

Journal für Kardiologie

Austrian Journal of Cardiology

Österreichische Zeitschrift für Herz-Kreislaufkrankungen

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18th International Meeting of the Alpe-Adria
Association of Cardiology, September 16-18
2010, Vienna - Abstracts

*Journal für Kardiologie - Austrian Journal
of Cardiology 2010; 17 (Supplementum A)
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**18th International Meeting of
the ALPE-ADRIA Association of
Cardiology "New Developments
in Cardiology" Vienna
September 16-18, 2010 Old
General Hospital - Campus
Abstracts**

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18th International Meeting of the Alpe-Adria Association of Cardiology September 16–18, 2010, Vienna

Abstracts

BEST ABSTRACTS FOR ORAL PRESENTATIONS

Benefit of omega-3 fatty acids supplementation demonstrated in early stage of diabetes

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Background Cardiac dysfunction and heart rhythm disturbances are frequent complications of diabetes mellitus in human, while impaired cell-to-cell communication ensured by connexin (Cx) channels may be involved. Omega-3 fatty acids (omega-3 FA) have been reported to reduce cardiovascular diseases and arrhythmias. We, therefore, investigated whether myocardial Cx43 mRNA and protein expressions are altered in spontaneously diabetic rats and whether they may benefit from omega-3 FA supplementation.

Methods Goto-Kakizaki rats at pre-diabetic stage and age-matched healthy rats were divided into un-treated and treated for 2 month with omega-3 FA (200 mg/kg/day, Vesteralens, Norway). Selected biochemical and biometrical parameters were registered. Left ventricles were taken to perform Cx43 mRNA gene expression analyses by the real-time PCR technique and expression of Cx43 protein and protein kinase C-epsilon (which phosphorylates Cx43) by western blotting. Susceptibility of the isolated perfused heart to aconitine-induced ventricular fibrillation (VF) was examined as well.

Results Omega-3 FA significantly suppressed elevation of blood glucose, cholesterol and triglycerides in spontaneously diabetic rats. Myocardial Cx43 mRNA and protein levels were higher in diabetic than non-diabetic rats and increased due to omega-3 FA in both groups. Ratio of phosphorylated (functional) to non-phosphorylated Cx43 was lower in diabetic than healthy rats while enhanced upon omega-3 FA. It was accompanied with increase expression of PKC-epsilon. Diabetic rat heart was much prone to VF compared to healthy and particularly omega-3 treated rats.

Conclusion Rats at early stage of diabetes benefit from omega-3 supplementation due to suppression of risk markers and up-regulation of Cx43 linked with decreased arrhythmia susceptibility. Findings challenge to investigate the effect of omega-3 FA intake itself or in combination with anti-diabetic drugs in clinic.

This work was supported by VEGA 2/0049/09 and APVV SK-UA-0022-09 grants.

Complementary role of copeptin and high-sensitivity troponin in predicting outcome with stable chronic heart failure

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Background Copeptin, the c-terminal part of the vasopressin pro-hormone, has elevated concentrations after myocardial infarction

and predicts adverse outcome. It has been suggested that the combined determination of copeptin with cardiac troponins (cTnT) in patients with chest pain might accelerate the early diagnosis of myocardial injury. In the present study we investigated whether this complementary role of copeptin and cTnT in detecting myocardial stress could also be used for identification of high-risk patients with chronic stable heart failure.

Methods We measured copeptin and cTnT (high-sensitivity troponin T assay) in 172 consecutive patients with stable chronic heart failure. Patients were followed for all-cause mortality and re-hospitalization due to heart failure during a median time of 796 days.

Results Plasma copeptin showed modest but significant correlation with hs-cTnT ($r = 0.4$, $p < 0.001$), age ($r = 0.36$, $p < 0.001$), creatinine ($r = 0.52$, $p < 0.001$) and Nt-proBNP ($r = 0.42$, $p < 0.001$). Both copeptin ($p = 0.002$) and hs-cTnT ($p = 0.005$) concentrations increased significantly with higher NYHA classes. One hundred nine (58%) patients had hs-cTnT concentrations (> 14 pg/ml) and 104 patients (55%) had copeptin concentrations above the normal (16.4 pmol/l). In survival analysis both, elevated copeptin and hs-cTnT concentrations were significant predictors of outcome ($p < 0.001$ for both). Moreover, higher copeptin levels were related to higher risk of death or hospital re-admission both among patients with or without elevated hs-cTnT concentrations (< 14 pg/ml: HR 1.86, $p = 0.12$ and > 14 pg/ml: HR 1.81, $p = 0.027$; respectively). The combination of both markers showed a graded highly significant association with impaired outcome, which was independent of plasma Nt-proBNP.

Conclusion Our data suggest that hs-cTnT and copeptin could be used in combination to predict the outcome of patients with chronic stable heart failure. Future studies should evaluate how these biomarkers might guide our therapeutic decisions and help to improve clinical outcome.

Tailoring individual antiplatelet therapy after coronary stent implantation has the potential to abolish early definite stent thrombosis in compliant patients

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Background Early stent thrombosis (ST) occurs in up to 3 % of patients after coronary stent implantation and is associated with high residual platelet reactivity on standard dual antiplatelet therapy (DAP). Whether tailoring DAP with Multiple Electrode Aggregometry (MEA) has the ability to improve inhibition of platelet aggregation (IPA) and clinical outcome is controversial.

Methods Prospective, single-center cohort observation of 330 consecutive patients undergoing percutaneous coronary intervention (PCI) between September 24th 2008 and January 31st 2010. On-treatment platelet reactivity was measured by MEA, a new generation impedance aggregometer (Multiplate Analyzer, Dynabyte Medical, Munich, Germany) on average after 12 hours of loading. In case of

clopidogrel non/low response (area under the curve [AUC]: > 57 U ADP-induced aggregation), individual DAP was tailored with either repeated 600 mg clopidogrel loading doses (up to 3 times) until June 2009, or 60 mg prasugrel loading thereafter. 30 days follow up was obtained either by standard outpatient care, telephone contact or web.okra database search. The primary end point was definite early ST (acute or sub acute within 30 days). The secondary endpoint was defined as a composite of probable ST (according to ARC criteria) and cardiovascular death within 30 days.

Results Demographics: ACS indication for PCI (7 % STEMI, 39 % NSTEMI) was present in 46 % of the 330 consecutive patients (31 % female, 33 % diabetics, mean age 65 ± 12 , range 29–90). Majority of cases (78 %) revealed a complex lesion morphology (b2/c), with LM and/or LAD PCI performed in 10 % and 58 %, respectively. Two or three vessel disease was treated in 53 %. On average 2.2 stents/patient (range 1–10) were implanted (total stent length 8–190 mm). 88 % of patients received DES (Xience 47 %, Resolute 22 %, Biomatrix 22 %). Platelet reactivity: 12 hours after 600 mg clopidogrel loading, non- or low response occurred in 32 % of patients (AUC: 73 ± 22 U vs. 28 ± 12 U, $p < 0.0001$) with a significant higher proportion of diabetics (39 % vs. 28 %, $p = 0.04$) and overweight (BMI 29.5 ± 4.9 vs. 28.2 ± 4.5 , $p = 0.03$). Subsequently, 11 % received 60 mg prasugrel loading and 21 % 600 mg clopidogrel (up to 3 times in 3 %) to reach sufficient IPA levels (27 ± 16 U; $p < 0.0001$ vs. initial response). Clinical endpoints: At 30 day follow-up, no primary end point occurred in patients with DAP compliance (0 %). Only one patient (0.3 %), discontinuing DAP on the 27th day after PCI, experience a ST on day 32. The secondary endpoint occurred in 8 patients (2.4 %). One patient with known ischemic cardiomyopathy died suddenly 10 days after PCI for NSTEMI, which qualifies as probable ST. The other seven patients died within the index hospitalization, due to cardiogenic shock, CPR with hypoxic brain damage or massive cerebral embolisation of a ventricular thrombus, without evidence for ST on autopsy.

Conclusion Tailoring individual antiplatelet therapy to improve IPA levels below 57 U AUC with MEA is capable of abolishing early definite ST even in a not-low risk patient cohort with complex coronary anatomy, high percentage of ACS and usage of 2nd generation DES. Further observations should prove whether this benefit extends also to long term follow up.

Chronic and acute treatment with atorvastatin and omega-3 fatty acids protects from malignant arrhythmias. Are intercellular connexin channels implicated?

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Background It has been reported that lipid lowering compounds atorvastatin (Ato) and omega-3 FA exhibit antiarrhythmic effects in humans. However, underlying mechanisms are not elucidated yet. Our previous and others studies point out a crucial role of intercellular connexin (Cx) channels in the genesis of malignant arrhythmias. We examined, therefore, whether chronic and acute treatment with these compounds provides protection of the heart from ventricular fibrillation (VF) and whether myocardial distribution and/or expression of Cx43 are involved.

Methods Chronic experiments were conducted on VF prone male hereditary hypertriglyceridemic (HTG) rats that were treated with Ato (0.5 mg/kg/day) and omega-3 FA (EPA+DHA, 400 mg/kg/day) for 2 mth. VF inducibility was tested on isolated working heart preparation using burst electrical stimulation. Immunoblotting and immunostaining were performed to estimate Cx43 expression and distribution. In acute experiments the isolated heart of male and female HTG rats was perfused with 1.5, 7, 15 μ mol atorvastatin, EPA or DHA during 10 min prior el. stimulation. Bolus (150 μ mol) of either compound was applied to fibrillating heart to examine its defibrillation efficacy.

Results Chronic application of Ato and omega-3 FA resulted in a significant increase of stimulation threshold for VF to 40 ± 0.2 mA and 45 ± 0.2 mA vs 15 ± 0.1 mA. Total and phosphorylated forms of Cx43 were elevated in HTG compared to healthy rat hearts, while atorvastatin and omega-3 FA normalized it. Myocardial distribution of Cx43 was not affected by the treatment. Acute application of Ato, EPA and DHA reduced VF incidence to 33 %, 71.4 % and 80 % in male and to 60 %, 75 % and 60 % in female rats. Bolus of either EPA or DHA administered directly to fibrillating heart caused defibrillation, while atorvastatin was less efficient.

Conclusion It is concluded that both chronic and acute administration of atorvastatin and omega-3 FA protects from malignant arrhythmias. Chronic antiarrhythmic effects were associated with modulation of myocardial Cx43 expression, while acute anti- and defibrillating effects suggest direct modulation of Cx43 channel function. Findings point out the role of Cx43 channels in pleiotropic actions of statins and novel approaches in prevention of malignant arrhythmias.

This work was supported by VEGA 2/0049/09 and APVV SK-UA-0022-09 grants.

Shock burden and efficacy of antitachycardia pacing in patients with implantable cardioverter defibrillator showing multiple ventricular tachycardia morphologies during long-term follow-up

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Background The efficacy of antitachycardia pacing (ATP) is known to be related to the cycle length (CL) of ventricular tachycardia (VT) episodes in patients with implantable cardioverter defibrillators (ICD). We examined whether the variability in morphologies of VT episodes influences ATP effectiveness and the frequency of shock therapy.

Methods 41 patients with an ICD implanted for a sustained monomorphic VT were enrolled in this study. VT detection intervals were programmed according to the CL of the index arrhythmia. VT CL and morphology of different VT episodes stored by the device were analyzed.

Results The mean follow-up (FU) period of the 41 patients was 30.3 ± 12.3 months. 780 of the 833 analyzed episodes were treated with ATP with a success rate of 78 %. The mean CL of the episodes terminated successfully by ATP was 346.0 ± 44.9 msec, while 333.9 ± 55.6 msec in those with no termination after ATP. 6 (17.6 %) of 34 patients with at least two VT episodes during FU presented with a single VT morphology, while in the remaining 28 (82.4 %) multiple VT morphologies were detected. ATP was effective in 95.6 %, 85 %, and 64.4 % of patients with 1, 2 and 3 or more VT morphologies respectively ($p < 0.0001$), while shock burden was 4.2 %, 19.3 % and 24.7 % in these patient cohorts ($p < 0.0001$).

Conclusion Multiple VT morphologies are common in patients receiving ICD for sustained monomorphic VT. In patients presenting with numerous VT morphologies during follow-up the efficacy of ATP decreases while shock burden increases.

Asymptomatic microembolic lesions unmasked by magnetic resonance imaging after transcatheter aortic valve implantation

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Background Transcatheter aortic valve implantation (TAVI) is an emerging alternative treatment option for patients with symptomatic severe aortic stenosis (AS) and high risk for operative valve replacement. However, stroke can be a catastrophic complication of TAVI. Stroke has been reported to occur in up to 6.3 % of patients undergoing

ing TAVI. This study aimed to assess frequency and extent of subclinical microembolic cerebral lesions after TAVI.

Methods In our institution, 66 patients (20 male, 46 female; mean age 81 ± 5 years) with symptomatic severe AS underwent TAVI between July 2008 and April 2010. The current third generation self-expanding CoreValve prosthesis was implanted via transfemoral access using the current 18 French delivery catheter system. 57 patients were scheduled for cerebral diffusion-weighted magnetic resonance imaging (DW MRI) two days before and up to six days after TAVI. Nine patients were not eligible due to pacemaker implantation prior to enrolment. 38 patients underwent both pre- and postinterventional DW MRI, while 19 patients could not undergo postinterventional MRI and had to be excluded from analysis (need for permanent pacemaker implantation, $n = 5$; critical status, $n = 7$; MRI not available, $n = 6$; deceased, $n = 1$).

Results Thorough physical examination did not reveal any changes in neurological status after TAVI. However, comparison of pre- and postinterventional DW MRI showed that 34 of 38 patients (89.5 %) had newly acquired bright lesions ($p < 0.001$) in accordance with subclinical cerebral embolisation: class I (1–3 new bright lesions), $n = 14$ (36.8 %); class II (4–7 new bright lesions), $n = 11$ (28.9 %); class III (≥ 8 new bright lesions or cortical infarction), $n = 9$ (23.7 %). Only in four patients (10.5 %) there was no evidence for any newly acquired bright lesion (class 0).

Conclusion TAVI with the self-expanding CoreValve bioprosthesis is an emerging alternative treatment option for high-risk patients with symptomatic severe AS. Albeit risk of stroke is low, the vast majority of patients show newly acquired bright lesions in DW MRI compatible with subclinical cerebral embolisation. In the near future embolic protection devices along with a more detailed assessment of the aorta, improved techniques and less traumatic catheters might contribute to minimize cerebral microembolisation and even stroke.

