P3743
Factors affecting the degree of reverse myocardial remodeling due to long aerobic training in heart failure patients

T. Lelyavina, V.Y.U. Sitnikova, V.L. Galenko, P.S. Kozlov, M.A. Bortzova. *Almazov Federal Center of Heart Blood & Endocrinology, Saint Petersburg, Russian Federation*

To evaluate the effects of long-term aerobic training, designed with individualized method based on lactate threshold definition, on myocardial remodeling in heart failure patients and to detect its predictors.
Methods: We evaluated 197 HF patients, mean age 52±3.3, 116 men, with NYHA class III, LVEF 37,6±2,1%. CPET performed on a treadmill ("Oxycon Pro") at baseline, in every 8 weeks and after 9 months. All patients were randomized into following groups: 137 patients of study group (SG), who underwent physical rehabilitation program (PRP), calculated due to lactate threshold; and 60 HF patients control group (CG), who underwent physical training, calculated based on VO2 percentage.
Results: At baseline CPET results in both groups did not significantly differ. VO2 at lactate threshold and VO2peak were 8.8±0,5; 13,5±0,9 ml/min/kg and 9.0±0.9; 13,6±1,2 ml/min/kg in study group and control group, respectively (p1=0,08, p2=0,07, respectively). After 9 months of training VO2LT and VO2peak were better in the study group than in control group: the increase was 16% and 24% in the main group, and 4% and 7% in the control group, respectively (p1<0,01, p2<0,01). 54 pts from study group have trained every day more than 1,5 hour on their own. After 9 months of aerobic training it was significant improvement of myocardial contractile function in this 54 patients: LA, at baseline and after training were 5,5±0,1 and 5,1±0,6 sm; LVEDD 6,4±0,4 and 5,9±0,2sm; LVESD 5,9±0,3 and 5,3±0,3 sm, LVEF 33±3,7 and 46±5,5%, p<0,001. In control group patients and other 83 pts SG the improvement of myocardial contractile function was not observed: LA, at baseline and after training were 5,4±0,3 and 5,4±0,3 sm; LVEDD 6,3±0,5 and 6,3±0,2 sm; LVESD 5,9±0,5 and 5,8±0,3sm, LVEF 36±5,3 and 40,2±4,7%, p>0,05. We found correlation between LVEDD changes and duration of training (r=-0,9, p<0,05), LVEDD changes and BMI (r=0,7, p<0,05), LVEDD changes and b-blockers dose (r=0,4, p,0,05), LVSED changes and blood creatinine (r=-0,4, p<0,05).
Conclusions: Aerobic exercise, designed with individualized method based on lactate threshold definition, increase exercise tolerance, improves myocardial contractile function more than aerobic training, calculated based on VO2peak percentage. There are correlation between LVEDD changes and duration of training (r=-0,9, p<0,05), LVEDD changes and BMI (r=7, p<0,05), LVEDD changes and b-blockers dose (r=4, p,0,05), LVSED changes and blood creatinine (r=4, p<0,05).

P3744
Arterial stiffness as a factor of structural and functional remodeling in patients with abdominal obesity

T.Y.U. Kuznetsova, O.Y.U. Druzhilova, M.A. Druzhilov. *Petrozavodsk state university, Petrozavodsk, Russian Federation*

