol and glucose levels, lower LDL-cholesterol and HDL-cholesterol levels compared to other groups. AIxHR75 and CCA IMT were the lowest in the severe hypertriglyceridemia group ( $p < 0.001$  for both). MAP ( $107.66 \pm 11.33$  in severe hypertriglyceridemia group vs  $105.88 \pm 11.1$  in moderate hypertriglyceridemia group vs  $103.88 \pm 10.91$  in control group;  $p < 0.001$ ) carotid-radial PWV ( $9.25 \pm 1.13$  vs  $9.24 \pm 1.28$  vs  $8.91 \pm 1.28$  respectively;  $p < 0.001$ ) as well as carotid-femoral PWV ( $8.63 \pm 1.65$  vs  $8.75 \pm 1.58$  vs  $8.51 \pm 1.6$ ;  $p = 0.006$ ) were higher in hypertriglyceridemia groups compared to control. There were no significant differences between groups in FMD ( $3.39 \pm 2.01$  vs  $3.26 \pm 2.43$  vs  $3.45 \pm 2.61$ ,  $p = 0.283$ ).

**Conclusions:** Patients with metabolic syndrome and severe hypertriglyceridemia have lower CCA IMT and AIxHR75 and higher PWV and MAP. Our findings, with the exception of MAP and PWV, does not match with expected hypertriglyceridemia role in atherosclerosis. The study encouraged to consider whether certain non-invasive assessment of vascular parameters reflects the progression of atherosclerosis. Many factors could affect arterial parameters and more research are needed to investigate arterial parameters and hypertriglyceridemia connection.

## 40. EVALUATION OF ATRIAL FIBRILLATION MANAGEMENT AND CARDIOVASCULAR RISK PROFILE IN ATRIAL FIBRILLATION PATIENTS: A CROSS-SECTIONAL SURVEY

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**Introduction:** Atrial fibrillation is the most common sustained cardiac rhythm disorder in clinical practice [1]. Its prevalence increases with age from 0.1% in people younger than 55 years to more than 9% in 80 years old. More than 6 million Europeans suffer from this arrhythmia [2,3]. The recent projections estimate that the number of adults older than 55 years with atrial fibrillation in the European Union will double from 2010 to 2060 [4]. The social and economic burden of atrial fibrillation is steadily increasing in Western countries. Atrial fibrillation is independently associated with increased risk of a variety of adverse outcomes, including 5-fold risk of stroke, 3-fold incidence of congestive heart failure, and 2-fold risk of death [5].

**Objective:** The aim of this study to investigate the most frequent risk factors of atrial fibrillation, comorbidities, complications associated with atrial fibrillation and the use of anticoagulants and other medications in patients who were referred to university hospitals in Lithuania.

**Materials and methods:** This cross-sectional study enrolled consecutive inpatients and outpatients with atrial fibrillation presenting to cardiologists in the two biggest Lithuanian university hospitals from November 2013 to May 2014. Atrial fibrillation diagnosis was confirmed by a 12-lead ECG or 24-h Holter with an episode duration of >30 s.

**Results:** A total number of 575 patients were recruited, and complete data on clinical subtype were available for 515 patients (mean age of 70.7 years; 48.5% of women). Permanent atrial fibrillation was the most frequent type of atrial fibrillation (46.6%). Common comorbidities were hypertension (85.8%), heart failure (77.9%) and coronary artery disease (51.8%). Amiodarone was the most common antiarrhythmic agent used in 14.6% of the patients, while beta-blockers and digoxin were the most often used rate control drugs (59.6% and 10.7%, respectively). Oral anticoagulants were used by 53.3% of the patients; of them, 95.6% used vitamin K antagonists, while non-vitamin K antagonist were used by only 4.4%. The INR within a therapeutic range (2.0–3.0) was documented in 19.2% of the patients. Other antithrombotic drugs such as aspirin and clopidogrel were used in 13.7% and 2.0% of the patients, respectively; dual antiplatelet treatment was administered in 6.2% of the patients. Of the entire cohort, the mean CHA<sub>2</sub>DS<sub>2</sub>-VASc score was 3.97 ± 1.6 and the mean HAS-BLED score was 2.25 ± 1.0. **Conclusions:** Our study showed that non-vitamin K antagonists are rarely used drugs. However, when the patient has a high thromboembolic risk score, the incidence of non-vitamin K antagonist usage is going to increase. Also it is worth noting that the HAS-BLED score is still not a popular bleeding risk assessment score among primary and secondary health care specialists. Compliance with the treatment guidelines remains suboptimal and further patient education is needed.

### References:

- [1] Rosamond W, Flegal K, Furie K, Go A, Greenlund K, Haase N, et al. American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2008 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation* 2008;117:e25–146.
- [2] Kirchhof P, Benussi S, Kotecha D, Ahlsson A, Atar D, Casadei B, et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. The Task Force for the management of atrial fibrillation of the European Society of Cardiology (ESC). Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. Endorsed by the European Stroke Organisation (ESO). *Eur J Cardiothorac Surg* 2016; ezw313.
- [3] Fuster V, Ryden LE, Cannom DS, Crijns HJ, Curtis AB, Ellenbogen KA, et al. American College of Cardiology/ American Heart Association Task Force on Practice Guidelines. ACC/AHA/ESC 2006 Guidelines for the Management of Patients with Atrial Fibrillation: a report of the American College of Cardiology/ American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology

Committee for Practice Guidelines (Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation): developed in collaboration with the European Heart Rhythm Association and the Heart Rhythm Society. *Circulation* 2006;114:e257–354.

- [4] Krijthe BP, Kunst A, Benjamin EJ, Lip GY, Franco OH, Hofman A, et al. Projections on the number of individuals with atrial fibrillation in the European Union, from 2000 to 2060. *Eur Heart J* 2013. <http://dx.doi.org/10.1093/eurheartj/ehz280> [5] Braunwald E. Shattuck lecture—cardiovascular medicine at the turn of the millennium: triumphs, concerns, and opportunities. *N Engl J Med* 1997;337:1360–9.

## 41. SUBTHRESHOLD HIGH-FREQUENCY ELECTRICAL FIELD STIMULATION INDUCES VASCULAR ENDOTHELIAL GROWTH FACTOR EXPRESSION IN CARDIOMYOCYTES

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**Introduction:** Ischemic heart disease due to coronary artery disease remains the leading cause of death in the Western world [1]. Revascularization of existing arteries and the formation of new collateral vessels may be a promising strategic aim in order to improve the function of organs suffering from hypoxia. Vascular endothelial growth factor plays a pivotal role in angiogenesis and neovascularization. Recent studies have shown that subthreshold electrical stimulation augments vascular endothelial growth factor expression in cultured skeletal muscle cells. Moreover, in vivo subthreshold electrical stimulation has been shown to induce vascular angiogenesis in a hind limb ischemia model in rats mediated by vascular endothelial growth factor [2, 3].

**Aim:** To investigate the effect of subthreshold electrical stimulation on vascular endothelial growth factor regulation in cultured neonatal rat ventricular myocytes, in the aim to reveal new techniques for therapeutic angiogenesis in ischemic heart disease.

**Results:** Cell cultures of neonatal rat ventricular myocytes were electrically stimulated with field strengths below the myocyte depolarization threshold (0.5 V/cm with 1 ms bipolar impulse duration). Frequencies ranging from 5 Hz up to 25, 50, and 99 Hz were applied over a period of 48 h. The expression of vascular endothelial growth factor and its receptor KDR was determined with Western blot and ELISA. To reveal the biological activity of the secreted vascular endothelial growth factor amount, cultured human coronary artery endothelial cells were treated with the cell culture supernatant of neonatal rat ventricular myocytes exposed to subthreshold electrical stimulation. A dominant effect of subthreshold electrical stimulation was observed at 25 Hz. Within this particular frequency the vascular endothelial growth factor protein amount in the cytoplasm as well as in the cell culture supernatant increased significantly. In parallel, the protein expression of the KDR receptor decreased in a significant manner. Moreover, cell culture supernatant of neonatal rat ventricular myocytes exposed to subthreshold electrical stimulation augmented the growth of human coronary artery endothelial cells. Cardiomyocytes respond to subthreshold electrical stimulation with an increase in biologically active vascular endothelial growth factor expression that promotes cell proliferation of human coronary artery endothelial cells.

**Conclusions:** Cardiomyocytes stimulated by low-voltage electrical fields produce potent amounts of the angiogenetic factor vascular endothelial growth factor, which has positive proliferation effects on human coronary artery endothelial cells in vitro. This is a very potent step forward to the treatment of ischemic heart disease. Angiogenesis due to subthreshold electrical stimulation may be one optional alternative treatment of coronary artery disease.

### References:

1. Kuller, L.; Lilienfeld, A.; Fisher, R. Epidemiological study of sudden and unexpected deaths due to arteriosclerotic heart disease. *Circulation* 34:1056–1068, 1966.
2. Kanno, S.; Oda, N.; Abe, M.; Saito, S.; Hori, K.; Handa, Y.; Tabayashi, K.; Sato, Y. Establishment of a simple and practical procedure applicable to therapeutic angiogenesis. *Circulation* 99:2682–2687; 1999.
3. Nagasaka, M.; Kohzuki, M.; Fujii, T.; Kanno, S.; Kawamura, T.; Onodera, H.; Itoyama, Y.; Ichie, M.; Sato, Y. Effect of low-voltage electrical stimulation on angiogenic growth factors in ischaemic rat skeletal muscle. *Clin. Exp. Pharmacol. Physiol.* 33:623–627; 2006.



## 42. MANAGEMENT OF PULMONARY ARTERIAL HYPERTENSION AND CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION IN THE BALTIC STATES

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**Introduction:** Pulmonary arterial hypertension (PAH) and chronic thromboembolic pulmonary hypertension (CTEPH) are rare classes of pulmonary hypertension (PH), but represent severe diseases with progressive course and high mortality rate. The purpose of PH referral centres is assessment of PH, routine management of appropriate patients with PAH-specific drugs, cooperation with other healthcare providers to obtain the best patient outcomes, performing research and providing education [1]. Recommendations for facilities, resources, PH multidisciplinary team and skills are defined in the recent ESC/ERS guidelines [2].

**The aim:** to compare the management of PAH and CTEPH in five PH referral centers in the Baltic States (BS) and evaluate the concordance of the management with the ESC/ERS guidelines.

**Materials and methods:** Questionnaire about infrastructure, diagnostic procedures, educational programs, patient volumes (from 2016 to 2017) and characteristics of adult alive patients with PH (at 01-01-2017) was sent to 5 PH centers in the BS. Data were summarized as numbers (%) or as means  $\pm$  SD, as appropriate.

**Results:** In the two PH centers in Estonia and Lithuania and one in Latvia at either cardiology (3 centers), or pulmonology (2 centers) settings with multidisciplinary teams, the majority (>90%) of the guideline-recommended diagnostic and treatment facilities were found to be available. At the beginning of 2017, the Lithuanian PH centers managed 159 patients (55.8/million population), the Latvian center– 113 patients (57.9/million) and the Estonian centers– 53 patients (40.7/million) with PAH and CTEPH. The incidence of PAH and CTEPH in the BS was 11.5 per million population (the highest in Latvia– 14.4/million). The prevalence of PAH in the BS was 38.3 per million (the highest in Latvia being– 44.1/million) and the prevalence of CTEPH – 14.6 per million (the highest in Lithuania– 16.1/million). The availability of PAH-specific therapy is reasonable in the BS. Parenteral prostanoids are not reimbursed in Latvia. A small number of acute vasoreactivity testing was performed in Lithuania (10.9% of the total number of RHC vs. 16.7% in Latvia and 23.2% in Estonia) in 2016. In addition, Lithuanian and Estonian PH centers have access to genetic testing, screening programs for systemic sclerosis and recipients of liver transplants and PH rehabilitation. A total of 234 adult patients with PAH were managed at the 5 centers in the BS. The mean age of these patients was 54.4 years with the mean age being the lowest (50.5 $\pm$ 16.8 years) and most commonly associated with congenital heart diseases (53.0%) were in Lithuania. Almost 75% of PAH patients were female in Lithuania while 66% in Latvia and 70% in Estonia. Only 2 (2.4%) of the patients with idiopathic, heritable and drugs and toxins induced PAH were responders to CCB treatment. Even 71% received monotherapy (in Latvia– 90.7%), combination therapy was the most common regimen in Estonia (64.9% of patients).

**Conclusions:** Incidence and prevalence of PAH and CTEPH in the BS are similar to that in the other European countries. There are no significant differences between management of PH patients between the centers. All 5 PH centers almost meet the guideline recommended criteria.

### References:

1. Galiè N, Hoeper M, Humbert M, Torbicki A, Vachiery J-L et al. Guidelines for the diagnosis and treatment of pulmonary hypertension: The Task Force for the Diagnosis and Treatment of Pulmonary Hypertension of the European Society of Cardiology (ESC) and the European Respiratory Society (ERS), endorsed by the International Society of Heart and Lung Transplantation (ISHLT). Eur Heart J 2009; 30 (20): 2493-2537.

2. Galiè N, Humbert M, Vachiery J-L, Gibbs S, Lang I et al. 2015 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension. *Eur Heart J* 2016; 37 (1): 67-119.
3. Peacock AJ, Murphy NF, McMurray JJV, Caballero L, Stewart S. An epidemiological study of pulmonary arterial hypertension *Eur Respir J* 2007; 30: 104-109.
4. Humbert M, Sitbon O, Chaouat A, Bertocchi M, Habib G , et al. Pulmonary Arterial Hypertension in France. *Am J Respir Crit Care Med* 2006; 173; 1023-1030.
5. Tueller C, Stricker H, Soccal P, Tamm M, Aubert JD, et al. Epidemiology of pulmonary hypertension: new data from the Swiss registry. *Swiss Med Wkly* 2008; 138(25-26): 379-384.

### 43. ANTIPLATELET EFFECT OF TICAGRELOR AND CLOPIDOGREL IN PATIENTS WITH ACUTE CORONARY SYNDROMES

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**Introduction:** Dual antiplatelet therapy (DAPT) of thienopyridines (ticagrelor or clopidogrel) and aspirin is recommended for patients with acute coronary syndromes for a period of 12 months after percutaneous coronary intervention (PCI) and stent implantation [1]. Nevertheless, not all of the patients achieve the desired clinical outcome despite DAPT [2]. It has been shown that antiplatelets have lower effect on patients with ST – segment elevation myocardial infarction (STEMI) than non – ST- segment elevation myocardial infarction (NSTEMI) patients [3].

**Aim:** To evaluate and compare platelet aggregation (PA) in patient with STEMI and NSTEMI who were treated with dual thienopyridine (ticagrelor or clopidogrel) and aspirin antiplatelet therapy during induction and after 4 weeks of treatment.

**Methods:** This prospective study was carried on the patients with acute coronary syndromes (STEMI or NSTEMI) at the Department of Cardiology of the Hospital of Lithuanian University of Health Sciences Kauno klinikos in Kaunas, Lithuania from January 2013 till December 2016. All these patients undergone PCI and stent implantation. During a post-operative period these patients received dual antiplatelet therapy (DAPT) of ticagrelor or clopidogrel and aspirin. Evaluation of platelet aggregation (PA) was performed for all the patients during induction (the next morning after PCI) and after 4 weeks of DAPT treatment. Platelet aggregation is presented as mean±SD. A p value <0.05 was considered statistically significant.

**Results:** A total of 378 patients were included of whom 268 (70.9 %) received clopidogrel and 110 (29.1%) – ticagrelor (during induction after PCI). Higher PA values were determined in clopidogrel treated patients after 4 weeks of antiplatelet therapy (41.06±10.84 %Agr) than during induction (35.20±12.76%Agr), respectively, p<0.0001. No reduction in antiplatelet effect of ticagrelor was observed: 20.64±10.68 %Agr during induction vs 21.32±6.63 %Agr after 4 weeks of treatment, respectively, p=0.55. After 4 weeks of treatment higher PA was in clopidogrel treated patients with STEMI (n=80) in comparison to NSTEMI (n=173) patients (43.12±9.64 %Agr vs 40.11±11.25 %Agr, p=0.04). A such effect was not observed in ticagrelor – treated patients (p>0.05). **CONCLUSION:** Consistent and higher antiplatelet effect was observed in ticagrelor users but not in clopidogrel users after 4 weeks of antiplatelet therapy. Ticagrelor antiplatelet effect did not differ in STEMI or NSTEMI patients. In contrary, clopidogrel treated patients with STEMI had reduced antiplatelet effect.

#### References:

1. Roffi M, Patrono C, Collet JP, et al. 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC). Eur Heart J 2016; 37 (3): 267-315.
2. Cuisset T, Frere C, Quilici J, et al. High post-treatment platelet reactivity identified low-responders to dual anti-platelet therapy at increased risk of recurrent cardiovascular events after stenting for acute coronary syndrome. J Thromb Haemost 2006; 4: 542–9.
3. Pappas C, Lekakis J, Alexopoulos D. Ticagrelor recommended over clopidogrel in STEMI patients. Expert Review of Cardiovascular Therapy 2016; 14 (9): 983-985.

## 44. AGE COMES TO PCI-CARDIAC CATHETERIZATIONS OF NONAGENARIANS DURING 2006 – 2014

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*Aim:* To evaluate indications, outcomes and success of coronary angiographies (CA) and percutaneous coronary interventions (PCI) in nonagenarians.

*Methods:* Information regarding all CAs and PCIs performed in nonagenarians in Sweden during 2006-2014 were registered in a nationwide all comer's registry; Swedish Coronary Angiography and Angioplasty Registry. Descriptive statistics were used to describe various parameters.

*Results:* During the study period 1692 nonagenarians underwent a total of 1876 CA and/or PCI. The indications for index procedures were: ST-elevation myocardial infarction for 45.5%, non ST elevation acute coronary syndromes for 34.0%, stable angina for 4.7% and other indications were 15.8%. Of all the patients 62.1% had at least a 2 vessel disease. In 67.4% (1142) of cases the index CA was followed by ad hoc PCI. Stents were used in 87.5% of the procedures and drugs eluting stents in 32.2%. Procedural success was 89.8%. Any complications after ad hoc PCI occurred in 8.1% of cases, serious bleedings in 0.7% and neurological complications in 0.6%. After PCI the 30 day mortality was 18.1%.

*Conclusions:* The success of PCI in this aged population is close to the success rate for younger individuals and the complication rate is acceptable. It is likely that these nonagenarians are a selected population of healthier individuals than others in their age group. Their mortality rate will be compared to the mortality in the general population of nonagenarians and we will look for predictors of complications in the database.

## 45. VALUE OF HOLTER ECG MONITORING IN ASSESSING CARDIAC ARRHYTHMIAS IN PATIENTS WITH MEDIAL ARTERIAL CALCIFICATION

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*Introduction:* Several studies have shown that reduced ankle-brachial pressure index (ABI) is a reliable warning sign in increased cardiovascular risk. But also ABI values above 1.3 in the presence of medial arterial calcification (MAC), are associated with increased cardiovascular and all-cause mortality [1,2].

*Aim of the study:* To determine the prevalence of cardiac arrhythmias and myocardial ischemia in a group of patients with type 2 diabetes mellitus and MAC.

*Materials and Methods:* 41 patients with T2 DM (25 male and 16 female), mean age  $59 \pm 8$  years were investigated. The mean duration of DM was  $12.6 \pm 7.1$  years. MAC with ABI at least 1.3 was present at all members of our group. Arterial hypertension was present in 35 patients (85.3 %), history of MI in 8 patients (19.5 %) and history of stroke was present in 7 patients (17.1 %). 25 patients (61 %) had chronic renal disease. Holter monitoring with an average duration of recording 22.36 hours, was carried out by GE-Marquette MARS PC-ambulatory ECG Holter system (USA). Medial arterial calcification was detected by the BOSO, ABI-system 100 (Germany) using the oscillometric method of measuring blood pressure. Mean ABI value was  $1.615 \pm 0.193$ .

*Results:* Complex forms of arrhythmias were in 18 patients (43.9 %), Lown III B in 12 patients and Lown IV A in 6 patients. Atrial fibrillation was present in 6 patients (14.6 %) and myocardial ischemia was present in 10 patients (24.4 %). Normal Holter ECG records without ischemia or arrhythmias were present in 19 patients (46.3 %). There was significant correlation of ABI with age (Pearson  $r = 0.511$ ;  $p < 0.001$ ).

*Summary of research:* Medial arterial calcification is common in diabetes, and is associated with incident cardiovascular disease events independent of traditional risk factors. It occurs also often in patients with chronic renal insufficiency, hyperparathyroidism, smoking and autonomic neuropathy [3]. High incidence of cardiac arrhythmias, including complex forms, as well as myocardial ischemia in 22 patients (53.7 %) was found during Holter ECG monitoring in our group of patients with diabetes mellitus and medial arterial calcification.