Plasma adiponectin, but not asymmetric dimethyl-arginine (ADMA) level is linked via insulin resistance to endothelial dysfunction in normotensive offspring of subjects with essential hypertension

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Background Epidemiological and clinical studies have shown that the patients with essential hypertension (EH) exhibit metabolic abnormalities such as hyperinsulinaemia/insulin resistance (IR), lipid disorders and derangement in adiponectin secretion by adipose tissue. Hypoadiponectinaemia was found to worsen insulin sensitivity. Altered insulin signaling (NO-dependent) in endothelium may represent a common candidate mechanism underlying the association between IR and endothelial dysfunction. Indeed, association has been proposed to exist between IR and elevated ADMA level, an endogenous NO synthase inhibitor. The aim of the study was to determine some metabolic abnormalities in normotensive offspring of subjects with essential hypertension (familial trait – FT) and to examine their relations to endothelium-dependent (NO-mediated) dilation of the brachial artery (BA).

Methods Study encompassed 77 subjects of whom 38 were normotonic with FT aged 28–39 (mean 33) years and 39 age matched controls without FT. Insulin, adiponectin and ADMA plasma levels were determined by radio-immunoassay kit. Using high resolution ultrasound, BA diameters at rest and during reactive hyperaemia (flow-mediated dilation – FMD) were measured.

Results Subjects with FT had higher insulin and lower adiponectin levels than control group (13.65 ± 6.70 vs 7.09 ± 2.20 mE/L and 13.60 ± 5.98 vs 17.27 ± 7.17 μ g/mL respectively; $p < 0.001$), which are negatively interrelated ($r = -0.33$, $p = 0.003$). The ADMA levels were comparable in both groups. The study group had worse FMD than controls (5.89 ± 3.00 vs 10.09 ± 2.11 %; $p < 0.001$). IR was independently associated with FMD (partial $p = 0.029$ in multivariate model, $R^2 = 0.46$, $p < 0.001$).

Conclusion Our results indicate that increased insulin and decreased adiponectin levels along with endothelial dysfunction pre-exist in normotensive subjects with FT. Increased IR and hypoadiponectinaemia are interrelated but only hyperinsulinaemia had independent adverse influence on endothelial dysfunction. ADMA probably plays no pathogenetic role in pre-hypertensive period of EH.

ABSTRACTS ACCEPTED FOR MODERATED POSTER SESSION

■ Session A1: Atrial Fibrillation I

Clinical predictors of late arrhythmia recurrence following pulmonary vein isolation for atrial fibrillation

A1-1

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Background The success rate of pulmonary vein isolation (PVI) for atrial fibrillation (AF) varies considerably in different series. We studied pre-procedural predictors of AF recurrences following PVI.

Methods Fifty-six consecutive patients with drug refractory, symptomatic paroxysmal (75 %) or persistent/permanent (25 %) AF were included. Pulmonary vein isolation with or without additional linear ablation was performed in all patients.

Results Arrhythmia recurrence, defined as AF or regular atrial tachycardia after the first 8 weeks after ablation, occurred in 18 % of patients. Success rate, defined as no arrhythmia recurrence without antiarrhythmic drugs was 62 %. Patients with recurrence were older (64 vs. 52 years, $p = 0.007$) and more likely to have significant valvular disease and persistent/permanent AF, than patients without (38 % vs. 3 %, $p = 0.014$ and 75 % vs. 14 %, $p = 0.001$, respectively). Success rate was higher in case of paroxysmal AF (74 % vs. 27 %, $p = 0.006$) and smaller left atrial diameter (46 vs. 54 mm, $p = 0.012$). Multivariable logistic regression analysis identified persistent/permanent AF and left atrial diameter as independent predictors of AF recurrence and unsuccessful PVI ($p = 0.003$ and $p = 0.034$, respectively).

Conclusion Persistent/permanent AF and larger left atrial diameter are predictors of failure of PVI. These data help patients' selection for catheter ablation of AF.

Impact of pulmonary vein triggers on spatial distribution of dominant frequencies during paroxysmal atrial fibrillation

A1-2

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Background Paroxysmal atrial fibrillation (PAF) demonstrates a left atrial (LA) to right atrial (RA) frequency gradient upon dominant frequency (DF) analysis. We aimed to investigate temporal stability of DF distribution across the atria during PAF and its relation to the specific pulmonary vein (PV) triggering PAF.

Methods Ten patients with symptomatic PAF from two centres (7 males, age 55.9 ± 10 years) were prospectively studied. Isoproterenol infusion was used to induce ectopic activity initiating PAF. Endocardial activation pattern of ectopic beats was used to identify triggering PVs. Patients with triggers from other atrial regions were excluded. Five minutes after induction 2 recordings, separated by at least 10 minutes, were made with a decapolar circular mapping catheter sequentially from each PV ostium and the LA posterior wall (LAPW), simultaneously with recordings from the coronary sinus (CS) and RA. Fast Fourier transform was performed on 2 consecutive 5 second episodes of the intracardiac signal from each bipole. Highest power frequency was determined as the DF. DFs from the two 5 second episodes were averaged and the maximum value of each structure was used for analysis. Standard deviation of DFs (SD-DF) recorded from all bipoles in each PV was used as a measure of ostial DF variability.

Results There was a significant frequency gradient from the triggering PVs to the other PVs, LAPW, RA and CS (7.75 ± 1.49 Hz vs.

6.41 ± 0.96 Hz vs. 5.69 ± 0.46 Hz vs. 5.57 ± 0.78 Hz vs. 5.52 ± 0.58 Hz, respectively, $p < 0.0001$). Triggering PVs showed the highest DF in 8/10 and 10/10 patients for the two recordings respectively. SD-DF correlated with maximal DF for each PV ($r = 0.52$, $p < 0.0001$). Triggering PVs also showed higher ostial DF variability as suggested by the higher SD-DF in comparison to the other PVs (0.57 ± 0.51 Hz vs. 0.27 ± 0.30 Hz, $p = 0.041$). The time interval between the two recordings was 24.1 ± 5.99 (range 14–35) minutes. DF values of the two recordings from all structures correlated well ($r = 0.77$, $p < 0.0001$) suggesting good temporal stability of DF gradients.

Conclusion Ostia of triggering PVs show the highest DFs in patients with PAF. There is a significant frequency gradient from the triggering PV to the other PVs and to the rest of the atria. This suggests that in some patients with PAF, triggers and substrate essential for AF maintenance can be located in the same structures. DF values show good temporal stability.

Effect of left atrial radiofrequency ablation on the esophagus using a novel three-dimensional ablation catheter family

A1-3

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Background Extensive RF delivery during atrial fibrillation (AF) ablation procedures may lead to esophageal damage due to its anatomical course in close proximity of the left atrium (LA). Although lethal esophageal fistulas rarely occur, endoscopic studies have shown that ulcerative lesions are relatively common even after cryoballoon ablation, a technique considered to be safer than those using radiofrequency (RF) energy. The aim of our study was to prospectively evaluate the acute effect of the left atrial RF ablation on the esophagus, using a novel ablation system in the left atrium (Medtronic, Ablation Frontiers, Carlsbad, CA, USA).

Methods Patients (pts) with symptomatic AF underwent LA ablation using multielectrode RF ablation catheters designed for pulmonary vein isolation (PVAC), ablation on the LA septum (MASC) and along the posterior atrial wall (MAAC). RF energy was delivered in different ratio of bipolar and unipolar mode, using a target temperature of 60 °C and a maximum power of 10 W. Procedure endpoint was electrical isolation of all pulmonary veins in all patients. Sites showing complex atrial fractionated electrograms (CAFE) were also targeted in those with permanent AF. Esophago-gastroscopy was performed within 24 hours postablation in all patients.

Results A total of 25 pts (14 males), mean age 54.4 ± 11.06 year (29–67), underwent LA ablation. Twelve patients had had previous PVI procedures (ten of them cryoballoon ablation). PVI was performed in all pts, and additional ablation using MASC and MAAC was performed in 9 pts. A total of 81 PV were targeted. Acute successful isolation was achieved in 73 (90 %) of PVs. The mean procedure time was 138 ± 56.6 min (65–250) and mean fluoroscopy time was 38.7 ± 15.2 min (23.6–79.6). The mean PVAC time was 6.2 ± 4.5 min (2–19) and the mean number of application for PV ablation was 7.1 ± 5.24 (1–22). More applications were performed in the superior than in the inferior veins: (8.2 ± 5.6 vs 5.9 ± 4.6) and in the left sided than in right sided PVs (8.3 ± 5.59 vs 5.67 ± 4.45). The number of applications using MASC and MAAC was 4.25 ± 2.96 and 7.25 ± 3.45 , while mean ablation time was 6.25 ± 4.25 min and 4.57 ± 2.42 min respectively. Esophago-gastroscopy showed no lesion attributable to the ablation procedure in any patient.

Conclusion Based on our initial experience, extensive left atrial ablation with 3D multielectrode catheters using different ratio of unipolar and bipolar RF delivery causes no significant thermal injury to the esophagus.

Pulmonary vein isolation with Mesh Ablator versus Cryoballoon: six-month results

A1-4

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Background Catheter-based isolation of pulmonary veins (PVs) has emerged as established therapy to treat patients with paroxysmal atrial fibrillation. An increasing number of specific devices becomes available that should simplify the procedure but remain as effective as the current gold standard of point by point ablation using irrigated tip radiofrequency ablation. The purpose of the study was to compare the results of a simplified approach of ostial pulmonary vein (PV) ablation using the High Density Mesh Ablator Catheter (MESH) versus the Cryoballoon (CRYO).

Methods One hundred and seventeen patients with paroxysmal atrial fibrillation (AF) scheduled for a first procedure of PV isolation were screened by cardiac computed tomography for anatomical suitability to undergo a simplified procedure with a circumferential ostial ablation catheter. The procedure was finally performed in 76 patients (43 males, mean age 63 years) matching the criteria of 4 clearly separated PVs with an ostial diameter of 15–25 mm. The first consecutive 43 patients were treated with the MESH, the following 33 consecutive patients were treated with the CRYO. The procedures were performed with up to 3 times 5 minutes of either pulsed radiofrequency energy delivered by the MESH or cryo energy applied with the CRYO. Per protocol, no additional single tip ablation catheter was used in case a PV could not be isolated. Based on a personal log of duration and frequency of symptoms and repetitive 24h-ECG recordings, the clinical success rate was evaluated 6 months after a single procedure. Only patients free of AF off antiarrhythmic drugs were counted as clinical success.

Results Isolation of all 4 PVs could be achieved in 40 patients (93 %) in the MESH group compared to 29 patients (88 %) in the CRYO group ($p = \text{ns}$). Incomplete technical results, consisting of isolation of 3 PVs only (4 P), and 2 PVs only (3 P) were distributed equally among the two treatment groups. The mean procedure time of the MESH that enables ablation and mapping (178 ± 33 min) tended to be shorter compared to the CRYO that requires an additional mapping catheter to demonstrate ablation results (194 ± 46 min) ($p = \text{ns}$). Major complications consisted of one tamponade in the MESH group and one reversible phrenic nerve palsy in the CRYO group. After 6 months, the clinical success rate was 44 % (19/43 P) in the MESH versus 64 % (21/33 P) in the CRYO group ($p < 0.05$).

Conclusion Both methods of simplified circumferential PV ablation reveal a high acute success rate with a shorter procedure time in favor of the MESH. However, the clinical 6 months results of the MESH are statistically significant inferior compared to the CRYO.

Predictive value of plasma von-Willebrand Factor and ADAMTS13 as markers of endothelial dysfunction in patients with atrial fibrillation

A1-5

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Background Von-Willebrand factor (VWF) plays an essential role in platelet adhesion and thrombus formation. It is degraded into smaller and less active forms by ADAMTS13. Patients with atrial fibrillation (AF) have higher plasma VWF and lower ADAMTS13 antigen levels compared to age- and sex-matched control subjects. A significant correlation of the plasma levels with echocardiographic measures of left atrial dimensions and left atrium appendage flow velocity suggests a link to higher risk of intra-atrial thrombus formation. No outcome data are available relating plasma concentrations of VWF and ADAMTS13 in patients with AF to the incidence of

major adverse cardiovascular events (MACE) or all cause death. We therefore investigated whether a high ratio of plasma levels of VWF and ADAMTS13 might predict MACE and all-cause mortality in patients with AF.

Methods In this observational study, we measured plasma levels of VWF and ADAMTS13 in 284 consecutive patients with AF by means of commercially available assays and related these values to the subsequent incidence of MACE and all-cause mortality.

Results Plasma VWF/ADAMTS13 ratio was a significant predictor of MACE ($p < 0.001$) and all-cause mortality ($p < 0.001$) with a mean follow up duration of 1.379 days. A Cox regression analysis revealed that patients with a VWF/ADAMTS13 ratio above the median (23.13 (IQR 16.92–34.28)) had a significantly higher risk for MACE (HR: 2.79 (95 % CI 1.30–5.98) $p = 0.009$) and all-cause death (HR: 4.69 (95 % CI 2.24–9.81) $p < 0.001$) compared to patients with ratios below the median.

Conclusion Among patients with AF a high ratio of VWF/ADAMTS13 is predictive for MACE and all-cause mortality. Therefore endothelial dysfunction or VWF and its cleaving protease ADAMTS13 itself might play an important role in the mechanisms behind MACE and all-cause mortality among AF patients. This might be a novel target for future treatment strategies or an additional help to risk stratification in AF patients.

Cryoballoon pulmonary vein isolation in patients with symptomatic paroxysmal atrial fibrillation – mid-term follow-up

A1-6

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Background Pulmonary vein (PV) isolation using cryoballoon (CB) technology has been introduced worldwide to treat symptomatic paroxysmal atrial fibrillation (PAF). The technique is feasible although limited information is available on the mid and long-term outcome. Objectives of our study were to determine the mid-term (6–18 months) effect and safety of the first CB ablation procedure in consecutive PAF patients.

Methods Between July of 2008 and November of 2009 CB approach was performed in 49 (37 men, mean 57 ± 9.7 years old, range 23–73 years) PAF patients failed at least two antiarrhythmic drugs (AAD). After CB ablation the complete isolation of the PVs was checked with circular mapping catheter and redo CB or focal cryoablations (4 %) performed in case of incomplete block. The endpoint of the ablation procedure was to achieve complete isolation of all PV's in each patient. During the 3, 6, 12 and 18 months follow up visits 12 lead ECG, chest X-ray, pacemaker control (in patients with previously implanted device) and Holter recordings were performed. Since November of 2009 transtelephonic ECG (TTECG for 10 days) and phone questionnaire were taken.

