Abstract: **464**

The control efficiency of rehabilitation in patients after acute coronary syndrome

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Topic(s):
Cardiac rehabilitation

Citation:
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Objective: to develop a method for assessment of the effectiveness of a 3-week cardiac rehabilitation programme (CRP) for patients after acute coronary syndrome (ACS) using the International Classification of Functioning, Disability and Health (ICF).
Methods: A total of 347 patients with a recent ACS, 234 men and 113 women, mean age - 59,3 ± 8,5 years, were enrolled a 3-week CRP conducted in the Ivanovo State Medical Academy (ISMA) clinic. The following ICF domains characterizing the functional state of the cardiovascular system of patients were selected as the performance criteria of the rehabilitation program: b28011 - pain in chest, b4102 - contraction force of ventricular muscles, b4200 - increased blood pressure, b4550 - general physical endurance, b460 - sensations associated with cardiovascular and respiratory functions, d4500 – walking short distances. To indicate the extent or magnitude of an impairment of each domain the ICF generic qualifier was used: 0 (0-4%) - no problem, 1 (5-24%) – mild problems, 2 (25-49%) - moderate problems, 3 (50-95 %) - severe problems, 4 (96-100%) - complete problems.
Results: Upon completion of the CRP the number of patients with preserved left ventricular ejection fraction (LVEF) (b4102.0) increased from 71 to 88%, and the percentage of patients with mild systolic dysfunction (b4102.1) decreased from 25% to 13%. LVEF returned to normal value at discharge in 4,2% of the patients with moderate impairment of LVEF (b4102.2). The number of patients with normal blood pressure values (b4200.0) has doubled (from 30 to 58%), and the percentage of those with hypertension of the first degree fell from 34 to 16%. Controlled physical training improved physical endurance from poor (b4550.4) to below average (b4550.3) in 7% of the patients. More than 50% of patients kept an average level of exercise tolerance (b4550.2). The number of patients with physical endurance above average level increased from 14% to 32%. During the rehabilitation 48% of patients have not experienced chest pain (b2800.0). Mild angina (b2800.1) occurred in 21% of patients, a moderate angina (b2800.2) in 15% of patients. During cardiac rehabilitation the number of patients who could cover more than 450 meters during the 6-minute walking test (b450.1) increased from 50 to 67%, and the percentage of patients able to cover a distance of 375-450 meters (b450.2) increased from 10 to 24%. Upon completion of the CRP the percentage of patients experiencing severe dyspnoea (b460.3) decreased from 39 to 22%, while the number of patients with mild dyspnoea (b460.1) increased from 24 to 34%.
Conclusions: Application of the ICF helps to evaluate both comprehensively and quantitatively the effectiveness of a 3-week CRP for patients after ACS, developed in the ISMA clinic. This CRP increases exercise tolerance, promotes decrease in the frequency and severity of angina and shortness of breath and has an additional hypotensive effect.

Abstract: **490**

The possibility of reaching individual rehabilitation goals for patients with acute coronary syndrome in the cardiac rehabilitation

Authors:
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Topic(s):
Cardiac rehabilitation

Citation:
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Objective: to determine the possibility of reaching individual rehabilitation goals for patients with acute coronary syndrome (ACS) in the cardiac rehabilitation and to identify the adverse factors, which prevent their achievement. Materials and methods. Study sample consists of 103 patients, 72 men and 31 women, aged from 44 to 80 years, exposed to a three-week rehabilitation clinic TMGI after ACS. Members of the multidisciplinary team formulated objectives and assigned an individual rehabilitation program for each enrolled patient.
Results: The reduction of pain syndrome took place for 96% of patients. The absence of positive dynamics of pain was observed for only 2 patients with high levels of anxiety and depression according to the Hospital Anxiety and Depression Scale. Almost 100% of patients got an improvement and stabilization of blood pressure. For 22% of patients with clinical signs of angina pectoris the goal was to alleviate symptoms of coronary artery disease, for 78% the goal was to stabilize their physical conditions. This goal was achieved in 59% of patients. Planned increase of tolerance for physical exercises was not obtained for 21 people. The most frequent co-morbid diseases in this group were metabolic syndrome, diabetes, chronic heart failure, which seem to limit the intensity of physical training. The target of "reduction of the functional class of heart failure" was achieved in 91% of cases. From the total number of patients who have not reached the planned target 83% had de-compensated heart failure. Improvements and stabilization of normal lipid profile did not occur for 14 people; all of them had the metabolic syndrome and 22% of them suffered from type 2 diabetes. Reducing and maintaining normal blood sugar index values could not be achieved for 17% of patients with metabolic syndrome, 67% of them had type 2 diabetes. In the process of rehabilitation there was a significant improvement of quality of life measured according to the EQ-5D health questionnaire. At the same time the quality of life correlated inversely with angina and depression levels. According to the Seattle Angina Questionnaire patients the quality of life index was lower for elderly patients and patients with higher levels of anxiety and depression. Satisfaction with treatment had the direct positive correlation with the distance covered during the six-minute walking test, and the negative correlation with angina functional class. This shows that it is the exercise tolerance, which determined the level of satisfaction with the ongoing rehabilitation activities.
Conclusions: The likelihood of achieving the objectives of rehabilitation varies with individual clinical and functional parameters and depends on the presence of co-morbid diseases and on patients' commitment to conducted rehabilitation measures. When aiming rehabilitation one must take into account co-morbid disease and conditions limiting rehabilitation abilities.

Exercise testing/training/Cardiac Rehabilitation

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Effects of trimetazidine in therapy of microvascular angina

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Topic: Cardiac rehabilitation

In spite of the understanding of the pathogenesis of microvascular angina (MVA), the treatment continues to be insufficiently effective. The quality of life in these patients is low and physical activity is significantly limited.

Objective: To evaluate the effectiveness of trimetazidine in management of patients with MVA according to the main pathogenesis mechanism of MA as endothelial dysfunction (ED) of coronary microvasculature.

Materials and Methods: The study included 60 patients with MVA proved by symptoms, positive stress-test, normal coronary angiography, impaired reserve of endothelium - dependent vasodilation (cold pressor test) by positron - emission myocardial tomography (PET), the presence of ED be reactive hyperemia index (RHI) < 1.67 according to peripheral arterial tonometry (PAT). An additional test for the evaluation of ED was counting of circulating endothelial cells (CEC).

All patients were randomized into 2 groups. Group 1 patients (control) (30 persons) get standard antianginal therapy. Group 2 (30 persons) also received basic antianginal therapy and trimetazidine 35 mg 2 times a day. After 3 months exercise test (treadmill), PAT and PET were performed again.

Results: A positive exercise test after treatment was observed in 90% of patients in group 1. In group 2 among patients received trimetazidine, a positive exercise test was recorded in 53.3% ($p < 0,05$). In the second group, the total time of the exercise test increased from $5,15 \pm 1,41$ to 10.5 [9.7; 11.9] ($p < 0.05$). While in the first group, this parameter remained unchanged. The number of metabolic units (METS) in the control group of patients not significantly increased from $5,02 \pm 0,76$ to $6,96 \pm 1,05$. In patients received trimetazidine, these values were higher: from $4,45 \pm 0,87$ to $8,15 \pm 0,64$ ($p < 0.05$).

In the first group ED by PAT after treatment was found among all patients, averaged RHI was 1.44 [1.37; 1.57], and the second group averaged RHI consisted 1.79 [1.43; 1,88] ($p < 0,05$) and ED was found only 23,3% of patients.

It were not found any changes of coronary blood flow on PET after treatment in control group, while in trimetazidine group coronary blood flow increased from -1.8 [-20.5; 17.6] to 49.0 [30.9; 57.8] for LAD, with -1.2 [-20.5; 17.4] to 40.0 [27.7; 62.7] for the LCx and RCA with -8.5 [-20.0; 17.8] to 39.0 [28.2; 62.4].

The number of CEC in the beginning of study was similar in 1-st ($15 \pm 8/3x105$ Le) and 2-nd ($17 \pm 10/3x105$ Le) groups. After 3 month of treatment the number of CEC remained the same in group 1 ($12,53 \pm 6,79$ $p > 0,005$) but in patients from trimetazidine group significantly decreased ($8,70 \pm 5,45$ $p < 0.05$).

Conclusions: In patients with MVA the intensification of standard antianginal therapy by trimetazidine improves microvascular blood flow both by improving of myocardial metabolism, and due to a decrease in the microvascular ED, is the principal pathogenetic mechanism of MVA.

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The control efficiency of rehabilitation in patients after acute coronary syndrome

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Topic: Cardiac rehabilitation

Objective: to develop a method for assessment of the effectiveness of a 3-week cardiac rehabilitation programme (CRP) for patients after acute coronary syndrome (ACS) using the International Classification of Functioning, Disability and Health (ICF).

Methods: A total of 347 patients with a recent ACS, 234 men and 113 women, mean age - $59,3 \pm 8,5$ years, were enrolled a 3-week CRP conducted in the Ivanovo State Medical Academy (ISMA) clinic. The following ICF domains characterizing the functional state of the cardiovascular system of patients were selected as the performance criteria of the rehabilitation program: b28011 - pain in chest, b4102 - contraction force of ventricular muscles, b4200 - increased blood pressure, b4550 - general physical endurance, b460 - sensations associated with cardiovascular and respiratory functions, d4500 – walking short distances. To indicate the extent or magnitude of an impairment of each domain the ICF generic qualifier was used: 0 (0-4%) - no problem, 1 (5-24%) – mild problems, 2 (25-49%) - moderate problems, 3 (50-95 %) - severe problems, 4 (96-100%) - complete problems.

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Conclusions: Application of the ICF helps to evaluate both comprehensively and quantitatively the effectiveness of a 3-week CRP for patients after ACS, developed in the ISMA clinic. This CRP increases exercise tolerance, promotes decrease in the frequency and severity of angina and shortness of breath and has an additional hypotensive effect.

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Early rehabilitation after coronary artery bypass grafting - results from the SheppHeartCABG trial.

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Topic: Cardiac rehabilitation

Background: In phase one rehabilitation after coronary artery bypass grafting patients often experience pain, fatigue, and low physical activity. In addition, anxiety and depressive symptoms are common.

Purpose: The purpose was to evaluate the effect of a comprehensive 4-week rehabilitation programme during hospitalisation and after discharge versus usual care.

Methods: Patients were randomised 1:1. The primary outcome was physical function measured by the 6-minute walk test. The secondary outcomes were; mental health physical activity, anxiety, depression, quality of life, sleep, pain, and the sit-to-stand test. Patients allocated to the experimental intervention followed a 4-week rehabilitation programme.

Results: We randomised 326 participants, of whom 11 dropped out. There was a mean age of 65 years and 87% were male. There were no significant differences between the two groups after 4 weeks measured by the 6-minute walk test. The secondary outcomes showed no difference between the groups, except for a potential difference in favour of the experimental intervention was detected on HADS-D (Table 1).

Conclusions: There was no significant difference between the two groups on physical function, pain, sleep, quality of life, and anxiety, which could be due to the short intervention period. The experimental intervention might have had a beneficial effect on depressive symptoms. However, this is a secondary outcome and should be interpreted with caution.

Table 1.

Primary outcome	Estimate (95% CI)	p-value
6-MWT	16.2 (-13.0; 45.4)	0.27
Secondary outcomes	Estimate (95% CI)	p-value
SF-12 mental	1.18 (-1.74; 4.09)	0.43
SF-12 physical	-0.82 (-3.18; 1.54)	0.49
Pittsburgh Sleep QI	-0.91 (-2.06; 0.23)	0.12
Örebro MSQ	-1.92 (-4.34; 0.51)	0.12
Sit-to-stand test	1.09 (-0.34; 2.52)	0.13
Binary outcomes	OR (95% CI)	p-value
HADS anxiety (8+)	0.62 (0.29; 1.29)	0.20
HADS depression (8+)	0.46 (0.22; 0.97)	0.04
HeartQol (>median)		
HeartQol global	0.78 (0.45; 1.35)	0.37
HeartQol emotional	0.93 (0.42; 2.09)	0.86

Mean difference in outcome and odds ratio between 152 experimental and 158 control participants.

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Training focused on force or velocity: influence and relation with the power-force-velocity profile in coronary artery patients in cardiac rehabilitation

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Topic: Cardiac rehabilitation

Background: Cardiac rehabilitation sessions include endurance (aerobic training) and resistance (anaerobic training), adapted to cardiovascular pathology for which cardiac rehabilitation is prescribed. These sessions are planned according to the results of functional tests performed in aerobic and in anaerobic before training and follow the EAPC recommendations. Generally, aerobic training is conducted in around 60-70 rotations per minute and anaerobic training is conducted through increasing loads, inducing a training in a little more force than velocity. Many studies have shown the importance of the relationship between the power-force-velocity profile and athletes performances. This has not been demonstrated in patients with coronary artery disease in cardiac rehabilitation.

Objective: The impact of cardiac rehabilitation in force or velocity has been studied in patients with CAD and these two types of training were compared in terms of aerobic and anaerobic performance achieved after cardiac rehabilitation.

Material and method: The power-force-velocity profile of the patients was determined during testing on a cycle ergometer at the beginning of the cardiac rehabilitation. It was defined from 4 sprints of 5 seconds with several resistors (1, 3, 5 and 7 kPa). Aerobic performance (power and VO2 in the first ventilatory threshold) were measured during the cardiopulmonary testing and muscle performance (strength and muscular endurance) were assessed during the test on quadriceps. These tests were performed at the beginning and at the end of the cardiac rehabilitation.

Results: The study population included ten patients in the University Hospital after an acute coronary syndrome justifying myocardial revascularization by angioplasty or bypass surgery. The mean age was 52.2 ±5.4 years, ranging from 37 to 65. Five patients underwent a training in force, meaning low speed (<50 RPM) on cycle ergometer, increasing slope and loads respectively on treadmill and weight machines. Five patients underwent a training in velocity, meaning high speed (> 100 RPM) at increasing walking speed and movement execution, respectively on treadmill and weight machine. Aerobic performance had improved for both groups at the end of the cardiac rehabilitation; at the first ventilatory threshold and at maximum effort. The increase in power in the first ventilatory threshold was similar for both groups while it was more important for the group trained in force at maximum effort. The improvement in VO2 max was higher in the first ventilatory threshold and at maximum effort for the group trained in velocity. Anaerobic performance was improved for both groups and were more important to the group trained in force.

Conclusion

Evaluation of the power-force-velocity profile could establish an adapted and optimal training based on aerobic and anaerobic performance of coronary patients at the beginning of cardiac rehabilitation.