*Conclusion:* Patients with medial arterial calcification are threatened by serious cardiac complications, such cardiac arrhythmias and myocardial ischemia. We have found high incidence of cardiac arrhythmias, including complex forms, and also myocardial ischemia during Holter ECG monitoring. Holter ECG monitoring in patients with MAC is highly recommended, since subsequent management with interdisciplinary care can improve their prognosis.

### References;

1. Lamina C, Meisinger C, Heid IM, et al. Kora Study Group. Association of ankle-brachial index and plaques in the carotid and femoral arteries with cardiovascular events and total mortality in a population-based study with 13 years of follow-up. *Eur Heart J* 2006; 27: 2580-2587.
2. Suominen V, Uurto I, Saarinen J, et al. PAD as a risk factor for mortality among patients with elevated ABI – a clinical study. *Eur J Vasc Endovasc Surg* 2010; 39: 319-322.
3. Canani LH, Copstein E, Pecis M, et al. Cardiovascular autonomic neuropathy in type 2 diabetes mellitus patients with peripheral artery disease. *Diabetol Metab Syndr* 2013; 5: 54.



## 46. CARDIOVASCULAR RISK FACTORS IN THE YOUNG, A STUDY OF ICELANDIC COLLEGE STUDENTS. POSITIVE TRENDS FOR MALES OVER A SEVEN YEAR PERIOD

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*Introduction:* In recent year there has been a growing concern over the increase in cardiovascular risk factors related to life style, such as obesity, hypertension, type 2 diabetes and physical inactivity in adolescents and young adults.

*The aim* of our study was to investigate the prevalence of cardiovascular risk factors in young people aged 18-22 years in two colleges in the municipality of Akureyri, Iceland. Results of two investigations with a seven year interval were compared. After the first investigation both colleges adopted a health promoting policy.

*Methods:* Students aged 18-22 years, in two colleges in Akureyri Iceland were invited to participate in the Young Icelanders Study. The first part of the study was performed in 2010 and the second part in 2017. On physical examination blood pressure, weight, height, waist-and hip circumference were measured according to the World Health Organization (WHO) standards. Blood glucose, total cholesterol, HDL-cholesterol and triglycerides were measured and LDL-cholesterol calculated according to the Friedewald formula. Body mass index (BMI) values for normal weight (18,5-24,9), over weight (>25-29,9) and obesity (>30) and waist cut-off values (<88 cm for females and <102 cm for males) for increased cardio-vascular risk were determined according to WHO.

*Results:* In 2010, 270 students participated (65% females, 35 % males) and in 2017, 282 students participated (61% females, 39 % males). Males with BMI >30 were 18% in 2010 and 9% in 2017 (p=0,055). Males with waist circumference >102 cm were 14% in 2010 and 4% in 2017 (p=0,008). Females with BMI >30 were 8% in 2010 and 14% in 2017 (p=0,144). Females with waist circumference >88 cm were 26% in 2010 and 21% in 2017 (p=0,459). In 2010 males with BMI>30 had significantly lower HDL-cholesterol and significantly higher triglycerides, blood glucose and systolic blood pressure compared with those with BMI <30. In 2017 the only significant difference for the different male BMI groups was a lower HDL-cholesterol and higher LDL-cholesterol values. In 2010 the only significant difference in females was higher blood glucose in the BMI>30 group compared to BMI<30 group and in 2017 the only significantly difference was a lower HDL in the BMI>30 group.

*Conclusion:* For males there is a positive change with significantly fewer with waist circumference above the WHO cut off value and trend towards less obesity (BMI>30). No such change was seen for females and a considerable still have waist circumference above the WHO cut-off value. Obese individuals of both sexes have an unfavourable lipid profile with lower HDL already at a relative young age.

## 47. THREE YEARS CHANGES IN ANTICAOGULANT USAGE IN PATIENTS WITH LONG-LASTING ATRIAL FIBRILLATION UNDERGOING ELECTRICAL CARDIOVERSION IN LATVIAN CARDIOLOGY CENTRE BEFORE AND ONE MONTH AFTER PRCEEDURE

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*Introduction:* Atrial fibrillation (AF) is the most common type of cardiac arrhythmias and is associated with several life-threatening complications, for example cerebrovascular insults and systemic embolism. It increases the risk of stroke four to five fold and is responsible for 15–20% of all ischemic strokes. Additionally, AF is an independent risk factor for ischemic stroke severity and recurrence. [1] In order to prevent thromboembolic complications, oral anticoagulants (OAC) are used. Thromboprophylaxis can be achieved by usage of vitamin K antagonists (VKA, e.g., warfarin) or non-VKA oral anticoagulants (NOAC). Both VKAs and NOACs are effective in stroke and systemic embolism prevention. [2] The international normalized ratio should be tightly controlled for patients receiving VKAs while usage of NOACs does not require laboratory control. According to the guidelines, patients experiencing AF for longer than 48 h should start OAC for at least three weeks prior to cardioversion and continue it for four weeks afterwards. [3]

*Aim of the study:* The study focuses on determining differences in type of oral anticoagulation usage (VKA or NOAC) between patient groups with long-lasting persistent AF undergoing electrical cardioversion (ECV) in 2013 and in 2016, right before the procedure and one month afterwards.

*Material and methods:* We enrolled 150 patients from year 2016 and 110 patients from 2013 with persistent AF undergoing ECV in Paul Stradins Clinical University Hospital, Department of Arrhythmology. Anamnestic data was based on patient interviews and medical records. The follow-up data was collected during patient surveys via phone calls 30 days after ECV. Statistical analysis was conducted using SPSS 20.0 software.

*Results:* In 2016, 105 (70%) men and 45 (30%) women participated, with an average age of 64 years. In 2013 63 men (43%) and 47 women (57%) were enrolled, the average age was 65 years. Before ECV in 2016, 43 (28.5%) patients used warfarin, 43 (28.5%) used dabigatran, 61 (40.4%) used rivaroxaban, and 4 (2.7%) patients did not use any anticoagulants. One month after ECV 43 patients received warfarin (28.5%), 37 (24.5%) took dabigatran, 55 (36.4%) used rivaroxaban, 12 (7.9%) patients used antiaggregants (aspirin or clopidogrel), and 4 (2.6%) patients did not use any anticoagulants or antiaggregants. In year 2013, anticoagulants before ECV were used as follows: 41 patients used warfarin (37.3%), 46 (41.8%) used dabigatran, 7 (6.4%) used rivaroxaban, 13 (10.9%) patients used only aspirin, and 3 (2.7%) patients did not use any anticoagulants and antiaggregants. One month after ECV 53 (48.2%) patients received warfarin, 38 (34.5%) dabigatran, 8 (7.3%) patients received rivaroxaban, 9 (8.2%) patients used antiaggregants (aspirin or clopidogrel), and 2 (1.8%) patients were without any thromboprophylaxis.

*Conclusion:* The frequency of VKA and NOAC usage shifted during the last three years. In 2013 most patients received VKA whereas in 2016, patients predominantly were treated with NOAC. The most commonly used NOAC in 2013 was dabigatran, in 2016 it was rivaroxaban. Approximately the same number of patients did not use any anticoagulants one month after ECV in 2013 and 2016 (7,0% vs 7,5%).

### *References:*

1. James AR. Atrial Fibrillation and Stroke: Epidemiology. 2014. In: The American Journal of Medicine. Vol. 127 (4) , pp.15-16
2. Verheugt FW., Christopher BG. Oral anticoagulants for stroke prevention in atrial fibrillation: current status, special situations, and unmet needs. 2015. In: The Lancet. Vol. 386 (9990), pp. 303-310
3. Kirchhof P., Benussi S., Kotecha D., et al. 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS. 2016. In: European Heart Journal. Vol. 37 (38), pp. 2893-2962.

## 48. TREATMENT WITH STATINS AMONG YOUNG LITHUANIAN ADULTS WITH CORONARY HEART DISEASE

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**Background:** Nowadays statins are widely used for secondary prevention and their effectiveness in reducing mortality and cardiovascular events in adults with coronary heart disease (CHD) is evident [1]. As statins are one of the most-prescribed medications in the USA [2] prevalence of their usage in Lithuania is still unclear. Young patients with CHD should be considered for lipid-lowering therapy since dyslipidemia is a very common risk factor among Lithuanian adults [3].

**Aim of the study** was to evaluate treatment with statins among young Lithuanian adults with CHD during their hospital stay and recommendations for outpatient care.

**Materials and methods:** Data of 1714 young (<50 years) Lithuanian adults with CHD who were treated in Vilnius University Hospital Santariskiu Klinikos during the period of 2005-2016 was retrospectively analysed. Based on the diagnosis study population was divided into three groups – unstable angina (UA) group (n=318, 260 men and 58 women), stable angina (SA) group (n=168, 133 men and 35 women) and myocardial infarction (MI) group (n=1228, 1108 men and 120 women). Data concerning lipid-lowering therapy prescribed for these patients was collected and used for statistical analysis.

**Results:** Dyslipidemia was found in 77% (n=245) of UA, 71.4% (n=120) of SA and 77.2% (n=948) of MI group subjects. During their hospital stay 54.1% (n=172) of UA, 50.6% (n=85) of SA and 78.5% (n=964) of MI patients were treated with statins. Outpatient treatment with statins was recommended for 61.3% (n=195) of UA, 60.1% (n=101) of SA group and 78.8% (n=968) of MI group patients. Accurate MI group analysis showed that 83.2% of patients with MI who were treated with statins had dyslipidemia and 55.3% of subjects with MI who were not treated with statins also had dyslipidemia. In MI and statin treatment group more people had hypertension (AH) and obesity compared to subjects with MI who were not treated with statins (AH: 71.6% vs 59.5%, p<0.01, obesity: 55.5% vs 42.3%, p=0.048). During the period 2005-2016 the usage of statins among young adults with CHD in outpatient settings increased from 62.6% in 2005 to 78.9% in 2016. During the same period usage of statins increased in inpatient care as well: from 60.1% in 2005 to 78.9% in 2016. In ambulatory care Omega-3 fatty acids were recommended only for 1.3% (n=4) of adults in UA group, 4.2% (n=7) of SA group and 0.6% (n=7) of subjects with MI.

**Conclusions:** Prevalence of dyslipidemia among young adults with CHD is high and around seven out of ten of these patients got lipid-lowering therapy during their hospital stay or in ambulatory care. Most frequently statins were prescribed for adults with MI but more than a half of MI patients who did not get statins had dyslipidemia. Prevalence of lipid-lowering therapy with statins for secondary prevention is increasing in Lithuania.

### References:

1. Wilt TJ, Bloomfield HE, Macdonald R, et al. Effectiveness of statin therapy in adults with coronary heart disease. Arch Intern Med. 2004;164(13):1427-36.
2. 100 Best-Selling, Most Prescribed Branded Drugs Through March. Medscape. May 06, 2015.
3. Rinkuniene E. The identification of patients at high-risk of cardiovascular disease and the optimization of methods of active primary prevention. Summary of doctoral dissertation. Vilnius, 2014.

## 49. BODY COMPOSITION OF WOMEN WITH SEVERE DYSLIPIDEMIA: ARE THEY OBESE?

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**Background:** Excessive body fat is known as independent risk factor for cardiovascular disease and is associated with many metabolic comorbidities, one of the most common being dyslipidemia [1]. Traditionally evaluation of obesity is limited to simple measures such as weight, body mass index (BMI) and waist circumference however by only using BMI we are not able to discriminate between body fat and lean mass. New studies have shown that body fat percentage may be a better cardiovascular risk predictor than BMI [2].

**Aim of the study:** To examine body composition in women with severe dyslipidemia and to identify whether women with higher values of total cholesterol and lipoprotein cholesterol have more body fat than healthy control.

**Materials and Methods:** 50 Lithuanian women with severe dyslipidemia (total cholesterol  $\geq 7.5$  mmol/l or LDL cholesterol  $\geq 6$  mmol/l or triglycerides  $\geq 4.5$  mmol/l), average age of  $54.96 \pm 7.04$ , were included in this study based on their lipid panel results. Subjects with severe dyslipidemia of secondary causes were not included in this study. The control group (48 women, average age  $52.49 \pm 7.68$ ) was chosen based on their lipid profile that was within the normal range. Anthropometric measures including body weight, height, waist circumference (WC) and hip circumference were measured and body mass index (BMI) was calculated. The body composition of all subjects was evaluated using bioelectrical impedance analysis. Collected data was used for statistical analysis.

**Results:** Women with severe dyslipidemia had similar BMI ( $27.98 \pm 4.75$  vs  $26.66 \pm 5.55$ ,  $p=0.109$ ) and a greater percentage of fat ( $35.35 \pm 5.12$  vs  $32.95 \pm 6.33$ ,  $p=0.042$ ) compared with a control group. High percentage of body fat (more than 30% of body composition) was present in 61.7% of healthy women and in 84% of women with severe dyslipidemia. 46.8% of subjects in control group and 56% in study group were obese (body fat percentage  $\geq 35\%$ ). Control group had greater fat-free mass percentage ( $67.05 \pm 6.33$  vs  $64.65 \pm 5.12$ ,  $p=0.042$ ), greater muscle percentage ( $61.37 \pm 6.27$  vs  $58.68 \pm 4.85$ ,  $p=0.020$ ), greater protein percentage ( $13.10 \pm 1.71$  vs  $12.45 \pm 1.38$ ,  $p=0.042$ ) and greater total body water percentage ( $48.28 \pm 4.57$  vs  $46.55 \pm 3.67$ ,  $p=0.042$ ). Women with severe dyslipidemia had bigger average waist-hip ratio ( $0.95 \pm 0.07$  vs  $0.85 \pm 0.07$ ,  $p=0.000$ ) but average WC did not differ significantly from the control group ( $93.54 \pm 10.88$  cm vs  $90.45 \pm 15.50$  cm,  $p=0.127$ ).

**Conclusions:** Comparing to control group, women with severe dyslipidemia had similar BMI and higher body fat percentage. Waist circumference did not differ significantly between groups. In women with severe dyslipidemia bigger waist-hip ratio was observed. Healthy control group had more fat-free mass, muscle, protein and total body water. More than a half of control group subjects and most of severe dyslipidemia group women were overweight or obese.

### References:

1. Bays HE, Toth PP, Kris-etherton PM, et al. Obesity, adiposity, and dyslipidemia: a consensus statement from the National Lipid Association. J Clin Lipidol. 2013;7(4):304-83.
2. Zeng Q, Dong SY, Sun XN, Xie J, Cui Y. Percent body fat is a better predictor of cardiovascular risk factors than body mass index. Braz J Med Biol Res. 2012;45(7):591-600.

## 50. PREVALENCE AND CHARACTERISTICS OF RENAL FAILURE IN THE PROSPECTIVE ACUTE HEART FAILURE COHORT

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**Background:** Acute heart failure (AHF) is currently receiving a higher attention due to rapidly increasing prevalence and worsening the prognosis. Cardiac and kidney function have important interactions in AHF.

**Purpose:** To evaluate the prevalence of renal failure in prospective acute heart failure cohort and its association with age, gender and heart failure type.

**Methods:** The prospective observational cohort study has been conducted in two university hospitals. In total 1108 patients referred to emergency department with acute dyspnea, but without acute coronary syndromes, were enrolled during the period of May 2015 to March 2017. Diagnosis of AHF was confirmed to 363 patients by adjudication of 3 HF specialists. Estimated glomerular filtration rate (eGFR) was evaluated by CKD – EPI and categorized in to 5 groups as normal renal function ( $>90$  mL/min/1.73 m<sup>2</sup>), mild (60-89 mL/min/1.73 m<sup>2</sup>), moderate (30-59 mL/min/1.73 m<sup>2</sup>), severe renal failure (15-29 mL/min/1.73 m<sup>2</sup>) and terminal renal failure (RF) ( $<15$  mL/min/1.73 m<sup>2</sup>). Left ventricular ejection fraction (LVEF) was evaluated by echocardiography according to the Simpson's rule. The prevalence of renal failure was analyzed depending on the HF type (HF with reduced EF [HFrEF, n=186], HF with mid-range EF [HFmrEF, n=49] and HF with preserved EF [HFpEF, n=128]), age and gender. Statistical analysis performed with SPSS v23 software using Chi-Square test. P value  $<0.05$  was significant.

**Results:** Current analysis included 363 patients (151 women and 212 men) of mean age  $69.5 \pm 12.6$  years. The frequencies of various RF degrees on study subgroups are displayed in Figure. In total 144 of women and 179 of men had impaired renal function, in 30 patients severe RF was present. At least moderate RF was documented in 192 patients. Worse renal function was found in women: more women than men had severe RF (12.6% vs 5.2%,  $p=0.001$ ), while more men had a normal renal function (15.6% vs 4.6%,  $p=0.001$ ). Elderly patients demonstrated more prevalent moderate RF ( $p<0.001$ ), while younger patients more frequently had mild RF ( $p<0.001$ ). Predominant mild and moderate renal impairment were similarly distributed among three HF types without significant difference.

**Conclusions:** Majority of patients in prospective acute heart failure cohort had impaired renal function with at least moderate renal dysfunction present in the half of the patients. Women and elderly patients had more prominent renal failure in comparison with men and younger subjects. Similar pattern of renal impairment in HFrEF, HFmrEF and HFpEF is demonstrated.



## 51. THE DILATIVE PATHOLOGY OF THE ASCENDING AORTA: DIFFERENCES BETWEEN ECHOCARDIOGRAPHIC, HISTOLOGICAL CHANGES IN PATIENTS WITH TRICUSPID AND BICUSPID AORTIC VALVE MORPHOLOGY

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**Background:** dilatative pathology of ascending aorta (DPAA) is the most common cause of a life-threatening condition - aortic dissection and rupture. One of the main cause of DPAA is congenital bicuspid aortic valve (BAV) [1].

**Aim:** to evaluate the differences of 2D, 2D-speckle tracking (ST) echocardiographic, histological changes of the ascending aorta in DPAA patients (pts.) with congenital BAV or tricuspid aortic valve (TAV).

**Methods:** the current study included 44 pts. with DPAA: 21 with TAV and 23 with congenital BAV. Inclusion criteria were an ascending aorta or sinus dilation  $\geq 40$  mm with or without aortic valve (AV) pathology, good-quality echocardiographic images, sinus rhythm, and the absence of hemodynamically significant coronary artery disease shown by coronary angiography (stenosis  $< 50\%$ ). 30 pts. underwent surgery due to the conventional indications for aortic dilatation/aneurysm of the ascending aorta or AV pathology (stenosis or regurgitation) in the Cardiac Surgery Department at the Hospital of Lithuanian University of Health Sciences Kaunas Clinics during 2012-2014. The samples of the ascending part of the aortic wall were obtained during cardiac surgery. The characteristic features under evaluation were as follows: cystic media degeneration, media necrosis, fibrosis, elastic fiber fragmentation. A clinical evaluation, 2D, 2D-ST echocardiography were performed prior to cardiac surgery. For the aortic 2D-ST analysis, tissue harmonic images were used. The echocardiographic images of the ascending aorta were obtained from the long-axis parasternal view. The peak longitudinal strain (LS), longitudinal (LD) and transverse (TD) displacements, longitudinal velocity (VL) of the Valsalva sinuses and the ascending part of the aorta were evaluated. SPSS version 22 was used for all data analyses.

**Results:** no statistically significant difference of demographic, anthropometric and clinical data between TAV and BAV was found. Only pts. with BAV's were statistically significant younger than TAV's pts. ( $63.2 \pm 13.1$  vs.  $47.2 \pm 13.2$  yrs.,  $p=0.001$ ). The rate of arterial hypertension (AH) was bigger in TAV population but without statistically significant difference 19 (90.5%) vs. 15 (68.2%),  $p=0.076$ . Indexed diameters of sinuses of Valsalva ( $25.4 \pm 5.1$  vs.  $22.0 \pm 3.0$  mm/m<sup>2</sup>,  $p=0.009$ ) and sinotubular junction (STJ) ( $22.5 \pm 4.7$  vs.  $19.3 \pm 3.3$  mm/m<sup>2</sup>,  $p=0.034$ ) were significantly larger in TAV group comparing BAV. Smaller TD values of posterior ascending aorta segment ( $3.4 \pm 3.6$  vs.  $5.5 \pm 1.7$  mm,  $p=0.04$ ), of all posterior aortic wall ( $3.0 \pm 3.2$  vs.  $4.9 \pm 2.0$  mm,  $p=0.045$ ) as well as smaller values of LS of posterior sinus ( $9.1 \pm 10.8$  vs.  $21.4 \pm 14.8\%$ ,  $p=0.012$ ) were estimated in TAV's population. Elastic fiber fragmentation was statistically significantly greater in TAV's population ( $p=0.031$ ) and no difference between BAV and TAV groups of cystic medial degeneration, medial fibrosis and necrosis expression was found. Generally, in the pts. with AH the greater elastic fibers fragmentation was found.