Results The mean left atrial volume was 34.9 ± 9.9 ml/m² and the LVEF was 63 ± 5 %. The mean X-ray exposition time was 38 ± 11 and the procedure time 142 ± 33 minutes respectively. Patients were followed for 11 ± 4.1 months. Complete isolation of all PV's achieved in 97 % with the combined (CB and focal cryoablations) technique. Any type of atrial arrhythmias were detected in 39 % of the patients but 72 % of them were free of any symptoms and 11 % experienced significant clinical improvement. Only 17 % of our patients remainsymptomatic. After 6 months of ablation 25 % of the patients were AAD free. There was two temporary and one permanent (lasting 22 months) right phrenic nerve paralysis.

Conclusion The cryoballoon ablation technique is an effective method for the ablation treatment of the PAF patients. The method is safe; only one patient suffered permanent but no life threatening complication.

■ Session A2: Cases I

From the neurologist to the heart surgeon: a peripartum endocarditis, as a cause of stroke – case report

A2-1

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Background The 32 year old woman had a childhood anamnesis of unexplored heart murmur. Six weeks after delivery taking place under antibiotic prophylaxis, she had a pain and a minimal edema in her right leg after a long walking previously. She visited the Emergency Care Unit, where elevated levels of D-Dimer and CRP were found, however, the ultrasound investigation did not show any sign of thrombosis. Two weeks later the patient has got a severe hemiparesis on the left side, and she was transported to the Department of Neurology urgently. CT angiography showed the occlusion of the right middle cerebral artery, and the early CT did not show any ischemic signs. The patient has fever and systolic murmur of 2/6 grade and a proto-meso diastolic murmur of 3/6 grade was detected.

Methods Diagnostics: Trans-Thoracic Echocardiography (TTE) showed bicuspid, roughly thickened aortic valve. Under the valve, in the left ventricular outflow tract, there was a 3.5 × 15 mm “kissing vegetation” attached to the septum, having a mobile part of 11 mm length, threatening with a high chance for new embolia. In addition there was an aorta insufficiency of grade II–III.

Questions of intervention:

- 1) A conservative treatment of the endocarditis and the stroke? (The risk was a new and possible lethal embolia.)
- 2) An urgent heart surgical operation? (The risk was the turning of the stroke to a fatal intracranial bleeding.)

Decision: The endocarditis itself might have a 17 fold increase in the chance for a second stroke, it was here aggravated by the presence of a large, mobile vegetation. On the other hand, the risk of bleeding could be less than 10 %, We carried out the operation as soon as it was possible, because of the vital indication.

The operation: aortic valve replacement was performed with the excision of the infected, vegetation containing part of the septum.

Results There were no bleeding complications, and the patient woke up with an unchanged neurological and stabile cardiovascular status. The postoperative follow up has still been ongoing.

Conclusion As the surgical intervention could be carried out within four hours from the arrival of the stroke patient, the efficient team-work could improve the chance for survival and eventual healing for this young mother.

Recurrent multiple pulmonary vein stenoses following catheter ablation of paroxysmal atrial fibrillation

A2-2

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Background Radiofrequency ablation of ectopic foci within pulmonary veins and surrounding atrial tissue has become a curative treatment for medically refractory AF. Pulmonary vein stenosis is recognized as its rare but difficult complication, whose long-term management represents a real interventional challenge with no established treatment guidelines. We would like to report on an unusual case of recurrent stenoses of all pulmonary veins following a successful transcatheter RFA.

Methods 43 years old male with a history of paroxysmal AF and no pulmonary vein anomaly underwent successful catheter ablation in April 2008 and reablation due to palpitations and effort dyspnoe in November 2008. Between July 2008 and June 2010 he was for 4 times referred to our hospital with effort dyspnoe and cough due to

chronic pulmonary hypertension (showed by TEE) that was caused by PVS (each time confirmed by CECT scans and MRI). In July 2009 an occlusion of upper left PV, significant stenosis of right upper PV, moderate stenosis of lower right PV was shown, while lower left PV was not depicted. Consequently a successful transcatheter recanalisation of upper left PV and balloon dilatation of upper right PV was performed leading to immediate relief of symptoms and correction of pulmonary pressure. In September 2009 stenting of the left upper PV, balloon angioplasty of the right upper PV and right lower PV occurred due to restenoses. In March 2010 stenting of the right upper PV and balloon angioplasty of left lower PV and right lower PV. In June 2010 restenting of left upper PV, stenting of right upper PV followed.

Results Between July 2009 and June 2010 the patient underwent four sessions of endovascular treatment of PVS, where all three present PV were first ballooned, then stented due to restenosis and subsequently restented. Every intervention has lead to immediate although temporary relief of symptoms and correction of pulmonary pressure. The patient is presently asymptomatic with no signs of pulmonary hypertension.

Conclusion Pulmonary vein balloon angioplasty with subsequent stenting may represent an effective treatment of PVS following catheter ablation of AF. Close post-ablation monitoring with prompt recognition of PVS symptoms and early stent placement might prevent development of chronic irreversible vessel and parenchyma changes caused by persistent pulmonary hypertension.

Shock syndrome after aorto-intestinal fistula – case report

A2-3

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Background Secondary aortoduodenal fistula is an uncommon life-threatening complication of abdominal aortic reconstruction. It usually develops because of graft infection and may occur several months to years after aortic surgery. Clinical manifestation of aortoduodenal fistula is mostly upper gastrointestinal bleeding with hemorrhagic shock. The only successful treatment is urgent surgical intervention with aggressive supportive therapy both before and after surgery. Mortality is high even with rapid diagnostic and surgical intervention (around 40 % in those patients that survive to hospital).

Methods We report a case of a 54 year old man with generalised atherosclerosis.

Results In 2005 he underwent aortobifemoral graft insertion due to bilateral iliac artery stenosis. 4 years later the patient presented with melena and hemorrhagic shock. Because bleeding could not be controlled endoscopically, surgery was performed, revealing aortoduodenal fistula. Aortobifemoral graft was constructed again and he was admitted to intensive care unit, requiring massive transfusion. 3 months later he presented again with melena and hemorrhagic shock immediately upon initiation of anticoagulant therapy due to right lower extremity deep vein thrombosis. Abdominal CT was performed, revealing aortoenteric fistula. Emergent surgery was performed with construction of axillobifemoral bypass. He again required massive transfusion but was discharged home after prolonged stay in the intensive care unit.

Conclusion Our case shows that in patients after aortic surgery with upper intestinal bleeding and signs of hemorrhagic shock one needs to consider in differential diagnosis the possibility of aortoduodenal/enteric fistula. Survival is possible only with rapid diagnostic evaluation, surgical treatment and supportive therapy.

Acute AV block following chronic infection

A2-3

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Background The tick bite transmitted Lyme disease is one of the most common antropozoonosis in Europe and North America. The pathogenic agent is the *Borrelia* bacteria of the spirochete phylum,

the vectors are the Ixodes ticks. 10,000 new infections are reported in Hungary each year. The progress and clinical presentation of the disease can vary markedly and the diagnosis can also be difficult. In the late disseminated stage of the infection carditis can occur in about 4–10 % of the cases.

Methods A serologically verified Lyme disease caused third degree AV block in an otherwise healthy 30-year old young man. Among his complaints were sustained intense weakness, dizziness and presyncope. He was referred and transported to our department for pacemaker implantation after third degree AV block was detected on ECG. Regarding the tick-bites mentioned a few weeks prior to the patient's hospital admission the signs were considered as symptoms of Lyme carditis and the administration of antibiotics and monitor observation was performed. The typical skin lesions for Lyme infection – such as erythema migrans – were not recognized after the removal of the ticks. The early electrophysiological examination recorded a predominant supra-His AV block and so was the indication for pacemaker implantation set aside. A total regression of the AV conduction could be detected later starting from the second day of the hospital observation. The serological tests established an underlying Lyme disease, which proved to be surprisingly older than one year.

Results The Lyme carditis can be accompanied by a total AV block in about 50 % of the cases, where the initial sign is often an Adams-Stokes syndrome. There is no definite treatment recommendation available for Lyme triggered carditis. Pacemaker therapy is considered to be the symptomatic, and antibiotics, administered for a period of 2 or 3 weeks, the causal treatment for the disease.

Conclusion The symptoms that occur in Lyme disease are not specific for borrelia infections. We present a case, where Lyme carditis was considered as a possible cause of acute heart rhythm conduction disturbances in a young and healthy individual. The previous tick bites seemed to be the key factor on the way to our diagnosis about the origin of the AV block; however the serological tests proved the underlying Lyme disease to be older than one year. A thorough examination of the previous medical history and exact serological tests are essential at identifying the cause and pacemaker implantation can be avoided in this potentially reversible condition.

Repeatedly reversible right phrenic nerve injury following endocardial radiofrequency and cryothermal ablation of inappropriate sinus tachycardia

A2-5

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Background During the course of inappropriate sinus tachycardia (IAST) resting heart rate is pathologically elevated (above 100/min). Tachycardia develops on minimal exertion with symptoms of palpitation, fatigue and exercise intolerance. Failure of medical treatment and symptoms of dyspnoea require catheter modification and in some cases total ablation of the sinus node (SN). Phrenic nerve injury and chronotropic incompetence with need for pacemaker implantation can complicate these invasive procedures.

Methods Our patient underwent three procedural successful radiofrequency (RF) followed by a cryothermal (CRYO) modification of the SN always followed by IAST recurrences within one months after the procedures. Right phrenic nerve paralysis evolved during cryoablation which resolved 6 months after the SN modification. Complaints persisted and the patient presented to our clinic with severe clinical symptoms (NYHA III dyspnoea) two years after the successful Cryo ablation. Holter monitoring showed permanent sinus tachycardia (84–146, mean 106/min). RF sinus node modification was done at our clinic. The procedure resulted in relief of symptoms just for five months, when severe IAST developed.

Results We performed an extended area SN RF ablation with the help of CARTO electroanatomical mapping system. Junctional escape rhythm with 50–60/min frequency was established during the procedure. Because of repeated syncope episodes and persisting

junctional escape rhythm AAIR pacemaker implantation was done. Repeated phrenic nerve paralysis developed, but resolved 17 months after the ablation. The patient has been symptom-less with pacemaker rhythm for two years now.

Conclusion Aim of this case presentation is to demonstrate nature and tendency for healing of phrenic nerve injury after ablation procedures and high recurrence rate of IAST after successful SN modifications.

Aortic dissection as part of the spectrum of autosomal-dominant polycystic kidney disease (ADPKD)

A2-6

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Background Autosomal-dominant polycystic kidney disease (ADPKD) is the most common inherited renal disease. It is characterized by renal and extrarenal involvements with cystic and noncystic manifestations. Nowadays cardiovascular problems are a major cause of morbidity and mortality in patients with ADPKD. Hypertension and left ventricular hypertrophy are the most frequent findings, and the prevalence of aneurysms is greater than in the general population. Cardiac valvular abnormalities are common in patients with ADPKD, defects of mitral valve, aortic root, annulus and valve are the predominant abnormalities, ordinarily. This case-report highlights associations of rare manifestations of ADPKD.

Methods A 52-year-old Caucasian male patient with 3 years history of hypertension reported at the Cardiology Office for control examination. Routine echocardiography revealed mitral valve prolapse, left ventricular hypertrophy, bicuspid aortic valve with moderate stenosis and severe regurgitation. Aortic root and ascending aorta was dilated to a maximal diameter of 54 mm. These abnormalities indicated cardiac surgery management. As parts of preoperative examinations abdominal ultrasound and chest computer tomography were performed which showed bilateral renal enlargement with numerous cysts – 6.5 cm the largest, multiple hepatic cysts and bilateral emphysematic pulmonary bullous beside ascending aorta aneurysm. These clinical constellations affirmed the diagnosis of adult type, autosomal-dominant form of PKD, however family history of the patient was negative. On the basis of laboratory data renal function was preserved. According to cardiac surgery indications since preservation of the aortic valve was impossible due to fibrotic degeneration, resection of aortic valve and of the dilated ascending aorta was performed, and these were replaced with a composite graft and coronary orifices were reimplanted. Early postoperation period was silent and the patient was directed to a rehabilitation program.

Results On the 12th day clinical and echocardiographic signs of pericardial tamponade arised which required urgent pericardial fenestration. Pleural fluid was also present. Two days later fever appeared. To exclude early prosthetic valve endocarditis transoesophageal echocardiography was performed which showed no vegetation but revealed aortic dissection (type postoperative Stanford A). As the circulation of both visceral organs and lower limbs was appropriate, and the patient had no signs of tissue mal-perfusion we decided a conservative therapy for the management of aortic dissection, regarding strict blood pressure control. With antibiotic therapy febrile state ceased. Two weeks later the patient went home with stable haemodynamic parameters, without any complaints. At four-months control the patient was well, his hypertension was well-controlled, and started to share in chronic nephrology care program.

Tricuspid regurgitation after horse's hoof kick into the chest

A2-7

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Background Traumatic tricuspid valve regurgitation is usually a result of blunt chest trauma. Clinical picture largely depends on the

severity of the new-onset tricuspid regurgitation; untreated tricuspid valve injury frequently results in chronic right-sided heart failure. Surgery is the preferred treatment option.

Methods Case report.

Results Case report. We are presenting a young female with an injury of the tricuspid valve after horse's hoof kick into the chest wall. We found severe tricuspid regurgitation without clinical signs of congestive right-sided heart failure. The patient underwent surgical repair of the tricuspid valve. The treatment was successful.

Conclusion In a patient with a blunt chest trauma an injury of the heart should be suspected. Tricuspid valve injury is usually initially asymptomatic, while early surgical treatment can prevent late complications.

Catecholamin-induced cardiomyopathy – case report

A2-8

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Background Patients with pheochromocytoma typically present with a classic triad of hypertension, tachycardia and headache plus sweating. But rarely patients can present with acute heart failure due to catecholamine-induced cardiomyopathy and deteriorate rapidly to cardiogenic shock and death. Catecholamine-induced cardiomyopathy may be caused by coronary vasospasm, increased vascular resistance, tachycardia or direct catecholamine-mediated myocyte injury. Rapid cardiac deterioration has been documented echocardiographically in catecholamine-induced cardiomyopathy.

Methods We report a case of a 28 year old woman with a postmortem finding of a pheochromocytoma whose first presentation was acute heart failure/ cardiogenic shock.