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Effect of cardiac rehabilitation on endothelial function in outpatients with chronic heart failure

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Topic: Cardiac rehabilitation

Background: Cardiac rehabilitation (CR) improves symptoms and survival in patients with chronic heart failure (CHF). Endothelial dysfunction predicts future cardiovascular events and is associated with a less favorable prognosis in patients with heart failure.The relationship between cardiac rehabilitation and endothelial function is largely unknown.

Purpose: We aimed to investigate effect of cardiac rehabilitation on endothelial function measured by reactive hyperemia-peripheral arterial tonometry (RH-PAT) in outpatients with CHF.

Methods: We studied thirty five outpatients with stable CHF (mean age:74.2±9.5 years, 20males, EF=51.1±20.5%) participated in CR one or twice per week for three months.Each session consisted that after stretching and low intensity resistance training for 15minutes, patients performed ergometer for 20minitues according to Borg scale and cool-down stretching for 10minitues. We could follow up twenty five patients (mean age:72.6±9.5 years, 16 males, EF=53.2±18.3%). At baseline and 3months after CR, we performed 6-minute walk distance (6MWD), hand grip and knee extension strength, 10-meter walk test (10mWT), short physical performance battery (SPPB), RH-PAT index and measured plasma brain natriuretic peptide (BNP), LDL, HDL, Creatinine, Hemoglobin, Albumin, Geriatric Nutritional Risk Index (GNRI:14.89×serum albumin(g/dl)+41.7×BMI/22) and Hospital Anxiety and Depression Scale (HADS).

Results: In thirty five patients, Ln RH-PAT index were significant positive correlation with HDL (r=0.37, p=0.029) and negative correlation with Hb (r=-0.34, p=0.045) but no significant correlation with other factors.In follow up twenty five patients after three-months CR, significant improvements in 6MWD (360.0±105.6 to 429.4±110.7 m, p<0.001), hand grip strength (25.5±9.7 to 27.2±9.2 kg, p<0.001) and knee extension strength (0.44±0.17 to 0.48±0.19 kgf/kg, p=0.04), 10mWT (1.35±0.39 to 1.57±0.42 m/s, p<0.001), SPPB (10.2 ±2.2 to 10.9±1.8, p=0.011), BNP (139±132 to 113±124 pg/ml, p=0.045), LDL (104.9 ±32.5 to 93.4±32.2 mg/dl, p=0.028), GNRI (103.8±9.9 to 106.8±8.6, p=0.033), Anxiety (HADS score:4.6±3.2 to 3.3±2.3, p=0.022) and Depression(HADS score:8.7±4.0 to 6.3±3.4, p=0.008) were observed. But there were no significant changes in Ln RH-PAT index (0.40 ±0.19 to 0.43±0.19, p=0.68), HDL (50.2±18.2 to 51.9±16.3 mg/dl, p=0.27) and Hb (12.8 ±1.6 to 12.8±1.9 g/dl, p=0.70).

Conclusions: In outpatients with CHF, endothelial function were positive correlation with HDL and negative correlation with Hb. Three months CR improved BNP, LDL, physical, psychological and nutritional status but not Hb, HDL and endothelial function assessed by RH-PAT.

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Beneficial effects on smoking habits and sedentarism of a short duration phase II cardiac rehabilitation program

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Topic: Cardiac rehabilitation

Background: it is widely recognized that cardiac rehabilitation programs (CRP) have long-lasting benefits in patients with recent myocardial infarction, mostly due to cardiac risk factors modification, but so far optimal CRP duration to achieve those benefits is not clear.

Purpose: the aim of this study was to assess the benefits of a short CRP (2-4 weeks) regarding cardiac risk factors modification in patients with coronary artery disease.

Methods: fifty-three patients (50 men, 3 women; mean age 53.6 years, low-intermediate cardiac risk) were included in a 2-4 week CRP depending on the prior cardiac risk stratification (clinical presentation of myocardial infarction, number of treated vessels, ejection fraction, stress test result), functional ability (METs, comorbidities) or patients' preferences.

Data on smoking status, employment situation and sedentary lifestyle were collected at the beginning of the program and at six-months follow-up, when patients were asked about the medication adherence.

Results: there was a significant reduction (P=0.001) in the proportion of current smokers (23 - 52.3%- vs. 9 -20.5%-) at six-months follow-up. Likewise, a significant reduction (P= 0.002) in patients with sedentary lifestyle was observed. In the pre-program period, 36 (81.1%) patients did not engage in any physical activity in comparison with 23 (52.3%) after six-months follow-up (p=0.002).

A non significant improvement in terms of physical ability in a Bruce protocol stress test (7.45 versus 8.45 METS; P=0.426) was also observed.

During a six-month follow-up, 47 (88.6%) patients achieved a full treatment adherence.

Conclusions: our short duration phase II cardiac rehabilitation program shows significant benefits in smoking habits, sedentary lifestyle and therapeutic compliance.

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Effect of a cardiac rehabilitation on left ventricular diastolic function in patients with coronary heart disease

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Topic: Cardiac rehabilitation

Background: A cardiac rehabilitation and prevention program (CRPP) is a recognized in the management of coronary heart disease (CHD). However, the effect of a CRPP on diastolic function of the heart is controversial and no data exists in CHD.

Methods: Patients (n = 140) with recent acute myocardial infarction were referred CRPP. Serial treadmill exercise testing and rest echocardiography were performed before and after exercise training / workout.

Average age: 54 years (80% male, 20% female), diagnosed with STEMI, 60% (84 patients) and

NSTEMI: 40% (56 patients). Complete coronary revascularization: 80%. LVEF average: 48%.

We note that almost all of our patients have diastolic dysfunction of the left ventricle at cardiac rehabilitation program baseline. With the following distribution by grade of diastolic dysfunction: normal diastolic function: 5.6%ëƒ diastolic dysfunction class I: 73%ëƒ class II 17%ëƒ and class III: 4.4%.

After the cardiac rehabilitation program, we observed improvement in diastolic dysfunction of the left ventricle, with the following distribution: normal diastolic function: 33%ëƒ diastolic dysfunction class I 60%ëƒ class II: 4.8% and class III 2.2%, statistically significant differences p <0.01.

Conclusions: Diastolic dysfunction of the left ventricle is a predictor of cardiac events. Cardiac rehabilitation improves diastolic left ventricular function in patients with ischaemic heart disease.

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Association between physical activity and cardiac performance in chronic heart failure

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Funding Acknowledgements: UK NIHR Biomedical Research Centre

Topic: Cardiac rehabilitation

Background: Physical activity plays an important role in cardiovascular morbidity and mortality. Patients with chronic heart failure demonstrate reduced physical activity. The aim of the present study was to assess the relationship between daily physical activity level and cardiac performance in chronic heart failure.

Methods: Twenty patients (age 68±7 years, four females) with stable chronic heart failure due to reduced ejection fraction (LVEF 31±8) were recruited into the study. Daily physical activity (i.e. number of steps) was monitored objectively using pedometers over a seven-day period, and average number of steps per day was calculated. All patients underwent maximal graded cardiopulmonary exercise testing with non-invasive gas exchange and haemodynamic (bioreactance) measurements. Peak exercise cardiac power output as indicator of overall cardiac function and performance was calculated as the product of mean arterial blood pressure and cardiac output, expressed in watts. Quality of life was assessed using Minnesota Living with Heart Failure questionnaire.

Results: The average daily physical activity performed by patients was 5108±3064 steps / day. Peak oxygen consumption was 17±4 ml/kg/min, mean arterial blood pressure 105±14 mmHg, cardiac output 13±4 l/min, cardiac power output 3.1±1.3 watts, and quality of life score 26 ±19. There was a significant positive relationship between daily number of steps and peak oxygen consumption (r = 0.39, p=0.03), but non-significant relationship was found between daily physical activity and peak exercise cardiac output (r=0.32, p=0.09), mean arterial blood pressure (r=0.23, p=0.11), cardiac power output (r=0.21, p=0.10), and quality of life (r=0.18, p=0.16).

Conclusion: The present study confirms that daily physical activity in patients with chronic heart failure is low. Higher levels of daily physical activity are associated with increased cardiorespiratory fitness but not cardiac performance. Physical activity and exercise interventions are warranted to reduce sedentary behaviour and improve clinical outcomes in patients with chronic heart failure.

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Analysis of f physical rehabilitation efficiency in patients with chronic heart failure

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Topic: Cardiac rehabilitation

Introduction: In the world practice, the selection of physical training intensity of patients with CHF is on the basis of anaerobic threshold achievement during cardiorespiratory test (CPET). But the majority of patients with severe CHF are not able to achieve it during the CPET, that requires the use of certain indicators in the appointment of physical training. This alternative indicator can be lactate threshold, which achieved first during the execution of the CPET.

Purpose: To evaluate the effectiveness of aerobic physical exercise in HF patients, selected on the basis of achievement the lactate threshold during CPET and based on functional class of heart failure and comorbidity.

Methods: 77 patients, CHF NYHA II -III (under the supervision of cardiologists-experts in heart failure) were randomized into two groups - primary (aerobic training) and control (standard treatment of heart failure). Main group - 64 patients, mean age 54±12,5 years, body mass index (BMI) 26,46±6,4 kg/m2, among them 46 patients (72%) had III CHF functional class and 18 patients (28%) – II CHF functional class. The control group - 13 patients, age 53±17 years, BMI was 25,4±6.8 kg/m2, 12 patients had III CHF functional class, 1 patient – I. CPET, quality of life (QOL), exercise tolerance (ET) was assessed at baseline and after 1,3,6 months of follow-up. The CPET served on tredmile using hardware " Oxycon Pro ", Jaeger, Germany. Echocardiography (EchoCG) were performed at baseline and after 6 months. The data were statistically processed using software package "Statistika, 6.0".

Results: In the main group after 6 months of training EF increased by 7.5±0.5% and End-diastolic volume decreased by 6±2.0 ml from baseline, QOL was changed by 17.5±8 points (significant regression of symptoms), ET increased by 9±1 points. After 1 month of observation VO2 peak increased by 2.6±0.1 ml/min/kg after 6 months – 4.4 ml/min/kg. In the control group showed an increase EF 4±1,1%, End-diastolic volume decreased by 68±14,8 ml, the change of QOL 14± 7,22 points, the increase in ET at 1.5 points. Decreased VO2 peak in a month 1,05±1,2 ml/min/kg, after 6 months – 1,7 ml/min/kg. Revealed a strong positive correlation between the initial values of VO2 peak and EF (rEF=0,4, p), and between baseline levels of sodium, hemoglobin and the effectiveness of physical rehabilitation (rNa= 0,41, p,0,05; rHb = 0,45, p<0,05).. There was a positive impact of the initial content of red blood cells (rEr=0,6, p=0.03), sodium (rNa=0,4, p=0.05), LV EF (r=0.5, p=0.05) and level VE at the peak of exercise load (r=0.5.p=0.01) on training effectiveness. The level of BNP and a long history of CHF had a negative effect on the result of physical training (rBNP=-0,7, p=0.05; rCHF=-0,6, p=0.05).

Conclusion: Aerobic physical exercise in CHF patients, selected on the basis of lactate threshold achievement during the CPET, is effective in improving values of CPET, EchoCG, QOL and increasing exercise tolerance.

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Demographic, psychological and socioeconomic predictors of cardiac rehabilitation attendance, uncovering mechanisms of non-attendance among patients with low socioeconomic position

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Topic: Cardiac rehabilitation

Background: It is well documented that patients with low socioeconomic position (SEP) are less likely to participate in cardiac rehabilitation (CR), but the reason for this association is still unresolved. It is important to address these disparities since there appear to be a higher burden of disease and cardiac risk factors in groups with low socioeconomic position.

The mechanisms driving social inequality in cardiac rehabilitation attendance are unknown. Anxiety, depression, comorbidity, self-efficacy and travel time are potentially mediators of the SEP-CR association. Gender, age and cohabitation appear to be important factors for cardiac rehabilitation attendance, but evidence of their impact on the SEP-CR association is sparse.

Aim: To identify demographic, psychological and socioeconomic predictors of cardiac rehabilitation attendance and uncover mechanisms of non-attendance among patients with low socioeconomic position.

Methods: The study was designed as an observational prospective study and was part of a larger Mixed Methods study. From March 2015 till March 2016 patients admitted with acute coronary syndrome (ACS) were invited to participate in the study. Patient data (exposure) was obtained through self-administrated questionnaires and patient medical records. Four to five months post hospitalization information on cardiac rehabilitation attendance (outcome) was obtained through a closed-ended telephone interview with the patient. Data was analysed using descriptive statistics and logistic regression.

Preliminary findings: Patients who were low educated, single living, had comorbidity or had a high degree of travel time to the cardiac rehabilitation clinic were significantly less likely of attending the full cardiac rehabilitation program. The association between education and cardiac rehabilitation attendance was not affected when age, gender, cohabitation, anxiety, depression, self-efficacy, comorbidity or travel time was added to the statistical model.

Preliminary **Conclusion:** The study showed that education, cohabitation, comorbidity and travel time were predictors of cardiac rehabilitation attendance.

Further more the study showed that social inequality in cardiac rehabilitation attendance persists to be a problem. The study tried to uncover the underlying mechanisms explaining social inequality in cardiac rehabilitation attendance; however neither social differential exposure of anxiety, depression, self-efficacy, comorbidity or travel time could explain the association. Further research is required to uncover the mechanisms explaining social inequality in cardiac rehabilitation attendance.

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Findings of Ankle-Brachial-Index examinations performed on symptom-free patients after acute coronary event in our in-patient cardiac rehabilitation center

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Topic: Cardiac rehabilitation

The coincidence of cardiovascular-, peripheral artery-, and cerebrovascular diseases is very high. Despite this, patients who went through a coronary event, -surgery, or -intervention but do not have any symptom of claudication are generally not examined further. At our in-patient cardiac rehabilitation center we screened patients with ABI measurement (BOZO) who had gone through a cardiovascular event or intervention, did not have claudication, but had dyslipidemia or diabetes or were smokers (or had been smoking until the coronary event).

455 patients were screened from which in 101 cases abnormal values of ABI were found. These 101 patients were further examined by vascular surgeon. Based on the specialist consultation 32 of these 101 patients did not need further treatment but regular control. 40 cases drug treatment (cilostazol) was indicated. 29 patients went through invasive angiological examination from whom 17 patients had reconstructive surgery and 8 patients had PTA.

The average age of these 101 patients is 67.2 years, 68% of them are male, 72% of them are smokers, 65% has diabetes, and 55% are smokers and diabetic. 90% of those who had surgery are smokers and 70% of them have diabetes.