**Conclusion:** there were significantly larger diameters of sinuses of Valsalva and STJ, smaller 2D-ST echocardiography values of TD of posterior ascending aorta segment and all posterior aortic wall, LS of posterior sinus and greater elastic fiber fragmentation in TAV population. Seemingly linear diameters, histological changes and 2D-ST values of ascending aorta were more influenced by AH and age than AV morphology, although BAV patients were younger.

### References:

Cheung, Christine, Andreia S. Bernardo, Matthew W. B. Trotter, Roger A. Pedersen, and Sanjay Sinha. 2012. "Generation of Human Vascular Smooth Muscle Subtypes Provides Insight into Embryological Origin-dependent Disease Susceptibility." *Nature Biotechnology* 30(2):165–73.

## 52. ASSOCIATION OF CARDIOVASCULAR RISK FACTORS WITH LEFT ATRIAL STRAIN PARAMETERS

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**Introduction:** The role of the left atrium (LA) is to modulate left ventricular filling and cardiovascular performance by functioning as a reservoir, conduit and booster pump [1]. Impairment of LA function may be associated with adverse cardiovascular outcomes [2]. Recent studies of LA function by 2-dimensional speckle-tracking echocardiography suggested its association with cardiovascular risk factors, such as hypertension, diabetes mellitus, and obesity [3, 4].

**Aim:** To evaluate the association of cardiovascular risk factors (arterial hypertension, obesity, smoking, diabetes mellitus, dyslipidemia, family history of early cardiovascular disease) with parameters of left atrial deformation.

**Methods:** This was a prospective cohort study ongoing since 1977 that enrolled a random sample of 12-13-year-old children. Data from the last examination in 2012 were analyzed. 139 subjects with adequate image quality were included in this analysis. LA endocardial border was manually traced in the 4-chamber view, delineating a region of interest of 6 segments. LA strain (LA-S) and strain rate (LA-SR) values for each segment were generated. Apical lateral and mid-lateral LA roof segments were excluded from the analysis. Univariate and multivariate analyzes were performed.

**Results:** Mean  $\pm$  SD age at baseline was  $48 \pm 0.2$  years, 66 (47.5%) subjects were male. Subjects with hypertension had lower LA-S ( $35.2 \pm 10.6\%$  vs  $43.4 \pm 12.5\%$ ;  $p < 0.001$ ), and early diastolic LA-SR ( $-1.9 \pm 0.6/s$  vs  $-2.4 \pm 0.5/s$ ;  $p < 0.001$ ), but not late diastolic LA-SR ( $-2.5 \pm 0.8/s$  vs  $-2.5 \pm 0.8/s$ ;  $p = 0.66$ ), compared to non-hypertensive individuals. LA-S and early diastolic LA-SR were lower in current smokers compared to non-smokers ( $37.1 \pm 11.5\%$  vs  $43.8 \pm 12.4\%$ ;  $p < 0.05$  and  $-2.1 \pm 0.7/s$  vs  $-2.4 \pm 0.6/s$ ;  $p < 0.05$ ), however, late diastolic LA-SR did not differ between these groups. LA-S, early and late diastolic LA-SR were significantly reduced in obese compared to non-obese subjects ( $32.3 \pm 10.3\%$  vs  $41.5 \pm 12.3\%$ ;  $p < 0.05$  for LA-S;  $-1.9 \pm 0.6/s$  vs  $-2.3 \pm 0.6/s$ ;  $p < 0.05$  for early diastolic LA-SR;  $-2.1 \pm 0.6/s$  vs  $-2.6 \pm 0.8/s$ ;  $p < 0.05$  for late diastolic LA-SR, respectively). In multivariate linear regression analysis, only body mass index was significantly associated with LA-S ( $\beta = -0.8$ ,  $p = 0.02$ ) and late diastolic LA-SR ( $\beta = 0.06$ ,  $p = 0.008$ ). Hypertension was independently associated only with early diastolic LA-SR ( $p < 0.001$ ). LA-S and LA-SR were not significantly associated with diabetes mellitus, dyslipidemia, or family history of early cardiovascular disease.

**Conclusions:** In middle-aged subjects, LA strain and LA strain rate were significantly associated with hypertension and obesity.

### References:

1. Donal, E., A. Behagel, and D. Feneon. "Value Of Left Atrial Strain: A Highly Promising Field Of Investigation". *European Heart Journal - Cardiovascular Imaging* 16.4 (2014): 356-357.
2. Oliver, Walter et al. "Factors Associated With Left Atrial Remodeling In The General Population". *Circulation: Cardiovascular Imaging* 10.2 (2017): e005047.
3. Liu, Yan et al. "Noninvasive Assessment Of Left Atrial Phasic Function In Patients With Hypertension And Diabetes Using Two-Dimensional Speckle Tracking And Volumetric Parameters". *Echocardiography* 31.6 (2013): 727-735.
4. Miyoshi, Hirokazu et al. "Contribution Of Obesity To Left Atrial And Left Ventricular Dysfunction In Asymptomatic Patients With Hypertension: A Two-Dimensional Speckle-Tracking Echocardiographic Study". *Journal of the American Society of Hypertension* 8.1 (2014): 54-63.

### 53. INFLUENCE OF ATMOSPHERIC PRESSURE ON THE OCCURRENCE OF ST-ELEVATION MYOCARDIAL INFARCTION IN PATIENTS WITH MATRIX METALLOPROTEINASE-3 POLYMORPHISM

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**Introduction:** Studies demonstrated correlation between atmospheric pressure (AP) and occurrence of ST-elevation myocardial infarction (STEMI) [1,2]. The pathophysiology of MI involves matrix metalloproteinases (MMPs) [3], which promote destabilization and rupture of atheromatous plaque [4]. Meanwhile, genetic variation of MMPs expression influences the occurrence of MI [5]. A meta-analysis of MMP-3 5A/6A polymorphism showed that the risk of MI significantly differed between the carriers of the 5A allele and the carriers of the 6A6A genotype [3]. The underlying cause-effect relationship of subjects with different MMP-3 polymorphism and role of AP on the incidence of STEMI remains unclear. Aim. To evaluate the association of MMP-3 5A/6A polymorphism with the occurrence of STEMI according to the changes of AP.

**Methods:** The retrospective study enrolled 336 patients diagnosed with acute STEMI in 2007-2010. Data on MMP-3 (-1171) 5A/6A genotypes distribution was provided by Laboratory of Molecular Cardiology, Institute of Cardiology. The study analyzed the MMP-3 (-1171) 5A/6A genotype distribution and allele frequency according to the AP, set to 2 days before hospitalization due to STEMI, quartiles. Day mean values of AP were determined in the Karmėlava airport meteorological station. Statistical analysis was performed using SPSS 22. Statistical significance was based on an alpha level of 0.05 ( $p < 0.05$ ).

**Results:** Of 336 examined patients 83 (24.7%) were female, 253 (75.3%) were male. 218 (64.9%) patients were >65 years old. The distribution of 5A5A, 5A6A, 6A6A, genotype in STEMI patients, was 28.0%, 52.4%, 19.6%, respectively. The frequency of alleles in AP quartiles: I quartile - 47.40% 5A and 52.60% 6A, II - 52.38% 5A and 47.62% 6A, III - 55.98% 5A and 44.02% 6A, IV - 61.18% 5A and 38.82% 6A. The frequency of STEMI patients with 5A5A genotype was significantly increasing in AP quartiles. It was 18.8%, 28.6%, 29.3%, 36.5% in I, II, III, IV quartiles, respectively ( $p \chi^2$  for trend was 0.010). It was tendency of decreasing frequency of 6A6A genotype by increasing AP quartiles: 24.0%, 23.8%, 17.4%, 14.1% (I, II, III, IV quartiles, respectively;  $p \chi^2$  for trend was 0.063), while frequency of 5A/6A did not differ significantly in AP quartiles: 57.3%, 47.6%, 53.3% and 49.4% (I, II, III, IV quartiles, respectively). Thus the frequency of 5A increased, while 6A alleles decreased in AP quartiles: I quartile – 0.47 and 0.53, II – 0.52 and 0.48, III – 0.56 and 0.44, IV – 0.61 and 0.39, respectively ( $p \chi^2$  for trend was 0.010).

**Conclusion:** Occurrence of STEMI increased with increasing atmospheric pressure in patients with MMP-3 5A5A genotype, while for 6A6A genotype was an opposite tendency. Such combined effect of MMP-3 5A/6A polymorphism and atmospheric pressure in pathogenesis of STEMI requires further investigation.

#### References:

1. Houck PD, Lethen JE, Riggs MW et al. Relation of Atmospheric Pressure Changes and the Occurrences of Acute Myocardial Infarction and Stroke. *Am J Cardiol* 2005;96:45–51.
2. Dominguez-Rodriguez A, Juarez-Prera RA, Rodríguez S et al. Influence of Meteorological Conditions on Hospital Admission in Patients With Acute Coronary Syndrome With and Without ST-Segment Elevation: Results of the AIRACOS Study. *Med Intensiva* 2016;40(4):201-207.
3. Wang J, Xu D, Wu X et al. Polymorphisms of Matrix Metalloproteinases in Myocardial Infarction: a Meta-Analysis. *Heart* 2011 97: 1542-1546.
4. Dabek J, Kulach A, Gasior Z. The Role of Matrix Metalloproteinases in Acute Coronary Syndromes. *Eur J Intern Med* 2007;18:463e6.
5. Ye S. Influence of Matrix Metalloproteinase Genotype on Cardiovascular Disease Susceptibility and Outcome. *Circ Res* 2006;69:636e45.

## 54. DISTRIBUTION OF PGP 9.5 IMMUNOREACTIVE NERVES IN RIGHT ATRIAL TISSUE FROM PATIENTS WITH CORONARY HEART DISEASE

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*Objectives:* The heart is innervated by parasympathetic and sympathetic fibers. The aim of this study was to identify the appearance and distribution of PGP 9.5 immunoreactive nerves in the right atrial tissue from patients with coronary heart disease.

*Methods:* During elective coronary revascularization surgery, right atrial tissue fragments were taken from 20 patients. The mean age was (mean±SD) 65.0±9.6 years (range 52-80 years), and there were 15 male patients. All tissue fragments were stained for immunohistochemical detection of PGP 9.5 containing nerves. For the quantification of structures, the semiquantitative counting method was used. To determine the differences of distribution of different variables between groups, we used the Mann-Whitney U test. A Spearman's rank-order correlation was used to determine the relationship between variables.

*Results:* All examined specimens showed mainly numerous PGP 9.5 containing innervation. There was a statistically significant moderate negative correlation between the number of PGP 9.5 positive nerves in myocardium and the grade of mitral insufficiency (rs -0.482; p 0.037). Furthermore, only few PGP 9.5 positive nerve fibres were found in right atrial tissue from patient with coronary heart disease and severe ischemic mitral insufficiency. No significant differences were noted between the innervation of right atrial tissue from patients with or without history of atrial fibrillation, with or without history of diabetes mellitus and with or without hemodynamically significant stenosis of right coronary artery.

*Conclusions:* Decreased innervation of right atrial tissue is associated with more severe ischemic mitral insufficiency.

## 55. MITRAL VALVE REGURGITATION POST ACUTE MYOCARDIAL INFARCTION: EPIDEMIOLOGY, IN-HOSPITAL CARDIAC DEATH AND FOLLOW UP

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**Introduction:** Mitral valve regurgitation (MVR) as a complication often follows acute myocardial infarction (AMI) [2, 3]. Moderate/severe MVR accounts up to 6 – 12 % of MVR [1, 4]. MVR degree is an independent factor of major cardiac events, mortality [1, 3].

**Aims:** 1. Identify, compare MVR distribution, common clinical features, in-hospital cardiac death among MVR groups; 2. Evaluate hospitalisation, repeat revascularisation, late mortality during follow up among MVR groups.

**Methods:** Study included 569 patients (pts) treated in Hospital of Lithuanian University of Health Sciences for AMI in 2012. According to echocardiographic data pts were divided into 3 MVR groups: I-st- no regurgitation, II-nd - mild regurgitation (orifice area < 0.2 cm<sup>2</sup>), III-rd – moderate/severe regurgitation (> 0.2cm<sup>2</sup>). Case histories were analysed, pts were contacted by phone. Statistical analysis was performed using SPSS 20. 0 Student's t, Mann Whitney Wilcoxon,  $\chi^2$ , Kaplan Meier tests. Descriptive data is given in mean value  $\pm$  standard deviation. Chosen significance level  $p < 0.05$ .

**Summary:** Among 597 pts II group was most common - 386 (67.8%), I - 85 (14.9 %), II - 98 (17.2 %). Average age among groups differed significantly: I -  $62.2 \pm 11.4$  y., II -  $64 \pm 11.8$ , III-rd -  $69 \pm 12.2$  ( $p < 0.01$ ). I group consisted of 59 (69.4 %) men, 26 (30.6 %) women, II respectively: 270 (69.9 %) and 116 (30.1 %), III: 68 (69.4 %) and 30 (30.6 %). There were 24 (4.2 %) in-hospital cardiac death cases: 2/85 (2.4 %) from I group, 11/386 (2.8 %) – from II, 11/ 98 (11.2 %) - from III ( $p < 0.05$ ). 337 pts agreed to be followed up. Average observation period was  $34.3 \pm 3.5$  months. Treatment among MVR groups did not differ significantly: I group (52 pts): 44 (84.6%) - angioplasty, 4 (7.7 %) - coronary artery bypass grafting (CABG), 4 (7.7 %) - no interventional treatment (NIT). II - (232 pts) respectively: 206 (88.8 %) - angioplasty, 10 (4.3 %) - CABG, 16 (6.9 %) - NIT. III (53 pts): 43 (81.1%) - angioplasty, 2 (3.8%) CABG + valvuloplasty, 8 (15.1%) - NIT. During follow up 71 pts (21.9 %) were hospitalised: 12 (23.5 %) from I group, 53 (24.9 %) – from II, 6 (14.3 %) – from III. 46 patients had repeat revascularisation: 8 from I, 34 - II, 4 - III. Late mortality was 9.2 % (31/337). 64.5 % (20) deaths were due to cardiologic reasons. Mortality rate due to cardiologic reasons differed significantly: I - 0/52 (0 %), II - 12/232 (5.2 %), III-rd – 8/53 (15.1 % ) ( $p < 0.03$ ).

**Conclusions:** 1. Mild MVR after AMI was most common. Patients with moderate/severe MVR were significantly older, suffered more in-hospital cardiac deaths. No significant difference was found among MVR groups and gender. 2. No difference was found among acute period treatment, hospitalisation, revascularisation and MVR groups. Patients with moderate/severe MVR had significantly higher late mortality rate.

### References:

1. Valuckienė Ž, Urbonaitė D, Jurkevičius R. Functional (ischemic) mitral regurgitation in acute phase of myocardial infarction: Associated clinical factors and in-hospital outcomes. *Medicina* 51 (2015) 92-99.
2. Pant S, Neupane P, Pant O. B, Paudel R, Kumar M. P. K, Vijayashankar C. S, Shrestha M. R. Mild Functional Ischemic Mitral Regurgitation Following Acute Coronary Syndrome: A Retrospective Study. 2011; 12(3): 93–98.
3. Naser N,1 Dzibur A, Kusljagic Z, Kovacevic K,3 Kulic M,2 Sokolovic S, Terzic I, Haxhibeqiri-Karabdic I, Hondo Z, Brdzanovic S, Miseljic S. Echocardiographic Assessment of Ischaemic Mitral Regurgitation, Mechanism, Severity, Impact on Treatment Strategy and Long Term Outcome. 2016 Jun; 24(3): 172–177.
4. Bursi F, Enriquez-Sarano M, Nkomo VT, Jacobsen SJ, Weston SA, Meverden RA, et al. Heart failure and death after myocardial infarction in the community: the emerging role of mitral regurgitation. *Circulation* 2005;111:295-301.



## 56. RIGHT VENTRICULAR MYOCARDIAL INFARCTION: CLINICAL CHARACTERISTIC AND INFLUENCE ON IN-HOSPITAL MORTALITY

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**Introduction:** Right ventricular myocardial infarction (RVMI) is usually associated with inferior myocardial infarction, isolated RVMI is extremely rare because of its smaller muscle mass, which requires less oxygen [1]. Inferior myocardial infarction with RVMI involvement is considered to have a more negative impact on patient status, outcomes and some clinical data when compared with inferior myocardial infarction with no RVMI involvement [2]. However, there is only few data how right ventricle involvement in inferior myocardial infarction affects clinical features and outcomes [3].

**Aim of the study:** To investigate right ventricular myocardial infarction clinical characteristics and outcomes, compare them with inferior myocardial infarction with no RVMI involvement.

**Methods:** A retrospective study was conducted in Vilnius University Hospital Santariskiu Clinics. We examined 894 patients who were hospitalized with inferior myocardial infarction diagnosis (both STEMI / NSTEMI) between October 2013 and December 2015. We separated patients in two groups: with RVMI involvement and no RVMI involvement. Epidemiological and clinical data was collected: gender, age, Killip class, BMI, clinical symptoms, comorbidities, laboratory findings, in-hospital mortality. All data were analyzed with SPSS 23.00. Mann-Whitney, Student t-test and chi square test () were needed.

**Results:** Total number of patients involved in the study were 894 (men – 621 (69.5%); women 273 (30.5%)), the mean age of patients were  $66.15 \pm 12.24$ . There were 818 (91.6%) patients with ST segment elevation and 75 (8.4%) without ST elevation, Killip I was assigned to 628 (70.2%) patients, II-III -168 (18.8%), IV – 98 (11%). Out of 894 patients 612 (68.4%) had inferior myocardial infarction without RV involvement and 282 (31.5%) with RV involvement. Patients with RV involvement and patients with no RV involvement had similar ratio of typical and non-typical myocardial infarction symptoms: 94.3% vs 92.5%,  $p=0.287$ ; 24.5% vs 23.3%,  $p=0.366$  respectively. Comparing these groups we found that there is significantly higher rate of IV Killip class patients with RV involvement vs no RV involvement (17.7% vs 7.8%,  $p<0.001$ ), in cases with I and II-III Killip class - no difference was found. In-hospital mortality rate was not significant between groups, however, in-hospital mortality rate in IV Killip cases was significantly lower within patients with RV involvement vs with no RV involvement (30% vs 50%,  $p=0.043$ ), in other Killip cases in-hospital mortality rate difference was not significant. Other clinical characteristics such as gender, comorbidities (diabetes mellitus, arterial hypertension, dyslipidemia, renal failure), CRP, BMI wasn't significantly different between groups.

**Conclusions:** Right ventricle involvement in inferior myocardial infarction does not affect incidence of clinical symptoms of acute coronary syndrome. Comparing basic clinical characteristics between groups no difference was found. However, right ventricular myocardial infarction is involved in more IV Killip cases, although is not responsible for higher in-hospital mortality rate for patients with cardiogenic shock.

### References;

1. Ondrus T., Kanovsky J., Novotny T., Right ventricular myocardial infarction: From pathophysiology to prognosis./Exp Clin Cardiol/ 2013;18(1):27-30.
2. Nicholaos K., Dennis V., Right ventricular myocardial infarction: pathophysiology, diagnosis, and management./Postgrad Med J/ 2010;86:719-728.
3. Mehta R., John W., Madhu K., Impact of Right Ventricular Involvement on Mortality and Morbidity in Patients with Inferior Myocardial Infarction./Journal of the American College of Cardiology/2001;37:37-43.

## 57. EFFECT OF MUSIC ON PAIN, ANALGESIC USE AND PHYSIOLOGICAL STATES IN MYOCARDIAL INFARCTION

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*Objective:* The purpose of the current study was to investigate the effect of music therapy on pain, analgesic use and physiological states in Turkish myocardial infarction.

*Design:* The study employed a quasi-experimental design. Patients were selected using randomized controlled sampling. *Setting:* The study was conducted in a coronary intensive care in Turgut Özal Medical Centre, Inonu University, Malatya, a city in the east of Turkey.

*Subjects:* The study was conducted with a total of 500 patients; 250 in the experimental group; 250 in the control group; aged between 18 and 79; and able to speak, read and write Turkish. *Intervention:* The control group received routine care after myocardial infarction while the experimental group listened to their choice of music for 30 minutes in coronary intensive care.