Results Her story starts three weeks prior to admission, when she was treated for a chest infection but had otherwise unremarkable past medical history. On the day of admission she developed high fever, then started vomiting, became progressively weaker and tachypnoic. She contacted emergency team who found her awake, oriented, hypotensive (80/40 mmHg), tachycardic (120/min), in respiratory distress (SaO₂ 86 % on air), with diffuse crackles over the lungs and tender abdomen. After receiving oxygen and i.v. fluids her vital signs improved (blood pressure 100/60 mmHg, SaO₂ 90 %, pulse rate 80/min), but she was progressively tachypnoic. Upon arrival into the emergency department the patient went into cardiac arrest with ventricular fibrillation as the first rhythm. After defibrillation and 2 min of CPR spontaneous circulation was restored. She was then admitted to ICU. On admission she was in established cardiogenic shock – with hypotension (blood pressure 55/30), elevated lactate (6,9 mmol/l), unconscious (GCS 5), tachycardic (160–170/min), hypoxic (SaO₂ 77 % on 100 % oxygen). An echocardiogram showed diffusely hypokinetic myocardium with severely impaired systolic function (estimated left ventricular ejection fraction 10 to 15 %), normal dimensions of atria and ventricles, moderate mitral insufficiency. In laboratory tests there were elevated troponin levels (30,0 mcg/l). Other diagnostic tests were unhelpful: screening for toxins (negative), CT of the head (normal), ECG (supraventricular tachycardia, no ST changes). The patient was treated with i.v. fluids, vasopressors (noradrenalin and adrenalin), inotropic agents (dobutamin in maximal dosage), intraaortic balloon pump was inserted. Despite treatment she remained in cardiogenic shock, her heart function did not improve, she repeatedly went into cardiac arrest and approx. 12 hours after admission to ICU she died. The etiology of acute heart failure was unclear (fulminant myocarditis was suspected) so autopsy was performed. On autopsy there was no histological evidence of myocarditis but in her right suprarenal gland a tumor was found, histologically a pheochromocytoma. We concluded that the patient suffered catecholamin-induced cardiomyopathy that rapidly progressed to cardiogenic shock and death.

Conclusion Our case shows that a catecholamine excess in undiagnosed pheochromocytoma can lead to a severe cardiomyopathy and can rapidly progress to cardiogenic shock and death. In all patients with fulminant cardiac failure a catecholamine excess should be considered as a differential diagnosis.

■ Session A3: Rhythmology

Intravenous amiodarone induced acute liver failure: retrospective study of 3 years of Semmelweis University Heart Center

A3-1

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Background Amiodarone is the first choice of antiarrhythmic drugs to treat acute tachyarrhythmic and haemodynamic unstable patients with impaired cardiac function. Intravenous amiodarone-hydrochloride (IvAm) provides high antiarrhythmic and/or rate-control efficacy, though its dosage is empirical. Main adverse effects of IvAm are hypotension, severe bradycardia, asystole, acute heart failure, impaired liver function. Acute liver failure (ALF) is a known, but very rare complication of IvAm that can be reversed by stopping the infusion. The few papers in the literature suggest that polysorbate 80, the vehicle of IvAm causes ALF in certain cases. Oral administration do not to have such vehicle, therefore IvAm can be changed to oral form without adverse events in any cases.

Methods Our aim was to investigate retrospectively the incidence of ALF and relation of IvAm and ALF in cardiac patients. History, treatment sheets, laboratory parameters of 11,722 patients treated in the Heart Center between 2005 and 2007 were analyzed. Patients were considered severe ALF patients if transaminase levels exceeded 80 × ULN during stay in our clinic. Cut off point was determined to differentiate ALF patients from heart failure and myocardial infarct patients with elevated transaminase levels.

Results According to the enzyme levels 55 patients suffered from severe ALF during the 3 years, 26 of them had IvAm treatment. On the basis of treatment sheets, start and elimination of IvAm treatment, status of acute myocardial infarct and heart heart failure and transaminase kinetics 8 patients had ALF induced by IvAm. Indication for amiodarone was atrial fibrillation (n = 6) and ventricular tachycardia. Average multipliers of ULN were 379 ± 190 at ASAT, 191 ± 87 at ALAT, 57 ± 22 at LDH. Time from start of IvAm to detection of ALF was 17 ± 4.6 hrs. One fourth of these patients has died in ALF. Liver enzymes decreased to 10xULN during 2.5 ± 0.6 days.

Conclusion ALF is a rare but potentially life threatening adverse effect of IvAm. Authors suggest monitoring liver enzymes from the start of IvAm treatment. Rapid elevation in liver enzyme levels indicate hepatotoxic effect of IvAm. In these cases the immediate stop of IvAm administration and start of intensive care is life saving.

Clinical profile of patients with an early occurrence of a serious arrhythmic event after myocardial infarction

A3-2

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Background The risk of sudden cardiac death (SCD) is highest in the first months after myocardial infarction (MI). However, treatment with an implantable cardioverter-defibrillator (ICD) early after MI was not associated with a mortality benefit in randomized trials. A better prediction of SCD and life-threatening ventricular arrhythmias (ventricular fibrillation [VF] and tachycardia [VT]) is needed, particularly in the early post-infarction period. Our aim was to compare the clinical profile of patients with implanted ICD with an early (3 months and less) vs. later occurrence of the first serious arrhythmic event (FSAE) post MI.

Methods This retrospective analysis included all post-MI patients with an ICD implanted in a specialized centre in France between 2000 and 2007 with a known timing of FSAE (n = 166; mean age 64.5 ± 9.7 years; mean left ventricular ejection fraction 32 ± 8 %). FSAE was defined as aborted SCD, VF/VT, syncope or a first appro-

appropriate ICD intervention since the last MI. The investigated parameters were recorded at the time of ICD implantation and included age, sex, BMI, history of atherosclerosis risk factors, atrial tachyarrhythmias, coronary revascularisation, MI location, history of VF/VT or cardiogenic shock during the acute phase of MI, NYHA functional class, left ventricular ejection fraction, QRS duration, heart rate, systolic and diastolic blood pressure and serum levels of urea and creatinine.

Results In the group with early occurrence of FSAE ($n = 21$), there were less patients with a posterior MI location (33.3 % vs. 63.4 %, OR 0.29 CI 0.11–0.76, $P = 0.02$) and more patients with sustained VF/VT complicating the acute phase of MI (23.8 % vs. 7.6 %, OR 3.81 CI 1.17–12.36, $P = 0.03$). These patients were also significantly younger (57.5 ± 12.4 vs. 65.5 ± 8.8 years, $P = 0.01$), had a shorter QRS duration (110 ± 29 vs. 126 ± 32 ms, $P < 0.01$) and lower serum creatinine levels (96 ± 11 vs. 112 ± 29 $\mu\text{mol/l}$, $P < 0.01$). The differences in other compared parameters were not statistically significant.

Conclusion Parameters associated in our study with an early occurrence of FSAE (particularly the history of other than inferior MI and VF/VT during the acute phase of MI) could help to identify the patients at risk of life-threatening ventricular arrhythmias early after MI and contribute to a better selection of candidates for early primary prophylactic ICD implantation. However, our findings have to be confirmed prospectively in larger populations.

Comparison of minimal myocardial damage after single and dual chamber pacemaker implantation

A3-3

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Background The cardiac troponins are highly specific markers of myocardial damage. Their elevation after pacemaker implantation is well known. The aim of our investigation was to determine the correlation between single and dual chamber pacemaker implantation and other below defined factors that can cause the elevation of troponin I.

Aims: (1) To determine the elevation of troponin I after the implantation of pacemaker (single or dual chamber) with active lead. (2) To determine the relationship between the elevation of cardiospecific markers and other below defined factors.

Methods A defined group of 73 patients were indicated for the implantation of pacemaker. The values of cardiospecific markers (troponin I, CKMB, myoglobin) were stated before pacemaker implantation and repeated 6 hours later. Monitored factors were skiascopic time, the number of attempts of pacemaker implantation (attachment to myocardium), single chamber versus dual chamber pacemaker implant and other clinical data. An Echo was performed in most patients.

Results The mean patient age was 76.4 ± 7.6 years (median 78 years). Females formed 34 % of the group. A total of 48 double chamber and 25 single chamber pacemakers were implanted. The average skiascopic time was 44.4 ± 31.3 seconds (median 34.9s). The serum levels of troponin I in single chamber group increased from the initial 0.02 ± 0.04 $\mu\text{g/l}$ to 0.10 ± 0.09 $\mu\text{g/l}$, $p = 0.0001$ (t-test). The serum levels of troponin I in dual chamber group increased from the initial 0.02 ± 0.04 $\mu\text{g/l}$ to 0.23 ± 0.16 $\mu\text{g/l}$, $p < 0.05$ (t-test). The difference in troponin levels between both groups (single vs dual chamber) before pacemaker implantation was not significant, $p = 0.39$ (t-test). The difference in troponin levels between both groups (single vs dual chamber) 6 hours after pacemaker implantation was higher in the dual chamber group (0.23 ± 0.16 $\mu\text{g/l}$ versus single chamber group: 0.10 ± 0.09 $\mu\text{g/l}$, $p = 0.000017$ (t-test). Active leads were successfully attached at first attempt in a majority of cases. The correlation between serum levels of troponin after the implantation of pacemaker and skiascopic time in the whole group of 73 patients were not proven (Correlation coefficient = 0.38).

Conclusion Mild myocardial damage is a common phenomenon after the implantation of pacemaker with active lead electrode system. We noticed a higher increase in troponin levels after dual chamber pacemaker implantation. We did not find a correlation between troponin I levels and the difficulty of implantation, since a large majority of implantations were uncomplicated and skiascopic times were short.

Telemonitoring of pacemaker / ICD patients: investigation of technologic possibilities of home monitoring

A3-4

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Background Home Monitoring technology enables the transmission of diagnostic data stored in pacemaker/implantable cardioverter defibrillator (ICD) memory to the implanting hospital via GSM network. This provides remote monitoring and can reduce the numbers of unnecessary personal visits. The physician periodically receives report about the technical status of the device, arrhythmia episodes, therapeutic steps and promptly gets messages of significant changes detected by the device, which are available detailed on the Home Monitoring domain.

Methods We analysed the case reports ($n = 234$) of patients ($n = 54$) having received HM system in our center since 2006. Implanted devices were cardiac resynchronisation therapy device in 54 %, ICD in 46 % of the patients. Safety aspects, diagnostic efficacy of HM system, detected events and related therapeutic steps were investigated. Furthermore HM-related characteristics of patient comfort was examined by a questionnaire.

Results 17 patients called our clinic and 10 patients of them needed personal medical visit. Physicians called the patients on the reason of HM alarms in 17 cases (e.g. ventricular tachycardia – VT, ventricular fibrillation – VF, heart failure monitor, signal decrease) but only 6 patients needed personal visit. 91.5 % of patients were satisfied with the system, felt closer doctor-patient contact, and preferred the HM system against regular FU, 85.1 % felt more secure. We have examined 588 VTs and 74 VFs detected by devices where 127 out of 402 antitachycardia pacing and 57 out of 74 shocks were successful.

Conclusion Our results show that the physician can remotely monitor the patient's device and rhythm, by this means the number of unnecessary personal visits can be reduced, critical events that potentially endanger patients' life can be detected early. Moreover most of patients are satisfied with the HM system.

Six years experience of a low volume electrophysiology centre in Hungary

A3-5

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Background Our department has a 30-year old history in fields of cardiac pacing and electrophysiology. Since 2004 we have been performing RF catheter ablation procedures and since 2006 biventricular device implantations have been carried out on a routine basis.

Methods In the past 6 years we have performed 368 ablation procedures (202 for AV nodal reentry tachycardia, 33 for AV reentry tachycardia, 103 for isthmus dependent atrial flutter, 27 AV node ablations and 10 for atrial tachycardia and idiopathic ventricular tachyarrhythmias) Twelve patients underwent a second procedure due to recurrence of the index arrhythmia. We observed no intra-hospital mortality. Postoperative echocardiography revealed no cardiac tamponade. 3 patients underwent permanent pacemaker implantation due to complete AV block. In 2 cases early after the procedure and in one case about 6 months later.

Results Sixty four biventricular devices were implanted during the above mentioned time interval. Eight patients underwent lead repositioning at a tertiary centre due to lead dislodgement.

Conclusion According to our data conventional RF ablation procedures and biventricular device implantations can be performed safely and effectively in lower volume centres, where cardiac surgery is not readily available.

Atrial fibrillation: Early observations with pulmonary vein ablation catheter (PVAC) A3-6

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Background Atrial fibrillation is the most common arrhythmia in clinical practice. The most effective treatment of paroxysmal and persistent atrial fibrillation is based on the electrical isolation of pulmonary vein ostia to prevent trigger activity to extend to the left atrial tissue. Several methods are used to achieve this purpose. The most promising is the procedure which is simple, accurate, has a low radiation time, and achievable in a short time frame. Therefore we started to use a lasso ablation method with intracardial echo (ICE) monitoring to fulfill these criteria. Our initial results are presented here.

Methods The Pulmonary Vein Ablation Catheter (PVAC) is a multi-electrode lasso catheter, which is used to map, ablate and verify isolation of the pulmonary veins. Multi-slice computer tomography (MSCT) has been performed to assess the anatomy of the pulmonary veins because our ablation strategy is based on these images. Furthermore we use real-time intracardial echocardiography (ICE) to monitor the transeptal puncture and the position of the PVAC catheter. Since March 2010, 21 patients has been undergone the procedure (15 male, 6 female, average age 58.5 years.)

Results During our interventions the average procedure time has not exceeded 122 minutes, and radiation time after the initial learning curve has been significantly decreased (from 44:50 min to 17 min). The endpoint, i.e. the electrical isolation of each pulmonary vein, was fulfilled in each patient. No major complications have been occurred in our first 21 cases

Conclusion Our study group strongly recommends the use of this new technique in cases of atrial fibrillation due to high reliability and simplicity, the reduced time of intervention and radiation time. Based on the advantages of PVAC, we can point out that it provides less impact for the patients and for the medical staff.

for 'in situ' immunodetection of Cx43 and electron microscopy. Western blotting was performed to assess total Cx43 expression, its phosphorylation status and expression of PKCe (which phosphorylate Cx43). Susceptibility to electrically-induced VF was tested using Langendorff isolated heart model.

Results Results showed that omega-3 FA supplementation led to a significant decline of blood pressure in SHR and reduced incidence of VF despite myocardial remodelling (i.e. hypertrophy in young SHR or hypertrophy and fibrosis in old SHR) were not eliminated. However, integrity of the cardiomyocytes and their junctions were improved. Moreover, omega-3 FA significantly increased total Cx43 expression and its phosphorylated forms that were markedly decreased in both young and old SHR. It was accompanied by enhanced PKCe expression different to its suppression in untreated SHR.