Objective: Various metabolic, hormonal and hemodynamic disorders in obesity, affecting the cardiac muscle, lead to structural and functional heart remodeling. At the same time, the pathophysiological mechanisms underlying this association remain unclear. The aim is evaluate the association of arterial stiffness parameters with the presence of structural and functional heart remodeling in patients with abdominal obesity (AO).
Methods: 274 normotensive men with AO (age 44.8±5.0, body mass index 30.7±3.4 kg/m^2, waist circumference 103.8±7.6 cm) without cardiovascular diseases and diabetes mellitus were examined. The diagnostic tests included the lipid and glucose profiles evaluation, echocardiography, bifunctional daily blood pressure monitoring (portable recorder) with evaluation of arterial stiffness parameters (average daily aortic pulse wave velocity (PWVao), augmentation index (Aix), aortic systolic blood pressure (SBPao)). The left ventricular mass index (LVMI) was calculated by the ASE formula, left atrial volume (LAV) was determined using the "ellipsoid" model. Data were summarised as mean±standard error and compared with paired two-tailed t-tests, Pearson $\chi 2$ criterion and Fisher's exact test, relationship between parameters was evaluate by Pearson correlation coefficient.
Results: PWVao was 7.5±0.7 m/s, Aix -36.6±18.6%, SBPao 108.5±5.5 mm Hg. The Pearson correlation coefficients of the PWVao, Aix and SBPao with LVMI were 0.21 (p<0.001), 0.31 (p<0.001) and 0.24 (p<0.001), with LAV indexed to body surface area – 0.24 (p<0.001), 0.29 (p<0.001) and 0.19 (p<0.001) respectively. A group of patients (n=86) characterized by PWVao equal to or greater than the 75th percentile (7.7 m/s for persons 35–45 years and 8.2 m/s for persons 46–55 years) was isolated. This group was characterized by higher values LVMI (93.19±16,4 g/m^2 vs 86.5±12.7 g/m^2, p<0.01; 43.3±8.4 g/m$^{2.7}$ vs 40.1±6.4 g/m$^{2.7}$, p<0.01), LAV indexed to body surface area (22.4±3.8 ml/m^2 vs 20.9±3.4 ml/m^2, p<0.01). In this group left ventricular hypertrophy and left ventricular diastolic dysfunction were detected more frequently: 29.1% vs 4.3% (p<0.001) and 39.5% vs 6.9% (p<0.001) respectively. Compared groups did not differ in the systolic and diastolic blood pressure levels (118.4±7.4/74.3±4.8 mm Hg vs 117.5±4.3/73.4±4.2 mm Hg).
Conclusions: Arterial stiffness parameters are associated with the parameters, which characterized the structural and functional heart remodeling. Patients with PWVao equal to or greater than the 75th percentile (7.7 m/s for normotensive persons 35–45 years and 8.2 m/s for normotensive persons 46–55 years) have higher values of left ventricular mass and left atrial volume indexes, higher frequency of left ventricular hypertrophy and left ventricular diastolic dysfunction. This association, apparently, is one of the numerous pathophysiological mechanisms of chronic heart failure development in patients with abdominal (visceral) obesity.

P3745
Facilitating cardiac fibroblast to myofibroblast transformation in 3D peptide hydrogel scaffold culture system

Y.-W. Chiu[1], Y.-A. Shi[2], Y.-L. Ho[2]. *[1]Far Eastern Memorial Hospital, Taipei, Taiwan ROC; [2]National Taiwan University Hospital, Taipei, Taiwan ROC*

Enhanced expression of extracellular matrix (ECM) proteins will cause further fibrotic depositions in diseased heart tissue. In this study our purpose was to mimic enhanced ECM environment by a 3D disarray nanopeptide hydrogel scaffold (PuraMatrix) systems, cultured human cardiac fibroblast and checked the phenotype changes. Comparing the cardiac fibroblasts in 3D and 2D systems, the 3D system had 4.27 fold procollagen type I N propeptide (PINP), 4.51 fold procollagen III C-terminal peptide (PIIICP) change than 2D system, which represented more collagen synthesis in 3D system. The expression of connexin 43 and alpha smooth muscle actin (α-SMA) also increased 4.15±1.76 and 2.49±0.83 folds in 3D system, which represented more myofibroblast transformation (Table 1). The confocal image also showed more myofibroblast formation in 3D system (Figure 1).

Table 1. Increased collagen synthesis and myofibroblast transformation in 3D system

	PINP	PIIICP	Connexin 43	α-SMA
3D/2D	4.27±0.20	4.51±0.55	4.15±1.76	2.49±0.83

PINP: procollagen type I N propeptide. PIIICP: procollagen III C-terminal peptide. α-SMA: alpha smooth muscle actin.