*Main outcome measures:* Data was obtained by face-to-face interviews and follow-up using Personal Sociodemographic characteristics and Visual Analog Scale.

*Results:* Pain, analgesic use, systolic and diastolic blood pressure, pulse and oxygen saturation averages between the groups following the music therapy were statistically significant for the experimental group and the control group ( $p < 0.001$ ).

*Conclusions:* These findings support the use of music as an independent nursing intervention to manage pain, analgesic use and physiological states in patients after myocardial infarction. Listening to self-selected music during the after myocardial infarction can effectively reduce pain, analgesic use, systolic and diastolic blood pressure, pulse levels and should be a useful tool for coronary intensive care nursing.

## 58. FAST UPTAKE OF NON-VITAMIN K ANTAGONIST ORAL ANTICOAGULANTS IN ESTONIA

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*Introduction:* Non-vitamin K antagonist oral anticoagulants (NOAC-s) have been introduced over the last 7 years as an easier to use alternative to warfarin in the thromboprophylaxis and treatment of venous thrombosis. Clinical data confirm their non-inferior efficacy and lower risk of intracranial bleeding compared to vitamin K antagaoists (VKA). More recent data point to possible differences among the clinical profile of the four approved NOAC-s, including different effect on overall survival. Rivaroxaban and dabigatran entered the Estonian market first, followed by apixaban. Edoxaban is not marketed in Estonia. NOAC-s are reimbursed for thromboprophylaxis in orthpoaedic surgery based on cost-minimisation against LMWH, and for second line use in atrial fibrillation if the achieved time in target range with warfarin is below 60%. NOAC-s, although cost-effective in the above settings, inflict a major impact onto the healthcare budget.

*Methods:* We analysed the practice change in the use of anticoagulants in Estonia during the period of 2006-2016 and compared the prevalence of the VKA and NOAC use in the Nordic region based on official sales data of 2015 and 2016. We used the WHO ATC/DDD methodology (1) and descriptive statistics.

*Results:* The use of anticoagulants in Estonia increased 5-fold during the period of 2006-2016 (3 vs 15 DDD/1000/d), due to the growth in warfarin utilisation until 2013 and the rapid uptake of NOAC-s thereafter. The preferred NOAC in Estonia is rivaroxaban (67% of NOAC use). In comparison with the Nordic countries the total NOAC use in Estonia (8 DDD/1000/d) is largely similar to that in Sweden, Norway and Denmark and markedly higher than in Finland (9, 11, 9 and 3 DDD/1000/d, respectively). The choice of NOAC-s is more balanced in the Nordic countries compared to Estonia, with the biggest difference in the utilisation of apixaban. The total prevalence of anticoagulant use is highest in Finland and lowest in Estonia (20 vs 15 DDD/1000/d). The highest GDP per capita in the study region is in Norway and the lowest in Estonia (21 600 vs 46 300 PPP in 2015) (2).

*Conclusions:* The uptake of NOAC-s in Estonia has been fast and the comparison in their utilisation with the Nordic countries does not parallel the economic disparities between the countries. The opportunity cost to other health care services in Estonia may be high.

### *References:*

1. ATC/DDD Index 2017. [https://www.whocc.no/atc\\_ddd\\_index/](https://www.whocc.no/atc_ddd_index/) (accessed 10.04.2017)
2. Purchasing power parities (PPPs), price level indices and real expenditures for ESA 2010 aggregates. <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do> (accessed 10.04.2017)

## 59. COMPLICATIONS AND CAUSES OF DEATH IN PATIENTS WITH EISENMENGER SYNDROME IN VILNIUS COHORT

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**Introduction:** Eisenmenger syndrome (ES) refers to any untreated congenital cardiac defect with large intracardiac communication that leads to severe pulmonary arterial hypertension (PAH), flow reversal, cyanosis, and chronic hypoxemia. Complications and causes of death in ES were defined in several studies from Europe [1-4]. Data from Eastern Europe is lacking, however. The aim of this study was to review ES cohort treated at Vilnius University Hospital Santariskiu Klinikos, assess complications and causes of death and compare with published data.

**Materials and methods:** ES patients treated at Adult Congenital Disease subunit in our Hospital from year 2006 to 2017 were selected for review from the database. We reviewed demographic and clinical data (gender, age, type of systemic-to-pulmonary shunt, type of treatment, complications and causes of death). Types of congenital systemic-to-pulmonary shunts were defined according to anatomical-pathophysiological classification. Data analysis was performed using SPSS 20.

**Results:** We studied 61 patients with ES (mean age 37.1 yrs (18–71)): 64% females (n=39, aged 37.5±14 yrs) and 36% males (n=22, 36.5±12.7 yrs). 11% of patients had trisomy 21. The majority had a complex heart defect (n=22, 36%), followed by patients with a pre-tricuspid (n=11, 18%), post-tricuspid (n=18, 30%) and combined lesions (n=10, 16%). Out of all patients, arrhythmia occurred in 59% (n=36), 46% (n=28) were admitted to hospital due to hemoptysis at least once, 13% (n=8) had pulmonary artery embolism and 20% (n=12) suffered cerebral complications. Over a median follow-up period of 8.5 years (3 months - 11 years), 20 patients died (35%, n=7 men, aged 30.1±13.2 yrs, and 65%, n=13 women, aged 38.5±14.4 yrs). Among causes of death, complex heart defect, simple pre-tricuspid, simple post-tricuspid and combined shunts comprised 50% (n=10), 25% (n=5), 15% (n=3), and 10% (n=2), respectively. 41 patients survived follow-up period: 37% men (n=15, aged 39.5±11.7 yrs) and 63% women (n=26, aged 36.9±14.06 yrs). The predominant defects in the survival group were simple post-tricuspid, complex, simple pre-tricuspid, and a combined shunt in 37% (n=15), 29% (n=12), 15% (n=6), and 19% (n=8), respectively. 78% of patients (n=32) from the survival group were treated with PAH-specific drug therapy and it was significantly higher comparing with dead patients group - 35% (n=7, p<0,05). The New York Health Association (NYHA) functional class (FC) IV was higher in the dead patient group (85%, n=35 vs 12%, n=5), respectively. Patients who died had significantly lower mean oxygen saturation at rest (73.99±16.7% vs 85.46±6.9%). Chronic heart failure proved a predominant cause of death (40%, n=8). 15%, (n=3) occurred due to infection, 10% (n=2) due to sudden-cardiac death; 35% (n=7) due to other causes. In addition, 1 patient died early after heart-lung complex transplantation.

**Conclusions:** Chronic heart failure is the main cause of death in patients with Eisenmenger syndrome in our Hospital. NYHA FC IV, complex shunt and lower mean oxygen saturation at rest were associated with a higher mortality rates. Treatment with PAH-specific drug therapy is associated with improved survival. Our data is in line with results of current studies [1-3]

### References:

1. Hascoet S, et al. Outcome of adults with Eisenmenger syndrome treated with drugs specific to pulmonary arterial hypertension: A French multicentre study. Arch Cardiovasc Dis (2017).
2. Diller GP et al. Survival Prospects and Circumstances of Death in Contemporary Adult Congenital Heart Disease Patients Under Follow-Up at a Large Tertiary Centre. Circulation. 2015;132:2118-2125. DOI: 10.1161/ CIRCULATIONAHA.115.017202.
3. Kempny A et al. Predictors of Death in Contemporary Adult Patients with Eisenmenger Syndrome: A Multi-centre Study. Circulation. 2016 Dec 15. CIRCULATIONAHA.116.023033.
4. Skride A et al. Pulmonary hypertension in adults with congenital heart disease: First data from Latvian PAH registry. Eur J Intern Med. 2016 Dec;36:e20-e21. doi: 10.1016/j.ejim.2016.09.002. Epub 2016 Sep 13.

## 60. LATVIAN CENTRE OF CARDIOLOGY REAL-LIFE REGISTRY. TWO-YEAR CLINICAL OUTCOMES AFTER IMPLANTATION OF AN EVEROLIMUS-ELUTING BIORESORBABLE SCAFFOLD

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**Aim:** We evaluated 2-year clinical and angiographic outcomes of elective percutaneous coronary intervention with everolimus-eluting bioresorbable scaffold (BRS) from the single high volume centre registry.

**Methods:** Between November 2012 and December 2016 there were N=415 patients included in Riga Centre Absorb registry database. N=187 patients were selected with stable angina and acute coronary syndrome after percutaneous coronary intervention (PCI) following bioresorbable scaffold implantation with mean scaffold length  $20.10 \pm 6.48$  mm, mean scaffold diameter  $3.17 \pm 0.36$  mm. 96.2% (n=187) of patients reached 2 year clinical follow-up. N=7 (3.8 %) patients were lost of follow-up. There were N=148 (79.1%) patient with stable angina, N=4 (2.1%) with silent ischemia and N=35 (18.8%) with acute coronary syndrome. During follow-up, we analyzed clinical and angiographic results such as all-cause death, cardiac death, target vessel-related myocardial infarction (MI), target lesion revascularization (TLR), target vessel revascularization (TVR), scaffold thrombosis (ST), cerebrovascular events.

**Results:** Man population from n=187 was 78.6 % (n=147) with mean age  $56.74 \pm 11.85$  years un arterial hypertension was 80.7% (n=151), diabetes mellitus 17.6% (n=33), active smoking 15.5% (n=29), previous MI 34.8% (n=65). Angiographic data: Multi-vessel disease where 61.5% (n=115) of cases. Absorb scaffold implantation mostly done in left anterior descending artery 49.7% (n=93). Target lesion localization ostial 18.2% (n=34). True bifurcation lesion was 14.9% (n=28). More than 1 lesion treated in 17.6% (n=38) of cases. Procedural data: radial approach 75.9% (n=142), Intravascular ultrasound (IVUS) use 17.1% (n=32), optic coherence tomography (OCT) used in 16.6% (n=31) of cases, GPIIb/IIIa blockers during procedure where admitted in 59.9% (n=112), pre-dilatation was done in 92.5% (n=173), cutting balloon pre-dilatation 49.7% (n=87), mean post-dilatation balloon diameter  $3.46 \pm 0.41$  mm, post-dilatation maximum atmospheres  $17.11 \pm 3.34$  bars. Clinical follow-up reached 96.2% (n=187) patients. In-hospital death 1.1% (n=2), in-hospital myocardial infarction 0.5% (n=1). The rate of all reason death in follow-up period was 4.3 % (n=8, cancer 1.6 % (n=3), cardiovascular 1.1% (n=2), Unknown 1.6% (n=3), MI 1.7% (n=3), TLR 4.0% (n=7), TVR 8.6% (n=15), scaffold thrombosis at follow-up 1.9% (n=4), repeat PCI 37.5% (n=81). Hospital scaffold thrombosis 0.5% (n=1) due to clopidogrel resistance, early scaffold thrombosis in fifth day was 0.5% (n=1). There was no CABG during follow-up. A major bleeding complication occurred in 1.1% (n=2). In-scaffold restenosis where 6.1% (n=5); from that focal intra-stent 1.2% (n=1), diffuse intra-stent 4.9% (n=4). Clinical, lesion and procedural factors did not show significant difference between patients with and without TLF.

**Conclusion:** Bioresorbable scaffolds showed acceptable rates of target lesion revascularization and scaffold thrombosis at mid-term follow-up in stable angina and acute coronary syndrome patients.



## 61. HEALTH CARE PROFESSIONALS' PERCEPTION AND EXPECTATION OF TELEMONITORING IN PATIENTS WITH HEART FAILURE IN LITHUANIA, NORWAY AND SWEDEN

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**Background:** Modern digital technologies are widely used by health care professionals (HCPs) in various parts of the world. In the new ESC guidelines, telemonitoring is mentioned as an option for monitoring but it is also stated that there is not just one type of telemedicine, and each approach needs to be assessed on its individual merit. To test and implement telemonitoring an open attitude of HCP's is needed and these might differ in individual countries. Little is known about the opinion and expectation HCPs regarding telemonitoring heart failure (HF) patients in separate Nordic Baltic countries.

**Purpose:** To describe and compare HCP's opinion and expectations of telemonitoring in patients with HF in Lithuania, Norway and Sweden.

**Methods:** Three surveys were performed nationwide in three Nordic Baltic countries enrolling cardiologists and nurses working with HF patients in 41 hospitals in Lithuania, in 53 hospitals in Norway and in 61 hospitals in Sweden. Validated translations from English to Lithuanian, Norwegian and Swedish of a previously developed validated questionnaire were used. Possible reasons for introducing telemonitoring in future were rated on a 10 point scale (0 not relevant, 10 very relevant) Pearson Chi-Square Likelihood Ratio and Fisher's Exact Test Linear-by-Linear association were used for data comparison between countries.

**Results:** Responses from 656 HCP (n=310 in Lithuania [137 cardiologists, 173 nurses/specialized nurses], n=226 in Norway [63 cardiologists, 163 nurses/specialized nurses] and n=120 in Sweden [39 cardiologists, 81 nurses/specialized nurses]) were analysed. In all three countries monitoring of patients on a distance (telephone or telemonitoring) were reported to be good ways of performing follow-up of stable HF patients (49% -in Lithuania, 58% – in Norway and 38% - in Sweden). However, in all countries a clinic visit to a GP or cardiologist or a home visit by a nurse were also considered by most HCP's. HCP's scored as most relevant reasons for introducing future telemonitoring reducing readmission ( $7.7 \pm 2.5$  (LT),  $7.8 \pm 2.4$  (NO),  $7.5 \pm 2.5$  (SE)) improving patients' self-care ( $7.6 \pm 2.6$  (LT),  $7.8 \pm 2.4$  (NO)  $7.4 \pm 2.5$  (SE) and offering a higher quality of care ( $7.9 \pm 2.6$  (LT),  $7.5 \pm 2.8$  (NO),  $7.0 \pm 2.7$  (SE)). Lithuanian HCP's significantly more often mentioned 'reducing workload on the HF out-patient clinic' than Swedish and Norwegian HCPs as a relevant reason for introducing telemonitoring ( $p < 0.05$ ). Monitoring the effect of the treatment and adjusting it remotely and remote drug titration were significantly less reported to be future application of telemonitoring by Norwegian HC professionals compared to Swedish and Lithuanian HCP's ( $p < 0.05$ ).

**Conclusion:** Although telemonitoring is still limitedly implemented in Lithuanian, Norway and Sweden, Health care professionals can see a possible role for telemonitoring in heart failure patients. In Lithuania, Sweden and Norway there are different expectations and possible thoughts about application of telemonitoring.

## 62. ORAL ANTICOAGULANTS AND MOST COMMON DRUG INTERACTIONS BETWEEN HIGH-RISK ATRIAL FIBRILLATION PATIENTS IN LATVIA

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*Introduction:* Atrial fibrillation is a rising problems in cardiology due to societies aging [1] Alongside with heart arrhythmia most patients have more conditions, that require drug therapy. [2] It's not uncommon, that drugs may potentially interact with one another due to one metabolic pathway through P-glycoprotein CYP450, increasing the risk of bleeding. [3,4] Most common interactions with oral anticoagulants are with other drugs for heart and vascular diseases, nonsteroidal anti-inflammatory drugs (NSAIDs), proton pump inhibitors such as omeprazole and pantoprazole, serotonin reuptake inhibitors, and Omega-3 preparations.

*Aim:* Clarify the most frequent potential drug interactions for oral anticoagulant, warfarin, dabigatran, rivaroxaban users with high-risk atrial fibrillation in Latvia's society.

*Methods* used including statistical analysis methods. High-risk atrial fibrillation patients (CHA<sub>2</sub>DS-VASc score for male greater or equal than 2, female greater or equal than 3; HAS-BLED score greater or equal 3; ORBIT score greater or equal 4; ATRIA score greater or equal 6) were interviewed at the Latvian Cardiology Center during their hospitalization period. The questionnaire included data about their gender, age, diagnosis, daily and frequently used medication and supplements. All data were collected and analyzed with SPSS Statistics 23.0.0.0, using descriptive analysis.

*Results:* Altogether 114 high-risk atrial fibrillation patients were interviewed during the period from October 2016 till March 2017, from which 55 (48,2%) were male and 59 (51,8%) female. Mean age – 69,8(+10,3) years. There were 60 (52,63%) warfarin users, 20 (17,54%) – dabigatran and 34 (29,82%) rivaroxaban users. Totally 62 (54,4%) patients had potential drug interactions, of which 25 (21,93%) patients had potentially major drug interactions and 44 (38,60%) patients moderate drug interactions. In the warfarin group 21 (39,6%) patients had potentially moderate drug interactions, which includes 14 (26,4%) with Omega-3 supplements, 9 (17,0%) with proton pump inhibitors and 4 (7,6%) with rosuvastatin. 25 (21,93%) warfarin users had potentially major drug interaction, of which 10 (19,6%) was with NSAIDs, 9 (17,7%) with amiodaron, 3 (5,9%) with aspirin and 1 (2%) with clopidogrel. In the dabigatran group 9 (50%) patients had moderate potential drug interactions - 5 (27,8%) with proton pump inhibitors, 3 (16,7%) with amiodaron, 1 (5,6%) with spiranolacton and for 2 patients (11,1%) with Omega-3 supplements. Potentially major interaction with dabigatran was for 1 (5,6%) patient, who used NSAIDs. In the rivaroxaban user group 10 (35,7%) had potential drug interaction with amiodaron, 6 (21,4%) with Omega-3 supplements, 1 (3,6%) serotonin reuptake inhibitors. Two patients (7,1%) had potentially major drug interaction with NSAIDs.

*Conclusion:* The majority of patients, who use oral anticoagulants daily, have potential drug interactions that can increase the oral anticoagulant concentration level in the blood, thereby increasing the bleeding risk. The majority of these interactions could easily be avoided, by carefully evaluating the list of drugs patient use daily and adjusting the therapy, thus lowering the bleeding risk.

### *References:*

1. Freedman, J.E., Gersh, B.J. (2014). Atrial Fibrillation and Stroke Prevention in Aging Patients. What's Good Can be Even Better. *Circulation*. P. 129-131.
2. Kim EJ, Atrial fibrillation without comorbidities: Prevalence, incidence and prognosis (from the Framingham Heart Study). Retrieved March 12, 2017
3. <https://www.drugs.com/drug-interactions/warfarin.html>. Retrieved March 12, 2017
4. Graf L., Korte W. Direct oral anticoagulants and drug-drug interactions. *Ther Umsch*. 2015; 72(2):99-104 1414 Heidbuchel H et al. *Europace*. 2015; 17(10):1467-507

### 63. DIFFERENT ORAL ANTICOAGULANT INFLUENCE ON THE EQUALITY OF LIFE FOR HIGH-RISK ATRIAL FIBRILLATION PATIENTS IN LATVIA

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**Introduction:** It is known that for an adequate high-risk atrial fibrillation therapy patients need to use consistent therapy that also includes oral anticoagulants for lowering ischemic stroke risk. [1] Patients can choose between K vitamin antagonist warfarin and new oral anticoagulants – dabigatran, rivaroxaban. Both medication groups differ with the usage regime and monthly needed laboratory tests that influence everyday life of the patient.

**Aim:** Evaluate whether different oral anticoagulant groups, K vitamin antagonists and novel oral anticoagulants (NOACs) can influence the quality of life for high-risk atrial fibrillation patients in Latvia.

**Methods** used including statistical analysis methods. Patients were interviewed at the Latvian Cardiology Center during their hospitalization time during the period from October 2016 till March 2017, information about age, gender, daily used medicaments and short form SF (social functioning)-36 were obtained. Collected data were analyzed with SPSS Statistics 23.0.0.0. using descriptive analysis and inferential analysis, using test of homogeneity of variances, Mann-Whitney test and Pearson correlation formula.