Conclusion Findings indicate that up-regulation of myocardial connexin-43 and PKC-e is most likely involved in the cardioprotective-antiarrhythmic effects of omega-3 fatty acids in hypertensive rats. Results challenge to know a possible beneficial effect of omega-3 FA supplementation in patients suffering from hypertension or in pre-hypertension state population.

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Effects of coronary revascularization with or without cardiopulmonary bypass on plasma levels of the endogenous nitric oxide synthase inhibitor ADMA A4-2

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Background The concentration of asymmetric dimethylarginine (ADMA), an endogenous inhibitor of nitric oxide synthase, is increased in patients with endothelial dysfunction. The present study was designed to measure and compare serum ADMA, symmetric dimethylarginine (SDMA) and L-arginine levels in blood samples obtained from coronary sinus and from peripheral vein in patients undergoing coronary revascularization with or without cardiopulmonary bypass.

Methods Two groups of patients with coronary heart disease (CHD) were selected for elective coronary bypass graft surgery (CABG). Patients were subjected to CABG surgery with cardiopulmonary bypass (CPB) (n = 20) or with off-pump CABG surgery (OPCAB) (n = 21). Blood samples for measurements of ADMA, SDMA and L-arginine were withdrawn from the coronary sinus (CS) and from the peripheral vein (P) at baseline; three times during CABG surgery and on the first and fifth postoperative days. Plasma levels of L-arginine, SDMA, ADMA were determined with liquid chromatography-tandem mass spectrometry (LC-MS-MS).

Results Based on the intraoperative (CS) samples, the post-hoc ANOVA did not reveal a discernible increase of ADMA in the OPCAB group. In contrast ADMA levels rose in the CPB group (F = 0.416, p < 0.685 and F = 14.751, p < 0.001 for OPCAB and CPB groups respectively). A similar significant increase of ADMA was observed in the peripheral blood (F = 30.738, p < 0.001) during CPB, while ADMA levels remained largely unchanged in the peripheral blood during OPCAB. The time-course of L-arginine levels was significantly different in the blood samples from coronary sinus (F = 3.255, p < 0.05), when compared to samples from the peripheral blood (F = 3.255, p < 0.05). In the OPCAB group repeated measures ANOVA did not reveal a significant intrasubject time effect of L-arginine, either in blood samples from coronary sinus or in the samples from the peripheral vein. The values of the L-arginine/ADMA ratio were significantly higher in the OPCAB group at baseline and on the first postoperative day as compared to results of the CPB group (178.29 ± 11.56 vs. 136.28 ± 13.72 and 129.43 ± 7.08 vs. 106.8 ± 6.9 for OPCAB and CPB groups respectively).

■ Session A4: Risk Factor Management I

Cellular mechanisms involved in cardioprotective-antiarrhythmic effects of omega-3 fatty acids in young and old spontaneously hypertensive rats A4-1

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Background Hypertension-induced myocardial structural and gap junction remodelling contributes to heart failure and occurrence of life-threatening arrhythmias in both patients and experimental animals. Supplementation with omega-3 polyunsaturated fatty acids (omega-3 FA) reduces the incidence of cardiovascular diseases and sudden cardiac (arrhythmic) death. Since myocardial connexin (Cx) channels at the gap junctions ensure electrical and metabolic coupling to maintain cardiac synchronisation and function, we investigated whether omega-3 FA may affect distribution, expression and/or phosphorylation of Cx-43 in aged spontaneously hypertensive rats (SHR). Myocardial ultrastructure and susceptibility of the heart to ventricular fibrillation (VF) were examined as well.

Methods Male, 3 and 14 months old SHR and non-hypertensive Wistar Kyoto and Lewis rats were fed with omega-3 (Vesteralsen, Norway, 40 mg/day/2 mth) and compared with untreated. Blood pressure was registered and left ventricular tissues were processed

Conclusion Plasma levels of ADMA, SDMA, L-arginine and L-arginine/ADMA ratio are reliable and feasible markers of an early ischaemia-reperfusion injury. During CPB operation (but not during OPCAB), the plasma concentration of ADMA increased significantly and remained elevated until the first postoperative day due to extensive ischemia-reperfusion injury caused by CPB.

Coronary flow velocity reserve is an independent predictor of long-term event-free survival in non-diabetic patients with normal epicardial coronary arteries

A4-3

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Background Diabetes mellitus (DM) is known to be associated with coronary micro- and macroangiopathy. Both DM and coronary flow velocity reserve (CFR) are known predictors of future cardiovascular events in patients with and without coronary artery disease. The present study was designed to examine whether cardiovascular outcome can be predicted by Doppler echocardiography-derived CFR even in non-diabetic patients with chest pain and negative coronary angiograms.

Methods The present study comprised 91 non-diabetic patients with normal epicardial coronary arteries. Coronary angiography was used to exclude significant (> 50 %) coronary artery stenoses. CFR was calculated as the ratio of posthyperaemic to basal peak diastolic coronary flow velocities.

Results The success rate of follow-up was 56 out of 91 (62 %). During the mean follow-up 90 ± 36 months (median value: 103 months), 4 patients suffered sudden cardiac deaths and another 3 patients died of pulmonary tumors. During this follow-up period, 19 patients had been hospitalized due to cardiovascular reasons. Using ROC analysis, CFR < 2.2 had the highest accuracy in predicting event-free survival (sensitivity 62 %, specificity 73 %, area under the curve 66 %, $p = 0.024$). Patients with events have significantly lower CFR (2.14 ± 0.84 vs. 2.62 ± 0.86 , $p < 0.05$). CFR < 2.2 were significantly more frequent in subjects with events (62 % vs. 27 %, $p < 0.05$). Patients with CFR < 2.2 had more events (67 % vs. 31 %, $p < 0.05$). Multivariable regression analysis showed that only lower CFR (hazard ratio (HR) 2.22, 95 % CI of HR: 1.15 to 4.16, $p < 0.05$) was independent predictor of outcome.

Conclusion CFR is an independent predictor of event-free survival in non-diabetic subjects with negative coronary angiograms.

Regional (continental versus Mediterranean) behavioral and interim cardiovascular risk factor characteristics of Croatian hospitalized coronary heart disease patients

A4-4

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Background Regional differences among coronary heart disease (CHD) patients have not been extensively investigated so far. Because of its geographic characteristics (clear differences between continental and Mediterranean parts) and various historical influences Croatia is a very suitable country for such a study, as characteristics of a country create optimal conditions for such regional differences to be discovered if they exist. Our group investigated these differences among Croatian CHD patients and started a nation-wide study in 2007.

Methods In total 1298 CHD patients from 12 research centers participated in this study from 2007 until 2009. Centers were divided into two groups: continental region (ConR, 7 centers) and Mediterranean region (MedR, 5 centers). Following characteristics of Croatian CHD patients were investigated: behavioral (use of tobacco, regular

alcohol use and level of physical activity) and interim cardiovascular risk factors (hypertension and overweight/obesity).

Results Almost 34 % males (M) and more than 26 % females (F) use tobacco, with no regional differences. Regular alcohol consumption was recorded in more than 51 % M and in more than 17 % F, with smaller proportion of M in the ConR (45.18 % vs. 59.95 %, $P < 0.0001$). Inadequate levels of physical activity were present in more than 57 % of M and more than 68 % F, with significantly more inactive M in the MedR (54.60 % vs. 61.62 %, $P = 0.0365$). Hypertension was found in more than 67 % of M and in more than 83 % of F, and there were significantly more hypertensive M in the ConR (71.83 % vs. 62.50 %, $P = 0.0031$). More than 76 % M and 77 % F were overweight or obese, and there were more obese M (31.08 % vs. 21.34 %, $P = 0.0046$) and F (39.50 % vs. 18.18 %, $P < 0.0001$) in the ConR. More than 85 % M and more than 86 % F had abnormal waist circumference, again with more M in the MedR (82.89 % vs. 89.97 %, $P = 0.0029$).

Conclusion Results of this study confirm that the prevalence of selected modifiable cardiovascular risk factors is still unacceptably high among Croatian CHD patients. Continental CHD patients more frequently have hypertension (M) and are more frequently overweight or obese (M and F), and a smaller proportion of them is consuming alcohol regularly (M). Mediterranean CHD patients are more often physically inactive (M) and have abnormal waist circumference (M). These results show that there are clear regional differences, which should serve as a guideline for region-specific better treatment and prevention.

This study is a part of the project #108-1080135-0126 (Ministry of science, education and sports of the Republic of Croatia).

Psychosocial characteristics of hospitalized patients (male vs. female) with coronary heart disease in Croatia

A4-5

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Background The aim of this study was to determine some psychosocial characteristics in men and women as a potential risk factor of coronary heart disease (CHD).

Methods This study was undertaken from October 1st 2007 to March 31st 2009. We included hospitalized patients with acute or chronic CHD in 12 hospitals in continental and Mediterranean parts of Croatia. We used a study questionnaire to collect data on socioeconomic status (income, education, occupation, place of living), psychosocial status (marital status, loss of job, family stress such as death or illness) and of some standard medical examinations (blood pressure, lipid status, body mass index [BMI]).

Results We interviewed 1298 patients. From this number 82.71 % females and 67.29 % males had raised blood pressure, 20 % females and 10 % males older than 65 years had a BMI > 30. Furthermore 49.6 % females and 47.4 % males younger than 65 years had at least one psychosocial stress factor. There were more men who had this factor(s) present in the continental part (53.50 % vs. 43.83 %, $P = 0.0036$). Males older than 65 years with CHD had better education than females (elementary school 14.35 % vs. 36 %, four more years 19.9 % vs. 25 % and high school 5.71 % vs. 8.56 %). Male patients mostly had a very good income (56.49 % vs. good 36.32 %, vs. low 7.19 %) and live in continental, urban part of Croatia ($P < 0.0001$). Females with CHD mostly had very good to good income (both 43 % vs. low 14 %) and live in urban part of Croatia (73.9 %).

Conclusion Psychosocial factors seem to play an important role in the etiology of coronary heart disease in Croatian, both male and female, patients. Some of these risk factors are potentially modifiable. Multidisciplinary approach, both primary and secondary, can be helpful to prevent and treat coronary heart disease.

This study is a part of the project #108-1080135-0126 (Ministry of science, education and sports of the Republic of Croatia).

Physiologic left ventricular hypertrophy and remodelling in elite athletes

A4-6

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Background Elite athletes may develop functional and structural changes of the heart, which is described as the „athlete’s heart syndrome”. It is of high clinical priority to identify these parameters and to discriminate from other pathologic conditions (hypertrophic cardiomyopathy). Parameters describing physiologic hypertrophy and remodelling may help to distinguish.

Methods 36 endurance-strength elite athletes (mean age 26 years) and a control group of 20 sedentary volunteers (mean age 28 years) underwent transthoracic echocardiography.

Results Left ventricular end-diastolic diameters were significantly higher in elite athletes compared to the control group (53.7 ± 5.1 mm vs. 50.4 ± 3.7 mm ($p = 0.017$), however, the end-systolic diameter was not significantly different (33.4 ± 4.1 vs. 31.6 ± 2.4 mm, $p = 0.08$). The resting ejection fraction was significantly lower in the athletes (59.8 ± 4.3 vs. 62.4 ± 3.9 %, $p = 0.02$). Left ventricular mass index was lower in the control group (111.9 ± 24.8 vs. 134.1 ± 26.9 g/m², $p = 0.004$). Elite athletes showed significantly higher stroke volume (75.4 ± 13.4 vs. 62.7 ± 16.6 ml, $p < 0.05$). Hypertrophy index showed normal values in the control group (0.44 ± 0.1) in contrast, it was significantly higher in the elite athletes (0.93 ± 0.2 , $p < 0.001$). No significant differences were found either in the systolic and diastolic sphericity index (systolic 0.27 ± 0.08 vs. 0.26 ± 0.09 , $p = 0.64$; diastolic 0.35 ± 0.12 vs. 0.37 ± 0.16 , $p = 0.66$) or in the left ventricular remodelling index (athletes 2.25 ± 0.52 vs. control group 2.25 ± 0.45 , $p = 1.00$), proved, that remodelling did not alter the LV geometry.

Conclusion In conclusion, higher hypertrophy index and higher left ventricular mass index were observed in elite athletes compared to the control group. The normal sphericity indices and left ventricular remodelling index verified the presence of symmetric hypertrophy.

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■ Session B1: Heart Failure I

Prevalence of sarcomeric gene mutations in Hungarian patients with hypertrophic cardiomyopathy

B1-1

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Background Hypertrophic cardiomyopathy (HCM) is a primary disease of the myocardium due to mutations in genes encoding for mainly sarcomeric proteins. The distribution of the disease genes is not known in Hungarian HCM patients.

Methods We analysed Hungarian HCM patients for mutations in sarcomere genes. The beta-myosin heavy chain gene (MYH7, exons 3-23), the myosin binding protein C gene (MYBPC3, exons 1-35), the troponin T gene (TNNT2, exons 8, 11, 14, 15, 16) and the troponin I gene (TNNI3, exons 7-8) have been analysed in 93, 45, 99 and 99 HCM patients, respectively. The coding exons of the genes were amplified using the polymerase chain reaction, mutation analysis were done using single strand conformation polymorphism (SSCP) or denaturing high performance liquid chromatography (DHPLC) assays. Amplicons with altered migration patterns were direct sequenced.

Results In the HCM groups we identified five MYH7 mutations (5 %) [Arg719Gln, (exon19); Arg249Gln, (exon 9); Val606Met, (exon

16); Glu924Lys, (exon 23); del930Glu, (exon 23)], eight MYBPC3 mutations (18 %) [Gln1233ter, (exon 33); IVS7+1G>A, (intron 7); 2919-2920delCT, (exon 27); 1831-1832delGT, (exon 18); 486-487delGT, (exon 4); 3462-3464delACT, (exon 31)], and one TNNT2 mutation (1 %) [del165Glu, exon 11]. No mutation in the TNNI3 gene was observed. The Gln1233ter mutation of the MYBPC3 gene was found in three, apparently unrelated families. All of the mutations were present in a heterozygous form. Three mutations in the MYBPC3 gene (1831-1832delGT, 486-487delGT, 3462-3464delACT) are novel mutations.

Conclusion These results indicate that the MYBPC3 gene is the most frequently affected disease gene in Hungarian HCM patients.

The Gln1233ter alteration of the myosin binding protein C gene (MYBPC3) in hypertrophic cardiomyopathy: causative mutation or innocent polymorphism?

B1-2

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Background One of the most frequently affected disease gene in hypertrophic cardiomyopathy (HCM) is the myosin binding protein C gene (MYBPC3). The Gln1233ter alteration of the gene (exon 33, 3752C>T) has been identified by several research groups so far. The significance of the alteration is not clear, as no affected-to-affected inheritance has been observed, and some also suggested the alteration to be a rare polymorphism as it was found in control groups as well.