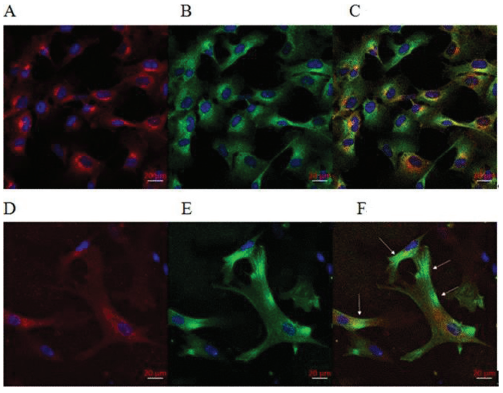


Figure 1. Fibroblast in 2D and 3D system

These results suggest that disarray 3D culture system may alternate cardiac fibroblast function, result in more collagen synthesis and more myofibroblast formation. It can be a model for further analyzing the process of cardiac fibrosis and the findings re-enhanced the importance about enhanced ECM environment in cardiac fibrosis.
Funding Acknowledgements: Far Eastern Memorial Hospital National Taiwan University Hospital Joint Research Program (104 FTN03)

P3746
Peak cardiac power output-to-left ventricular mass independently predicted the risk of adverse left ventricular remodeling in patients with heart failure and reduced ejection fraction

I. Fabiani, N.R. Pugliese, C. Santini, G.G. Galeotti, A. D'Agostino, I. Rovai, R. Pedrinelli, F.L. Dini. *Cisanello Hospital, Department of Cardiac-Thoracic and Vascular, Pisa, Italy*

Background: Exercise stress echocardiography (ESE) can evaluate the contractile response of patients with heart failure (HF) through ESE-derived indexes, including left ventricle ejection fraction (LV EF), end-systolic volume (ESV) index, the end-systolic pressure-volume relation (ESPVR, i.e. LV elastance) and cardiac power output to LV mass (CPOM). Little is known whether ESE parameters may be useful to identify the risk of the ensuing LV remodeling.
Aim: We sought to test whether ESE parameters are useful to identify the risk of LV remodeling at follow-up in patients with chronic HF and reduced EF (HFrEF).
Methods: Enrolled patients underwent a symptom-limited graded bicycle semi-supine ESE. A complete echocardiographic study was carried out at baseline and at peak stress. CPOM (expressed in Watts/100 g) was calculated as the product of a constant (K=2.22×10^{-1}) with cardiac output (CO) and mean arterial pressure (MAP), divided by LV mass (M): CPO=K×CO×MAP/M. LV remodeling was defined as ≥10% increase in ESV at 6 months. We used multivariable logistic analysis to assess the risk of LV remodeling at follow-up. Patients were also followed-up for the end-point of all-cause mortality.

Results: We studied 134 patients (age: 61±11 years, 19% female) with chronic HF and LV EF<45% (median follow-up: 35 months). An increase ≥10% of LV ESV at 6 months exhibited the worst survival (36% vs 85%, log rank 29.6, p<0.0001). The univariate determinants of LV remodeling at logistic regression analysis were: ischemic aetiology (p=0.007), chronic kidney disease (p=0.0085), mitral regurgitation (p=0.0047), NYHA class (p=0.0046), E/e' (p=0.0023), BNP (p=0.0002), peak cardiac power output (p=0.0002), peak CO (p=0.0002), peak LV ESV (p<0.0001), peak LV EF (p<0.0001), peak ESPVR (p<0.0001), and peak COPM (p<0.0001). Peak CPOM resulted the only independent predictor of LV remodeling (p=0.03), after adjusting for demographics, clinical, biochemical, and echocardiographic data.
Conclusion: Patients with HFrEF that developed LV remodeling during follow-up had the worst outcome. A compromised ESE-derived peak COPM was the most powerful predictor of LV remodeling.