**Results:** Altogether 114 patients from whom 55 (48,2%) were male and 59 (51,8%) were women. There were 60 (52,63%) warfarin users (mean age 70,9 ( $\pm$  10,4) years) and 54( 47,37%) (mean age 68,5  $\pm$ 10,5) NOAC users. Both groups were statistically equal for mean age ( $p=0,92$ ). Correlation between the chosen anticoagulant and age did not exist. ( $r=0,139$ ;  $p=0,08$ ). Test of homogeneity of variances was  $p=0,923$ , therefore further analyses were made with Mann-Whitney test. Evaluating general health, the mean score in warfarin group was 37,92% (95%CI 32,02%-43,80%), NOACs group - 52,31% (95%CI 46,35%-58,28%); energy/fatigue level– warfarin users scored 50,17% (95%CI 43,23%-57,10%); NOACs users - 57,41% (95%CI 50,89%-63,93%); emotional well being– warfarin users - 57% (95%CI 67,15%-76,43%), NOACs users - 73,41 (95%CI 68,99%-77,84%), physical functioning in warfarin group – 59,66% (95%CI 50,44%-68,88%), NOACs group - 76,67% (95%CI 69,71%-83,62%); social functioning– warfarin group - 66,25% (95%CI 58,47%- 74,03%), NOACs group - 76,39 (95%CI 69,84%-82,94%); role limitations due to physical health – warfarin group - 46,67% (95%CI 33,67%-59,66%), NOACs group - 64,81% (95%CI 51,66%-77,97%); role limitations due to emotional problems: warfarin group – 55% (95%CI 42,04%-67,96%), NOACs group – 68,52 (95%CI 55,72 – 81,31). Comparing with Mann-Whitney test the quality of life between warfarin users and NOAC users, it shows a statistically significant difference between physical functioning abilities (mean rank in warfarin user group – 49,53; NOAC user group – 65,17;  $p=0,01$ ) and general health evaluation (mean rank in warfarin group = 48,75; NOAC group – 67,22), NOACs showing higher results. In all the other evaluation scales there was not a statistically significant difference, but a trend NOACs scoring a better result was observed in all the rest social functioning areas.

**Conclusion:** In all the scales of evaluating the quality of life, the NOAC users scored better results. A statistically significant difference was observed comparing warfarin group (37,92%) and NOAC user group (52,31%) for general health evaluation ( $p=0,002$ ) and physical functioning ( $p=0,01$ ; warfarin group – 59,66%; NOACs group - 76,67%).

#### *References:*

1. 2016 ESC Guidelines for the management of fibrillation developed in collaboration with EACTS

## 64. LATVIAN ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA (ARRHYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPATHY) REGISTRY ANNUAL DATA REPORT

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*Background:* ARVD is a leading cause of sudden death among young athletes. ARVD is rare cardiomyopathy form in which the heart muscle of the right ventricle is replaced by fat and/or fibrous tissue. Pathogenesis is largely unknown. It may develop due to genetic mutations of desmosomes. Most commonly affected gene is PKP2. Early recognition and follow up of this disease can reduce prevalence of sudden cardiac death.

*Aims:* Continue enrolling patients and their family members. To determine the genetic background associated with this disorder and to identify sudden cardiac death risk and improve therapy.

*Methods:* The multidisciplinary prospective registry of ARVD lasts 5 years with annual follow up visits. Patient screening was made in hospital based on accidental findings in Holter monitoring, electrocardiography and/or echocardiography. Diagnosis was made after modified in 2010 Task Force ARVD criteria. The following initial data were collected - medical history, treatment, quality of life questionnaires, electrocardiogram, echocardiography, cardiac magnetic resonance, Holter monitoring. Clinical parameters were defined. PKP2 (12p11.21) gene analysis was done using the direct sequencing method. Genetic variations were verified in the ARVD-C database and their frequency was compared with European population data. ARVD related sudden cardiac death risk group were calculated after Fernández-Armenta J., Brugada J., 2012.

*Summary:* 20 symptomatic patients were enrolled – 12 females (60%) and 8 males (40%) with a median age of 43 years (SD = 14.3). The high risk of SCD was identified in 4 (20%) patients — all of them have experienced sustained ventricular tachycardia. Moderate risk of SCD for 13 (65%) and low for 3 (15%) patients. Abnormalities in electrocardiography were found in 10 (50%) patients, Holter monitoring in 19 (95%) patients, echocardiography - 20 (100%) patients, and structural changes in cardiac magnetic resonance - 6 (30%) patients. Twelve (60%) patients have a history of medium to high intensity physical activities in the past. All of them have a high or moderate risk of SCD. For treatment, beta-blockers were used in 9 patients (45%), radiofrequency catheter ablation (RFCA) – 7 (35%) patients, implantable cardioverter-defibrillator (ICD) – 3 (15%) patients. No gender-based or racial/ethnic-based differences were present.

*Conclusion:* Latvian ARVD registry recorded 20 new patients. All patients have abnormalities in echocardiography and majority (95%) of them have abnormalities in 24h Holter monitoring. The prevalence of the majority of non-pathological genetic variations are similar in Latvian ARVD patients and European population. The most common one is c.2145+45G>A. Three novel, unregistered, possibly non-pathogenic genetic variations were found in the PKP2 gene. Genetic variations c.1592T>G and c.2489+1G>A are possibly pathogenic and with a high probability approves ARVD diagnosis genetically. For the first time c.1592T>G was found in homozygote form and inherited in autosomal recessive trait, which is not common for ARVD. Unregistered genetic variations will be applied for registration in ARVD and ClinVar database. Research will be continued and other ARVD associated genes will be sequenced to confirm ARVD diagnosis genetically and help to find out the risk for first-degree relatives.

## 65. AUTOLOGOUS BONE MARROW MONONUCLEAR CELL TRANSPLANTATION IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION AND CHRONIC HEART FAILURE IN LATVIA

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**Background:** Heart failure and acute myocardial infarction (MI) are the leading cause of morbidity and mortality. In recent years, the rapid advancements in stem cell research have garnered much praise for paving the way to novel therapies in reversing myocardial injuries and improving left ventricle ejection fraction.

**Purpose:** Evaluate whether regenerative stem cell therapy is safe and improves cardiac systolic function within one year in patients with acute coronary syndrome and chronic heart failure.

**Materials and methods:** Between September 2009 and April 2016 patients aged 18 to 75 years with acute myocardial infarction and successful revascularization (but with reduced left ventricular ejection fraction 15-50% or left ventricular apical aneurysm) or known heart failure at the Latvian Center of Cardiology were enrolled for autologous mononuclear stem cell transplantation (n=123). There were n=100 (81.3%) patients with acute myocardial infarction and n=23 (18.7%) patients with chronic heart failure. During follow-up, we analysed clinical and angiographic results such as all-cause death, cardiac death, target vessel-related myocardial infarction (MI), target lesion revascularization (TLR), target vessel revascularization (TVR). We report the interim analysis of the follow-up at 3 month and 12 months after stem cell therapy. Statistical data analysis was performed with SPSS software (IBM SPSS Statistics Version 21, SPSS inc., USA).

**Results:** Man population from n=123 was 112 (91.9%) at mean age  $51.91 \pm 10.96$  years. Previous PCI (percutaneous coronary intervention) was performed in n = 33 (26.8%), diabetes mellitus 9 (7.3%), arterial hypertension n=58 (47.2%), dyslipidaemia n=90 (73.2%), positive family history n=39 (31.7%), active smoking n=49 (39.8%). Mean left ventricle ejection fraction at baseline in patients with acute coronary syndrome (n=96) was  $42.76 \pm 9.02\%$ , in patients with chronic heart failure (n=21) -  $27.33 \pm 9.57\%$ . Mononuclear stem cell implantation mostly done in left anterior descending artery n=85 (86.7%). Mean implanted cell amount was  $47.44 \pm 26.06$  million. Clinical follow-up at three months reached n=101 (82.1%). Non-Q MI were observed in n=2 (2.02%), cardiac death n=1 (1.01%), TLR n=4 (4.04%), TVR n=5 (5.05%), ST-N n=2 (2.02%). At three month follow-up echocardiography performed n=80 (65.04%), left ventricle ejection fraction in patients with acute coronary syndrome (n=67) increased significantly (from  $44.58 \pm 7.68$  to  $48.75 \pm 9.99\%$ ,  $p < 0.001$ ), in patients with chronic heart failure (n=13) (from  $29.31 \pm 8.01$  to  $34.38 \pm 10.43\%$ ,  $p = 0.005$ ). One year follow-up reached n=88 (71.54%), echocardiography performed 82 (93.18%), left ventricle ejection fraction in patients with acute coronary syndrome (n=70) increased significantly (from  $43.94 \pm 8.23$  to  $48.83 \pm 11.44\%$ ,  $p < 0.001$ ), in patients with chronic heart failure (n=12) (from  $29.83 \pm 7.83$  to  $35.42 \pm 10.13\%$ ,  $p = 0.015$ ).

**Conclusions:** Stem cell therapy is safe and significantly improves cardiac systolic function within three months and one year in patients with acute coronary syndrome and chronic heart failure. The study should be continued with longer follow-up up to 24 months in a larger group of patients.



## 66. THE SIGNIFICANCE OF IMPAIRED RENAL FUNCTION IN MEN AND WOMEN WITH ACUTE ST-ELEVATION MYOCARDIAL INFARCTION

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*Background:* Impaired renal function is a common problem due to the aging of the population. Chronic kidney disease is associated with a high burden of coronary artery disease [1]. In patients with acute coronary syndromes, impaired renal function is associated with poor short- and long-term outcomes [2]. Latest publications addressing renal impairment in ST-elevation myocardial infarction (STEMI) investigate low eGFR as a potent and independent risk factor for short-term outcomes and complications [3].

*Aim:* The aim of the study was to evaluate the incidence of impaired renal function diagnosed on admission and its impact on short-term outcomes in men and women undergoing percutaneous coronary intervention (PCI) for STEMI.

*Methods:* This was a retrospective analysis of medical records of patients hospitalised in the Hospital of Lithuanian University of Health Sciences Kauno klinikos Department of Cardiology in 2015. We included STEMI patients who underwent PCI. A total of 333 patients with STEMI were studied. We used CKD-EPI equation to estimate GFR. eGFR <60 ml/min/1.73m<sup>2</sup> was defined as impaired eGFR and GFR ≥ 60 ml/min/1.73m<sup>2</sup> was defined as preserved eGFR. Patients were divided into four groups: group I – men with normal renal function, group II – men with impaired renal function, group III – women with normal renal function, group IV – women with impaired renal function. Quantitative variables with a normal distribution are presented as a mean and standard deviation. Comparisons between groups were made using independent samples t tests for numerical variables and  $\chi^2$  test of independence to check the relationship between the quantitative variables. We compared ordinal variables using non-parametric U-Mann-Whitney test.  $P < 0,05$  was considered statistically significant.

*Results:* 126 patients (56 men, 70 women) were diagnosed with impaired renal function. Men with impaired renal function were older (72 vs 59 years,  $p < 0,05$ ), had higher Killip class (III cl. 14,3% vs 5,2%; IV cl. 16,1% vs 1,3%,  $p < 0,05$ ), were anaemic (46,4% vs 17,0%,  $p < 0,001$ ), had previous myocardial infarction (21,8% vs 9,8%,  $p < 0,05$ ) compared with men with normal renal function. Renal impairment in men had association with multi-vessel coronary disease (58,9% vs 35,9%,  $p < 0,05$ ), left main coronary artery disease (12,5% vs 4,6%,  $p < 0,05$ ), lower left ventricular ejection fraction (35 vs 41,  $p < 0,05$ ), increased levels of C-reactive protein (39 vs 21 mg/l,  $p < 0,05$ ), higher in-hospital mortality rate (8,9% vs 2,6%,  $p < 0,05$ ) and were treated longer in hospital (8 vs 7 days,  $p = 0,056$ ). Women with impaired renal function had no significant differences between Killip class, previous myocardial infarction, multi-vessel coronary disease, LMCA disease, left ventricular ejection fraction, levels of C-reactive protein and in-hospital mortality rate compared with preserved renal function.

*Conclusions:* Men with impaired renal function, who developed STEMI, are considered as higher risk population. Decreased eGFR should be considered as an independent risk factor for adverse short-term outcomes and complications in men with STEMI.

### *References:*

- [1]. Chang S-H, Tsai C-T, Yen AM-F, Lei M-H, Chen H-H, Tseng C-D. Proteinuria and Reduced Estimated Glomerular Filtration Rate Independently Predict Risk for Acute Myocardial Infarction: Findings from a Population-Based Study in Keelung, Taiwan . *Acta Cardiologica Sinica*. 2015;31(2):106-112.
2. Vashistha V, Lee M, Wu YL, Kaur S, Ovbiagele B. Low glomerular filtration rate and risk of myocardial infarction: A systematic review and meta-analysis. *Int J Cardiol*. 2016 Nov 15;223:401-409. doi: 10.1016/j.ijcard.2016.07.175.
3. Marenzi G, Cabiati A, Assanelli E. Chronic kidney disease in acute coronary syndromes. *World Journal of Nephrology*. 2012;1(5):134-145. doi:10.5527/wjn.v1.i5.134.

## 67. PREVALENCE OF ATHEROGENIC CARDIOVASCULAR RISK FACTORS IN HIGH CARDIOVASCULAR RISK PATIENTS

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**Introduction:** Cardiovascular disease (CVD) is the leading cause of death worldwide and it causes more than half of all deaths in Europe [1]. Acute coronary syndromes (ACS) have the highest rate of lethal outcomes. As ACS is a result of coronary artery disease (CAD) the aim of modern medicine is to investigate the prevalence of most atherogenic risk factors and to find ways for prevention[2]. AIM: To investigate the distribution of atherogenic risk factors in Lithuanian population

**Methods:** 1000 patients, who underwent examination according CVD prevention programme, were enrolled in to retrospective cohort study. Primary examination was performed at the Department of Cardiology of Lithuanian University of Health Sciences between October 2010 and April 2012. 5-year hospitalizations due to ACS and performed interventional procedures were assembled. Patients were divided into 4 groups by low density lipoprotein (LDL): 1 group (LDL  $\leq 3$ mmol/L), 2 group (LDL  $> 3$ -4mmol/L), 3 group (LDL  $> 4$ -6mmol/L), 4 group (LDL  $> 6$ -8mmol/L); and by total cholesterol (TC): 1 group (TC  $\leq 6$ mmol/L), 2 group (TC  $> 6$ -8mmol/L), 3 group (TC  $> 8$ mmol/L); by triglyceride (TG): 1 group (TG  $< 1,7$ mmol/L), 2 group (TG  $\geq 1,7$ mmol/L); reduced High Density Lipoprotein (HDL)  $< 1,3$ mmol/L in females and 1,04mmol/L in males. Data were analyzed using SPSS 20 statistical package. The chosen significance level of  $p < 0.05$ .

**Results:** 319 (31,9%) patients of all were male while 681 (68,1%) were female. Mean age in males was  $46 \pm 0,186$  and in females was  $55 \pm 0,117$ . Sex in LDL and TC groups differs as follow: LDL in groups (males vs. females): 1 ( $\leq 3$ mmol/L): 38(3,8%) vs. 71(7,1%); 2 ( $> 3$ -4mmol/L): 110(11%) vs. 178(17,8%); 3 ( $> 4$ -6mmol/L): 153(15,3%) vs. 344(34,4%); 4 ( $> 6$ -8mmol/L): 14(1,4%) vs. 83(8,3%). TC in groups (males vs. females): 1 ( $\leq 6$ mmol/L): 122(12,2%) vs. 195 (19,5%); 2 ( $> 6$ -7mmol/L): 96(9,6%) vs. 184(18,4%); 3 ( $> 7$ -8mmol/L): 64(6,4%) vs. 150(15%); 4 ( $> 8$ mmol/L): 36(3,6%) vs. 150(15%). TG in groups (males vs. females): 1 ( $< 1,7$ mmol/L): 70(7%) vs. 245(24,5%); 2 ( $\geq 1,7$ mmol/L): 268(26,8%) vs. 409(40,9%). HDL in groups (males vs. females): 1 (normal): 221(22,2%) vs. 456(45,6%); 2 (reduced): 96(9,6%) vs. 221(22,2%). Of all patients 46 (4,6%) were defined as having moderate CVD risk, 319 (31,9%) as having high CVD risk and 634 (63,4%) as having very high CVD risk. 15 (1,5%) patients had ACS within 5-year follow-up, all them were of very high CVD risk. 5 of 15 ACS events patients were males (33,3%), 10 (66,7%) were females. Males mean age was  $47,61 \pm 0,859$ , females mean age was  $56,04 \pm 1,16$ . Mean LDL and TC in patients who experienced CVS events were  $4,55 \pm 1,10$  and  $6,89 \pm 1,305$  respectively, while in general population they were  $4,42 \pm 1,249$  and  $6,80 \pm 2,278$  respectively.

**Conclusions:** More than fifty percent of patients we at very high CVD risk. Very high LDL and TC levels were observed more often in females. Near fifty percent of females showed elevated TG level. But only 1,5% patients survived CVS events within 5-year follow-up it might be stated that the prevention programme with risk modifying treatment is useful for patients at risk helping focusing patients attention to atherogenic risk factors to prevent CVD and lethal outcomes.

### References:

1. World Health Organization The top 10 causes of death. January 2017 <http://www.who.int/mediacentre/factsheets/fs310/en/>
2. Goswami DS, Manohar TP. Cardiometabolic Risk Factors in Acute Coronary Syndrome with Special Reference to Non-HDL Cholesterol. J Assoc Physicians India. 2016 Oct;64(10):30-36.
3. Reiner Z, Catapano AL, De Backer G et al. ESC/EAS Guidelines for the management of dyslipidaemias. European Heart Journal, August 27, 2016
4. Rinkuniene E, Petrulioniene Z, Laucevicius A, Ringailaite E, Laucyte A. Tradicinių rizikos veiksnių paplitimas tarp sergančiųjų išemine širdies liga. Medicina (Kaunas) 2009; 45(2)

## 68. ASSESSMENT OF CARDIOVASCULAR PATIENTS KNOWLEDGE ABOUT RISK FACTORS AND ASSOCIATED HABITS

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*Introduction:* Cardiovascular diseases are acute health problem in Lithuania as in many countries of the world. The researchers say that 80 percent of cardiovascular diseases can be prevented with a healthy lifestyle, a full-fledged diet, physical activity, rejecting harmful habits. Therefore it is important to identify knowledge about risk factors of cardiovascular patients [1]. The main cardiovascular risk factors are smoking, high blood pressure, high cholesterol, type II diabetes, poor diet, physical inactivity, overweight, obesity, the abuse of alcohol, and mental and social stress [3]. The more risk factors, the higher the risk of developing [2]. Discussions about the importance of patient teaching began in Western Europe and the United States more than 40 years ago. Studies on patient education and awareness in Lithuania were launched only in the last decade [4].

*Aim* – to assess cardiovascular patients knowledge about risk factors and associated habits.

*Methods:* A quantitative survey was performed. The study included 100 patients of primary and 100 patients of secondary prevention of cardiovascular diseases. The survey was conducted in 2014-2015 at Vilnius University Hospital Cardiology and Angiology center.

*Results:* More smokers are among primary prevention patients. Patients of secondary prevention program are better informed about the impact of smoking to stroke risk comparing to participants of primary prevention program ( $p = 0,007$ ). Only one fifth of both groups of patients takes the principles of healthy eating. Patients of secondary prevention program are better informed about the importance of malnutrition for cardiovascular diseases comparing to participants of primary prevention program ( $p = 0,026$ ). Both groups of patients are not physically active sufficiently, their lack information about physical activity influence to the health. Both groups of patients are not interested sufficiently in their arterial blood pressure, do not measure it every day, so do not know about it. Those who know that their blood pressure is elevated, do not take treatment because do not feel anything ( $p = 0,015$ ). Statistically significant differences were determined in the assessment of the respondents' answers about drug doses for the hypertension treatment ( $p = 0,048$ ).

*Conclusions:* Patients known influence of smoking to the risk of cardiovascular diseases. Cardiovascular patients are fairly well informed about the harmful effects of smoking on health and cardiovascular disease risk. Patients have insufficient knowledge about healthy nutrition and its effect on cardiovascular disease. Both groups of patients have lack of knowledge about blood pressure. Patients have lack of information on healthy life impact in reducing hypertension. Patients are not physically active sufficiently, their have lack of information about physical activity influence to health.

### *References:*

1. Bagdonas G. Arterial hypertension: in old age. Lietuvos bendrosios praktikos gydytojas (Lithuania), 2009. 13: 5.
2. Petrulionienė Ž., Apanavičienė D. A. Evaluation of arterial hypertension control and treatment in daily practice of family physicians. Medicina (Lithuania), 2010. 46 (10): 657-663.
3. Rinkūnienė E., Petrulionienė Ž., Zdanevičiūtė I., Dženkevičiūtė V. Trends of mortality from cardiovascular diseases in Lithuania and the countries of European Union. Medicinos teorija ir praktika (Lithuania), 2013. 19: 2.
4. Zagurskienė D., Misevičiene I. Nurses opinion about the patient's health training and their knowledge of health. Sveikatos mokslai (Lithuania), 2011. 21: 5 (77).

## 69. LONG-TERM SURVIVAL OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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**Introduction:** Despite the decreasing incidence of acute coronary syndromes worldwide, the rate of NSTEMI (Non-ST elevation myocardial infarction) has increased relative to STEMI (ST elevation myocardial infarction). This may be due to more sensitive biochemical markers. The effect of this change on long-term prognosis is unclear. In recent decades, the mortality due to acute coronary syndromes in Iceland has decreased. Approximately 75% of the decrease in mortality has been attributed to reductions in major cardiovascular risk factors(1). Long-term survival after myocardial infarction has not been determined in Iceland.