Conclusion: those high-risk patients who went through any coronary event or intervention definitely need further angiological examinations and treatment in order to prevent serious vascular complications or even amputation. After a coronary event the patients' low physical exertion covers the symptoms of peripheral artery disease therefore the screening of symptom-free patients is highly important.

The incidence of PAD of 20% among symptom-free patients is definitely higher than we expected based on international data.

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Unexpected modifications in antiplatelet therapy within the first year after an acute coronary syndrome.

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Topic: Cardiac rehabilitation

Background and **Purpose:** New antiplatelet agents such as second generation adenosine diphosphate receptor inhibitors (2G ADPri) makes antithrombotic therapy in acute coronary syndrome (ACS) more complex with a variety of possible combinations. We have limited information regarding the incidence of modification of initial therapeutic regimens and the underlying causes for it.

Methods: We retrospectively analyzed a series of patients (p.) hospitalized due to ACS during the first semester of 2015, focusing on the incidence of adverse events during follow-up defined as death, major cardiovascular event (MACE) or bleeding. We also collected and analyzed modifications in the antiplatelet treatment scheme initially not foreseen.

Results: We recruited 212 p. who underwent a one year follow-up after an ACS. 9 p. were excluded due to death during hospitalization (In-hospital mortality rate 4.3%), another 14p died during follow up (mortality at one year 10.3%). Patients were analyzed separately according to 2G ADPri treatment: 68 p.(32%) treated with 2G ADPri, mean age 61 ± 12, 94% percutaneous revascularization, 86% Drug-eluting stents, compared to 144 p. (68%) without 2G ADPri, mean age 71 ± 12, 66% percutaneous revascularization and 47% Drug-eluting stents. There were no significant differences in the incidence of death, MACE or bleeding between both groups (see table). 12 p. without 2G ADPri at discharge (8.3%) required modifications not planned initially. In the group of p. with 2G ADPri,10 unforeseen changes occurred at discharge (14.7%), driven mainly by the need for anticoagulation (4 p.) and due to bleeding (3 p.)

Conclusions: In our experience, unforeseen changes were generally rare, probably as a result of the correct selection of patients to one treatment regimen or the other. The clinical significance of these changes remains unclear.

incidence of MACE, bleedings and changes

	Without 2G ADPri (144 p., 68%)	With 2G ADPri (68 p., 32%)	p
Death	10 (6.9%)	4 (5.9%)	0.771
MACE: - Stent Thrombosis	1 (0.7%)	2 (2.9%)	0.510
-Myocardial Infartion	15 (10%)	6 (8.8%)	0.510
- Revascularization	3 (2%)	2 (3%)	0.510
- Stroke	1 (0.7%)	0	0.510
Bleeding: - Total	20 (13.9%)	7 (10.2%)	0.464
-Major (TIMI 3)	5 (3.4%)	2 (3%)	0.464
Unforseen modifications	12 (8.3%)	10 (14.7%)	0.156
Time-to-modification (days)	178 [134-281]	175 [43 - 241]	0.55

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An audit of LDL-c levels post Nurse-led Phase 1 Cardiac Rehabilitation at the University Hospital.

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Topic: Cardiac rehabilitation

Background: Cardiovascular disease (CVD) prevention is defined as a coordinated set of actions, at population level or targeted at an individual, that are aimed at eliminating or minimizing the impact of CVD and their related disabilities.

Purpose: The crucial role of dyslipidaemia, especially hypercholesterolaemia in the development of CVD is documented beyond any doubt. Most cholesterol is normally carried in low density lipoprotein (LDL) and there is a strong positive correlation between total cholesterol, LDL-c and the risk of CVD. This association applies to men and women, and to those without known CVD as well as those with established CVD. The evidence that reducing LDL-c reduces CVD risk is undeniable. For patients who undergo Percutaneous Coronary Intervention (PCI) for CVD, the cardiac rehabilitation nurses are best placed to offer advice/education in reducing cholesterol levels. The most recent meta analyses show a reduction of 26% in cardiac mortality and 20% reduction in all-cause mortality in patients who partake in a cardiac rehabilitation programme. We set out to investigate whether individualised written/verbal education by cardiac rehabilitation nurse specialists on lowering LDL-c has positive impact on patients post PCI.

Methods: All patients seen by the Cardiac Rehabilitation nurses during admission (Phase 1) from Jan 2015 – Aug 2016 were included (N = 719 patients). Routinely, all patients admitted to the cardiac department of UHL have fasting lipid profiles obtained. The patient received individualised verbal and written information on how to lower LDL-c levels by the Cardiac rehabilitation nurse in combination with a prescription for maximum tolerated dose of statin therapy. The patients are then reviewed at the nurse led PCI clinic 4-6 weeks later where the fasting profiles are repeated.

Results: A total of 719 patients were included, mean age 65 years. Indication for PCI were as follows: STEMI (n= 172), NSTEMI (n= 148), Angina (n= 321), Dyspnoea (n= 26). Syncope (n= 18), Other (n= 34). On admission, mean LDL-c was 2.5mmol/L. Patients then underwent individualised education with the cardiac rehabilitation nurses and given written dietary information & advice on lifestyle modification prior to discharge. These patients were then invited back to the nurse led PCI clinic 6 weeks post PCI where repeat fasting lipid profile was taken. Mean LDL-c post nursing intervention, in combination with statin therapy was 1.8mmol/L.

Conclusion: This audit has proven the effectiveness of individualised education for patients post PCI by the cardiac rehabilitation team. The 2016 European guidelines on cardiovascular disease prevention in clinical practice recommend an LDL-c of ≤1.8mmol/L for patients at high/very high risk for CVD and this has been proven to lower the risk of recurrent CVD events.

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Depression a factor of influence on the patients prognosis after suffering the acute coronary syndrome

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Topic: Cardiac rehabilitation

Purpouse: In treatment of the acute coronary syndrome (ACS) the key role pertains to the myocardial revascularization, that became possible due to the extensive X-operating units networks development. among patients who overcame the ACS, different levels of depression are often found, that influences either the disease's prognosis or the period of the rehabilitation. The aim of the work - find out the prevalence of the depression and its level among patients ACS depending on the chosen treatment strategy.

Methods: Questioned 125 ACS patients,aversge age (64-4,7) using questionnaires PHQ-2. On the next step 80 patients answered the questionnaire's question PHQ-9. All questioned patients were divided into two groups 1 group - patients ACS, who passed the myocardial revascularization, in all cases it was an urgent coronary angiography followed by stenting of the myocardial dependent coronary artery, n=52,average age(62,3±6,10). 2 group-(control), patients ACS, who did not passed the myocardial revascularization, n=28,average age (65,4 ±5,4).

Results: On the questionnaire's question PHQ-2 responded positively 80 of the examined (64,3%). the results of the questionnaire PHQ-9 established that 12 person(15%) have no signs of the depression, 25 patients (31,1%) diagnosed with mild subclinical depression,20 patients (25%) - depression of moderate severity,16 patients (20%) - the medium severity of depression,7 patients(8,7%)- severe depression. Among patients of the 1 group the signs of the depression are found among 40 patients (47%), male prevailed, the key factors of the anxiety-depressive changes include concomitant arterial hypertension, diabetes. Prevailed the patients with the signs of mild subclinical depression. Among the 2 group the signs of the depression are diagnosed among 27 patients (67,5%),equally among male and female. The connection between the level of the depression and suffered before myocardial infarction, angina, comorbidities is indicated. Among this group patients that had medium and severe depression prevailed.

Conclusion: Patients who suffered ACS the prevalence of the depression is 64,3%, significantly more among patients who did not overcome the myocardial revascularization. The direct connection between the sex, age, comorbidities and the level of depression is indicated.

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Smoking-related attitudes, behaviors, and cessation among patients with cardiovascular disease in Hungary

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Topic: Cardiac rehabilitation

Background: Smoking is a severe public health matter in Hungary as is the case in many other countries in Europe. Due to the impact of cardiovascular disease (CVD) on public health, smoking cessation strategies for CVD patients are increasingly important.

Purpose: The purpose of this study is to reveal different factors, such as demographics and socioeconomic status, psychological variables, and nicotine dependence that are related to persistent tobacco use. More specifically we want to identify factors that discourage CVD patients from quitting after diagnosis.

Methods: A convenient sample of 316 cardiac patients from out- and inpatient cardiological rehabilitation program in Sopron, Hungary were recruited. Participants were patients at the State Rehabilitation Institute Sopron.

Results: 54% of the CVD patients participants were current or ex smokers. The most reasons for encouraging quitting after CVD diagnosis were ' the effect of smoking on my health' 84%, followed by "my doctor tell me to stop or cut down"; 77%. Multiple regression analysis was used to test if the psychological traits significantly predicted participants' ratings of barriers to cessation, desire to quit smoking, and confidence to quit smoking after being hospitalized for a cardiovascular incident. The results of the regression for barriers to cessation indicated that the four predictors explained 14.2% of the variance ($R2=.14$, $F(4,259)=10.66$, $p<.0001$). It was found that social support significantly predicted perceived barriers ($t=-2.53$, $p=0.0121$), as emotional well-being ($t=-2.21$, $p=0.0280$), as work stress ($t=3.01$, $p=0.0029$), as household stress ($t=2.55$, $p=0.0114$). Barriers are predicted by the four traits however, social support is the main predictor for confidence and desire to quit. Thus, would be the main channel to intervene to support cessation interventions for such groups.

Conclusion: Although many legislative efforts were made lately in Hungary in the right direction, there is a need for more effective smoking cessation programs to maintain and promote high risk patients' motivation to quit smoking.

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Exercised - based cardiac rehabilitation in myocardial infarction with non-obstructive coronary arteries (MINOCA): Should we pay attention?

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Topic: Cardiac rehabilitation

Myocardial infarction with non-obstructive coronary arteries (MINOCA) is a puzzling clinical entity with no previous evaluation of the literature. Type 2 Myocardial Infarction (T2MI) according to The Third Universal Definition of Myocardial Infarction (MI) consensus document is diagnosed in instances in which a supply/demand imbalance leads to myocardial injury with necrosis that is not caused by ACS, including arrhythmias, aortic dissection, severe aortic valve disease, hypertrophic cardiomyopathy, shock, respiratory failure, severe anemia, hypertension with or without left ventricular hypertrophy, coronary spasm, coronary embolism or vasculitis, and coronary endothelial dysfunction without significant coronary artery disease. Despite its incidence and association with worse outcomes there are no guidelines addressing the acute or long-term management of this entity. We aimed to investigate frequency of previous T2MI in patients referred to our three weeks in house cardiac rehabilitation program after myocardial infarction and its outcome.

Patients and Methods: Medical records from Cardiac rehabilitation Department, Institute for Rehabilitation were screened for patients with previous MINOCA. Medical data of the identified cases was retrieved and reviewed.

Results: Out of 2006 patient referred to our center during year 2015 and 2016. Previous MINOCA - T2MI was detected in only two females and one male. Coronary spasm was underlying cause of cardiac troponin arise and ECG changes in acute event. Exercise test was performed on admission and exercise based cardiac rehabilitation program was tailored. One to two treatment sessions per day were given by a physiotherapist seven days a week. No rhythm disorders or ST segment changes were detected by telemetry while crossing over Nyllin steps, cycling or free walking. Patients fulfilled cardiac rehabilitation program without any complications.

Conclusions: Patients with previous MINOCA - T2MI are rarely referred to exercise based cardiac rehabilitation program which could be of great importance if underlying etiology is coronary vasospasm. With high sensitivity cardiac tropnin assays approved for clinical use, supply/ demand (type 2) myocardial infarction will be detected more frequently. Further efforts are required to set up guidelines for long term management and cardiac rehabilitation might have important role.

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Usefulness of exercised-based cardiac rehabilitation patients with left ventricle systolic dysfunction

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Topic: Cardiac rehabilitation

Left ventricle systolic dysfunction is highly prevalent in myocardial infarction survivors and is a major cause of morbidity, mortality an re- hospitalizations Cardiac rehabilitation (CR) exercise training and chronic heart failre (CHF) self-care counseling have each been shown to improve clinical status and clinical outcomes in CHF.The aim of this study was to evaluate the usefulness of exercise based in house cardiac rehabilitation in patients with left ventricle dysfunction after myocardial infarction

Patients and Methods: Out of 2054 patients who were admitted to our three weeks in- hospital rehabilitation program, we analyze a total of 207 patients who were admitted early after coronary revascularization (percutaneus coronary interventions or coronary bypass surgery) with ejection fraction below 40%. The majority of patients were males (61%). The oldest patient was 85 years of age. Ejection fraction below 25% was detected in 442%. We noted risk factors and co morbidities. Patients were selected for exercise training after six minute walking test (82%) or cardiopulmonary exercise test. After 3 weeks in hospital cardiac rehabilitation the patients were re-tested.

Results: The major comorbidities in our patient population were as follows: diabetes, hypertension and previous stroke. Six minutes walking test was performed and the total distance walked ranged from 180 to 380 meters and the beginning of the program. Patient had 7 -days a week training program. After the 3 weeks in hospital exercise rehabilitation the improvement in the test was ~35%. Cardiopulmonary test showed also improvement of functional capacity. We noted several rhythm disturbance complications by telemetry (VT, VES, SVES, and new on set of AF) and when needed the amiodaron or beta blockers were added. Also we noted silent ischemia in 15% after CABG with ST segment depression detected by telemetry. None had acutisation of chronic heart failure (with peripheral edema and congestion). All patients fulfilled cardiac rehabilitation program.

Conclusions: The study showed usefulness and safety of exercised –based in-hospital cardiac rehabilitation program. Supervised multidisciplinary cardiac rehabilitation program, including an individualized exercise component is safe and can improve functional status and exercise tolerance in patient with left ventricle dysfunction after myocardial infarction

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Exercise-based cardiac rehabilitation programs improve ecocardiographic variables associated with cardiac structure and function

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Topic: Cardiac rehabilitation

Introduction: Cardiac rehabilitation (CR) programs play an important role in patient recovery. Exercise-based aerobic training protocols and professional-guided behavioural changes promote a healthy lifestyle and improve cardiovascular risk factors. All these interventions significantly reduce cardiac mortality, relieve symptom and improve exercise tolerance leading to an early and safe return to daily and working activities. The purpose of this study was to assess whether all these clinical benefits may be related to cardiac function and structure changes during CR.

Materials and Methods: We studied 66 patients (58±9 years, 86% men) who prospectively completed our institutional CR from September 2015 to August 2016. Demographic, clinical, biochemical and ecocardiographic variables were recorded at study entry and following the standard phase-II CR program.

Results are presented as mean±SD for continuous variables and as percentages for categorical data. Comparisons between continuous variables were analyzed using the unpaired t-test and Wilcoxon test, as appropriate. Differences were considered to be statistically significant if the null hypothesis could be rejected with >95% confidence. The SPSS 20.0 statistical software package was used for all calculations.