Methods We analysed 45 HCM probands (27 males, 18 females, average age at diagnosis: 38 ± 15 yrs) for mutations in the myosin binding protein C gene. The coding 35 exons of the gene were amplified using the polymerase chain reaction, mutation analysis were done using single strand conformation polymorphism (SSCP) or denaturing high performance liquid chromatography (DHPLC). Amplicons with altered migration patterns were direct sequenced. The Gln1233ter mutation has been verified by Cac8I restriction enzyme analysis, too.

Results The Gln1233ter mutation was observed in three families. Among the 20 family members screened for the mutation we identified 8 mutation carriers. Six mutation carriers proved to be affected by HCM, while 2 family members did not manifest the disease. The affected-to-affected inheritance of the mutation was observed in all three families. We did not find the mutation among 464 control subjects (healthy controls and dilated cardiomyopathy patients). During follow up, 1 mutation carrier HCM patient died, because of stroke, and in another patient myectomy was performed because of significant left ventricular outflow tract obstruction.

Conclusion The results suggest that the Gln1233ter alteration of the MYBPC3 gene is a causative mutation and not a silent polymorphism. In the light of our previous results the above mutation is the most frequent mutation in Hungarian HCM patients so far.

Diastolic dysfunction may cause heart failure symptoms in patients hyperresponder to cardiac resynchronization therapy

B1-2

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Background Cardiac resynchronization therapy (CRT) decreases left ventricular end-systolic, end-diastolic volumes and improves systolic function, with restoration of normal left ventricular (LV) ejection fraction (EF) in approximately 10 % of patients (hyperresponders). Diastolic function also improves in most patients responding to CRT. In our experience, heart failure symptoms persist in some patients despite normalization of LV systolic function. We assessed the hypothesis that heart failure symptoms in patients demonstrating normalization of systolic LV function in response to CRT

may be the consequence of elevated left atrial filling pressure due to diastolic dysfunction.

Methods Clinical status of patients was evaluated by NYHA classification and 6-minute walk test. Left ventricular volumes, LV-EF, left atrial volume and diastolic parameters (E, A, Ad, DT, e' lat., e' sept., IVRT, Flow propagation, S, D, Ar, Ard) were assessed by echocardiography. Pro-BNP, haemoglobin and creatinin were also evaluated.

Results A total of 27 hyperresponder patients (15 female, mean age: 61.6 ± 9.7 years) with a LV-EF $> 50\%$ were involved in our study including 14 with heart failure symptoms (NYHA II–III). Symptomatic patients had a significantly shorter 6-minute walking distance (329 ± 30.8 m vs. 498 ± 24.1 m; $p = 0.0018$). An elevated left atrial pressure with a significantly higher pro-BNP level (498.8 ± 162.5 vs. 97.2 ± 56.1 pg/ml; $p = 0.0003$) was found in 5 out of these 14 patients. Alternative etiology of symptoms (COPD, hypertension, obesity) was found in the rest of symptomatic patients.

Conclusion Elevated left atrial filling pressure due to diastolic dysfunction was found in a significant proportion of patients with heart failure symptoms who were hyperresponder to CRT.

Association of NT-pro Brain natriuretic peptide levels and echocardiographic variables in longterm heart transplant recipients B1-4

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Background The diagnostic value of N-terminal pro-brain natriuretic peptide (NT-proBNP) after heart transplantation (HTx) is still incompletely understood. We investigated the relationship between NT-proBNP levels and echocardiographic variables in HTx patients with preserved systolic graft function.

Methods 176 asymptomatic pts (28 f/148 m), aged 60 ± 11 yrs, 105 ± 58 mo postHTx, donor age 34 ± 12 yrs were studied. Echocardiography and NT-proBNP (sandwich immunoassay by Roche Diagnostics) sampling was performed at the same follow-up visit.

Results Median resting NT-proBNP level was 394 pg/ml (25th–75th percentile 165–758; range 17–7792 pg/ml). In multivariate analysis, log-transformed NT-proBNP levels correlated significantly with left and right atrial dimensions ($r = 0.45$ and $r = 0.40$, both $p < 0.0001$), left ventricular enddiast. diameter ($r = 0.18$, $p < 0.05$), left ventricular hypertrophy grade ($r = 0.19$, $p < 0.05$), left ventricular diast. dysfunction stage ($r = 0.17$, $p < 0.05$) and time after HTx ($r = 0.32$, $p < 0.0001$).

Conclusion Our data – confirming earlier results of a time dependent rise in NT-proBNP levels late after HTx – demonstrate that increased endocrine activity of the nonfailing transplanted heart is associated with left ventricular size, mass and a restrictive filling pattern.

The potential role of ultra-sensitive troponin-determination in chronic stable heart failure B1-5

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Background Patients with stable coronary artery disease (CAD) have highly a worse clinical outcome even at very low concentrations of cardiac troponin T (cTnT), which are usually undetectable with the currently used routine assays. As shown previously, increased concentrations of cTnT, as measured by routine assays, are also predictive of outcome in patients with chronic heart failure. However, it is not known to date, whether very low concentrations of cTnT, as measured with a new ultra-sensitivity assay (hs-cTnT), might be used for prediction of clinical outcome in patients with chronic stable heart failure.

Methods We measured cTnT both with a 4th generation troponin T assay as well as with an ultra-sensitivity troponin T assay (5th generation) in 186 consecutive patients with stable CHF. Patients were fol-

lowed for all-cause mortality and re-hospitalization due to heart failure during a median time of 914 days.

Results 31 % of patients with normal cTnT levels by use of the commercial routine assays (cut off value > 0.01 ng/ml) had detectable cTnT levels above the normal range (> 14 pg/ml) by use of this 5th generation ultra-sensitive assay. In these patients elevated hs-cTnT levels were significant predictors of outcome (HR: 1.08 (1.03–1.14) $p < 0.001$) as hs-cTnT levels of > 14 pg/ml were associated with significantly higher risk of death or re-hospitalization due to heart failure (HR: 2.47 (1.38–4.40) $p = 0.002$). This strong association between outcome and elevated hs-cTnT in survival analysis remained highly significant (HR: 2.68 (1.41–5.12) $p = 0.003$) after multivariate adjustment of covariates.

Conclusion One third of patients with stable CHF and undetectable cTnT levels measured by the currently used routine assays had pathologic concentrations of hs-cTnT by use of an ultra-sensitive assay and an impaired clinical outcome. Accordingly, the use of an ultra-sensitive cTnT assay should be used for an optimal prediction of future clinical course of these patients.

Custodiol-N, the novel cardioplegic solution reduces ischemia/reperfusion injury after cardiopulmonary bypass B1-6

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Background The histidine-tryptophan-ketoglutarate (HTK) solution (Custodiol) is the leading cardioplegic solution in the field of cardiac surgery. However, Custodiol is unable to effectively reduce reperfusion injury after cold ischemic period. On the basis of this solution, novel HTK cardioplegic solutions were developed. In this study, we investigated whether their reduced cytotoxicity and their ability to reduce reactive oxygen generation after ischemia/reperfusion injury have beneficial effects in the canine model of CPB.

Methods 24 dogs underwent hypothermic cardiopulmonary bypass with 60 minutes of hypothermic cardiac arrest. Dogs were divided into 3 groups: traditional HTK ($n = 8$) and Custodiol-B (addition of L-arginin and N-acetyl-L-histidine), Custodiol-N (Custodiol-B supplemented with iron-chelators deferoxamine and LK-614). Biventricular hemodynamic variables were measured by a combined pressure-volume conductance catheter at baseline and after 60 minutes of reperfusion. Coronary blood flow, ATP content, nitrite and myeloperoxidase levels were also determined.

Results Traditional HTK solution was failed to prevent cardiac and endothelial dysfunction, however both Custodiol-B and N improved coronary blood flow, but only Custodiol-N was able to effectively prevent cardiac dysfunction after cardiac arrest. In addition, the ATP content, nitrite was significantly higher after application of the new solutions. Furthermore, myeloperoxidase level significantly decreased in the new HTK-groups.

Conclusion The new HTK cardioplegic solutions improved myocardial and endothelial function after cardiopulmonary bypass with hypothermic cardiac arrest. The observed protective effects imply that the Custodiol-N could be the next generation cardioplegic solution in the protection against ischemia-reperfusion injury in cardiac surgery.

Copeptin and Nt-proBNP as precursors of post-operative outcome in patients with major vascular surgery B1-7

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Background N-terminal pro-B-type natriuretic peptide (Nt-proBNP) is a well described predictor of postoperative outcome after elective vascular surgery. Copeptin, the C-terminal part of the pro-va-

sopressin peptide, has been shown to predict the clinical outcome of patients with acute myocardial infarction and heart failure. In the present study we investigated whether the pre-operative determination of plasma copeptin levels might improve risk stratification for high-risk patients undergoing major vascular surgery on top of plasma Nt-proBNP.

Methods One-hundred-ninety-eight consecutive patients undergoing major vascular surgery (58.6 % infra-inguinal aortic reconstruction, 23.7 % abdominal aortic aneurysm surgery, 17.7 % carotid endarterectomy) were included in the present study. Patients were monitored for in-hospital and long-term (2-years) major adverse cardiac events (MACE) consisting of cardiac death, nonfatal myocardial infarction, and emergent coronary revascularization.

Results Overall, 41 (20 %) events occurred during the follow-up time of median 829 days (IQ-range 629–1065). Median pre-operative concentrations of copeptin (15.4 pmol/l vs. 6.5 pmol/l; $p < 0.001$) and plasma Nt-proBNP (median 554 pg/ml vs. 168 pg/ml; $p < 0.001$) were significantly higher in patients with cardiac events during follow-up compared to those without. In total, 41 (21 %) of the patients had elevated copeptin levels (> 16.4 pmol/l) prior to surgery. In these patients the combined MACE rate was significantly higher (41.5 % vs. 15.2 %; $p < 0.001$) and associated with a 3.3-fold increased risk for worse clinical outcome compared to patients with normal pre-operative copeptin levels ($p < 0.001$). In multivariate Cox regression analysis – adjusted for the type of surgery, age, sex, NYHA and CCS Classes, hs-CRP, history of congestive heart failure and myocardial infarction, pre-operative LVEF and plasma Nt-proBNP – elevated Copeptin concentrations were independently associated with an increased risk for cardiac events in addition to plasma Nt-proBNP (HR: 1.03; $p < 0.001$). Copeptin concentrations of > 16.4 pmol/l were significant determinants of outcome both in patients with low and elevated Nt-proBNP.

Conclusion Our results suggest that the pre-operative determination of copeptin concentrations might substantially improve the estimation of post-operative outcome after major vascular surgery and therefore help to define patients of high-risk for post-operative complications.

Predictors of in-hospital mortality in patients hospitalized for acute heart failure in Slovakia B1-8

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Background Acute heart failure (AHF) represents a significant and still growing morbidity and mortality burden. In-hospital mortality is high, especially in patients with evidence of cardiogenic shock. Prospective surveys and registries provide a unique opportunity to assess current clinical practice and outcomes of patients. SLOVASEZ (Slovak Acute Heart Failure Survey) is a first nationwide multicenter survey in the field of AHF. Aim of the study was to identify predictors of in-hospital mortality in a non-selected population of patients hospitalized due to AHF.

Methods We used the data from SLOVASEZ, a nationwide multicenter AHF survey, with 860 consecutive patients enrolled during 3 months in 11 hospitals throughout Slovakia. Data were transferred from specific paper forms designed for this survey into the electronic database and were statistically processed. Mean age of patients was 72 years, 52 % of them were male and 81 % were in NYHA class III/IV. The majority of patients were admitted with decompensated heart failure (68.4 %), new-onset AHF (AHF de novo) was diagnosed in 31.1 %. Frequency of cardiogenic shock was 0.3 %. Coronary heart disease was the predominant primary aetiology of AHF (67 %), followed by hypertension, valvular disease and dilated cardiomyopathy in 10.5, 10 and 9 %, respectively. We analysed sixty-one potential predictor variables in univariate analysis. Significant of them ($p < 0.05$) were subsequently entered into linear regression model for multivariate analysis.

Results Mean length of stay was 9.2 days and all-cause in-hospital mortality was 9.1 %. There were identified 18 significant predictors of in-hospital mortality in univariate analysis. Independent predic-

tors of in-hospital mortality after multivariate analysis were older age (11.8 vs. 4.6 % for older and younger than 70 years, $p < 0.001$), inotropic treatment (42.3 vs. 7 % for yes and no, $p < 0.05$), cardiogenic shock (66.7 vs. 9.0 % for with and without shock, $p < 0.01$), QRS length > 120 ms (13.3 vs. 7.9 % for longer and shorter QRS, $p = 0.01$), serum creatinine > 170 μ mol/L, and bilirubin > 25 μ mol/L (20.7 vs. 6.8 % for creatinine and 12.6 vs. 5.6 % for bilirubin, both $p < 0.01$) as well as serum sodium < 135 mmol/L (20.0 vs. 6.3 %, $p < 0.05$) at admission.

Conclusion Characteristics and in-hospital prognosis of an unselected population hospitalized due to AHF are presented. Risk of in-hospital mortality in this group of patients remains high and is increased in patients who are older, treated with inotropic treatment, admitted with cardiogenic shock and hyponatremia, as well as longer QRS, elevated serum creatinine and bilirubin.

■ Session B2: Interventional Cardiology I

The adipokine vaspin inhibits smooth muscle migration in vitro and the development of coronary in-stent restenosis in vivo B2-1

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Background Percutaneous coronary intervention (PCI) represents the most important treatment modality of coronary artery stenosis. In-stent restenosis (ISR) is still a limitation for the long-term outcome despite the introduction of drug eluting stents. Adipokines may directly influence vessel wall homeostasis by influencing the function of endothelial cells and arterial smooth muscle cells (SMC). Visceral adipose tissue-derived serpin (vaspin) was recently identified as a member of serine protease inhibitor family and several studies could demonstrate a relation to metabolic diseases like diabetes which also plays an important role in the development of ISR. The aim of this study was to investigate a role of vaspin in SMC migration in vitro and development of ISR in vivo.

Methods Human coronary artery smooth muscle cell (HCASMC) migration was analyzed by an in-vitro migration assay with different concentrations (0.004 ng/ml up to 40 ng/ml) of vaspin. The development of ISR was studied in 74 patients with stable coronary artery disease who underwent elective and successful percutaneous coronary intervention (PCI) with implantation of drug eluting stents. Blood samples were taken directly before PCI. Vaspin plasma levels were measured by specific elisa. ISR was evaluated eight months later by coronary angiography.