**Purpose:** The aim of this study was to compare long-term survival rates of NSTEMI and STEMI patients and to explore the effects of risk factors on survival.

**Methods:** Among 447 consecutive patients diagnosed with acute myocardial infarction in Iceland in 2006, 280 patients were diagnosed with NSTEMI and 167 with STEMI. Information about risk factors of these patients was obtained using electronic medical records from Landspítali University Hospital. The primary endpoint was all cause mortality and the secondary endpoint was defined as death or myocardial infarction. Statistical comparison of the mean-ages between groups was executed using the t-test. Categorical variables were compared using chi-square. Survival distributions for STEMI and NSTEMI were plotted using Kaplan-Meier estimates and compared using the log-rank test. A multivariate Cox-regression model was constructed adjusting survival rates according to the following categorical risk factors: age, sex, smoking history, diabetes, hypertension, family history and hyperlipidemia.

**Results:** NSTEMI and STEMI incidence rates per 100.000 inhabitants were 91.3 and 55.9, respectively. The mean age of NSTEMI patients was 73.1 years (SD 12.9), women were on average 8.4 years older than men. The mean age of STEMI patients was 65.3 years (SD 13.2), women were on average 7.3 years older than men. Mortality over the course of a 9-year follow-up was 56.1% (157 patients) in the NSTEMI group and 32.3% (54 patients) in the STEMI group. Five-year survival rate for NSTEMI patients was 51%, 42% amongst women and 57% amongst men (Logrank:  $p < 0.02$ ). The five-year survival rate for STEMI patients was 77%, 68% amongst women and 80% amongst men (Logrank:  $p < 0.04$ ). The five-year age-adjusted survival rates were higher for STEMI (87%) than for NSTEMI (76%) (Logrank:  $p = 0.02$ ). Patients with diabetes had higher hazard ratios than non-diabetic patients, diabetic STEMI patients had a hazard ratio of 2.36 ( $p = 0.04$ ) and diabetic NSTEMI patients had a hazard ratio of 1.42 ( $p < 0.06$ ). Other risk factors did not have a significant impact on long-term survival.

**Conclusions:** The incidence of NSTEMI was higher than that of STEMI in Iceland in 2006. The worse prognosis of women as compared to men was due to the higher mean age of women with myocardial infarction. Overall, long-term survival of NSTEMI patients was worse than that of STEMI patients even after adjustment for age.

### References:

1. Aspelund T, Guðnason V, Magnúsdóttir BT, Andersen K, Sigurdsson G, Thorsson B, et al. (2010) Analysing the Large Decline in Coronary Heart Disease Mortality in the Icelandic Population Aged 25-74 between the Years 1981 and 2006. PLoS ONE 5(11): e13957. doi:10.1371/journal.pone.0013957

## 70. IS AORTIC VALVE EFFECTIVE ORIFICE AREA A KEY PARAMETER FOR THE SURGERY IN PATIENTS WITH AORTIC STENOSIS IN CASE OF CONCOMITANT ATRIOVENTRICULAR VALVES INSUFFICIENCY

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*Introduction:* Aortic valve replacement (AVR) for aortic stenosis is the most wide-spread cardiac surgical procedure on heart valves [1]. Aortic valve effective orifice area (EOA) is one of the key parameters in indications for this operation in case of isolated aortic stenosis. However there are few data in the international guidelines about aortic stenosis complicated with atrioventricular valves insufficiency.

*Aim:* To analyze influence of the Aortic valve EOA on 5-year mortality as index for surgery in patients with Aortic Stenosis complicated with atrioventricular valves insufficiency.

*Methods:* Among all patients admitted to the Clinic (2005-2007) 365 patients with severe aortic stenosis and secondary mitral and tricuspidal regurgitation were included. in prospective non-randomized study. Using exclusion criteria (infective endocarditis, cancer, mitral stenosis), finally 198 patients were included: 152 patients underwent aortic valve replacement adding repair of atrioventricular valves; 46 patients were not operated because of different reasons. Patients were divided into 3 subgroups according to the EOA values: 1st is 0,3-0,79 cm<sup>2</sup> (15 not operated and 50 operated patients) ; 2nd is 0,8-0,99 cm<sup>2</sup> (16 not operated and 44 operated patients) ; 3d is 1,0-1,3 cm<sup>2</sup> (15 not operated and 58 operated patients). Follow-up period was 5 years. Statistical variance and logistic regression analyses were used.

*Results:* The average age of 198 patients was 59.16 ( $\pm 11,19$ ) years, the proportion of men - 67% (133 persons). The majority of patients were in the 3d NYHA Heart Failure functional class (73,3%). The average left ventricular ejection fraction was 47.76 ( $\pm 14,22$ )%. Subgroups were similar by these parameters ( $p < 0,05$ ). 5-year mortality rate in not operated patients increased with the decrease in AV EOA value ( $\chi^2 = 12,1$ ,  $p < 0,01$ ). For operated patients such tendency wasn't observed ( $\chi^2 = 1,2$ ,  $P > 0,05$ ). 5-year mortality after operation with adjustment for age and sex in patients either from the 1st group or from the 2nd group wasn't significantly different in comparison with the patients from the 3d group (OR=1,4, 95% C.I. for Exp (B) 0,44-4,39,  $P > 0,05$ , and OR=1,26, 95% C.I. for Exp (B) 0,36-4,34,  $P > 0,05$ , relatively).

*Conclusion:* Long-term results after AVR have no significant relationship with AV EOA value in case of Aortic stenosis complicated with atrioventricular valves insufficiency. The indication of time for surgery needs to be individually predicted in this category of patients.

### *References:*

1. A prospective survey of patients with valvular heart disease in Europe: the Euro Heart Survey on Valvular Heart Disease / B. Iung [et al.] // Eur. Heart. J. -2003. - Vol. 13. - P. 1231-1243.



## 71. INFLUENCE OF BETA2-MICROGLOBULIN ON ARTERIAL STIFFNESS IN END STAGE RENAL DISEASE

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**Introduction and aims:** Recently the inflammatory properties of beta2 microglobulin and its relationship with atherosclerosis as well as with arterial stiffness has been discussed. The aims of our study was to investigate the influence of beta2M concentration to carotid-femoral pulse wave velocity in end stage renal disease patients currently on dialysis and to verify their relationship with incidence in vascular events.

**Methods:** 29 stable hemodialysis patients (mean age  $55.48 \pm 14.66$ ) without previous cardiovascular or cerebrovascular events and PAD were prospectively studied. Blood tests (including pre-dialysis beta2 microglobulins (beta2M)), cardioechoscopy, measurement of carotid-femoral pulse wave velocity (cfPWV) at the beginning of the study and after 6 months were performed.

**Results:** No linear correlation between beta2M concentration and cfPWV at the beginning of the study ( $r=0.1469$ ,  $p=0.4469$ ) and after 6 months ( $r=0.07$ ,  $p=0.7022$ ) were found. Patients with left ventricular hypertrophy (considered as left ventricular mass index  $>115\text{g/m}^2$  in male and  $>95\text{g/m}^2$  in female) had significantly higher beta2M levels ( $p=0.0501$ ), but no significant difference in cfPWV. After subsetting beta2M into quartiles, the patients in quartile 4 had nonsignificant higher cfPWV values (mean= $13.06\text{ m/s}$ ,  $p=0.3127$ ). We revealed that increase in beta2M concentration within 6 months influences increase in cfPWV ( $X\text{-squared}=4.4726$ ,  $p=0.0344$ ). During the average follow-up of 2 years 7 cases of vascular events (2 ischaemic heart disease, 2 myocardial infarction, 1 ischaemic stroke, 2 peripheral artery disease) were observed. In univariate logistic regression vascular events were significantly associated with increase in cfPWV, increase in beta2M within 6 months, higher than  $5\text{mg/l}$  C-reactive protein level, increased left ventricular mass, higher than  $500\text{ ng/ml}$  ferritin levels. On multivariate logistic regression analysis, increase in beta2M concentration within 6 months was associated with increase in cfPWV and hyperferritinemia.

**Conclusion:** Increase in beta2M concentration within time affects increase in arterial stiffness. Additionally to other factors, such as high CRP and hyperferritinemia, it benefits in predicting incidence in vascular events in patients on hemodialysis.

## 72. PREVALENCE OF PULMONARY HYPERTENSION SIGNS IN 63 PATIENTS ON REGULAR HEMODIALYSIS

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**Introduction:** Pulmonary hypertension (PH) is a progressive disease with high morbidity and mortality rates and is present when mean systolic pulmonary artery pressure (SPAP) is above 25mmHg at rest or 30 mmHg while exercising [1]. Cardiovascular disease is a well-recognized and important source of mortality in patients with end stage renal disease (ESRD). PH has been described in hemodialysis (HD) patients and has been associated with increased morbidity and mortality. The prevalence of PH in HD patients is relatively high and varies in different studies from 25% to 58.6% [3-5]. Determination of PH is important to prevent heart failure or cardiovascular death in HD patients.

**Aim of the study:** To identify and evaluate the prevalence, causes and risk factors of PH in patients on regular HD.

**Methods:** We conducted a retrospective study of 63 HD patients in two dialysis centers. PH signs were evaluated by clinical symptoms, electrocardiographic and echocardiographic criteria. Patients were divided in to two groups: patients who had PH signs (PH+) and patients who did not have PH signs (PH-). Both groups were compared by demographic and HD parameters, PH risk factors, laboratory results, and medication use. The data was analyzed using SPSS 23.0 and P<0.05 was considered statistically significant.

**Results:** Study population consisted of 42 (66.7%) men and 21 (33.3%) women, with mean age 66.60±14.28 (24-85) years. The mean duration of HD was 53.71±49.98 (12-228) months. Causes of renal failure were: arterial hypertension 18 (20.6%), diabetes 13 (20.6%), glomerulonephritis 8 (12.7%), polycystic kidney disease 6 (9.5%), myeloma 5 (7.9%), others 11 (17.5%). PH signs were found in 32 patients (50.2%) (PH+ group). HD access were: 21 (65.52%) patients via arteriovenous fistula, 11 (34.38%) patients via tunnelled HD catheter. In PH+ group, 24 (75%) patients had left heart and 5 (15.63%) - lung disease. Patients in PH+ group had higher body mass index (27.8±5.74 compared to 25.09±4.82 kg/m<sup>2</sup>, p=0.045), lower hemoglobin concentration (100.48±15.54 compared to 108.31±14.70 g/l, p=0.034), lower hematocrit levels (31.13±4.61% compared to 33.76±4.74%, p=0.022). Comparing to PH- group, patients in PH+ group had higher prevalence of mitral regurgitation (21; 65.63%, p=0.026), II-III° tricuspid regurgitation (11; 34.38%, p=0.002), right atrial enlargement (19; 59.38%, p=0.015), right ventricle enlargement (12; 37.5%, p<0.001), abnormal left and right ventricle ratio <2 (14; 43.75%, p=0.001), lower pulmonary artery acceleration time <120ms (25; 78.13%, p<0.001). We found no statistically significant difference between clinical symptoms, dialysis type and duration, chronic kidney disease causes, medication use, and electrocardiographic criteria in both groups.

**Conclusion:** Pulmonary hypertension signs were found in 50.8% HD patients, most of them had left heart or lung disease. PH+ patients demonstrated a higher rate of pathological heart ultrasound findings, higher body mass index, and more severe anemia.

### References:

- Dagli CE, Sayarlioglu H, Dogan E et al. Prevalence of and factors affecting pulmonary hypertension in hemodialysis patients. *Respiration*. 2009;78(4):411-415.
- United States Renal Data System. Excerpts from USRDS 2005 Annual Data Report. *U.S. Am J Kidney Dis* 2006;47(Suppl 1):S1.
- Mahdavi-Mazdeh M, Alijavad-Mousavi S, Yahyazadeh H et al. Pulmonary hypertension in hemodialysis patients. *Saudi J Kidney Dis Transplant*. 2008; 19(2):189-193.
- Yigla M, Abassi Z, Reisner S.A. et al. Pulmonary hypertension in hemodialysis patients: an unrecognized threat. *Semin dial*. 2006;19(5):353-357.
- Fabbian F, Cantelli S, Molino C et al. Pulmonary hypertension in dialysis patients: a cross-sectional Italian study. *IntJ Nephrol*. 2010.

## 73. IMPACT OF BODY MASS INDEX ON PROGNOSIS IN HEART FAILURE

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*Introduction:* In patients with chronic heart failure (CHF), previous studies have reported mortality rates in patients with increased body mass index (BMI). [1] In essence, obesity is a risk factor for developing HF, but after the onset of HF, obesity is shown to be a positive predictor for survival.[2]

*Aim:* To examine BMI relationship with cardiovascular risk factors and the effect of increased BMI on all-cause mortality in congestive HF patients.

*Methods:* Prospective observational cohort study enrolled consecutive patients with congestive heart failure admitted to the emergency department with dyspnea due to decompensated HF, exacerbation of chronic obstructive pulmonary disease, pneumonia, pulmonary embolism and other reasons. Mortality data were collected at study timepoints of 1 month, 3 months and 1 year by telephone call. Patients were classified as obese if BMI was  $\geq 30$  and having overweight or obesity in case of BMI  $\geq 25$ . Data were analyzed using SPSS 21 statistical package with Chi square Pearson test, non-parametric Mann Whitney U and parametric T test for two independent samples.

*Summary results:* Data of 189 patients 107 male (56.5%) and 82 female (43.4%) with the final diagnosis of HF were analyzed. Mean age of the studied patients was found to be  $71.96 \pm 10.87$  years for females and  $66.78 \pm 13.38$  years for males ( $p=0.006$ ). Mean BMI of all patients was calculated as  $30.8 \pm 8.6$ . Obese patients admitted with HF appeared to be generally younger compared to those in overweight or normal BMI (mean age  $67.87 \pm 10.35$  and  $70.06 \pm 14.24$  years, respectively,  $p=0.031$ ). Obese patients were found to have lower BNP values during admission ( $n=166$ ) at the emergency department as compared to normal or overweight patients ( $986 \pm 1613$  ng/l and  $1440 \pm 1226$  ng/l, respectively,  $p=0.017$ ).

Being overweight or obese was associated with coronary heart disease risk factors (*table 1*), but the overall-cause mortality over 1 year period was found to be significantly lower in the obese patient group (*table 2*).

Table 1

|                       | BMI <25        | BMI $\geq 25$    | p value       |
|-----------------------|----------------|------------------|---------------|
| Diabetes mellitus     | 14,58% (7/48)  | 37,59% (53/141)  | ( $p=0,003$ ) |
| Arterial hypertension | 70,83% (34/48) | 85,11% (120/141) | ( $p=0,028$ ) |
| Atrial fibrillation   | 43,75% (21/48) | 65,96% (93/141)  | ( $p=0,007$ ) |

Table2

|          | BMI <30      | BMI $\geq 30$ | p value   |
|----------|--------------|---------------|-----------|
| 1 month  | 11% (11/100) | 5,6% (5/89)   | $p=0,2$   |
| 3 months | 13% (13/100) | 8,9% (8/89)   | $p=0,381$ |
| 1 year   | 22% (22/100) | 9,9% (10/89)  | $p=0,049$ |

However, among those who died during the 1 year period ( $n=32$ ) overweight and obese patients were found to be younger than patients in normal BMI range ( $67.95 \pm 1$  years vs  $78.55 \pm 10.89$  years respectively,  $p=0.029$ ).

*Conclusion:* Being overweight or obese appears to be related to cardiovascular disease risk factors – diabetes mellitus, arterial hypertension and atrial fibrillation. Obese patients seem to develop HF younger, their BNP levels during the first admission and one year all-cause mortality rate have been found to be lower than overweight or normal BMI patients'. Nevertheless, despite having a better 1-year clinical prognosis, overweight/obese heart failure patients still die younger than their normal weight counterparts.

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<sup>1</sup>Oreopoulos A et al. Body mass index and mortality in heart failure: a meta-analysis

<sup>2</sup>Lavie C. J., Milani R. V., Ventura H. O. Obesity and cardiovascular disease: risk factor, paradox, and impact of weight loss

## 74. RENAL ARTERY THROMBOSIS – PRESENTATION OF CASE AND REVIEW OF LITERATURE

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**Introduction:** Renal artery thrombosis is a rare and misdiagnosed disease that can cause kidney infarction. Acute renal artery thrombosis can be caused by thromboemboli or by local atheroembolic plaque.

**Aim of the study:** to represent the most recent review of the literature on the causes, diagnostics and treatment of renal artery's thrombosis.

**Case Description:** A 79 year old patient in 2016 was brought to major university hospital's emergency room. His major complaints were abdomen, chest and loin pain, low-grade fever and anuria. Because of the 3rd degree acute renal impairment and high uremia (creatinine **1867 µmol/l** and urea **58,29 mmol/l**) hemodialysis was started. It was known from the patient's medical history that he had permanent atrial fibrillation and was taking warfari. In 2016 his right leg was amputated because of atherosclerosis and there was chronic left leg ischemia. On the first days of patient's admission the cause of acute renal impairment was unknown. But later during the internal organ sonoscopy a hypoechoegenic zone in the left kidney was found. When it was decided to make biopsy of the left kidney, tubular necrosis and oxalosis was found. The decision was to perform computed tomography scan angiography. Left renal artery thrombosis and the occlusion of right renal artery branches was present. But the kidney function was lost and the patient remained hemodialysis-dependent.

This disease can have a variety of clinical manifestations and has no recommended diagnostic or treatment guidelines, due to the lack of patients and comparative-studies. Although, according to gathered data, this disease can be suspected if there is flank pain, hematuria, elevated lactatdehydrogenase in blood serum, as well as if computed tomography scan with contrast or radioisotopic renography are positive. There can be symptoms of nausea and vomiting, high-grade fever, hypertension. Laboratory findings include proteinuria > 0,3g/l (in 38,2%), micro (42,4%) or macro (6,38%) hematuria, elevated lactatdehydrogenase values. [1] Renal artery thrombosis can mimic pielonephritis (fever and flank pain), nephrolithiasis (flank pain and hematuria) or acute abdomen. This condition can be treated with anticoagulants therapy, thrombolysis, thrombectomy or angioplasty with or without stent.

So it is important to know risk factors and conditions which can lead to the formation of thrombosis.

**Conclusion:** The heart is the main source of peripheral thromboemboli, including those that migrate to the renal arteries. Men and women with atrial fibrillation have a fourfold and almost sevenfold risk[2], respectively, of developing peripheral thromboemboli in comparison with persons without atrial fibrillation, but only 2% of peripheral emboli secondary to atrial fibrillation target the kidney.[3] The duration, kidney collateral bloodflow and the extent of ischemia are major determinants of the prognosis for an ischemic kidney. The human kidney is believed to tolerate absence of blood flow for 60 to 90 minutes. [4] But there are reports about kidney function recovery after 14 days of ischemia. [5]

### References:

- Bourgault M, Grimbert P, Verret C, Pourrat J, Herody M, Halimi JM, et al. Acute Renal Infarction: A Case Series. *CJASN*, March 07, 2013, vol. 8, no. 3, 392–398.
- Cheng KL, Tseng SS, Tarng DC. Acute renal failure caused by unilateral renal artery thromboembolism. *Nephrol Dial Transplant*. 2003;18:833-835.
- Frost L, Engholm G, Johnsen S, et al. Incident thromboembolism in the aorta and the renal, mesenteric, pelvic, and extremity arteries after discharge from the hospital with a diagnosis of atrial fibrillation. *Arch Intern Med*. 2001;161:272-276.
- Yavuzgil O, Gurgun C, Zoghi M, et al. Bilateral renal arterial embolisation in a patient with mitral stenosis and atrial fibrillation: an uncommon reason of flank pain. *Anadolu Kardiyol Derg*. 2003;3:73-75.
- Koivuviita N, Tertti R, Heiro M, Manner I, Metsärinne K. Thromboembolism as a Cause of Renal Artery Occlusion and Acute Kidney Injury: The Recovery of Kidney Function after Two Weeks. *Case Rep Nephrol Urol*, 2014 Jan–Jun; 4(1): 82– 87.

## 75. Different adaptations of global and regional right ventricular shape to pressure and volume overload

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**Background:** Right ventricular (RV) adapts to different loading conditions by changing size, function and shape. We know that interventricular septum curvature differs in patients (pts) with RV volume (VO) and pressure overload (PO). However, shape changes occurring in other regions of the RV have not been reported.