Results: Ischemic heart disease was present in 88% of patients, 47% had hypertension, 61% dyslipidemia, 20% type-II diabetes mellitus and 46% were active smokers. According to AACVPR criteria, 6% of patients had a high risk and 44% had an intermediate risk. At baseline, 33% of patients had a LVEF <0,50 and 55% had a NYHA functional class II-III.

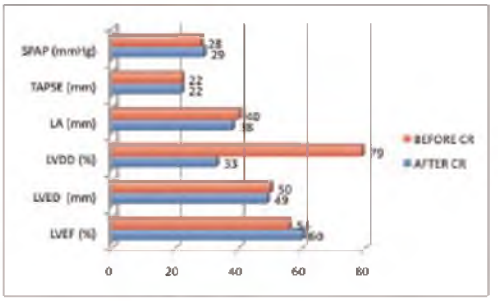
Conclusions: CR program is associated with significant improvements in LVEF and lower LVED and LA diameters. It is also associated with significant reduction in systolic PAP and better LV diastolic function. This cardiac function and structure improvements may play a role in the significant clinical and prognostic benefits shown by CR programs.

Ecocardiographic variables in CR.

	PRE-CR	POST-CR	p
LVEF (%)	56±8	60±7	<0,001
LVED diameter (mm)	50±5	49±4	0,02
LV diastolic dysfunction (%)	79	33	<0,01
LA diameter (mm)	40±6	38±6	0,01
TAPSE (mm)	22±3	22±3	0,3
Systolic PAP (mmHg)	29±6	28±5	0,008

LA: Left atrium. LV: Left ventricle. LVED: Left ventricular end-diastolic. LVEF: Left ventricular ejection fraction. PAP: Pulmonary artery pressure. TAPSE: Tricuspid annulus plane systolic excursion. LVDD: LV diastolic dysfunction.

Ecocardiographic variables in CR



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Effect of Trimethylhydrazinium propionate (Meldonium) on sexual activity in patients with coronary artery disease.

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Topic: Cardiac rehabilitation

The problem of sexual activity (SA) in men with coronary artery disease (CAD) associated with erectile dysfunction (ED), up on epidemiological data from 44 to 65% of cases the common clinical practice. At the same time it has been shown that patients with ED have a correlation between the coronary artery disease and the violations of blood flow in the penile arteries.

Objective: to estimate the effect of Trimethylhydrazinium propionate (Meldonium) on tolerance physical stress due to SA in patients with CAD.

Results: We examined 40 men with CAD and ED - aged 37 - 59 years old. These patients had a diagnosis of stable angina II - III FC, and 1 and 2, the level of risk at Princeton classification. This patients had monitoring of electrocardiogram (ECG) and blood pressure during wakefulness, including episodes of SA without medical support, and on the background of Trimethylhydrazinium propionate (Meldonium) 3 week course of treatmentl. For analyze the quality of sexual life questionnaire was used "LIEF". A positive result was considered an effective SA based on the questionnaire of patients. On the background of Trimethylhydrazinium propionate (Meldonium) during the SA we recorded significantly smaller increase in heart rate and blood pressure (systolic and diastolic) and the manifestations of ischemia. Improved sexual activity indicated 63% of patients.

Conclusions: The use of Trimethylhydrazinium propionate (Meldonium) in patients with CAD and ED indicate the significant increase tolerance to the physical coital stress.

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Cardiac rehabilitation in patients with coronary artery disease

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Topic: Cardiac rehabilitation

Introduction: In order to achieve healthier lifestyles, more effective risk factor management and adherence with medications, patients require comprehensive prevention and rehabilitation programmes. There is compelling scientific evidence that secondary prevention and cardiac rehabilitation are effective services for patients with coronary artery disease.

Purpose: The aim of this study is to analyse the cardiac rehabilitation carried out on Bulgarian patients with coronary artery disease.

Methods: We analyse the data from Bulgarian cohort of patients with coronary artery disease included in both surveys EUROASPIRE (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) III and IV, held in 2007 and 2013. The protocols of EUROASPIRE III and IV trials comprise standard questionnaires used by all countries to determine the patient health status.

Results: 71.3% of the patients in EUROASPIRE III (72.4% of men and 68.7% of women) are advised to participate in a cardiac rehabilitation programme after hospitalization. 22.2% of patients, which is recommended, attend at least half of the rehabilitation sessions. Only 15.4% of all patients in the cohort attended at least half of the sessions (16.4% of men and 12.3% of women).

Of the coronary patients in EUROASPIRE IV 20.0% are advised to participate in a cardiac rehabilitation programme (22.4% of men and 14.3% of women) and 66.7% of those advised attended at least one-half of the sessions (68.4% of men and 60.0% of women). Only 13.3% of all patients from the cohort attend at least half of the sessions (15.3% of men and 8.6% of women).

Conclusions: Only a small number of patients with coronary artery disease are able to access cardiac rehabilitation programmes in Bulgaria. All patients with coronary artery disease would benefit from access to comprehensive cardiovascular prevention and rehabilitation programmes. The cardiac rehabilitation in Bulgaria continues to be widely underused. Only about 1 of 7 patients with coronary artery disease benefits from cardiac rehabilitation.

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Dealing with cardiovascular risk factors - are we there yet?

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Topic: Cardiac rehabilitation

Introduction: Optimising cardiovascular (CV) risk factors helps improve prognosis and quality of life in the patients with CV disease. Studies have shown that patients who adhere to CR programs have a lower mortality and readmission rate. Helping patients manage their CV risk profile is one of the main aims of an effective CR program.

Aim: To assess whether patients attending the local CR program had better CV risk factor control at the end of the CR program (defined as an attendance of 6 or more exercise sessions).

Methods: Relevant demographic and clinical data at enrollment and at the end of the CR program was collected by the CR team. All patients who successful completed the CR program in 2015 were included. Descriptive and statistical analysis was performed using Microsoft Excel©.

Results: The CR program in 2015 had a total of 147 patients who successfully completed the program, defined as an attendance rate of more than 50% of the exercise sessions (6 out of 12). There was a marked improvement in some CV risk factors when comparing values at baseline and following program completion, including LDL (4.16mmol/L vs 2.07mmol/L [p<0.001]), Triglycerides (1.41mmol/L vs 1.23mmol/L [p=0.031]) and fasting blood glucose [FBG] (6.98mmol/L vs 6.27mmol/L [p-0.009]).

Systolic blood pressure [SBP] (131.28mmHg vs 128.15mmHg [p=0.08]) and waist circumference [WC] (101.74cm vs 99.94cm, [p=0.099]) were borderline significant. Diastolic blood pressure (73.97mmHg vs 74.1mmHg, [p=0.462]), HbA1c (6.34% vs 6.40%, [p=0.391]), weight (80.77kg vs 79.68kg, [p=0.259]) and total cholesterol (4.42mmol/L vs 4.53mmol/L [p=0.434] were not significant. Smoking in contrast seemed to be more prevalent (p<0.001), with 5 ex-smokers restarting to smoke and only 2 smokers quitting by the end of the CR program.

Conclusion: LDL, Triglycerides and FBG were statistically better at the end of the program. Smoking, waist circumference and body weight however failed to improve. This clearly illustrates the need for an in-house smoking cessation and weight reduction program, in contrast to community based programs as is currently the case.

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Comparation between functional capacity and exercise results in patients who underwent phase ii cardiac rehabilitation program after coronary artery bypass graft surgery and valve surgery at national

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Topic: Cardiac rehabilitation

Introduction: Coronary artery bypass grafting (CABG) is one of effective and established treatments for clinically significant coronary artery disease (CAD). Meanwhile, surgery is still the most established treatment in valvular heart disease. The functional capacity of the patients who underwent CABG and valve surgery is still one of most important thing to predict outcome after surgery. We have evaluated the functional capacity those patients with 6 minute walk test (6MWT) pre discharge.

Background: The objective of this study was evaluated and compare between functional capacity and exercise results in post CABG surgery and valvular surgery patients.

Methods: 243 patients post CABG surgery and 75 patients post valvular surgery sent to our rehabilitation unit in National Cardiovascular Centre, to attend functional capacity pre test discharge, from December 2014 until May 2015. This study was retrospective descriptive. We analyzed the distance of 6MWT, and left ventricle ejection fraction. Then, we categorized our sample in two group each type of surgery procedure. The patient with LVEF $\leq$ 40% (n=45) and patients with LVEF $\geq$ 40% (n = 198) in post CABG surgery. In patients with valvular surgery LVEF $\leq$ 40%(n= 20) and LVEF $\geq$ 40% (n = 55).

Results: All of the 243 patients post CABG surgery, the mean age was 58.27 $\pm$ 7.844 years old (35 – 80), the mean of LVEF was 52.33 $\pm$ 14.566%, the 6MWT distance average 249.44 $\pm$69.589 meters (60-485). In post valvular surgery, the mean age was 34.28 $\pm$ 5.847 years old (24 – 43), the mean of LVEF was 54.35 $\pm$ 6.738 %, the distance average 290.59 $\pm$ 53.765 meters. Patients with good ejection fraction in post valvular surgery could have increased of functional capacity and distance.

Conclusion: Aerobic functional capacity patients was higher in patients post valvular surgery with high ejection fraction.

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Effects of a short program of relaxation therapy on anxiety level in patients with chronic coronary artery disease

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Topic: Cardiac rehabilitation

Purpose: anxiety (A) can affect the onset of symptoms, quality of life and outcome in patients (P) with coronary artery disease (CAD). Known are the beneficial effects of the Relaxation Therapy (RT) after an acute coronary syndrome (ACS), coronary artery bypass grafting or coronary angioplasty. Aim of this preliminary investigation was to assess both the level of A in P with chronic CAD, both the effectiveness of a short program of RT in reducing it.

Methods: 16 patients, average age of 69.7 years, without a diagnosis of psychological disorder, participated in a program of RT of four meeting lasting one hour each, every week. As an evaluation tool was used the Hamilton Anxiety Scale (HAS) created to assess the somatic and psychic A with a score between 0 and 56. The test, administered before and after completing the program, consists of 14 items each rated with a 5-point scale from none to very severe. A value above 17 is considered pathological. All P were clinically stable and the ACS occurred 12-24 months before.

Results: the results of the HAS are reported in the table below. The anxiety level was moderate to severe. In all the P was documented a statistically significant reduction of the score that, after the RT, reached normal-mild level.

Conclusions: A can remain high even at a distance from an ACS. An short-time (4 weeks) supervised relaxation practice can have a positive effect to reduce the level of A. RT must be part of the psychological intervention, that is an essential ingredient of cardiac rehabilitation, in addition to physical exercise and tailored drug therapy. Moreover can optimized the psycho-educational intervention. Is desirable that the RT is carried out not only near the stressful acute event, but also repeated at distance, although in short-time program.

HAMILTON ANXIETY SCALE n 16 p		
Pre	Post	p
25±10.36	14±6.73	<.001

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The effectiveness of the second stage rehabilitation of patients who implanted cardic pacemaker

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Topic: Cardiac rehabilitation

Objective: to evaluate the effectiveness of the measures for the rehabilitation of patients with an implanted cardic pacemaker.

Materials-Methods: Study sample was 205 patients (M-78, W-127, 75.5±15.2 y/o) after electrocardiostimulator implantation. Subjects were randomly assigned to either a group with special programme for the rehabilitation (SAPR) (n = 100), who received specialized aerobic physical training with Ergoline system, or to a control group (CG) (n = 105), who received standard care. During exercise CG the HR should not be higher than 80 times p/min. Patients with severe cardiopulmonary disease or who were unable to perform a maximal stress test were not selected. The primary outcome measure with respect to effectiveness was the 6-minute walk test (6MWT).

Results: the most part of patiens were implanted type DDDR ECS (75.1%) for high degree atrioventricular (AV) block and chronotropic incompetence due to either sick sinus syndrome or atrial fibrillation with slow ventricular response. They come to second stage rehabilithation average of 5 days. At the end of rehabilitation period all subjects showed an increase of physical capacity, but in SAPR group it was better. In the SAPR group walked longer distances (205.8 vs 343.7 m) by 6MWT at the end rehab. In bouth groups the most that have occurred for these risk factors such hypertension (90%), dyslipidemia (50.3%), immobility (55.3%). More than 87 percent of the patients have two and more adjacent diseases.

Conclusion: intensive aerobic training is more effective measure of rehabilitation, than standart training in order to improve exercise tolerance in patients with an implanted cardic pacemaker. This study is planing to continue to include patients in long-term training assessment.

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UK outpatient community based cardiac rehabilitation: fit for purpose?

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Topic: Cardiac rehabilitation

Background: Cardiac Rehabilitation (CR) has recently been reported to have smaller than expected effects on cardiovascular mortality and no effect on all-cause mortality (Anderson et al 2016: JACC 67: 1). This is unexpected considering the positive effects exercise can have on a plethora of prognostic markers in patients. In the UK standard practice is a 6 week programme of biweekly exercise with both "cardiovascular and strength training components", performing exercise in circuits at 40-70% of heart rate reserve (HRR). This approach may not provide a sufficient stimulus to evoke adaptations necessary for long-term improvements in health outcomes for CR patients.

Purpose: This study aimed to 1) characterise the exercise stimulus presented by phase III UK community-based outpatient CR and 2) evaluate the factors influencing changes observed in the incremental shuttle walk test (ISWT) following completion of the programme.

Methods: 35 patients (28 M/7 F aged 33-83) were recruited following referral to phase III CR within Leeds Community Healthcare NHS Trust subsequent to MI, PCI or CABG. Heart failure or valvular disease was excluded. Patients underwent an ISWT, during which heart rate (HR) and Ratings of Perceived Exertion (RPE 1-10) were monitored at each stage, prior to and following the completion of the programme. 62 rehabilitation sessions were characterised for continuous in-exercise HR. Data were analysed using Spearman or Chi-squared analyses for associations, and Wilcoxon signed rank or Kruskal-Wallis tests for changes in key variables pre-post or between terciles of the CR programme.

Results: Patients spent on average 2.01 ± 3.44, 0.78 ± 2.44 and 0.80 ± 3.40 min of each 28 min session at 60-69, 70-79 and >80 % HRR, respectively. These durations did not change between terciles of the CR programme (60-69% HRR p = 0.520 70-79% HRR p = 0.318 and >80% HRR p = 0.209). ISWT distance (436m ± 138 vs 670 m ± 250 p<0.001), and RPE (3.4 ± 0.7 vs 4.1 ± 0.7 p<0.001) and HR (103 ± 9 vs 115 ± 17 p<0.001) at ISWT completion increased significantly post CR. The change in distance was correlated with baseline ISWT distance (r = 0.608, p<0.001), with a greater change being associated with spending any time exercising > 60% HRR ($\chi 2 = 4.6$ p = 0.032). Only 40% of CR sessions included any time above this threshold. No significant relationships were observed between changes in ISWT distance and sex, time since cardiac event, presence of diabetes, hypertension or type of cardiac event (p<0.05).