CHRONIC HEART FAILURE – EPIDEMIOLOGY, PROGNOSIS, OUTCOME

P3747
The importance of the number of administrations for reducing heart failure readmissions

H. Yumoto, M. Saito, S. Takaoka, T. Yoshida, S. Inaba, T. Sumimoto. *Kitaishikai Hospital, Ozu, Japan*

Background: Readmission is a frequently occurring and serious economical and clinical issue associated with heart failure (HF). The majority of elderly patients with HF are frail and suffer from multiple chronic comorbidities. Consequently, they tend toward higher dependency on medications. Polypharmacy is a risk factor associated with adverse drug reactions and outcomes. Furthermore, an increased number of administrations may worsen drug adherence, which may lead to higher incidences of readmission.
Purpose: We aimed to test the hypothesis that increased administrations per day may be associated with readmission in patients with HF, independent of and incremental to conventional risk factors and polypharmacy.
Methods: We conducted a retrospective study of 452 consecutive patients with HF (median age, 81 years) who were admitted to the Hospital. They were followed up for determining the all-cause and HF-specific readmissions over a median of 2.5 years. The number of drug administrations per day and the number of kinds of medicines administered at the time of discharge from index admission were investigated. Drug adherence was confirmed by the presence of leftover medicine six months after discharge from index admission in 191 patients who regularly visited the Hospital.
Results: All-cause and HF-specific readmissions were observed in 269 (60%) and 145 patients (32%), respectively. The median number of administrations was three and the median number of kinds of administered medicines was nine. When the patients were divided into groups based on these median values, both outcomes were associated with a higher number of the kinds of medicine and a higher number of administrations (Figure A). The model is based on clinical parameters for predicting HF-specific readmission and was significantly improved by adding a higher number of kinds of administered medicine, and was further improved by adding a higher number of administrations (Figure B). However, a higher number of administrations did not significantly improve the model power for predicting all-cause readmission (chi-squared test: 38.0–39.4, p=0.18). A higher frequency of leftover medicine was observed in patients with higher number of administrations than in patients with lower number of administrations, but the value was not noted to be significant (22% vs 18%, p=0.62).

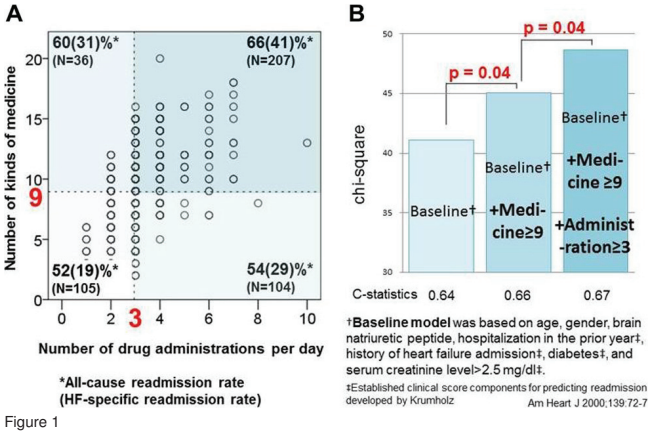


Figure 1

Conclusion: Aside from polypharmacy, the number of administrations may be an important factor in reducing the occurrence of HF-specific readmission. Prospective analysis for the association between the number of administrations and drug adherence is warranted for the confirmation of this result.

P3748
Are there gender differences in humoral activation of chronic heart failure patients?

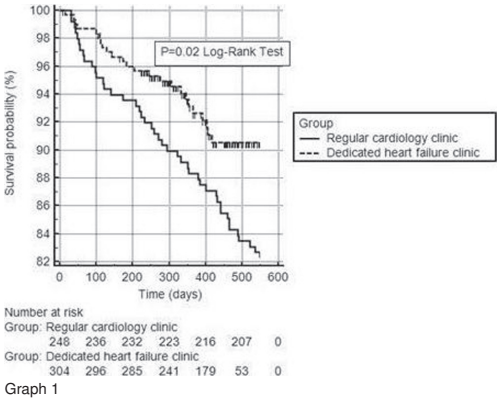
L. Spinarova[1], J. Spinar[2], M. Goldbergova-Pavkova[3], J. Parenica[2], O. Ludka[2], K. Labr[1], M. Spinarova[1], F. Malek[4], P. Ostadal[4], J. Tomandl[5], K. Benesova[6], J. Jarkovsky[6]. *[1]Masaryk University,St. Anne's Faculty Hospital,1st Department of Internal Medicine-Cardioangiology, Brno, Czech Republic; [2]University Hospital and Masaryk university, Internal Cardiologic Dpt, Brno, Czech Republic; [3]Masaryk University, Pathophysiologic Dept, Medical Faculty, Brno, Czech Republic; [4]Homolka Hospital, Cardiologic Dpt, Praha, Czech Republic; [5]Masaryk University, Biochemistry Dept, Medical Faculty, Brno, Czech Republic; [6]Masaryk University, Faculty of Medicine, Institute for Biostatistics and Analysis, Brno, Czech Republic*