**Purpose:** To compare global and regional RV shape changes in pts with VO and PO.

**Methods:** We obtained 3D echo data sets of the RV from 33 pts with VO (severe pulmonary regurgitation in corrected Tetralogy of Fallot, age 22±8 years, 54% men) and 28 pts with PO (pulmonary hypertension, mean age 58±13 years, 75% women). RV surfaces were reconstructed at end-diastole (ED) and end-systole (ES) using dedicated software packages. The RV was segmented in 4 parts: inflow (RVIT) and outflow tracts (RVOT), apex, and body (both divided into free wall and septum) and their curvatures were calculated using custom software. Zero curvature defines a flat surface, whereas positive or negative curvature indicates convexity or concavity, respectively.

**Results:** VO pts showed larger volumes (Table) and higher RV ejection fraction (45±5% vs 37±8%, p<0.0001) than PO. VO pts demonstrated more convex body septum during diastole and RV free wall surface during systole. Conversely, in PO pts, body septum showed a tendency to have a more convex shape at ES (Table). Apical septum curvature was similar in both groups.

**Conclusions:** RV dilates more in VO than in PO, reaching a more spherical shape in the former. In PO, the septum, bulges more into the left side at ES. Conversely, VO pushes less the septum, and this causes a rounder shape of the RV free wall to accommodate the “large” RV volume. These findings may help to refine our understanding of RV remodeling and pathophysiology of tricuspid regurgitation in different diseases.

**Table.** Right ventricular volumes and curvature in distinct loading conditions.

| Parameters                        | End-diastole |           |         | End-systole |           |         |
|-----------------------------------|--------------|-----------|---------|-------------|-----------|---------|
|                                   | ToF (n=33)   | PH (n=28) | P value | ToF (n=33)  | PH (n=28) | P value |
| Volume index (ml/m <sup>2</sup> ) |              |           |         |             |           |         |
| Total volume                      | 130±33       | 91±28     | <0.001  | 74±24       | 59±24     | <0.05   |
| Apex                              | 21±5         | 14±4      | <0.001  | 11±4        | 9±4       | <0.05   |
| Body                              | 50±13        | 34±11     | <0.001  | 28±9        | 23±9      | <0.05   |
| RVIT                              | 36±10        | 26±8      | <0.001  | 21±7        | 17±7      | <0.05   |
| RVOT                              | 24±6         | 17±5      | <0.001  | 14±5        | 11±5      | <0.05   |
| Curvature (indexed to volume)     |              |           |         |             |           |         |
| RVIT                              | 1.138 ±0.12  | 1.14±0.24 | NS      | 1.19±0.09   | 1.13±0.23 | NS      |
| RVOT                              | 1.52 ±0.11   | 1.43±0.29 | NS      | 1.44±0.10   | 1.37±0.28 | NS      |
| Free wall body                    | 1.08±0.05    | 1.05±0.22 | NS      | 1.06±0.06   | 0.97±0.20 | <0.01   |
| Free wall apex                    | 1.95±0.18    | 1.93±0.44 | NS      | 2.05±0.27   | 1.79±0.41 | 0.001   |
| Septal body                       | 0.40±0.14    | 0.31±0.14 | <0.05   | 0.37±0.17   | 0.44±0.15 | 0.06    |
| Septal apex                       | 1.01±0.26    | 0.95±0.38 | NS      | 1.14±0.39   | 1.14±0.49 | NS      |



## 76. Comparison of coronary plaque components between non-culprit lesions in patients with acute coronary syndrome without ST segment elevation and target lesions in patients with stable angina: virtual histology – intravascular ultrasound analysis.

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**Background:** Previous studies have reported that plaque components may play a pivotal role in the plaque disruption and thrombosis that leads to acute coronary events [1]. Several Virtual Histology-IVUS (VH-IVUS) studies have reported that acute coronary syndrome (ACS) patients in their culprit site had more necrotic core –containing lesions and more vulnerable plaques compared with stable angina (SA) patients [2;3]. However not much studies are made which compares the non-culprit lesions in ACS patients and target lesions in SA patients so the differences in plaque characteristics between non-culprit lesions in ACS without ST segment elevation patients and target lesions in SA patients are not well understood.

**Aim:** The aim of this study is to compare the plaque components between non-culprit lesions in ACS without ST segment elevation patients and target lesions in SA patients using a virtual histology – intravascular ultrasound.

**Subjects and Methods:** We compared virtual histology – intravascular ultrasound findings between 25 ACS non-culprit lesions and 22 SA target lesions. The ACS without ST segment elevation and SA was determined according to the European Society of Cardiology guidelines [4;5]. Evaluation of plaque components were performed within 5 mm length above and 5 mm length under the minimum lumen site. VH-IVUS classified the color-coded tissue into four major components: green (fibro-elastic); light green (fibro-fatty); white (dense calcium) and red (necrotic). The planar and volumetric analysis of plaque components was made in both groups. The Statistical analysis was used. Continuous variables were presented as mean value  $\pm$  1SD; comparisons were conducted by Student's t-test or nonparametric Wilcoxon test. Discrete variables were conducted by chi-square statistic or Fisher's exact test as appropriate.

**Results:** Although the plaque volume was significantly smaller in ACS without ST segment elevation group compared with SA patients group ( $90,8 \pm 21 \text{ mm}^3$  vs.  $102,6 \pm 28 \text{ mm}^3$ ,  $p > 0,05$ ). Non-culprit lesions in ACS without ST segment elevation patients had a greater % necrotic core volume (18,8 vs. 14,3,  $p > 0,05$ ) and % dense calcium volume (8,5 vs. 5,2  $p > 0,05$ ) and % fibro-fatty volume (17,6 vs. 16,3,  $p > 0,05$ ) compared with target lesions in SA patients at the minimum lumen site. Volumetric analysis by absolute counts showed that non-culprit lesions in ACS patients had a greater  $\text{mm}^3$  NC volume (19,1 vs. 12,4,  $p < 0,05$ ) and  $\text{mm}^3$  dense calcium (15,6 vs. 9,6  $p < 0,05$ ) compared with target lesions in stable angina patients.

**Conclusion:** Although the plaque volume was significantly smaller in ACS group, non-culprit lesions in ACS without ST segment elevation patients had more vulnerable plaque components compared with target lesions in SA patients.

### References:

- Virmani R, Kolodgie FD, Burke AP, Farb A, Schwartz SM. Lessons from sudden coronary death: a comprehensive morphological classification scheme for atherosclerotic lesions. *Arterioscler Thromb Vasc Biol* 2000;20:1262-75.
- Missel E, Mintz GS, Lee CW, et al. Comparison of virtual histology to intravascular ultrasound of culprit coronary lesions in acute coronary syndrome and target lesions in stable angina pectoris. *Am J Cardiol* 2007; 100:953-9.
- Hong YJ, Jeong MH, Choi YH, et al. Plaque characteristics in culprit lesions and inflammatory status in diabetic acute coronary syndrome patients. *JACC Cardiovasc Imaging* 2009;2:339-49.
- Marco Roffi, Carlo Patrono, Jean-Philippe Collet, Christian Mueller, Marco Valgimigli, Felicita Andreotti et al. ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. *European Heart Journal* (2016) 37, 267–315.
- Gilles Montalescot, Udo Sechtem, Stephan Achenbach, Felicita Andreotti, Chris Arden, Andrzej Budaj et al. ESC guidelines on the management of stable coronary artery disease. *European Heart Journal* (2013) 34, 2949–3003.

## 77. Assessment of the relationship between the blood pressure and heart rate variability in patients with hypertension

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*Introduction:* Recent studies have demonstrated that hemodynamic abnormality in hypertension is associated with markers of increased sympathetic and decreased parasympathetic tone of the autonomic nervous system (ANS). They are visible using ambulatory blood pressure and heart rate 24-hours Holter monitoring and analyzing the variability of both. But if the increased blood pressure variability (BPV) is associated with a higher risk of cardiovascular events, the heart rate variability (HRV) is the opposite. Both interactions represent an adaptive mechanism to maintain homeostasis. The relationship between changes in blood pressure and heart rate variability during the time of day is not entirely clear.

*Aim:* To assess the relationship between daily and night coefficients between standard deviation (SD) of BP and HRV parameters.

*Methods:* During the study 37 patients were examined (50-55 years old patients having essential hypertension with metabolic syndrome or type 2 diabetes). 24-hours monitoring was conducted between 8 and 10 am. Daily electrocardiogram (ECG), BP and actigraphy (AG) profiles were monitored with certified devices (ABPM-05 with „Card(X) plore“, Meditech Ltd., Hungary) on the left arm of the patient. Three ECG channels were digitized with 300 Hz/channel, and two AG channels with 10 Hz/channel. Daytime BP measurement frequency was set at an interval of 15 minutes (07:00–22:59). Nighttime BP measurement frequency was set at an interval of 30 minutes (23:00–06:59). The 24-h Holter's ECG was used in order to determine the RR interval. The main spectral components of HRV were calculated from hourly RR interval recordings by integrating the power spectral density in standard defined frequency bands - the average of the power of high frequency (HF; 0.15–0.4Hz) and low frequency (LF; 0.04–0.15Hz) components of the RR intervals. Assessment of fast BP fluctuations occurring within the 24-hour time-frame have been shown with SD and alterations in the day-to-night profile (coefficient of dippers). Analysis of the relationship between the BPV and HRV were evaluated through the correlation of SD of BP, HF, LF components of HRV and BP profile.

*Results:* The results have shown that the more vagal influence is expressed in day and night heart rate regulation, the lessening is the effect of SBP dipping. The correlation coefficient between the SBP dipper and HF was  $-0,31$  ( $p < 0,05$ ). The higher the daytime was sympathetic tone (LF) the lower the daytime variability of SBP and DBP ( $r = -0,25$  between SD and LF). Conversely, the greater of daytime HF, the greater of night-time variability of SBP and DBP ( $r = 0,25$  between SD and HF).

*Conclusion:* The study showed that the complex regulatory mechanisms of the day runs between the heart rate and the blood pressure. Increase of the vagal regulation of the heart rate at night-time can accentuate the dipping process, which has prognostic significance in hypertension.

## 78. Early changes of left ventricular rotational deformation in patients with chronic aortic regurgitation and preserved left ventricular ejection fraction: speckle tracking echocardiography analysis

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**Background:** It remains difficult to detect subtle left ventricular (LV) myocardial dysfunction in chronic aortic regurgitation (AR) patients with preserved LV ejection fraction (EF).

**The aim** of this study was to evaluate LV rotational systolic and diastolic parameters in asymptomatic patients with chronic AR and normal EF using two-dimensional speckle-tracking echocardiography (2D-STE).

**Methods:** One hundred-nine individuals were prospectively studied: 53 asymptomatic patients with moderate or severe chronic isolated AR and 56 age, gender and body surface area-matched healthy subjects. All patients underwent standard echocardiography and off-line 2D-STE.

**Results:** Patients with AR had significantly larger LV end-diastolic, end-systolic diameters and volumes, a more spherical LV compared with controls (55,8±5,3 mm vs. 47,7±3,9 mm, 36,9±4,2 mm vs. 31,8±4,2 mm, 174,7±41,5 ml vs. 83,9±20,1 ml, 76,1±21,4 ml vs. 34,0±8,5 ml, 3,90±0,66 vs. 2,98±0,74, respectively,  $p<0,001$ ), but normal LV ejection fraction in both groups (57±3 % vs. 59±3 %,  $p<0,001$ ). In AR patients group we found increased peak apical rotation and peak apical rotation rate than in healthy subjects group (14,1±5,6° vs. 9,7±4,6° and 93,6±33,9°/s vs. 74,4±26,7°/s,  $p\leq 0,001$ ), but peak basal rotation and peak basal rotation rate did not differ between the groups (-5,9±2,7° vs. -6,7±2,8° and -71,1±21,6°/s vs. -70,9±19,5°/s,  $p>0,05$ ). Despite increased the peak LV twist in AR patients compared with controls (18,6±5,9° vs. 16,4±5,4°,  $p\leq 0,05$ ) the peak LV twist rate was significantly reduced in AR patients (111,5±34,7°/s vs. 145,4±34,2°/s,  $p<0,001$ ). AR patients had lower LV rotational diastolic parameters as peak reverse rotation rate in early and late diastole at the base (64,4±21,4°/s vs. 81,1±25,8°/s and 39,7±24,2°/s vs. 47,3±20,7°/s, resp.,  $p<0,05$ ) and peak reverse rotation rate in late diastole at the apex (-36,4±24,2°/s vs. -49,6±22,7°/s,  $p=0,004$ ). The peak apical reverse rotation rate in early diastole was reduced, but not significantly (-79,3±28,4 vs. -87,7±35,3°/s,  $p>0,05$ ). Patients with AR had decreased the peak LV untwisting rate than controls (-109,5±55,0°/s vs. -168,8±45,6°/s,  $p<0,001$ ). The peak LV twist rate and LV untwisting rate parameters correlated with LV diameters, volumes and sphericity index (LV end-diastolic diameter  $r=-0,39$  and  $r=0,43$ , resp.,  $p<0,001$ ; LV end-systolic diameter  $r=-0,42$  and  $r=0,47$ , resp.,  $p<0,001$ ; LV end-diastolic volume  $r=-0,42$  and  $r=0,43$ , resp.,  $p<0,001$ ; LV end-systolic volume  $r=-0,42$  and  $r=0,39$ , resp.,  $p<0,001$ ; LV sphericity index  $r=-0,42$  and  $r=0,35$ , resp.,  $p<0,001$ ).

**Conclusions:** In asymptomatic AR patients with preserved LV EF the increase of LV rotational systolic parameters may lead to the preservation of normal EF, but the decrease of LV rotational diastolic parameters may detect pre-clinical LV dysfunction before LV EF declines.

## 79. Speckle tracking echocardiography in detection early left ventricular myocardial systolic deformation dysfunction in significant chronic aortic regurgitation with preserved left ventricular ejection fraction

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**Background:** Currently, the management of patients with severe chronic aortic regurgitation (AR) and preserved left ventricular (LV) ejection fraction (EF) thus remains controversial. We aimed to characterize LV systolic mechanics in patients with significant AR and preserved EF using two-dimensional speckle tracking echocardiography (2D-STE).

**Methods:** We studied 47 patients with moderate-to-severe or severe chronic AR and preserved LVEF ( $> 50\%$ ) who were divided into two groups – 23 asymptomatic patients ( $44 \pm 12$  years, 74% male, 61% hypertensive) and 24 symptomatic patients ( $59 \pm 12$  years, 71% male, 92% hypertensive). Subjects were judge symptomatic if they had a history of symptoms of heart failure (New York Heart Association [NYHA] class II or higher). 56 age and sex-matched healthy controls (age  $47 \pm 16$  years, 68% male) were included in the study. Conventional echocardiography and 2D-STE were performed.

**Results:** No significant differences in clinical characteristics (gender, body surface area, systolic and diastolic blood pressure, heart rate) were observed between chronic AR patients, except symptomatic patients were older and more hypertensive. Asymptomatic and symptomatic AR patients had comparable LV end-diastolic, end-systolic diameters, volumes and indexes respectively, but significantly larger than controls. The LVEF was lower in patients with symptoms ( $54 \pm 4\%$  and  $56 \pm 2\%$ , resp.,  $p < 0.05$ ), although all patients had by definition a preserved LVEF. Regarding the assessment of LV performance using 2D-STE, asymptomatic and symptomatic patients with AR demonstrated a significantly larger impairment in myocardial function in all three directions when compared with controls group (global LV longitudinal strain  $-19.0 \pm 2.2\%$ ,  $-17.6 \pm 1.9\%$  vs.  $-19.9 \pm 2.1\%$ , resp.,  $p < 0.001$ ; global LV circumferential strain  $-18.9 \pm 2.4\%$ ,  $-17.7 \pm 2.4\%$  vs.  $-20.7 \pm 2.9$ , resp.,  $p < 0.001$ ; global LV radial strain  $36.4 \pm 11.1\%$ ,  $33.4 \pm 11.4\%$  vs.  $45.2 \pm 2.1\%$ , resp.,  $p < 0.001$ ). Patients with symptomatic AR had a significant worse global LV longitudinal strain compared with those without symptoms ( $-17.6 \pm 1.9\%$  vs.  $-19.0 \pm 2.2\%$ , resp.,  $p < 0.05$ ). Global LV apical circumferential strain ( $-20.9 \pm 4.5\%$  vs.  $-23.9 \pm 3.9\%$ , resp.,  $p < 0.05$ ) and global LV midventricular radial strain ( $37.4 \pm 18.5\%$  vs.  $49.8 \pm 16.2\%$ , resp.,  $p < 0.05$ ) were more impaired in patients with symptoms than in those without symptoms. By ROC curve analysis, global LV longitudinal strain was good predictor of clinical symptoms [area under the curve (AUC)=0.73,  $p=0.006$ ].

**Conclusions:** Multidirectional global LV strain was impaired in patients with moderate-to-severe or severe AR compared to controls, despite preserved LVEF. Global LV longitudinal strain was more impaired in symptomatic than in asymptomatic significant AR patients with preserved LVEF and could predict clinical symptoms in asymptomatic AR patients with a consequent potential for improved timing of aortic valve surgery.

## 80. Early and long term outcomes of aortic valve reimplantation technique Kaunas experience 2004 -2016

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klinikos*

**Objectives:** We assessed early and long term outcomes of aortic valve reimplantation (David I) technique for both tricuspid and bicuspid aortic valve patients with aortic root pathology.

**Methods:** Between 2004 - 2016 y., 90 patients underwent aortic root replacement with aortic valve reimplantation. Tricuspid aortic valve (TAV) was present in 62 patients and 28 had bicuspid aortic valve (BAV). Our clinical data base was used to retrospectively identify clinical and surgical characteristics. The clinical follow-up was 100% complete with a mean follow up time of 4.1 years (range, from 5 days to 12.0 y.). Echocardiographic follow-up was available in 77.7% patients who still had their native aortic valve. Valve related outcomes were defined according to the Society of Thoracic surgeons guidelines for reporting mortality and morbidity after cardiac valve interventions. Time to event analyses were calculated using the Kaplan Meier method.

**Results:** Patients with BAV were younger  $42.3 \pm 12.4$  y compared to TAV group patients  $55.6 \pm 14.8$  y ( $p = 0.0001$ ) with no significant difference in terms of preoperative New York Heart Association (NYHA) functional status  $2.5 \pm 0.6$  and  $2.3 \pm 0.5$  ( $p > 0.05$ ). Aortic valve reimplantation was frequently accompanied with cusp repair in both groups: BAV group - 100% and TAV group - 83.8%. Early in-hospital mortality rate was 2.2% in TAV group (2 patients sepsis/at admission acute type I dissection) and 1.1% in BAV group (at admission acute type I dissection). None of the operated valve related complications including thromboembolic, stroke, valve reoperation, endocarditis were noted during early postoperative period in both groups. No pacemaker implantation was needed during early period in both groups. During follow up, there were 4 (4.4%) late deaths only in TAV group: 3 patients died due to non cardiac underlying diseases (trauma, cancer and etc.) and 1 patient experienced cardiac death due to congestive heart failure. Freedom from aortic valve reoperation was 100% in TAV group and  $82.5 \pm 7.5\%$  in BAV group at 10 years ( $p = 0.003$ ). Only BAV group patients needed valve substitute: due to cusp tear - 3 patients (3.3%) and 1 patient (1.1%) due to late infective endocarditis. All patients survived aortic valve replacement and were discharged without complications. Freedom from thromboembolic and neurological complications were 100% at 10 years in both groups. Freedom from operated valve endocarditis was 100% in TAV group and  $95.2 \pm 4.6\%$  in BAV group ( $p = 0.13$ ), respectively. Freedom from reoperation (due to dissection) on the residual aorta was 100% in both groups. The latest echocardiographic follow-up showed improved left ventricle remodeling in both groups.

**Conclusions:** Aortic valve reimplantation technique is a method of choice to correct and spare different morphology of aortic valves with excellent early and late postoperative outcomes



## 81. Changes in exercise capacity in patients with primary diagnosed PAH-CHD: First results in a 12-month prospective study

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*Introduction:* Pulmonary hypertension is one of the most serious complications in patients with congenital heart disease (CHD). The defect usually works as a shunt that connects both sides of the heart, thus creating abnormal blood flow. These shunts, depending on the severity of disease, can be left-to-right, right-to-left or bidirectional. The most common defect type is a ventricular septal defect (VSD), followed by atrial septal defect (ASD), a patent ductus arteriosus (PDA) or a combination of any of the previously mentioned.