Conclusion: Patients undergoing CR in the UK may not accumulate sufficient exercise time above 60% HRR in individual sessions or across the programme to drive health gain. It appears that improvements in ISWT distance over the programme are largely dependent upon patients' baseline ability and/or their achievement in reaching exercise HRs >60% HRR. Strategies to increase the dose and progression of time above 60% HRR are needed to enhance the effectiveness of UK CR.

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Personalized program of cardiac rehabilitation of patients with arterial hypertension

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Topic: Cardiac rehabilitation

Purpose: to develop personalized program of cardiac rehabilitation of patients with l hypertension based on pathophysiological mechanisms of blood pressure regulation and to estimate its medical and social and economic efficiency.

Methods: 113 patients with the hypertension aged from 31 up to 65 years (on average 45,9±1,0 year), not having any documented atherosclerosis, any other clinically significant diseases. We defined levels of serotonin, hydrocortisone, endothelin, adrenaline, noradrenaline/ We analyzed data of Hospital Anxiety and Depression Scale (HADS) and Zung questionaire, rheoencephalography, spiro bicycle ergometry test (spiroBET), treadmill-test, echocardiography (EcoCG), daily blood pressure monitoring.

Results: Developed program of cardiac rehabilitation included physical bicycle or treadmill trainings and personalized medical treatment. Type of the training load depended on individual character of blood circulatory system reaction either on spiroBET or treadmill-test. The main principe of the training loading selection – taking into the account individual level of power when anaerobic threshold was reached. Doses of anti-hypertensive drugs differentiated depending on reaction of parameters of a hemodynamics before physical trainings and blood pressure monitoring data. Under the influence of the developed program of rehabilitation at persons with hypertension improvement of the psychoemotional status (bicycle trainings improved of depression, trainings on the treadmill promote improved level of anxiety). We established also improvement of a cerebral blood flow, tolerance to physical loading of both types, decrease of negative myocardial remodeling, improvement of systolic and diastolic function of a left ventricle according to EcoCG. In the absence of cardiac rehabilitation and physical trainings signs of target organs damage appeared in the most part of hypertensive patients within 6 months. Developed program of cardiac rehabilitation promotes decreasing of direct and indirect costs by treatment of hypertensive patients due to decrease of need for hospitalization, decrease of number of cases of a temporary invalidity, expenses on drug treatment becomes perceptible (on 108,2 US dollars on each treated patient in a month).

Conclusion: cardiac rehabilitation based on individual tolerance to different types to physical loading and personal reaction on antihypertensive drugs contributed not only improvement of blood circulatory system status but significant decreasing of direct and indirect costs by treatment of hypertensive patients.

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The possibility of reaching individual rehabilitation goals for patients with acute coronary syndrome in the cardiac rehabilitation

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Topic: Cardiac rehabilitation

Objective: to determine the possibility of reaching individual rehabilitation goals for patients with acute coronary syndrome (ACS) in the cardiac rehabilitation and to identify the adverse factors, which prevent their achievement.

Materials and methods. Study sample consists of 103 patients, 72 men and 31 women, aged from 44 to 80 years, exposed to a three-week rehabilitation clinic TMGI after ACS. Members of the multidisciplinary team formulated objectives and assigned an individual rehabilitation program for each enrolled patient.

Results: The reduction of pain syndrome took place for 96% of patients. The absence of positive dynamics of pain was observed for only 2 patients with high levels of anxiety and depression according to the Hospital Anxiety and Depression Scale. Almost 100% of patients got an improvement and stabilization of blood pressure. For 22% of patients with clinical signs of angina pectoris the goal was to alleviate symptoms of coronary artery disease, for 78% the goal was to stabilize their physical conditions. This goal was achieved in 59% of patients. Planned increase of tolerance for physical exercises was not obtained for 21 people. The most frequent co-morbid diseases in this group were metabolic syndrome, diabetes, chronic heart failure, which seem to limit the intensity of physical training. The target of "reduction of the functional class of heart failure" was achieved in 91% of cases. From the total number of patients who have not reached the planned target 83% had de-compensated heart failure. Improvements and stabilization of normal lipid profile did not occur for 14 people; all of them had the metabolic syndrome and 22% of them suffered from type 2 diabetes. Reducing and maintaining normal blood sugar index values could not be achieved for 17% of patients with metabolic syndrome, 67% of them had type 2 diabetes. In the process of rehabilitation there was a significant improvement of quality of life measured according to the EQ-5D health questionnaire. At the same time the quality of life correlated inversely with angina and depression levels. According to the Seattle Angina Questionnaire patients the quality of life index was lower for elderly patients and patients with higher levels of anxiety and depression. Satisfaction with treatment had the direct positive correlation with the distance covered during the six-minute walking test, and the negative correlation with angina functional class. This shows that it is the exercise tolerance, which determined the level of satisfaction with the ongoing rehabilitation activities.

Conclusions: The likelihood of achieving the objectives of rehabilitation varies with individual clinical and functional parameters and depends on the presence of co-morbid diseases and on patients' commitment to conducted rehabilitation measures. When aiming rehabilitation one must take into account co-morbid disease and conditions limiting rehabilitation abilities.

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Effects of exercise-based cardiac rehabilitation programs on cardiovascular risk factors and exercise tolerance

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Topic: Cardiac rehabilitation

Introduction: Cardiac rehabilitation programs(CR) play an important role in patient recovery by using behavioural strategies to promote healthy lifestyle changes. We sought to assess the magnitude of cardiovascular risk factors (CRF) and exercise tolerance modification during a CR.

Methods: We studied 66 patients (58±9 years, 86% men) who prospectively completed our institutional CR program from September2015 to August2016. Clinical, biochemical and aerobic training variables were recorded at study entry and following the phase-II CR. Results are presented as mean±SD for continuous variables and comparisons with paired T-test. Statistical significance for a P<0,05. SPSS 20.0 statistical software.

Results: Ischemic heart disease in 88% of patients, 47% hypertension, 61% dyslipidemia, 20% type-II diabetes mellitus and 46% active smokers. 6% of patients had a high risk and 44% had an intermediate risk. At baseline, 33% of patients had a LVEF <50% and 55% NYHA class II-III.

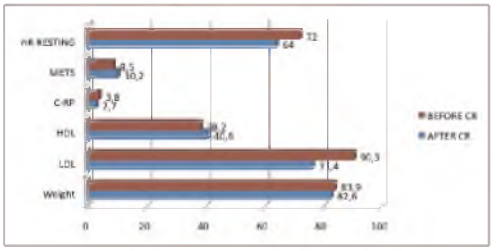
Conclusions: Exercise-based CR program has shown to significantly improve patients functional capacity and exercise tolerance, with a lower heart rate at rest and a lower blood pressure both at rest and after exercise. CR is also associated with significant improvements in CRF, such as weight, BMI and lipid profile.

Cardiovascular risk factors evolution

	PRE-CR	POST-CR	p
Weight (Kg)	83,9	82,6	<0,001
Body mass index (BMI)	28,9	28,5	<0,001
Abdominal circumference (cm)	102	100	<0,001
Systolic blood pressure at rest (mmHg)	125	112	0,003
Systolic blood pressure at peak exercise (mmHg)	163	157	0,008
Diastolic blood pressure at rest (mmHg)	76	71	<0,001
Diastolic blood pressure at peak exercise (mmHg)	82	77	<0,001
Resting heart rate (beats per minute)	72	64	<0,001
Heart rate at peak exercise (beats per minute)	131	129	0,4
Functional capacity (MET)	8,5	10,2	<0,001
Watios tolerated with the cycle ergometer	53	83	<0,001
Recovery time (beats in the first minute)	14,9	18,7	<0,001
LDL cholesterol (mg/dl)	90,3	76,4	0,002
HDL cholesterol (mg/dl)	38,2	40,6	0,01
Glycated haemoglobin (%)	6,1	6,3	0,6
C-Reactive protein (mg/l)	3,8	2,7	0,09

Abstract number:491

Cardiovascular risk factors evolution



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Effects of cardiac rehabilitation in ischemic heart disease: focus on diabetics patients

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Topic: Cardiac rehabilitation

Introduction: Cardiac rehabilitation (CR) is one of the techniques used in the area of Cardiology for the treatment and recovery of every aspect of ischemic heart disease: acute coronary syndrome, angina or its complications such as heart failure or decreased functional capacity. It is performed in three major therapeutic areas: continuous cardiac care; recovery of functional capacity through exercise; counseling and information about the disease.

Objectives: Increasing number of patients are included in CR programs every year. Various goals of the CR therapy are well known: the improvement of survival, functional capacity, quality of life and level of information. However, some types of patients such as women, elderly or diabetics are poorly represented. The aim of this study is to determine the results of the CR in diabetics patients (DM).

Materials and Methods: We performed a retrospective multi-center study comparing the characteristics and goals of CR in patients diagnosed with non-ST-segment elevation myocardial infarction between 2006-2012, dividing the sample in DM and non-DM.

The standard CR program is structured in 5 different parts: a first revision with the Cardiologist, exercise sessions 3 times a week, 8 information and counseling sessions, blood tests and in the end medical consultation discharge by the Cardiologist (when risk factors are controlled).

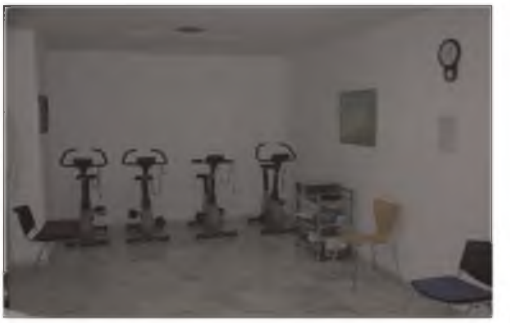
The following variables were measured before and after the CR program: risk factors; type and location of myocardial infarction; myocardium scan with Thallium and existence of ischemia; pharmacological treatment; functional capacity in METS; exercise time; ventricular systolic function by echocardiography; and cardiovascular events.

Results: The median age was 55.4 (39-75) years, 80% male. There were no basal differences between the DM and non-DM group. During the three-month duration of the CR program, we observed an increased in the functional capacity measured in test Bruce, both in time of exercise and METS achieved. This increase was significant in both groups: exercise time was 427 versus 491 seconds before and after CR ($p<0.005$) for non-DM and 362 versus 422 ($p=0.02$) in DM; functional capacity was 8.32 versus 9.16 METS before and after CR ($p<0.005$) in non-DM and 7.13 versus 7.75 in DM ($p=0.03$). Comparing both groups there are no differences in the collected variables, except for the lower basal functional capacity and exercise time in diabetics patients. Cardiovascular events did not appear, besides an hypoglycemic episode.

Conclusion: Diabetic patients can follow a RC program without complications and higher risk of cardiovascular events. Although the lower basal functional capacity, diabetics patients improve their METS and exercise time during the RC program, as well as the non-diabetics patients. As a final conclusion, RC is an important treatment in diabetics patients.

Abstract number:492

Cardiac Rehabilitation gym



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Efficacy evaluation of the outpatient rehabilitation program in patients with non-st-segment elevation myocardial infarction after percutaneous coronary intervention by holter monitoring

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Topic: Cardiac rehabilitation

Introduction: Percutaneous coronary intervention (PCI) is fast becoming a key instrument in revascularization patients with non-ST-segment elevation myocardial infarction (NSTEMI). However, there are still no outpatient clinical guidelines for those patients.

Purpose: The aim of this study is to evaluate efficacy of the outpatient rehabilitation program in patients with non-ST-segment elevation myocardial infarction (NSTEMI) by Holter monitoring.

Methods: Thirty five patients with NSTEMI after PCI with uncomplicated postoperative period (mean age=57.9±9.7 years) were recruited for this prospective study. All patients were involved in 3-month rehabilitation program in National Research Center for Preventive Medicine of the Ministry of Healthcare of the Russian Federation. Rehabilitation program consisting of 15-minutes stretching exercise and the following mechanotherapy (bicycle exercise and/or tredmill) for 3 times per week was used. The following mechanotherapy program was used: 25% functional threshold power for 3 minutes; 50-60% functional threshold power for 30 minutes; 30% functional threshold power for 5 minutes. Heart rate (HR), maximum HR (HR max), minimum HR (HR min), the amount of aurical and ventrical extrasystoles were evaluated before and after rehabilitation program by Holter monitoring.
Results: After the rehabilitation program there were a significant decrease in HR (from 70,7 ±11,8 to 67,4±7,3; P<0,001), HR min (from 50,1±8,0 to 47,2±7,3; P<0,001), HR max (from 114,3±20,2 to 109,3±13,2; P<0,001). There were no significant differences between the amount of aurical and ventrical extrasystoles, however there was a trend to their decrease after the rehabilitation program.
Conclusion
Our rehabilitation program in patients with NSTEMI after PCI leads to decrease in HR, HR min, HR max. There are no significant differences between the amount of aurical and ventrical extrasystoles, however there is a trend to their decrease after the rehabilitation program.

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The prognostic value of the peak oxygen uptake in patients with Chagas heart disease without functional impairment

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Topic: Exercise testing

Background: In Chagas heart disease (CHD), much attention has been given to the prognostic meaning of peak oxygen uptake (VO2peak) in patients with reduced functional capacity. However, targeting preventive action, the ability of VO2peak in survival prediction of patients without functional impairment should be investigated.
Objective: To verify the prognostic value of VO2peak in patients with CHD without functional impairment.
Methods: Sixty-three CHD patients (47.5±8.2 years, NYHA I-II) without functional impairment were evaluated by echocardiogram, Cardiopulmonary Exercise Testing and Six-minute Walk Test (6MWT) and followed for investigation of cardiovascular events. The functional impairment was defined according to Weber's criteria (VO2peak < 20 mL.kg.min). Statistical analysis was performed by ROC curve, Kaplan-Meier curve and uni and multivariate Cox regression.
Results: After a follow-up period of 42±12 months, 11 patients (17%) had cardiac death. The area under the ROC curve to predict survival by VO2peak in CHD patients without functional impairment was 0.74 (CI 95%: 0.547-0.938). The optimal cut point value was the VO2peak less than 31.4 mL.kg.min, with sensitivity and specificity of 72.7% and 73.1%, respectively. By Kaplan-Meier curve, patients with VO2peak less than 31.4 mL.kg.min had a higher probability of cardiac death after follow-up (log Rank test p=0.006). In the univariate Cox analysis, VO2peak less than 31.4 mL.kg.min and left ventricular ejection fraction (LVEF) were associated with survival (p=0.014 and p=0.002, respectively), but not age, gender, NYHA functional class, distance walked in the 6MWT, left ventricular end-diastolic diameter and E/e' ratio. In multivariate analysis, VO2peak (RR: 3.4, 95% CI: 1.4 to 6.3, <0.001) and LVEF (RR: 0.9, 95% CI: 0.8 to 0.9, p<0.001) remained as independent predictors of cardiac death in those.
Conclusion: The VO2peak was as independent predictor of cardiac death in CHD in patients without functional impairment. Our findings reinforce the need for periodic evaluation of the functional capacity of CHD patients even without functional changes.