Results During the follow-up period, 15 patients developed ISR. Patients with ISR had significantly lower vaspin plasma levels compared to patients without ISR (0.213 ng/ml vs 0.382 ng/ml; $p = 0.001$). Further we could demonstrate that vaspin nearly abolishes serum induced SMC migration (100 % vs. 7 %; $p < 0.001$) in a biphasic manner.

Conclusion We were able to show for the first time that the adipokine vaspin inhibits SMC migration in vitro. In addition, the occurrence of ISR after PCI with implantation of DES was significantly associated with low vaspin plasma levels before intervention. Determination of vaspin plasma levels before PCI might be helpful in the identification of patients with high risk for development of ISR after stent implantation.

Impact of pre-operative clopidogrel administration in patients undergoing cardiac surgery B2-2

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Background Clinical impact of the concomitant clopidogrel therapy on clinical outcomes in patients undergoing cardiac surgery is unclear. We aimed to pool and systematically analyze outcomes in clopidogrel-treated patients undergoing cardiac surgery to achieve greater statistical power and to define precise effect-estimates.

Methods PubMed and Central databases were searched for relevant studies published between January 2001 and May 2010. The main outcome measures were the rates of red blood cell (RBC) transfusion, reoperation, myocardial infarction and postoperative mortality. The outcome parameters were pooled with the random-effect model via generic-inverse variance-weighting.

Results Twenty studies comprising a total number of 23,668 patients were analyzed. Pooled analysis revealed that the administration of clopidogrel had higher risk for postoperative mortality (OR: 1.24; 95 % CI: 1.03–1.49, $p = 0.03$) that was consistent among studies. The rates of myocardial infarction were similar between groups. Clopidogrel-exposed patients were associated with a significantly higher rate of RBC transfusion (OR: 1.82; 95 % CI: 1.40–2.37; $p < 0.00001$) and reoperation (OR: 2.15; 95 % CI: 1.38–3.34; $p < 0.00001$), although there was marked heterogeneity among studies. According to subgroup analysis the mortality and the rates of transfusions were higher in studies in which clopidogrel was not discontinued 5 days prior to surgery, while the higher risk for reoperation was only apparent in studies published before 2006.

Conclusion Meta-analysis of observational studies demonstrated that concomitant treatment with clopidogrel before cardiac surgery is associated with a significant risk of bleeding-related complications and with higher mortality.

Periprocedural complications of elective coronary angiography and/or PCI B2-3

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Background Patients undergoing elective coronary angiography represent a significant group of clients of every cardiology department. The age and polymorbidity of these patients continues to rise. The aim of our observation was to determine the incidence and the distribution of complications of this diagnostic/therapeutic procedure.

Methods In our department, we performed 1538 coronary angiographies during the period from January to June 2008 in total. The study population is formed by 1132 consecutive patients admitted to elective coronary angiography and/or PCI. We recorded continuously any periprocedural complications which occurred in our patients. We did not include patients undergoing acute coronary angiography within 72 hours from the onset of an acute coronary syndrome.

Results The total number of complications was 84 (7.4 % of 1132 procedures), the complications in 8 patients of 1132 (0.7 %) were serious. One patient (0.1 %) died of cardiogenic shock. Of the severe complications, serious bleeding (TIMI major) occurred in 2 of 1132 (0.2 %), stroke in 3 of 1132 (0.3 %) and periprocedural myocardial infarction in 2 of 1132 (0.2 %) patients. The most frequent non-severe complication encountered was the access site hematoma/TIMI minimal bleeding in 55 of 1132 (4.9 %) patients followed by femoral artery pseudoaneurysm in 8 of 1132 (0.7 %) patients and TIMI minor bleeding in 2 of 1132 (0.2 %) patients. Other non-severe complications were observed in 11 of 1132 (1.0 %) patients. We proved statistically significantly higher incidence of complications in older patients, in women and in patients undergoing PCI. The administration

of 2 or more classes of antithrombotic agents was linked with a significantly higher occurrence of serious complications (12.5 % vs. 1.5 %; $p < 0.0001$). The radial access was chosen more frequently in women, diabetics and patients with higher BMI. The incidence of all complications was significantly lower in the radial access compared to the femoral access group: 17 of 370 (4.6 %) vs. 66 of 753 (8.8 %) procedures (odds ratio (OR) 0.50; 95 % CI 0.29–0.87; $p = 0.011$), serious complications occurred in 2 of 370 (0.5 %) and in 6 of 753 (0.8 %) patients respectively (OR 0.68, 95 % CI 0.14–3.37; NS).

Conclusion The incidence of serious complications in our series was low (0.7 %), some kind of complications occurred in 7.4 % procedures in total however. Higher age, female sex and the administration of more than two antithrombotic classes were identified as the risk factors of complication occurrence. In accordance with literature, we proved lower incidence of complications in the radial approach group.

Repeated restenosis after drug-eluting stent implantation for bare metal in-stent restenosis B2-4

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Background The long-term efficacy of percutaneous coronary intervention (PCI) is decreased by the need for repeated revascularizations caused by in-stent restenosis (ISR). There is no exact current guideline for the treatment of the repeated restenosis after stent implantation. Although the incidence of restenosis in drug-eluting stents (DES) implanted for ISR is low, these cases still represent a serious professional challenge. The aim of our study was to evaluate the long term safety and efficacy of DES in the treatment of an unselected population of bare metal stent (BMS) ISR compared to use of DES in patients with de-novo native coronary lesions.

Methods We examined a population consisting of 493 patients, underwent DES implantation between 1st of January 2003 and 30th of October 2006 in our institution. A number of 216 consecutive patients received DES for treatment of BMS ISR. 277 patients in the control group received DES for de novo native coronary lesions. The mean follow-up length was 40.5 ± 17.2 months. The mean age of the two groups were similar (63.4 ± 10.3 vs. 62.0 ± 10.9), the rate of diabetic patients were high in both groups (34.6 % vs. 38.2 %). Control group had higher number of patients treated for acute coronary syndrome compared to ISR group (56.3 % vs. 44.9 %, $p < 0.05$). All patients received aspirin and clopidogrel dual antiplatelet therapy for at least 12 months.

Results According to our results the incidence of ischaemia-driven target lesion revascularisation (TLR) in the ISR group was twice, compared to de-novo group (14.8 % vs. 7.9 %, $p < 0.05$). There was no significant difference in the cumulated all-cause mortality (6.5 % vs. 8.4 %, $p = 0.24$) and in the incidence of definite and probable stent thrombosis according to ARC criteria (1.2 % vs. 3.2 %, $p = 0.14$). The characteristics of restenosis did not differ significantly either between the two groups: 52.5 % of the lesions were focal, 15 % diffuse, 17.5 % diffuse-proliferative while in 15 % we found total occlusions. The first restenosis of the implanted DES were treated the same way in the two subgroups, in 47.5 % balloon angioplasty, in 37.5 % PCI with a new stent implantation, and in 7.5 % ACBG was indicated. In 7.5 % of the cases no additional revascularization was performed. Despite the successful treatment of the in-stent restenosis of DESs, repeated restenosis developed in 38 % of the cases in the ISR group, while in the de-novo group no additional TLR was needed.

Conclusion DESs are effective in treatment of ISR, but the rate of additional TLR is higher in these patients compared with the use of DES in de-novo native coronary lesions. After re-interventions a significantly higher rate of TLR can be anticipated.

Influence of lesion morphology on functional severity of coronary stenoses

B2-5

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Background Fractional flow reserve proved to be a more reliable method than coronary angiography for decision-making in revascularization of borderline coronary stenoses. It is known that coronary lesions of different morphology have diverse clinical relevance, however the influence of stenosis morphology has not yet clarified.

Aim of the study: To investigate whether the functional significance of coronary stenoses can be predicted by means of morphological classification of the lesions, or not.

Methods One hundred and forty-one stenoses of 127 patients undergoing FFR measurement were examined. Four groups were created by the Ambrose classification: concentric stenoses (A; n = 40), Ambrose I (B; n = 43), Ambrose II (C; n = 28) and multiple irregularity (D; n = 30). Correlation between the diametric stenosis (DS) and FFR was analyzed in each group by the Pearson's test. The difference between the measure of relationship of DS and FFR was examined by statistical comparison of correlation coefficients.

Results Significant correlation was found between DS and FFR in the A (r = -0.42, P = 0.007) and B patient groups (r = -0.47, P = 0.001). In case of complex morphology, i.e. in the C (r = -0.31, P = 0.1) and D groups (r = -0.32, P = 0.08) this correlation was not significant. The correlation coefficients of A and B groups did not differ significantly, which means that eccentricity of the lesions of simple morphology do not influence the relationship of DS and FFR.

Conclusion Angiographic severity of stenoses in lesions of simple morphology moderately, and significantly predicts their functional severity. In contrary, this relationship is absent in lesions with complex morphology, therefore FFR measurement in these cases is particularly important for the correct decisions of coronary revascularization.

Permanent pacemaker requirement after transcatheter aortic valve implantation

B2-6

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Background Complete atrioventricular block is a well-known complication after transcatheter aortic valve implantation (TAVI). In the current literature, a permanent pacemaker (PM) implantation rate in the range of 19 to 35 % is reported after TAVI with the self-expanding CoreValve bioprosthesis. After more than 100 revalving procedures we analyzed our own patient series regarding need for permanent PM implantation.

Methods Between May 2007 and May 2010, 117 patients (39 male, 78 female; mean age 81 ± 5 years; age range 63–90 years) with symptomatic severe aortic stenosis and a mean logistic EuroSCORE of 25 ± 18 % underwent a TAVI. All procedures were performed in the catheterization laboratory: transfemorally in 115 patients, in two patients via a left subclavian approach. A temporary PM was installed in all patients for rapid pacing during valvuloplasty and for ventricular back-up pacing in case of bradycardia. After balloon valvuloplasty, the self-expanding CoreValve prosthesis (diameter 26 mm, n = 62; 29 mm, n = 55) was implanted using the current 18 French delivery catheter system. Postprocedurally all patients were transferred to the intermediate care unit for a 48-hour monitoring period. Only patients with symptomatic bradycardia were scheduled for permanent PM implantation according to the current guidelines.

Results Acute procedural success rate was 99 %. TAVI resulted in a significant reduction of peak and mean aortic transvalvular pressure gradients and a significant increase of calculated aortic valve area. 14 of 117 patients already had a permanent PM implantation prior to selection for TAVI and were therefore excluded from analysis. In eleven of the remaining 103 patients (10.7 %; 6 male, 5 fe-

male; mean age 79 ± 4 years) a permanent PM was implanted two to seven days after TAVI due to symptomatic bradycardia. In eight of these eleven patients a 29 mm CoreValve prosthesis was implanted, two patients were revalved with a 26 mm prosthesis, and in one patient the prosthesis could not be safely positioned and had to be removed before complete deployment.

Conclusion The percentage of new permanent PM implantation in our TAVI series is much lower than previously reported in the literature (10.7 % vs. 19–35 %). Reasons for that might be that we did not implant any PM on a prophylactic basis (i.e. new-onset left bundle branch block or asymptomatic bradycardia) or for administrative logistical purposes (i.e. to promote earlier discharge from intermediate care unit or hospital). Furthermore, we aimed at a more superior positioning of the CoreValve prosthesis within the left ventricular outflow tract to mitigate conduction abnormalities and to reduce the need for permanent PM implantation. Finally, also prosthesis size could matter.

X-ray dose, blood loss, dose of radiocontrast agent and renal function in a series of 100 consecutive transcatheter aortic valve implantation patients

B2-7

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Background This observational prospective study was performed in the new field of transcatheter aortic valve implantation (TAVI) using the CoreValveTM self-expanding prosthesis (Medtronic Inc., MN, USA) in aortic stenosis patients (pts).

Methods One goal of the study was to compare the applied X-ray dose in TAVI with those of preceding diagnostic catheterisation in the same population. Further we investigated blood loss, need for transfusion, the amount of applied contrast and its influence on renal function.

Results The study population consisted of 100 consecutive pts, 36 male, median age 81 (25–75 %: 77–84) years, mean weight 67 (± 12) kg. X-Ray dose: Median dose-area product of X-ray in the diagnostic catheterisation was 113 (25–75 %: 71–160) Gy·cm² compared with 91 (55–172) Gy·cm² in TAVI respectively (p = 0.42). Blood loss: Median haemoglobin decreased from 11.6 (25–75 %: 10.9–12.5) g/dl right before TAVI procedure to 9.3 (8.5–10.1) g/dl afterwards but increased again to 10.7 (10.0–11.6) g/dl upon discharge (p < 0.001). Haemorrhages according to the TIMI score.

Conclusion The population of TAVI pts in our institution consists widely of octogenarians with impaired red blood count and impaired renal function just before intervention and is therefore on high interventional risk. X-Ray dose of the TAVI procedure is similar to those of a diagnostic catheterisation. Blood loss during TAVI is significant, but bleeding rates seem to be acceptable. Renal function in TAVI pts is affected significantly, nevertheless pts could be discharged with restored GFR. Larger studies are needed to robustly prove the safety of TAVI regarding the investigated parameters.

Session B3: Interventional Cardiology II**The influence of on-pump and off-pump coronary artery bypass grafting (CABG) on hemorheological parameters**

B3-1

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Background Conditions during CABG surgery performed on beating heart (off-pump) are more physiological than using extracorpor-

real perfusion (on-pump). These two methods have been compared in many views. The present study aims to examine the hemorheological aspects of the two techniques.

Methods Blood samples were obtained from patients (mean age: 62 years, 9 females, 14 males) undergoing on-pump (n = 12) and off-pump (n = 11) CABG surgery in the Heart Institute of Pécs. Samples were taken upon arrival to the operating theatre, after induction of anesthesia, 20 and 40 minutes after performing cardiopulmonary bypass (in case of off-pump surgeries after the mean time needed to perform a cardiopulmonary bypass), after closing the thorax, on the 1st and 2nd postoperative days, and on the 2 month control check-up. Hematocrit (Hct), whole blood and plasma viscosity (WBV, PV; Hevimet 40 capillary viscometer), red blood cell (RBC) aggregation and deformability (Myrenne RBC aggregometer and LORCA), and platelet aggregation (Carat TX aggregometer) were determined. Morphology of red blood cells was investigated by scanning electronmicroscopy.