According to the current guidelines, in patients with WHO-FC II and III, first line monotherapy treatment is Ambrisentan, Bosentan or Sildenafil, with Bosentan being the drug of choice for patients with Eisenmenger syndrome. The recommended treatment goal is a 6 minute walking test (6MWT) result of  $\geq 440$ m as suggested during the 5th World Symposium on Pulmonary Hypertension.

*Aim:* The aim of our research is to analyze the changes in exercise capacity in primary PAH-CHD before and 1 month, 3 months, 6 months and 1 year after the initiation of advance therapy.

*Methods:* The research was started in September 2015 and took place in Pauls Stradins Clinical University Hospital. Only previously untreated patients were included in this study. We evaluated exercise capacity using 6MWT as well as analyzed other available clinical data (ECHO, ECG, Holter monitoring and radiology results, full blood count, biochemistry results, BNP levels) when applicable. First visit was before the initiation of therapy and follow-up visits were planned 1, 3, 6 and 12 months after initiation of therapy. IBM SPSS Statistics 23 was used for statistical analysis.

*Results:* In total, 11 patients with a mean age of  $58.73 \pm 21.87$  years at the time of inclusion were included in the research. 3 of the patients refused to attend the follow-up visits. This meant that only the first visit before the initiation of therapy was obtained. At the time of writing, 3 of the patients included had completed 12 month follow-up visit, with 1 other patient having completed her 6 month follow-up visit, one – 3 month follow-up and 3 others – 1 month follow-up.

The mean delta (the primary point being 6MWD before initiation of therapy) at 1 month follow-up was  $25.14 \pm 18.79$ m, at 3 months –  $25.60 \pm 48.52$ , at 6 months –  $54.50 \pm 25.36$ m and at 12 months –  $70.00 \pm 14.14$ m. The Borg scale results showed no significant variations over time.

*Conclusion:* The results show that the advance therapy in PAH-CHD patients contributes significantly to increase in exercise tolerance, with the 1-year follow-up result being up to 80 meters higher than before the initiation of therapy.

## 82. HEART FAILURE PATIENTS' EDUCATION AND CONSULTING: FIRST SUCCESSFUL CASE

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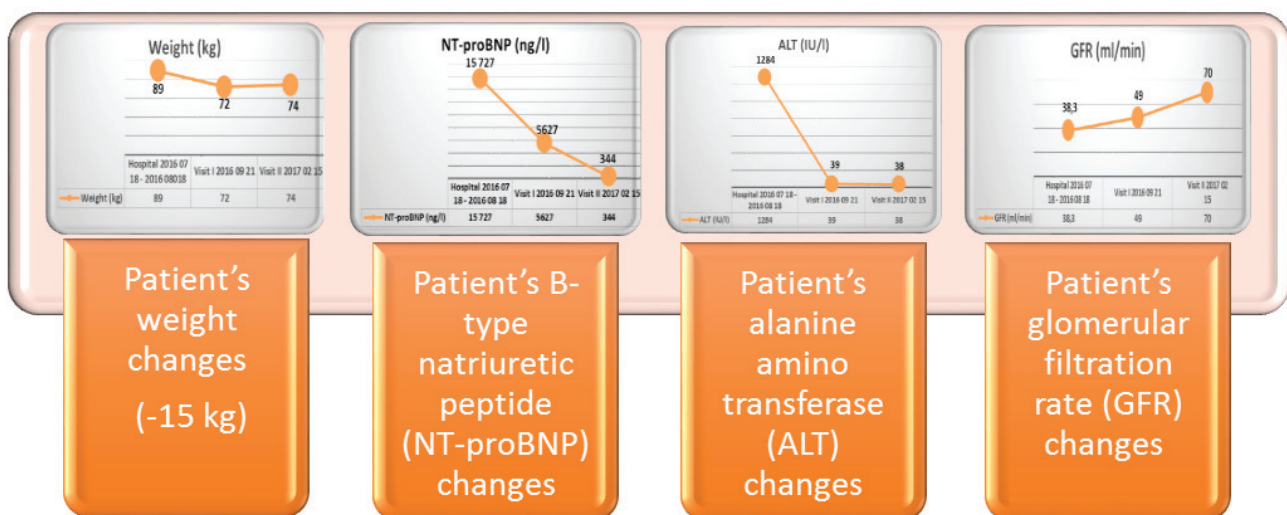
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**Background:** Heart failure (HF) is one of the most common clinical syndromes. The prevalence of HF is 2 percent among adult population in developed countries [1]. Despite medical advances, patients with HF faced with an increased initial and repeated hospitalizations and mortality risk [3]. HF influences an essential part of patient's life, because there is a requirement to follow daily drug treatment, change their lifestyle and also monitor the signs and symptoms in order to prevent HF decompensation. The goal of self-management interventions is to improve patients' knowledge and skills [5]. According to analysis, HF patients' education increases their attention to self-care [3]. Assurance of HF patients' self-management reduces hospitalization and mortality and improves their quality of life [4]. In Lithuania systematic HF patients education started after the order No. V-1330 issued by LR Ministry of Health [2].

**Aim** of the presentation is to introduce a successful case of HF patient education and impact of self-care.

**Results:** 47 year-old man hospitalized due to severe (IV NYHA f.cl.) and progressive HF after protracted and persistent tachysystolic atrial fibrillation has developed. The patient was extremely decompensated, suffering from irregular heart activity > 130 beats/min, with severe venous congestion in the lungs and right hydrothorax, jugular venous distension, hepatomegaly, severe ischemic hepatitis and secondary kidney failure, *anasarca*, hudge ascites and also ulcers in both legs. Symptomatic HF have been noticed for several years with progressive course and no previous HF treatment.

After discharge from the hospital during 6 month follow-up, consistent treatment and education sinus rhythm restored itself when HF compensation was achieved, liver and kidney function normalized itself and there were no more trophic ulcers on the legs after 1 month of treatment, patient's education and self-management. NT-pro BNP returned almost to the normal value – from 15727 to 344 ng/l and it was the best evidence of successful medical treatment, patients' education and sufficient self-care together.



Picture 1. Patient clinical and laboratory data dynamics within 6 months of ambulatory follow-up and consistent HF education

**Conclusion:** Significant HF patient's health status and quality of life improvement was observed after hospital and ambulatory treatment and two ambulatory consultations with patient' education by specialized HF nurse.

**Reference:**

Ponikowski P., Voors A.A., Anker S.D., Bueno H., et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *European Journal of Heart Failure* 2016; 18: 891–975.

SAM įsakymas „Dėl gydytojo kardiologo ir slaugytojo konsultacijos, į kurią įeina ir paciento mokymas, teikimo asmenims, sergantiems širdies nepakankamumu, reikalavimų aprašo patvirtinimo“. 2015-11-24 Nr. V-1330, Vilnius.

Jonkman N. H., Westland H., Groenwold R. H., et al. Do self-management interventions work in patients with heart failure? An individual patient data meta-analysis. *Circulation* 2016; 133 (12): 1189-1198.

McDonagh T.A., Blue L., Clark A., et al. ESC Heart Failure association standards for delivering heart failure care. *European J Heart Fail* 2011;13:235-41.

Stromberg A., Martensson J., Fridlund B., et al. Nurse-led heart failure clinics improve survival and self-care behaviour in patients with heart failure. *Eur Heart J* 2003;24:1014–23.

### 83. TWO CASES OF SPONTANEOUS CORONARY DISSECTION IN YOUNG WOMEN, TWO DIFFERENT PRESENTATION AND TREATMENTS – CORONARY STENTING WITH PERSISTENT STENOCARDIA AND CONSERVATIVE MEDICAL TREATMENT IN ASYMPTOMATIC PATIENTS

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Spontaneous coronary artery dissection is a rare but important cause of acute myocardial infarction (AMI), especially in young women. The pathophysiology and treatment differ significantly from patients with plaque instability due to atherosclerosis. In this abstract, management of two young women is proposed.

A woman aged 32 was acutely hospitalized after 40 min onset of exercise-induced first-in-life chest pain. She has three children (youngest 8 mo.), no known co-morbidities, non-smoker. Cardiogram showed ST segment depressions in inferior leads. First cardiomarkers taken 5 minutes after admission were negative, but with significant rise less than 3 hours later. Patient was admitted to coronary angiography approximately 5 h after pain onset, she had one vessel disease without notable coronary atherosclerosis- long smooth critical stenosis in left obtuse marginal branch (Fig. 1, in blue circle)

Coronary angioplasty (PCI) was performed because of continuous chest pain and poststenotic flow stagnation. After first stent implantation spiral flow-limiting dissection occurred ending just before left main coronary artery, the case was finally solved with three drug-eluting stents in total length of 85 mm (Fig. 2). Medical treatment was started by standard protocol. Final cardiac echocardiography showed resolution of lateral hypokinesis and normal ejection fraction (61%). Cardiac markers peaked on day 2<sup>nd</sup>, hs TnTc 3307 ng/L. The rehabilitation was uneventful with discharge to home on day 8. Cardiac stress-test 5 months later was performed with good exercise tolerance and was ischaemia negative.

The second patient, 47 y. old woman, admitted with acute chestpain of 20 minutes, non-remarkable cardiogram (isolated T inversion in lead III) and short ventricular tachycardia episode.

She had been treated hypertension for the last 10 years, migraine headaches and hormone therapy (dienogest/etynylestradiol) for uterine myomas with treatment cessation/probable overdose in last months. She is a non-smoker.

Coronary angiography was performed 10 minutes after hospitalization, similarly with the first patient no significant coronary atherosclerosis was noted except a long lesion in distal left anterior descending coronary artery (Fig. 3)



Fig. 1. Selective left coronary angiography, long critical obtuse marginal (OM) lesion (in blue circle)

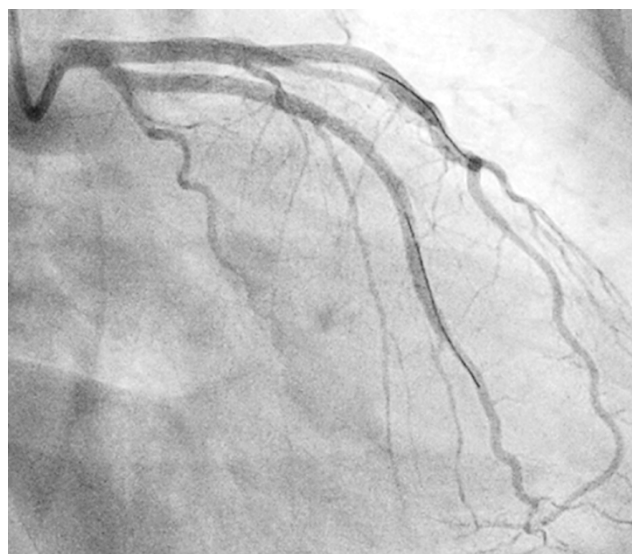


Fig. 2. Revascularisation: final result with coronary stenting total length of 85 mm, from distal obtuse marginal to circumflex ostium.

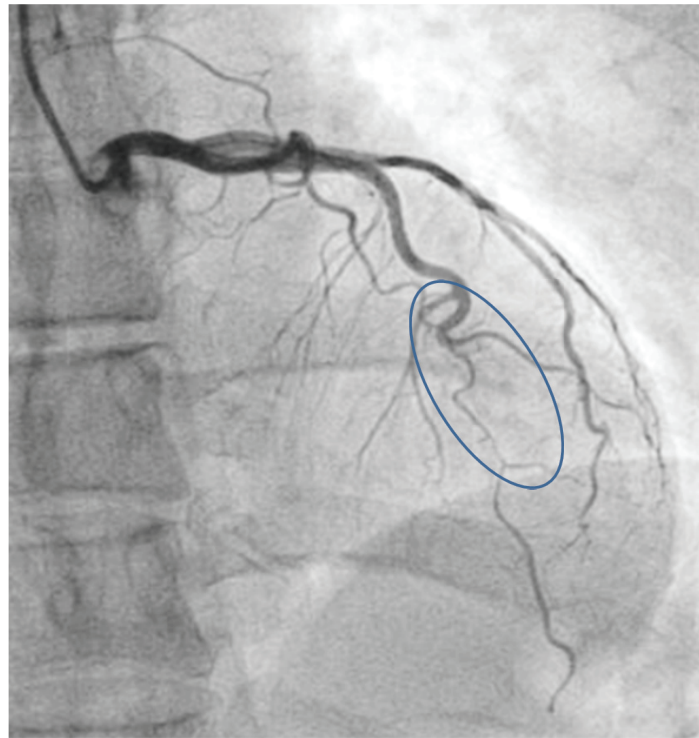


Fig.3. 47-year old woman presenting with transitory chest pain and atypical stenosis (in blue circle) in distal left anterior descending artery

The lesion was left to be treated conservatively. At that moment patient was pain-free and hemodynamically stable. There was only slight rise in cardiac troponin (165,2 ng/L), echocardiogram showed normal ejection fraction (73%) with no wall motion abnormalities. Patient was ambulated at day 5 and the follow-up with perfusion-MRI was performed 1 month later with normal ventricular function and no myocardial ischaemia signs neither at rest nor during stress.

Spontaneous coronary artery dissection (SCAD) is a rare but potentially life-threatening pathology as it can cause acute coronary syndrome [1,2]. The registry of SCAD patients in Mayo Clinic reported a mean age of 43 years and 82% female patients. The commonest identified predisposing factors were postpartum, connective tissue disease and hormone therapy [2].

SCAD differs from coronary atherosclerosis (CAD) in mechanism of coronary occlusion/stenosis, in CAD it is intraluminal atheroma and thrombus, contrary to SCAD intramural hematoma or endothelial dissection [2,3]. Also whole coronary tree, not only the stenosed part is involved, so stenting can cause propagation of the dissection plane, as also happened to our first patient. There has been also discussion about antiagregants and anticoagulants regarding the mechanism of the disease- could these cause expansion of the intramural hematoma [2].

For those reasons SCAD can be managed conservatively in most cases [2], as in the case of our second patient.

W. Tanis,<sup>1</sup> P.R. Stella,<sup>1</sup> J.H. Kirkels,<sup>1</sup> A.H. Pijlman,<sup>2</sup> R.H.J. Peters,<sup>3</sup> and F.H. de Man<sup>4</sup> · Spontaneous coronary artery dissection: current insights and therapy. Neth Heart J. 2008 Oct; 16(10): 344–349.

Shahid Aziz, Spontaneous coronary artery dissection, E-Journal of Cardiology Practice Volume 14 N°38 - 22 FEB 2017 .

Hisanori Fujikura, MD; Yoshiki Hata, MD; Yoshihiro Morino, MD; Atsushi Matsuzaki, MD; Keiko Oikawa, MD; Yuji Ikari, MD; Junichi Taguchi, MD. Acute Coronary Syndrome due to Intramural Hematoma Circulation. 2006;114:e644-e645



## 84. Impact of breath holding technique during coronary CT angiography on hemodynamics

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**Introduction:** Different breath holding techniques may be associated with different image quality of CT angiographic studies, as it depends on the ability to hold breath during CT scan and different dilution of contrast media with unopacified blood from vena cava inferior. We analysed contrast enhancement of great thoracic vessels during coronary CT angiography, performed in inspiratory and expiratory breath hold.

**Aim:** To measure and compare density of contrasted blood in pulmonary trunk, left atrium, ascending and descending aorta on CT images, obtained during different breath holding techniques.

**Methods:** In total 36 patients were enrolled in the analysis. Two breath holding techniques were used: slight breath in and hold vs. breath in – breath out and hold. Coronary CT angiography was performed using Toshiba Aquilion One scanner. Contrast media iopromide with iodine concentration of 370 mg I/ml (Ultravist 370; Bayer, Shering) was injected through 18 G catheter, inserted into right cubital vein. Contrast volume and injection rate were chosen according patient's weight as follows: <50 kg - 44 ml, 4 ml/s; 50-80 kg – 55 ml, 5 ml/s; >80 kg - 66 ml, 6 ml/s). Density (mean) of the contrasted blood in pulmonary trunk, left atrium, ascending and descending aorta in same anatomical landmarks and a similar region of interest area (2 cm<sup>2</sup>) of region of interest were measured and compared between the groups. Density was measured using CEDARA I-Reach 4.4 program. Statistical analysis was performed using SPSS 16.0 program. Mann Whitney U test for comparison data between the groups was used. A  $p < 0.05$  value was considered significant.

**Results:** Inspiratory breath hold group included 19 patients (14 women and 5 men), and expiratory breath hold group included 17 patients (9 women and 8 men). There was no significant difference between the groups regarding mean age, height and weight ( $p > 0.05$ ). Volume of injected contrast media was also similar between these groups (in the inspiratory breath hold group 63.8 ml, in the expiratory breath hold group 63.4 ml;  $p > 0.05$ ). Mean density was significantly higher in the left atrium, ascending and descending aorta in the inspiratory breath hold group, compared to expiratory breath hold group (568.2 HU vs. 401.4 HU,  $p < 0.05$ ; 674.8 HU vs. 545.6 HU,  $p < 0.05$  and 620.4 HU vs. 524 HU,  $p < 0.05$  respectively). Mean density in the pulmonary trunk did not significantly differ between the groups (187.6 HU in the inspiratory breath hold group and 155.1 HU in the expiratory breath hold group;  $p > 0.05$ ).

**Conclusions:** Breath hold techniques significantly influenced contrast opacification during coronary CT angiography.

Contrast enhancement during expiratory breath hold in aorta and left atrium was lower, compared to inspiratory breath hold and should be further investigated for more optimal performance.

## 85. TREATMENT WITH STATINS AMONG YOUNG LITHUANIAN ADULTS WITH CORONARY HEART DISEASE

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**Background:** Nowadays statins are widely used for secondary prevention and their effectiveness in reducing mortality and cardiovascular events in adults with coronary heart disease (CHD) is evident [1]. As statins are one of the most-prescribed medications in the USA [2] prevalence of their usage in Lithuania is still unclear. Young patients with CHD should be considered for lipid-lowering therapy since dyslipidemia is a very common risk factor among Lithuanian adults [3].

**Aim of the study** was to evaluate treatment with statins among young Lithuanian adults with CHD during their hospital stay and recommendations for outpatient care.

**Materials and methods:** Data of 1714 young (<50 years) Lithuanian adults with CHD who were treated in Vilnius University Hospital Santariskiu Klinikos during the period of 2005-2016 was retrospectively analysed. Based on the diagnosis study population was divided into three groups – unstable angina (UA) group (n=318, 260 men and 58 women), stable angina (SA) group (n=168, 133 men and 35 women) and myocardial infarction (MI) group (n=1228, 1108 men and 120 women). Data concerning lipid-lowering therapy prescribed for these patients was collected and used for statistical analysis.

**Results:** Dyslipidemia was found in 77% (n=245) of UA, 71.4% (n=120) of SA and 77.2% (n=948) of MI group subjects. During their hospital stay 54.1% (n=172) of UA, 50.6% (n=85) of SA and 78.5% (n=964) of MI patients were treated with statins. Outpatient treatment with statins was recommended for 61.3% (n=195) of UA, 60.1% (n=101) of SA group and 78.8% (n=968) of MI group patients.

Accurate MI group analysis showed that 83.2% of patients with MI who were treated with statins had dyslipidemia and 55.3% of subjects with MI who were not treated with statins also had dyslipidemia. In MI and statin treatment group more people had hypertension (AH) and obesity compared to subjects with MI who were not treated with statins (AH: 71.6% vs 59.5%, p<0.01, obesity: 55.5% vs 42.3%, p=0.048).

During the period 2005-2016 the usage of statins among young adults with CHD in outpatient settings increased from 62.6% in 2005 to 78.9% in 2016. During the same period usage of statins increased in inpatient care as well: from 60.1% in 2005 to 78.9% in 2016. In ambulatory care Omega-3 fatty acids were recommended only for 1.3% (n=4) of adults in UA group, 4.2% (n=7) of SA group and 0.6% (n=7) of subjects with MI.

**Conclusion:** Prevalence of dyslipidemia among young adults with CHD is high and around seven out of ten of these patients got lipid-lowering therapy during their hospital stay or in ambulatory care. Most frequently statins were prescribed for adults with MI but more than a half of MI patients who did not get statins had dyslipidemia. Prevalence of lipid-lowering therapy with statins for secondary prevention is increasing in Lithuania.

Wilt TJ, Bloomfield HE, Macdonald R, et al. Effectiveness of statin therapy in adults with coronary heart disease. Arch Intern Med. 2004;164(13):1427-36.

100 Best-Selling, Most Prescribed Branded Drugs Through March. Medscape. May 06, 2015.

Rinkuniene E. The identification of patients at high-risk of cardiovascular disease and the optimization of methods of active primary prevention. Summary of doctoral dissertation. Vilnius, 2014.