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Oxygen pulse trajectory in patients with suspected coronary artery disease; does it reveal exercise-induced myocardial ischemia?

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Topic: Exercise testing

Background: The oxygen pulse is a parameter of cardiopulmonary exercise testing which provides an estimate of left ventricular stroke volume during exercise. With normal coronary arteries, the oxygen pulse increases with incremental exercise, reflecting the rise in stroke volume and oxygen extraction. Abnormal myocardial contractions due to coronary artery disease (CAD) are likely to be associated with hemodynamic changes such as decreased stroke volume and change in oxygen pulse response during exercise.
Purpose: The aim of the present study is to evaluate the oxygen pulse trajectory in patients with and without coronary artery disease as detected by coronary angiography.
Methods: In this study, 40 men (mean age 57.23±11.09 years) with suggestive symptoms of CAD were evaluated with incremental cardiopulmonary exercise testing, followed by coronary angiography as the gold standard for diagnosing CAD.
Results: Peak oxygen pulse, oxygen pulse flattening duration and oxygen pulse reserve were not significantly different in patients with and without CAD. Time to flattening of oxygen pulse – calculated from the time of start of the test to the point where oxygen pulse flattening occurred – was significantly lower in patients with a positive angiogram compared with a negative angiogram (179±66 vs 245±75 second, respectively; p=0.03).
Conclusion: This study has indicated that time to flattening of oxygen pulse tended to be lower in patients with CAD compared with normal coronary subjects. The response of oxygen pulse to incremental exercise with particular attention to time to flattening of oxygen pulse may improve the specificity of standard exercise stress testing in patients with suspected CAD.

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Functional outcome in contemporary children with total cavopulmonary connection: motor competence, exercise capacity and health-related quality of life

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Topic: Exercise testing

Purpose: Studies have shown that children and adolescents with an univentricular heart after total cavopulmonary connection (TCPC) have functional impairments. This study investigates contemporary children with TCPC in terms of current motor development, exercise capacity and health-related quality of life (HRQoL).
Methods: Between June 2014 and October 2016 a total of 79 patients with TCPC (11.9 ± 3.2 years, 28% female) performed a motoric test including five tasks for strength and flexibility during their routine follow-up. They also underwent a symptom limited cardio-pulmonary exercise test and filled in a HRQoL questionnaire (KINDL-R). Patients' data were compared with a recent healthy sample (n=1651, 12.6 ± 2.4 years, 49% female).
Results: Multivariable regressions corrected for sex, age and BMI showed that TCPC achieved 10.6 repetitions of curl-ups (p<.001) and 2.9 push-ups (p=.008) less than healthy counterparts. Moreover they had impairments in trunk (-9.0 cm; p<.001), shoulder (-7.2 cm; p<.001) and lower limb flexibility (-4.9 cm; p<.001). Moreover peak oxygen uptake was reduced to 34.8 ± 7.5 ml/min/kg and 77.7% compared to peers (p<.001) respectively. Ventilatory efficiency was also impaired (Healthy: 27.5 ± 2.9 vs. TCPC: 31.6 ± 3.3; p<.001). HRQoL did not differ significantly (p=.184).
Conclusions: Patients with TCPC still present impaired motor development and exercise capacity whereas HRQoL is similar to healthy peers. Since low motor development may yield to worse exercise capacity early screening for motor development is recommended and needs to be treated if necessary.

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N-terminal pro-brain natriuretic peptide is an independent predictor of exercise performance in stable patients after myocardial infarction

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Topic: Exercise testing

Background: N-terminal pro-brain natriuretic peptide (NT-proBNP) is elevated due to impaired cardiac haemodynamics in myocardial infarction and is slowly decreasing in post-myocardial infarction (MI) patients. However, its association with exercise capacity in these patients is not well documented.
Aim: To assess association between NT-proBNP values and parameters of exercise capacity in post-MI patients.
Methods: Consecutive patients referred for post-MI cardiac rehabilitation at a single university medical centre were included. Demographics, clinical data, risk factors and NT-proBNP values were systematically collected. Data were described as median (interquartile ratio [Q1-Q3]).
Results: A total of 251 patients were included (median age was 56 [51-64] years, 81% were males). Exercise testing was performed on median 38 days (28-57) after acute MI. Median NT-proBNP values and exercise capacity were 459 nmol/l (175–1135) and 6.5 METs (5.6–8.2), respectively. In univariate analysis, NT-proBNP was significantly associated with exercise capacity (r=-0.237, p<0.001) and maximal heart rate-systolic blood pressure product (r=-0.224, p<0.001). In multivariate analysis, NT-proBNP retained statistical significance and emerged as an independent predictor of exercise capacity (β=-0.570, r=0.004) even after adjusting for age (β=-0.058, p<0.001), female gender (β=-0.889, p=0.002), BMI (β=-0.072, p=0.001) and cardiovascular risk factors (smoking, arterial hypertension, hyperlipidemia, diabetes mellitus).
Conclusion: NT-proBNP is an independent predictor of exercise capacity in post-MI patients and thus provides useful information on expected exercise performance in these patients. Its usefulness in predicting rehabilitation success should be further addressed.

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Hemodynamic response to the submaximal aerobic exercise in adolescents with overweight and obesity

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Topic: Exercise testing

The prevalence of overweight and obesity in children and adolescents is increasing. Childhood obesity is a strong predictor of adult obesity and major risk factor for main noncommunicable diseases. Fitness and modification of diet are an essential components of treatment for obese children. However obese children fared exercise worse than their peers with health weight, even if the load is low or moderate intensity. The reasons for this are unclear.

Aim: To evaluate the hemodynamic response to submaximal aerobic exercise in obese adolescents.

Methods: A total of 136 adolescents aged 12-18 were included in this study. All adolescents were divided into 4 groups: group 1a included adolescents with obesity and arterial hypertension (AH) (n = 51), group 1b comprised adolescents with obesity and normal blood pressure (BP) (n = 40), group 2a embraced adolescents with normal body weight and AH (n = 22) and group 2b was the control group (n = 23). These groups did not differ in sex, age and fitness. All adolescents underwent submaximal treadmill test by the Bruce protocol. The values of heart rate (HR) and BP were recorded before exercise and after each of the first two stages of the exercise protocol. Changes of each parameter were also assessed throughout all workload.

Results: At baseline children in all groups had a comparable HR values. However after the first load step adolescents with obesity in both groups had significantly higher HR than in control group (p1b-2b = 0.02; p1a-2b = 0.02). After the second stage they also had much higher HR than in lean children with AH (p1a-2a = 0.007; p1a-2b = 0.006; p1b-2a = 0.009; p1b-2b = 0.005).

After the second load step adolescents with obesity who had not had AH before, obtained much higher levels of SBP and pulse BP than adolescents of control group (p1b-2b = 0.02). Dynamics of diastolic BP was consistent in adolescents of all groups.

In regression models adjusted by age, gender, fitness and baseline levels of variables, BMI Z-score was significantly directly associated with the changes in all evaluated variables in submaximal exercise against the baseline values.

Conclusion: Hemodynamic response to aerobic exercise in adolescents with obesity is determined by an early and significant increase in HR unlike the response in adolescents with normal weight. Further increase of exercise duration and intensity for obese children is accompanied with significantly higher SPB and PP levels in comparison with healthy children. Degree of obesity in adolescents is an independent predictor of HR and BP changes in the course of submaximal aerobic exercise. These specificities should be taken into account when developing special programmes of physical training for obese children and adolescents.

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Effects of incremental electro skeletal muscle stimulation on oxygen uptake and serum levels of lactic acid and catecholamine in healthy young Japanese

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Topic: Exercise testing

Background: Exercise therapy is highly recommended for patients with cardiovascular diseases. However, several patients cannot perform vigorous exercise training and cardiopulmonary exercise test (CPX) because of orthopedic disorder, respiratory tract disease and critical limb ischemia. Electric skeletal muscle stimulation (EMS) serves benefits as an alternative therapy to such patients. There is limited reports regarding effects of incremental EMS on oxygen uptake and lactate production in comparison with those of usual ergometer exercise. Evaluation of exercise capacity by CPX may be the strongest predictor of prognosis.

Purpose: To explore oxygen uptake during incremental EMS and serum levels of lactic acid and catecholamine in comparison with usual ergometer CPX.

Methods: Ten healthy Japanese (6 males, 4 females, age raged from 21 to 29, mean age = 24.3). A incremental EMS(Auto tens pro rehabili unitâA; Homer Ion Co Ltd.) CPX was performed to all the subjects until the EMS output reach eight or more in Numerical Rating Scale (NRS) by target intensity. Serum levels of lactic acid (LA) and catecholamine were serially measured before, during and after EMS. Ergometer CPX was also done in all the subjects using the 20W Ramp method, and the same measurements were carried out. Tolerability of the EMS was adjusted with the change of the LA level(→LA).

Results: Peak VO2 during EMS was significantly lower than ergometer CPX,(14.1±3.3, 30.2 ±6.2 ml/kg/min, respectively, P¥¥0.001). Peak VO2 of EMS was similar to VO2 at AT value in ergometer CPX (15.1±2.6 ml/kg/min). LA and a plasma noradrenalin increased after EMS (Rest:1.4±0.3Peak:2.8±0.8 mmol, Rest:0.2±0.1Peak:0.4±0.1ng/mL, respectively). No significant correlation between peak VO2 of EMS and CPX. However, adjusted for EMS tolerability (peak VO2 of EMS /→LA) was found correlation with ergometer CPX(r = 0.688, p = 0.028). There were no significant difference in systolic or diastolic BP between peak of EMS and AT in ergometer CPX (EMS: 128.3±25.1 / 79.1±12.9 vs. Ergometer: 139.4±23.4 / 78.6±10.4 mmHg,). Peak heart rate just after EMS was significantly lower than heart rate at AT in ergometer CPX,(100.1±10.5, 115.2±12.5 bpm, p = 0.003).

Conclusion: VO2 during incremental supine EMS reach almost AT values in ergometer CPX (approximately 3 or 4 Mets) without adverse events. Passive training using EMS can serve suitable stress on cardiopulmonary system at AT level as well as lower extremity muscle training.

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Effect of atrial fibrillation on cardiac output during exercise

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Topic: Exercise testing

Background: Atrial fibrillation is known to diminish stroke volume because of lack of the atrial kick. This is supposed to induce the lowered exercise tolerance. However, if heart rate (HR) response to exercise is augmented and compensate this deterioration of stroke volume, cardiac output would be kept normal. However, stroke volume and heart rate response to the exercise in patients with atrial fibrillation is not fully studied yet. Hereby, we planned to evaluate the effect of atrial fibrillation on cardiac function and heart rate response during exercise.

Method: Of consecutive 862 patients who performed cardio pulumonary exercise tests (CPX) from 2012 to 2016, we enrolled 342 subjects with age (60-80 yrs) - and ejection fraction (>60%) - matched subjects with AFib and normal sinus rhythm. And we compared parameters of CPX between two groups.

Result: Comparing with sinus groups, Afib group had higher HR at rest and lower intensity [78.8±14.5 vs 70.6±12.8 bpm, 91.1±16.8 vs 79.3±14.1 bpm (p<0.05)]. However, they don't have significant difference of VO2 at rest and lower exercise intensity [208.2±41.4 vs 212.9 ±37.4 ml/min, 359.9±68.4 vs 380.0±79.4 ml/min]. As for the peak exercise intensity, Afib group had lower peak VO2/HR, maximum PETCO2 and Peak VO2 [6.3±2.4 vs 8.1±2.4 ml/beat, 35.5±4.4 vs 38.7±4.0 mmHg, 735.6±283.6 vs 932.2±278 ml/min (p<0.05)]. Regarding HR, no significant change at peak exercise [122.9±25.6 vs 117.1±20.4 bpm].

Conclusion: At rest, at a given work rate during lower exercise intensity, Afib groups try to maintain cardiac output by increasing their heart rate. However at the peak exercise, peak VO2/HR, maximum PETCO2 and peak VO2 decrease, because of HR wouldn't increase at the peak exercise intensity.

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effect of different exercise intensities on coagulation factors and selected cardiovascular parameters in in mild hypertensive women

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Topic: Exercise training

Background: No doubt that exercise play an integral role in the protection against cardiovascular disorders, however decision for the proper exercise intensity may constitute the major challenging step in achieving that goal.

Aim; to compare between the effect of different treadmill exercise intensities on selected cardiovascular parameters including; blood pressure,heart rate, lower limb blood flow and oxygen saturation in addition to coagulation factors including; bleeding time, clotting time, prothrombin time, prothrombin concentration. Subjects & methods Forty-five sedentary miled hypertensive women were recruited for the study their ages ranged from 30 to40 years old,subjects were divided into three study groups according to their exercise intensities : Group A (50%-65% of HRmax), B (65%-75% of HRmax), and C (75% to 80% of HRmax), they all participated in an exercise training program on treadmill for twenty minute three times per week for eight successive weeks.

Results significant decrease in blood pressure (systole and diastole), bleeding time, clotting time, prothrombin time and platelet count and significant increase in prothrombin concentration in group (A),group (B), compared to group (C).

Conclusion: The walking exercises of low and moderate intensities have a positive effect on blood pressure and coagulation variables in mild hypertensive female.

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Comparison of different weekly frequency training programs

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Topic: Exercise training

Cardiac rehabilitation programs have similiar structure since their beginning. Type of exercise, intensity of training and frequency of training have been implemented, looking for major efficiency and cost - benefit.