The aim of the study is to find if there are the gender differences in chronic heart failure and if it reflects in the levels of classic humoral substances NT-proBNP and new ones: copeptin and mid- regional pro-adrenomedullin (MR-proADM).
Methods: FAR NHL (FARmacology and NeuroHumoraL activation) registry is a database of patients treated in departments with specialized HF care in three University hospitals. The patients should have been treated for systolic HF: ejection fraction of left ventricle (EF) <50% and stable for at least 1 month, follow up was 1 year. Primary endpoint after 1 year follow-up was: death or hospitalization for decompensation of HF or heart transplantation (HTX) or LVAD implantation.
Results: To whole FAR NHL registry a total amount of 1100 patients were included, 889 males and 211 females. Mean age was 63.4 +12.0 in males and 66.7+12.3 years in females (p<0.001). Men had more often the diagnosis of ischemic heart disease 58.5 vs 46.9% (p<0.003) and previous myocardial infarction 45.4 vs 32.3% (p<0.001). There were no differences in systolic, diastolic blood pressure and heart rate. Mean EF was 30.2% in males vs 32.3% in females (p<0.003). There were no differences in the levels of NT-proBNP 1 466.8 pg/ml in males vs 1348.2 pg/ml in females (NS).
There were no differences between males and females in the levels of copeptin: 16.4 vs 16.3 pmol/l (NS) and MR-proADM: 0.65 vs 0.64 nmol/l (NS).
Conclusion: Although there are differences in etiology and some clinical features: women with chronic heart failure are older, less with ICD etiology and have higher EF than men, there were no gender differences in the humoral activation evaluated by NT-proBNP, copeptin and MR-proADM.

P3749
Management in a dedicated heart failure clinic is associated with improved over-all survival

D. Murninkas[1], Z.I. Iakobishvili[1], H.J. Jino[1], S.B. Birkenfeld[1], E.Y. Yuhananov[1], D.H. Hasdai[2]. *[1]Tel-Aviv-Jaffa District, Clalit Health Services, Cardilogy, Tel Aviv, Israel; [2]RABIN MEDICAL CENTER, CAMPUS BEILINSON, PETACH TIKVA, Israel*

Background: We recently demonstrated that patients managed in a dedicated heart failure (HF) clinic receive better evidence-based pharmacotherapy and attain better functional capacity. However, it remains unknown whether this is also translated into better over-all survival.
Aims: To determine whether management in a dedicated HF clinic confers survival benefit.
Methods: A dedicated HF clinic was established in 1.5.2016, and all patients with ejection fraction ≤0.4 were actively solicited to enroll. The control group consists of all eligible patients who elected not to enroll at the index date. The treatment group consists of all patients who elected to enroll from the index date until 31.10.2017. We analyzed over-all mortality.
Results: As compared to the 248 patients in the control group with a mean (±SE) follow up of 519±6 days, the 304 patients gradually enrolled in the dedicated HF clinic over a mean (±SE) follow up of 498±8 days were more likely to be males (81.2% vs 73.0%, p=0.03) and to have worse baseline heart failure symptoms (56% in NYHA class 3–4 as compared to 38%, p<0.001), but were of similar age (mean age 71.4±0.7 years vs 71.4±0.5, p=NS), had similar ejection fraction values (31.8±0.4% vs 32.6±0.5%, p=NS), and were similarly likely to have ischemic



Graph 1