Method: retrospective analysis of two groups of ischaemic cardiac patientes who attended a Cardiad Rehabilitation program Phase II at the University Hospital: Group A 3 sessions / week during 8 weeks and Group B 1 session /week during 8 weeks. Every other day all patients realized a walking domiciliary program. Once a week all of them attended a program of psycological support and secondary prevention. Patients classified as high or moderate risk were allocated in group A and those classified as low risk in group B. Those patients initially in group A who requested to come once a week for personal reasons were reallocated in group B. Before and after 8 weeks of rehabilitation, we evaluated anthropometric measurement, functional exercise capacity (6 Minutes Walking Test) and quality of life (SF-36). All patients signed an informed consent.

Abstract number: 505

Risk factors	Counseling			Standard care			P**
	Baseline	12 months	P*	Baseline	12 months	P*	
Current smokers, %	31.25%	28.57%	n/s	22.5	22.67	n/s	n/s
If yes, number of cigarettes per day, mean ± SD	4.19±7.20	3.87±6.83	n/s	2.76±5.75	2.39±5.26	n/s	n/s
Excessive alcohol intake, %	15.00	1.30	<0.01	7.50	0	<0.05	n/s
Walking or other physical activity, minutes per day, mean ± SD	106.01±93.99	95.97±88.97	n/s	110.71±105.31	122.65±85.87	n/s	n/s
Not limiting salt intake, %	18.75	11.7	n/s	18.75	6.67	<0.05	n/s
Limiting saturated fats intake, %	76.25	73.68	n/s	78.75		<0.001	<0.01
Sufficient consumption of vegetables and fruits, %	23.75	7.79	<0.01	23.75	4.00	<0.001	n/s
Stress by 10-point visual analog scale, mean ± SD	6.31±1.94	5.52±2.11	<0.05	5.74±1.65	1.79±2.34	<0.001	<0.001

*P for intra-group differences baseline vs 12 months**P for differences between the counseling group and the standard care group at 12 months

Results: 90 patients were included in Cardiac Rehabilitation between september 2015 and march 2016. 7 patients left the program. Group A: 53 patients (44 men and 9 women). Group B 29 patients (26 men y 3 women). Groups were comparable in age, sex and initial functional capacity. No significant variations of anthropometric measurement were observed. Both groups incremented their functional exercise capacity, no statistically significant difference between groups (6MWT: 62,207 ± 8,979 vs 47,688 ± 9,352 p >0,05). There were nosignificant changes in quality of life in any group.
Conclusions: different weekly frequency of cardiac rehabilitation sessions attended at the hospital doesn't prove statistically significant difference in anthropometric measurement, functional exercise capacity or quality of life. It seems reasonable to weigh modifications of cardiac programs to facilitate patient accomplishment, without diminishes the benefits.

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Effects of Tai Chi Chuan on physical, emotional and spiritual aspects and cardiovascular health

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Topic: Exercise training
Background: The interest in Tai Chi Chuan (TCC) effects has increased among health professionals. This method gives priority to the management of holistic health, involving mind, body and spirit, combining gentle movements and meditation elements, concentration, body awareness, balance, strength and flexibility, in synchrony with breathing. Despite the growing practice of TCC, few studies have investigated its effect on general and cardiovascular health.
Objective: To evaluate the impact of TCC in functional capacity, central obesity, physical, emotional and spiritual aspects of TCC practitioners.
Methods: In a quasi-experimental study, 26 individuals (57.5±6.5 years, 88.5% women) practiced TCC twice a week for four months. At baseline, the selected individuals were in overweight (body mass index = 28.6±6.7 kg/m2), central obesity (abdominal circumference = 94.4±9.2 cm) and systolic and diastolic blood pressure within normal parameters (119.9±16.3 and 73.3±9.9 mmHg, respectively). Individuals were evaluated before and after TCC training in relation to functional capacity (distance walked in six minutes - D6M), abdominal circumference, muscle strength by the sitting-rising test, self-esteem and anxiety (Rosemberg tests), depression (Beck Depression Inventory), and spirituality (Spirituality Self Rating Scale). Data were analyzed by paired t-test and Wilcoxon.
Results: There was a significant improvement in abdominal circumference (94.4±9.2 vs 91.4 ±7.0 cm, p = 0.004) and muscle strength (10.4±1.8 vs 13.0± 2.2 repetitions, p = 0.007), but not in D6M (552.9±61.8 vs 562.9±50.8 m, p = 0.833). In the emotional aspects, there was improvement in self-esteem (20.2±4.0 vs 23.6±4.2 points, p <0.001); anxiety [9.0 (4.0 and 14.5) vs 5.0 (3.0 and 7.5) points, p = 0.038]; depression [8.0 (3.5 and 11.0) vs 6.0 (1.0 and 7.5) points, p <0.001]; as well as in the aspects related to spirituality (13.9±7.1 vs 9.2±3.5, points p = 0.001).
Conclusion: In this group there was a positive impact of the practice of TCC in cardiovascular health and physical, emotional and spiritual aspects, suggesting the inclusion of this practice in the prevention of general and cardiovascular disease.

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Effect of lower-limb compression garments during exercise on physiological, perceived exertion and performance parameters in athlete and non-athlete adults: a systematic review and meta-analyses

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Topic: Exercise training
Introduction: Compression garments (CG) have been used to improve sporting performance. However, evidence on the efficacy of this strategy is conflicting.
Objectives: To summarize evidence on the effect of lower-limb compression garment (LLCG) use during high-intensity exercises (≥85% peak oxygen consumption, VO2) on time performance, vertical jump height, VO2, blood lactate concentration ([La]), and ratings of perceived exertion (RPE) in athletes and non-athletes compared with a control group receiving no compression.
Methods: We performed a systematic review with meta-analysis of randomized controlled trials, with no restriction on date of publication, using the PubMed, EMBASE, Cochrane Library, and ClinicalTrials.gov databases, as well as the reference lists of previous reviews. The results were described as weighted mean difference (WMD) with 95% confidence interval (95%CI).
Results: The 26 included studies showed low heterogeneity for the outcomes assessed (I^2 = 0.00%). There was no significant difference between the groups with regard to time performance (time trial: WMD = -0.24, 95%CI -2.87 to 2.40; time to exhaustion: WMD = -0.03, 95%CI = -0.31 to 0.26), vertical jump height (WMD = -0.14, 95%CI = -2.31 to 2.03), VO2 (WMD = 0.18, 95%CI = -0.64 to 1.01), [La] (WMD = 0.32, 95%CI = -0.00 to 0.64), or RPE (WMD = -0.18, 95%CI = -0.44 to 0.08).
Conclusions: Using LLCG during high-intensity exercise did not show improvement in performance time, VO2, vertical jump height, [La], or RPE. However, when the type of LLCG was analysed separately, individuals who used socks or compression sleeves showed an increase in lactate concentration. Further studies are needed to elucidate the influence of compression during exercise, especially on the kinetics of lactate. In this scenario, practical recommendations regarding the use of LLCG should be cautions.

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Muscle metabolism evaluated by skeletal muscle oxygen consumption during cardiopulmonary exercise test with the diabetes patients

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Topic: Exercise testing
Background: Evaluation of skeletal muscle metabolism is important for various condition. However muscle metabolism is still well unknown. On the other hand, diabetes patients have lower muscle function than non-diabetes people is already known. The aim of this study is to investigate muscle metabolism with oxygen uptake from cardiopulmonary exercise test in the patients with diabetes.
Methods and results: We studied 22 patients who were men (Age: 66.8±7.9years, Weight: 64.9 ±1.6kg, BMI: 23.7±2.4kg/m2) with heart diseases which is not heart failure(LVEF> = 60%, NTpro-BNP<200pg/ml), COPD and dialysis in our cardiac rehabilitation center. All patients underwent bioelectrical impedance analysis (InBody 720), cardio pulmonary exercise test (CPX), blood test and echocardiography. We also check their medication. Patients are divided 12 diabetes patients (DM group) and 10 non-diabetes patients (NDM group).
The DM is higher %fat (DM/NDM:24.8±4.0/20.8±3.2%, p<0.012), HbA1c (6.7±0.9/5.9 ±0.3%, p<0.005) and lower LVEF (67.0±5.1/72.0±5.5%, p<0.037) than NDM. There were no difference of their medication except anticoagulants and diabetes drug between 2 groups. Muscle metabolism defined as VO2 per skeletal muscle mass. DM group is low peak VO2/skeletal muscle mass (44.7±11.1/54.1±9.7 ml/min/kg, p<0.056) and significantly lower peak VO2/legs skeletal muscle mass (79.1±19.0/97.2±15.5 ml/min/kg, p<0.035) than NDM but not arms and abdominal skeletal muscle.
Conclusion: Diabetes patients has lower oxygen uptake per skeletal muscle compared with non-diabetes patients who was cardiac disease without heart failure. We consider that VO2 per skeletal muscle would be specific information about one of muscle metabolism.

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Effect of single-session in-hospital counseling on lifestyle risk factors after PCI

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Topic: Motivational psychology
Background: Patient education is a crucial part of coronary heart disease (CHD) management so we should use any opportunity for preventive counseling.
Purpose: To assess the impact of a single brief in-hospital counseling session after percutaneous coronary intervention (PCI) on lifestyle risk factors (RF) after 1 year.
Methods: Consecutive CHD patients (pts) who have undergone PCI in a tertiary care center were randomly allocated into 2 groups. The educational intervention group received one session of group counseling of 30-40 minutes duration covering basic information on CHD

and its RF coupled with printed materials. The control group received standard care including all necessary explanations from attending physicians. Pts were followed for 12 months by telephone. Self-reported lifestyle risk factors were assessed before counseling and by the end of follow-up.

Results: A total of 160 pts were enrolled: 80 were assigned to counseling and 80 received standard care. During follow-up 3 pts from the intervention group and 5 pts from the control group have died (non-significant). The table below presents key lifestyle RF in both groups at baseline and at follow-up.

Conclusion: A single session of preventive counseling during hospitalization after PCI is not sufficient to ensure consistent changes of behavioral RF for CHD.

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Different preventive counseling programs for patients with paroxysmal atrial fibrillation after catheter ablation

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Topic: Motivational psychology

Background: Atrial fibrillation (AF) is one of the most common cardiac arrhythmias in routine clinical practice. Development of preventive counseling (PC) programs for patients after catheter ablation (CA) could help to improve management of these patients, their quality of life, patient compliance and achievement of target of cardiovascular risk factors (RFs).

Purpose: to develop 2 programs with a significant impact on psychological status, life style and well-being in AF patients after CA and evaluate their effectiveness.

Methods: A prospective randomized controlled study of AF patients after CA with 3 parallel groups is ongoing. The duration of follow-up is 1 year. The study will enroll 165 patients. They are randomized into 3 groups (I, II, III) of 55 patients each. All 3 groups will get group PC (Educational School for AF patients) and individual PC according to their individual profile of cardiovascular RFs. Patients in groups 1 and 2 are provided with additional PC (in group 1 via a doctors call by phone once in 14 days, in group 2 – by e-mail or sms message once in 14 days), group 3 will receive a usual care. Psychological status of patients will be evaluated using the following questionnaires: Visual Analogue Scale (the level of stress), Hospital Anxiety and Depression Scale (anxiety and depression), DS-14 questionnaire (type D personality), SF-36 questionnaire (quality of life) and Illness Perception Questionnaire (cognitive and emotional representations of illness).

Results: Study will examine clinical and psychological status of AF patients in 3, 6 and 12 months after CA. There will be a comprehensive evaluation of the effectiveness of PC programs (impact on the clinical condition of the patients, their psychological status, quality of life and adherence to treatment) and control of the traditional cardiovascular RFs.

Conclusion: The results may optimize approaches to the management of patients with AF after CA.

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Effect of single-session in-hospital counseling on outcomes of patients after PCI

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Topic: Motivational psychology

Background: Patient (pts) education is a crucial part of coronary heart disease (CHD) management so we should use any opportunity for preventive counseling.

Purpose: To evaluate the impact of a single brief in-hospital counseling session on clinical outcomes in pts after percutaneous coronary interventions (PCI).

Methods: Consecutive CHD pts who have undergone PCI in a tertiary care center were randomly allocated into 2 groups. The educational intervention group received one session of group counseling of 30-40 minutes duration covering basic information on CHD and its RF coupled with printed materials. The control group received standard care including all necessary explanations from attending physicians. After 12 months information on vital status and major cardiovascular events was obtained by telephone.

Results: A total of 160 pts were enrolled: 80 were assigned to counseling and 80 received standard care. Baseline characteristics were well balanced between the 2 groups. The table below describes mortality, major clinical events and combined clinical end points in both groups during follow-up.

Conclusion: A single preventive counseling session during hospitalization after PCI had no effect on clinical outcomes.

Outcome	Counseling, n(%)	Standard care, n(%)	P
Death	3 (3.75)	5 (6.25)	n/s
AMI	1 (1.30)	2 (2.67)	n/s
PCI	3 (3.90)	0 (0.00)	<0.05
CABG	5 (6.49)	0 (0.00)	<0.01
Death, AMI, stroke or TIA	4 (5.00)	7 (8.75)	n/s
Death, AMI, stroke, TIA, CABG or PCI	9 (11.25)	7 (8.75)	n/s
Death, AMI, stroke, TIA, CABG, PCI, CVD hospitalization	24 (30.00)	29 (36.25)	n/s

AMI = acute myocardial infarction, CABG = coronary artery bypass grafting, AMI = acute myocardial infarction, TIA = transient ischemic attack, CVD = cardiovascular disease

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Evaluation of various preventive counseling programs in coronary heart disease patients with abdominal obesity after hospital discharge

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Topic: Motivational psychology

Introduction: Patients with coronary heart disease (CHD) and abdominal obesity (AO) represent a very high risk population and should be a priority for preventive counseling (PC) programs aimed to improve traditional cardiovascular risk factors (RFs).

Purpose: to develop 2 PC programs for CHD patients with AO and to assess their effectiveness.

Methods: A prospective randomized controlled study with 3 parallel groups evaluating PC programs with focus on dietary intervention for CHD patients with AO is ongoing. The planned duration of follow-up is 1 year. The study will enrol 180 in-patients with known CHD and AO who will be randomized into 3 groups (I, II, III) of 60 participants each. After hospital discharge patients in Groups I and II will receive individual PC with focus on dietary intervention. Subsequently these patients will be on maintenance PC programs (in Group I investigators will provide counseling every 7 days by phone, in Group II – by means of SMS messages or e-mail). Group III will serve as a control group and receive usual care (Figure 1). All patients will be examined at 3, 6 and 12 months with assessment of height, weight, waist circumference, body mass index, adiposity by bioimpedance analysis. Blood lipid and glucose levels, as well as biomarkers of obesity (leptin, insulin, C-reactive protein) will be also measured at all visits. Patients will also have to complete the Hospital Anxiety and Depression Scale (HADS), the Visual Analogue Scale (VAS) for stress level, the International questionnaire of physical activity (IPAQ) and the International Questionnaire of health-related quality of life (HeartQoL).

Results: The study will help to evaluate the role of different PC programs with respect to addressing abdominal obesity and other traditional risk factors and to figure out the time course of motivation, psychological status and quality of life of CHD patient with AO during participation in long-term preventive programs.

Conclusion: The results may help to optimize approaches to preventive counseling in CHD patients with AO after recent hospitalization.

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Relationship between psychological status and coping strategies in patients awaiting coronary artery bypass grafting

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Topic: Motivational psychology

Purpose: To assess the relationship between psychological status and stress coping strategies in patients awaiting coronary artery bypass grafting (CABG).

Methods: A total of 188 patients (147 (78.2%) males, 41 (22.8%) females) admitted for CABG were included in the study. The mean age of the patients was 57.26 ± 0.8 years. In addition to clinical assessment and instrumental examination, all patients underwent psychometric evaluation before CABG and at days 12-14 after surgery. Psychometric testing included the following depression and anxiety rating scales: Beck Depression Inventory (BDI), and the Spielberger-Hanin State-Trait Anxiety Inventory (STAI). The Ways of Coping Questionnaire (WOC) developed by R. Lazarus was used to measure patients' coping processes. The statistical analysis was conducted using the software STATISTICA 8.0.

Results: High state anxiety (SA) was found in 36 (19%) patients, and high trait anxiety (TA) – in 43 (23%) patients, whereas mild depressive disorders were found in 68 (36%) patients awaiting CABG. The analysis of coping processes showed that 107 (57%) patients used productive coping strategies: 28 (15%) patients used planful problem-solving, 60 (32%) patients – self-controlling, and 7 (4 %) patients - accepting responsibility. However, 49 (26%) patients used nonproductive coping strategies, namely confrontive coping (24 (13%) patients), escape-avoidance (11 (6%) patients), positive reappraisal (7 (4%) patients), and distancing (24 (13%) patients). The strategy of seeking social support was used by 13 (7%) patients.

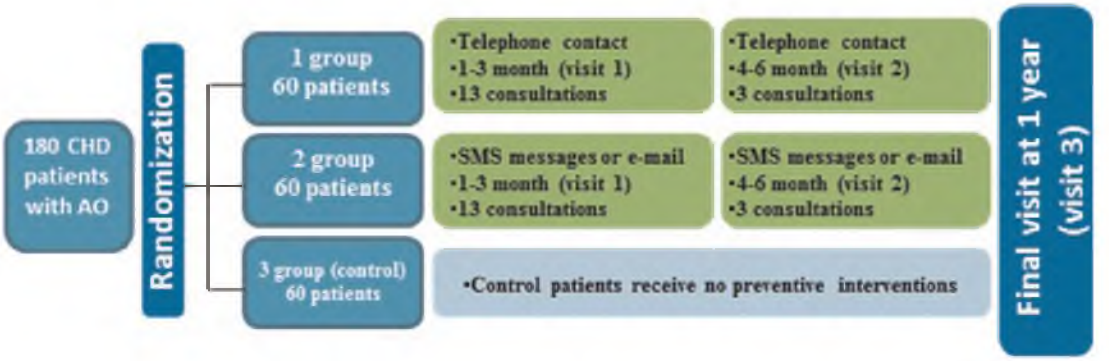
65% of patients with low SA (94 out of 145 patients) and 54% of patients with high SA (19 out of 36 patients) used productive strategies ($p<0.05$). Nonproductive coping strategies were determined in 36 (25%) patients with low levels of SA and in 16 (44%) patients with high SA ($p<0.05$). Seeking social support was detected in 14 (10%) patients with low SA, and in 2 (7%) patients with high SA, $p<0.05$.

There were no differences found in the rates of use for productive and nonproductive coping strategies among patients with low and high TA.

91% of patients (109 out of 120 patients) without depression and 27% of patients (18 patients) with depressive disorders had productive coping style, $p<0.05$. Nonproductive coping style was found in 8 (7%) patients without depression and in 44 (65%) patients with depressive disorders, $p<0.05$. Seeking social support was detected in 32 (27%) patients without depression and in 5 (8%) patients with depressive disorders, $p<0.05$.

Conclusion: Patients awaiting CABG who had nonproductive coping style more often suffered from anxiety and depression.

Abstract number:511
Study design



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Efficiency of medical art therapy for treating anxiety in adolescents undergoing aortic valve repair and replacement

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Topic: Motivational psychology

Background: Hospitalization can be a psychologically challenging time for adolescents resulting in psychological stress and long-term emotional disabilities. However, routine self-rating anxiety scales may fail if adolescents try to hide their emotions and internal thoughts from psychologists. Therefore, artistic media offers them a way to communicate experiences, feelings, and needs, which are hard to express verbally. This possibility for an alternative way of communication is important for adolescents who are dealing with emotional conflicts and spiritual or existential issues.

Purpose: To assess efficiency of medical art therapy in reducing anxiety and depression in adolescents with aortic valve disease undergoing on-pump cardiac surgery.

Methods: 25 patients (the mean age 14.24±1.96) with aortic valve disease undergoing elective on-pump cardiac surgery who had moderate scores (the mean score 42.41±5.56) on the Zung Self-Rating Anxiety Scale (SAS) were included in the study. All these patients were reassessed by a qualified psychologist using medical art therapy. Out of 25 patients, 12of them (the mean age 13.92±2.23, 8 female patient, 4 male patients) were found to have high anxiety levels and were included in the study group. The intervention phase of the study included art therapy interventions designed to familiarize subjects' with the hospital environment, provide opportunities for control and expression, and respond to subjects' established cognitive structures regarding their medical condition and treatment (at least 6 art therapy sessions for each subject).

Results: 66% of patients perceived art therapy sessions as relaxing and stimulating due to the creative activity. Moreover, 83% of patients assessed the sessions as allowing to communicate about themselves while feeling listened to. The psychologist reported a significant improvement in patients' state according to the patient-image-art triadic relationship which allowed to evaluate emotions through the painting and its symbolic function.

Conclusion: Medical art therapy proved to be effective method in reducing the anxiety among adolescents. Opportunities for creative expression can help young patients cope with the psychological challenges of hospitalization and prevent emotional disabilities.

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Improving diagnostics of rethrombosis of infarct-related coronary arteries following efficient system thrombolytic therapy

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Topic: Telemedicine

Purpose: to optimize the management of patients with STEMI, highlighting among them a group of patients requiring life-saving PCI.

Methods: The study included 117 patients with STEMI, 97 men and 20 women aged 59 (52; 64) years, which underwent an effective systemic thrombolysis after 150 (105, 240) minutes from the onset of anginal attack. The telemetric ECG was performed to all patients in a coronary care unit using a complex "Astrokard® - Telemetry" with the analysis of the dynamics of the ST segment on the 12-lead automatically with the following verification.

Results: Patients were divided into 2 groups. Group 1 included 85 patients (72,6%) who did not register new ST-segment deviation from the contour. According to coronary angiography, 77 subjects in this group (90,6%) had no signs of acute thrombosis of the coronary arteries, unstable atherosclerotic plaque has been visualized. In 8 patients (9,4%) in group 1 thrombotic occlusion of the infarct-related artery has been diagnosed. Group 2 included 32 patients (27,4%), who had the episodes of ST segment re-elevation of 1 mm or more in the infarct-related leads, lasting more than 1 minute after effective TLT. In most cases (71,9%) these episodes were asymptomatic, only in 9 patients (28,1%) the transient ST-segment elevation was accompanied by the development of typical angina attack ($p < 0,01$). According to coronary angiography in group 2 in 27 of 32 patients (84,4%) the signs of thrombosis of infarct-related coronary artery have been showed. Thus, the frequency of rethrombosis in group 2 was significantly prevailed compared with patients in group 1 ($p < 0,01$).

Conclusions: Episodes of re-elevation of ST segment are reliable diagnostic criterion of coronary artery rethrombosis. Timely detection of transient elevation of ST segment, which are asymptomatic in the majority of cases, is only possible using the ECG telemetry. Thus, the method of telemetry ECG monitoring can further identify the group of patients of very high risk of needing to conduct the life-saving PCI.

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Predictive factors for mortality, hospitalisation and health-related quality of life in heart failure: a systematic literature search

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Topic: Telemedicine

Background: Despite the improvement in treatment of heart failure (HF), no cure is currently available. Therefore, accurate disease management is of paramount importance.
The overall aim of the HeartMan project is to provide personalized advice on disease management to HF patients, through a decision support system (DSS) with telemonitoring and a mobile application.

Purpose: The goal of this study was to identify common key predictors for mortality, hospitalisation and health-related quality of life (HRQoL), with a focus on modifiable parameters. This information will enable the DSS to provide evidence-based advice that may improve patient's outcome.

Methods: A systematic literature search was performed by two independent reviewers for A) mortality and hospitalisation and B) HRQoL. MEDLINE, Web of Science, Embase and Cochrane Library were screened with a combination of the following terms for: A) heart failure, risk prediction model and mortality or hospitalisation between the period 1995 and 2016, B) heart failure, quality of life, health perception or functional status in a similar period. Only studies reporting on predictors for the previously mentioned outcomes in stable ambulatory HF patients were included.

Results: Thirty-two out of 3876 citations for mortality and hospitalisation and forty out of 7893 citations for HRQoL were selected for further data extraction. Similar parameters were used to predict both mortality and hospitalisation with a main focus on demographic characteristics, disease- related (e.g. NYHA classification) and clinical characteristics (e.g. blood pressure). More recently introduced risk prediction models also included comorbidities and exercise capacity. Data extraction for HRQoL resulted in striking parallels with mortality and hospitalisation, with demographic and disease-related characteristics playing also an important role in HRQoL. Nevertheless, novel types of modifiable predictors were also seen in HRQoL such as mental health, perceived health and behavioural determinants. Interestingly, HRQoL itself seemed to be a newly introduced predictive factor for mortality and hospitalisation.

Conclusion: A list of predictive factors which are common for both mortality and hospitalisation and HRQoL in HF has been identified through a systematic literature search. Besides demographic and disease-related characteristics, also the presence of comorbidities, mental health and behavioural aspects will be further implemented in the design of the HeartMan project.

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Optimizing atrial fibrillation management in primary care by utilizing an electronic medical record (EMR) dashboard for population health management

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Topic: Telemedicine

Background: Systematically applying evidence based guidelines for Atrial Fibrillation (A.Fib) Management in family practice can be challenging. We need automated and sustainable methods to improve patient care and outcomes.

Purpose: By piloting an A. fib Electronic Medical Record (EMR) dashboard in a multi-physician family practice, our objectives were to determine the dashboard's ability to identify care gaps in Atrial Fibrillation and our ability to address these care gaps with physician and clinical pharmacists.

Methods: We reviewed the literature regarding the design and effectiveness of existing EMR dashboards. We reviewed relevant A. fib clinical guidelines and developed a prototype EMR dashboard through an interactive process with feedback from physicians. We then recalled patients identified with care gaps to for management reassessment by a physician. Eligible patients were also seen by clinical pharmacists to review their medications. The results were tracked in real-time by the dashboard and allowed us to generate a report at the end of our intervention.

Results: Through the use of the dashboard, 15 patients were recalled for review and we achieved the following: Perform patient panel/roster clean up: correctly identified atrial fibrillation in 2 patients. We had an overall increase in clinic patients identified with A. fib through improved ability to review cases Improve identification of investigation care gaps: the number of a.fib patients without eGFR in 12 months decreased from 4 to 1 and the number of a.fib patients without ECHO on file decreased from 12 to 9. Improve identification of medication care gaps: the number of a.fib patients without anticoagulation agent decreased from 8 to 3

Increase opportunities for shared care: 8 eligible patients were seen by a clinical pharmacists and reviewed by a physician Identify opportunities for improved clinical audit: number of patients with Warfarin increased by 5, Apixiban increased by 1, Dabigatran decreased by 2, Rivaroxaban increased by 1 and Digoxin decreased by 1

Conclusion: This A. Fib EMR Dashboard allowed us to manage our A. fib patients more systematically, efficiently and effectively. This is achieved through improved recalls, the creation of physician alerts, and referrals to clinic team members. The concept of utilizing the A. fib dashboard is applicable to any EMR. It is a paradigm shift to promoting the use of technology to target care gaps. This holds promise to improve the management of A. Fib in primary care, but requires further investigation.

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The influence of localization of acute myocardial infarction with ST segment elevation on variability and QT dispersion in telemetry ECG recording

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Topic: Telemedicine

Purpose: To evaluate the effect of localization of acute myocardial infarction (MI) with ST-segment elevation on the parameters of myocardial electric instability.

Methods: The study included 90 patients with myocardial infarction with ST-segment elevation at the age of 56,3 ± 10,2 years: 78 (86,7%) men and 12 (13,3%) women. All patients underwent pharmaco-invasive reperfusion: thrombolytic therapy (TLT) and percutaneous coronary intervention (PCI). Time of onset prior to thrombolytic therapy was 129 (90; 240) min, interval "pain-balloon" - 6,15 (3,9; 12,3) hours. During the first days after PCI was conducted, telemetric ECG 12 leads using a complex "Astrokard® - Telemetry", followed by an analysis of the variability and dispersion of QT interval. Evaluation of the QT interval was performed in automatic mode, the following parameters have been analyzed: dispersion of QT interval duration before the end of the T-wave up to its peak (Qtedisp, Qtadisp), the standard deviation of the dispersion of QT interval duration before the end of the T-wave up to its peak (sdQte, sdQTa) per day.

Depending on the location of the infarction, patients were divided intotwo groups: group 1 included 53 subjects (58,9%) with options for localization, which were combined by the term "myocardial infarction of anterior wall of the left ventricle",the group 2 consisted of 37 (41,1%) patients with MI of posterior wallof left ventricular.

Results: high values of variability and dispersion of QT have been recorded in group 1: QTedisp - 56 (40; 78) ms ($p = 0{,}004$), QTadisp - 62 ± 30 ms ($p = 0{,}007$), sdQTe- 19 (15; 25) ms ($p = 0{,}0005$), sdQTa-22 (17; 31) msec ($p = 0{,}003$). Whereas in group 2, the following values of the parameters characterizing the variability of the QT have been revealed: QTedisp-32 (22; 59) ms, QTadisp - 45 ± 26 ms, sdQTe- 12 (9; 21) ms, sdQTa- 16 ± 9 ms.

Conclusion: higher values of the parameters that characterize the variability and dispersion of the QT interval have been revealed in patients with myocardial infarction of anterior wall of the left ventricle. This indicates that the structure of myocardial electric heterogeneity in this group isrelated to the broader area of necrosis.