Results Hct, WBV, PV and RBC aggregation decreased significantly during the early phase of surgery, started to recover in the postoperative period, and have reached the baseline values by the 2 month visit. Hct, WBV, PV and RBC aggregation showed a significantly smaller decrease in samples taken after 20 and 40 minutes when using the off-pump method. No significant difference was detected in RBC deformability measured with LORCA, however, scanning electronmicroscopy showed rather damaged and malformed cells in the 40-minute-samples, that was concordant with our preliminary results measured by filtrometry. Platelet aggregation decreased significantly by the end of surgery, and the decrease was significantly greater in case of on-pump surgery.

Conclusion During CABG surgery most rheological parameters change, that may mostly be caused by the change in Hct. Changes are greater in case of on-pump surgery. Cells seem to be mechanically damaged by the heart-lung machine. Off-pump technique seems to be favourable from a hemorheological point of view.

Transradial approach for coronary angiography and interventions. Our experience on first 500 patients

B3-2

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Background Transradial approach (TRA) for coronary angiography and percutaneous interventions (PCI) has risen gradually last decade, with currently hundreds Centers worldwide using this access route as primary option. Last few years there is increasing number of reports and new published studies providing further support for the TRA in diagnostic and coronary PCI, with investigators reporting significantly less bleeding and reduce incidence of hard clinical endpoints. earlier patient mobilization and discharge, including a strategy of day-case PCI in subset of patients.

Methods In aim to demonstrate safety and advantages of this access in diagnostic and interventions, not only for elective patients, but for those requiring complex intervention, those with ACS and AMI primary interventions as well, we analysed 500 patients who underwent TRA diagnostic and/or PCI interventions in our Cath lab. from 01.01.2008 to 01.05.2010.

Results There were 300 patients with PCI and 200 with diagnostic procedures only. Rate of radial access was almost 95 %, whereas procedural success rate was as high in both groups 90 % and 92 % respectively. Selective cannulation of the coronary ostium failed in only 2,5 % of the patients. There were no bleeding complications need for surgical repair or blood transfusions and no other complications in any group as well. We are presenting all procedural datas, and in three typical cases, one with diagnostic only, the second with elective but complex intervention, and finally the third with serious ACS and STEMI intervention, we have been demonstrating our strategy, technical preferences and advantages of transradial access approach.

Conclusion Pioneering this approach in our country, we are encouraging and inspiring other Centers in Croatia to follow and accept this

technique which offers an excellent instrument of achieving the priorities of PCI in the early next future.

Ballon aortic valvuloplasty in severe aortic stenosis in elderly

B3-3

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Background Calcific stenosis of the aortic valve (AS) is the most common acquired valve disorder in the Western world. Surgical aortic valve replacement (SAVR) is considered the treatment of choice in severe AS. Surgical risk in elderly patients with multiple comorbidities can be very high. In the last few years less invasive percutaneous treatment options such as percutaneous balloon aortic valvuloplasty (BAV) have been developed for poor-surgical-risk patients. Early restenosis of the dilated valve with symptoms recurrence within one year and poor long term survival are the limitations of this procedure. The Radiation Following Percutaneous Balloon Aortic Valvuloplasty to Prevent Restenosis (RADAR) pilot trial suggested that external beam irradiation of a dilated aortic valve may reduce restenosis.

Methods Between July 2008 and May 2010 we performed over 60 BAV. In December 2009, we started to enroll patients for a new randomized, case-control study RADAR-SLO. Before and after BAV patients underwent invasive and non invasive cardiac diagnostic studies to evaluate the severity of aortic stenosis and left ventricular function. Via transfemoral approach a balloon catheter is introduced and positioned across the aortic valve. Aortic valvuloplasty is performed with balloon inflation during rapid ventricular pacing. Noninvasive follow-up is performed after BAV and includes physical examination, determination of biochemical parameters and echocardiographic exam. Randomized patients for RADAR-SLO study are divided in case-control groups at a ratio of 2 to 1. We treated the first group with external beam irradiation (total dose of 16 Gy). The second group is a control group and does not receive any irradiation.

Results After a successful BAV we observed a significant increase in aortic valve area accompanied by a fall in peak and mean transvalvular gradients. Successful BAV was associated with symptomatic improvement and decrease in hospital admissions for cardiovascular causes. The most common complications within 24 hours after BAV were peripheral arterial complications with need for blood transfusion. Death occurred in 4 patients (6.6 %) and was secondary to the following reasons: pulmonary embolism (1.6 %), asystolia after self-extraction of pacemaker electrode (1.6 %), cardiogenic shock (3.3 %) attributable to myocardial infarction and to end-stage cardiac failure. During 6 months follow-up we observed a gradual restenosis of a previously dilated aortic valve with decrease in aortic valve area and increase in transvalvular pressure gradient.

Conclusion Preliminary data from our study confirmed an initial increase in aortic valve area and symptomatic improvement after BAV. Results of the RADAR-SLO study will show the role of external beam irradiation therapy following BAV on the prevention of restenosis after BAV. In case we determinate a reduction in restenosis rate and improvement of long-term survival after irradiation, BAV may be used as an alternative procedure to SAVR also in selected high-risk patients who would still be candidates for surgical therapy.

Comparison of the Leaman weighting factor and the Holistic Coronary Care Software on the basis of autopsy findings

B3-4

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Background In the Syntax study the Leaman weighting factor is used for the evaluation of the left ventricular areas affected by the

lesion. Taking the two main coronary circulation systems, in right dominance the scoring system orders one point to the right coronary artery and five to the left coronary artery. However, the circulation types can differ significantly from the two main types.

Methods The coronary angiograms were analyzed retrospectively from the data of 19 patients deceased from ST-elevation myocardial infarction. The Leaman factor and the result of the Holistic Coronary Care (HCC) software were compared with the extent of infarction found by the autopsy. The coronary angiography was performed in average 3.6 days before the death. With the consideration of the complementary distribution of the left anterior descending artery and posterior descending branch as well as the right and the left coronary artery there were $3 \times 4 = 12$ circulation types registered in the HCC. The size of the supplied area by the software (standard 17-segment model) was compared to the size of the involved area according to the Leaman weighting factor.

Results With regards to the individual circulation types in the HCC 0–64.7 % of the left ventricle was ordered to the right coronary artery, 5.9–64.7 % to the circumflex artery and 29.4–64.7 % to the left anterior descending artery. On the other hand, using the Leaman factor these values were 0 or 8.3 %, 25 or 41.7 % and 58.3 %, respectively. Multivariate regression analysis showed significant correlation between the extension of the infarction detected by autopsy and the HCC segment number ($r = 0.78$, $p = 0.0002$), while there was no significant correlation with the Leaman factor ($r = 0.46$, $p = 0.08$).

Conclusion With defining the individual circulation types with the HCC software it is possible to determine the left ventricular segments related to the lesion with better correlation than with Leaman weighting score.

The first results of chronic total occlusions program in Szeged B3-5

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Background The treatment of the chronic total occlusions (CTO) is one of the most challenging field of the interventional cardiology. CTO is defined as total occlusion of the coronary artery with either known duration of more than 3 months or presence of bridging collaterals.

Methods There is a systematic work in the management of complex CTO-s in our catheterisation laboratory from 2007. In this presentation our data will be demonstrated. Because of the difficulty of this procedures the learning curve should be controlled by an experienced operator. In our laboratory Georgios Sianos (AHEPA University Thessaloniki) played this role.

Results Seventy-eight patients were operated during this two and half years. The success rate was 85 %. There were 40 antegrad procedures and 25 retrograd interventions. Successful recanalisation was achieved at the second attempt in 9 patient and at the third one in 3. Patients were carefully selected. Their angina status were in most of the cases CCS3. The ischaemia was verified by echocardiography, stress echo or scintigraphy.

Conclusion The decision to perform percutaneous interventions instead of coronary bypass surgery was based on patients' preference in all cases. The follow up of patients warrants these complex percutaneous procedures in strictly selected cases.

■ Session B4: Risk Factor Management II

Investigation of classic risk factors and coagulation factor XIII in young myocardial infarction patients B4-1

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Background Acute myocardial infarction (AMI) shows a high incidence also in the population below 40 years of age. Our department admits 40–50 patients below 40 years of age with symptoms of acute myocardial infarction in each year. Exploration of its characteristics is important, because it results in a significant morbidity and psychosocial disability on active members of the society. While risk factors of AMI are well characterized in the older population, the young cases show numerous differences. Some risk factors come to the front, while others rarely can be found. Our aims were to examine the role of classic and new (non-conventional) risk factors in the development of AMI and to explore whether certain components of the hemostasis may influence the risk of coronary thrombosis in young individuals. Previously our group demonstrated that elevated factor XIII (FXIII) levels conferred a significantly high risk of AMI in middle-aged and older women.

Methods Young patients between 17 and 40 years of age and went through coronary angiography ($n = 356$) were recruited to our study in a 5 year time period. Patients with acute coronary occlusion and/or fulfilled the WHO criteria of AMI were defined as AMI positive ($n = 232$) and those having negative coronary angiography as AMI negative ($n = 124$). Risk stratification, including detailed family history was performed and blood was collected for laboratory investigation. At least three months were allowed to elapse between the onset of AMI and the blood sampling.

Results Among classic risk factors hypercholesterolemia (OR 2.4, $p = 0.023$), smoking (OR 7.4, $p < 0.001$) and male gender (OR 2.3, $p = 0.006$) were proved as risk factors of AMI, while hypertension (OR 0.7, $p = 0.21$) and diabetes mellitus (OR 2.1, $p = 0.1$) not. In this young population the occurrence of AMI did not show further age dependency (OR 1, $p = 0.41$). Significant difference in FXIII activity of patients and controls have been shown in both genders (118 % vs. 107 %, $p = 0.007$). FXIII activity was significantly higher in active smokers compared to non-smokers (123 % vs. 102 %, $p < 0.001$) while similar activity levels have been detected in ex-smokers and non-smokers (108 % vs. 102 %, $p = 0.32$). Ex-smokers still had elevated risk of AMI (OR 4.59, $p = 0.014$), however it was lower than the risk of active smokers. The only parameter which significantly influenced the FXIII level was smoking in our study. After adjustment to smoking the difference in FXIII activity between the AMI and control group disappeared (107 % vs. 111 %, $p = 0.39$).

Conclusion The majority of AMI events evolve on the basis of insignificant coronary stenosis, so besides platelet activation the role of coagulation arises especially in young age. Increased FXIII activity results in a thrombus more resistant to fibrinolysis, which results in shifting of hemostatic balance to procoagulant direction. The relationship between smoking and FXIII activity is not completely elucidated yet. Based on our study we can conclude that smoking raises FXIII activity, which may serve a new pathophysiological explanation for increased thrombogenicity of smokers.

Correlation between flow-mediated vasodilatation of the brachial artery and intima-media thickness in the carotid artery in hypertensive patients B4-2

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Background Flow-mediated dilation (FMD) of the brachial artery is a measure of endothelial function and intima-media thickness

(IMT) of the carotid artery, a measure of subclinical atherosclerosis. The purpose of this study was to elucidate the relationship between endothelial dysfunction in the brachial and intima-media thickness of the carotid artery in hypertensive patients.

Methods The study included 3 groups: 40 hypertensive patients with atherogenic dyslipidemia (HTN+DYS group), 35 hypertensive patients without atherogenic dyslipidemia (HTN-DYS group) and 40 control subjects (CON group), age and sex matched. High-resolution brachial artery ultrasonographic studies were performed to assess endothelium-dependent [expressed as % flow-mediated dilatation (FMD)] responses. The carotid intima-media thickness was assessed by high resolution B-mode ultrasound imaging according to the Mannheim Consensus.

Results HTN + DYS group had a significantly greater IMT of the common carotid artery than CON group (0.76 ± 0.06 versus 0.64 ± 0.05 mm, $p < 0.001$) and HTN-DYS group than CON group (0.73 ± 0.09 versus 0.64 ± 0.05 mm, $p < 0.001$). HTN + DYS group had a significantly lower brachial FMD than CON group (7.28 ± 3.47 versus 12.87 ± 1.19 %, $p < 0.001$) and HTN-DYS group than CON group (7.41 ± 3.33 versus 12.87 ± 1.19 %, $p < 0.001$). A significant negative correlation between the intima-media thickness of the carotid artery and brachial FMD was found in all of the subjects ($r = -0.29$, $p < 0.001$).

Conclusion The study revealed that hypertensive patients had increased IMT of the carotid artery and decreased brachial FMD, independent of the presence of atherogenic dyslipidemia. Endothelial dysfunction is significantly related to atherogenesis in hypertensive patients.

Mediterranean versus continental lifestyle: regional differences in selected risk factors in Croatian coronary heart disease patients

B4-3

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Background There is only few data on the occurrence and differences in risk factors for coronary heart disease (CHD) patients in relation to geographic areas. Existence of such differences could be used for better understanding of CHD occurrence, especially in terms of region-specific risk factor issues. Although this could ultimately lead to better treatment, it could be very useful for improving primary and secondary prevention and better planning in the healthcare system. Croatia is a country with large differences in terms of continental and Mediterranean climate and lifestyle due to geographical and historical reasons. In order to investigate if these differences are present in Croatia, the data from the Treatment and secondary prevention of ischemic coronary events in Croatia V (TASPIC-CRO V) study was used.

Methods This study was performed on Croatian CHD patients in 31 research centers in Croatia (September 2002 – March 2003) in two principal regions of Croatia (Mediterranean and continental) and corresponding subregions (continental Croatia: City of Zagreb, Central Croatia, Northern Croatia and Slavonia as parts of continental Croatia; Mediterranean Croatia: Primorje and Istria, and Dalmatia). Following data were gathered from hospital medical records of 3054 CHD patients: personal and demographic details; and risk factor recordings – history of cigarette smoking, hypertension, hyperlipidemia (total cholesterol, triglycerides, HDL-cholesterol and LDL-cholesterol) and diabetes.

Results Prevalences of hypertension and of decreased HDL-cholesterol in examined CHD patients were significantly higher in continental Croatia ($P < 0.001$ and $P = 0.006$), while there was a higher prevalence of smokers in coastal Mediterranean Croatia ($P = 0.007$). Other examined CHD risk factors do not differ significantly between these two regions.

Conclusion Risk factors in Croatian CHD patients differ in continental and Mediterranean parts of Croatia. Higher prevalences of both hypertension and decreased HDL-cholesterol were present in

the continental part, while in the Mediterranean Croatia there was higher prevalence of smokers. Focused prevention and treatment initiatives aimed at reduction of these risk factors in the regions where they are more prevalent could result in better outcomes. However, differences in prevalence of diabetes, total cholesterol, LDL-cholesterol and triglycerides between hospitalized CHD patients did not follow the expected Continental-Mediterranean pattern, as there were no significant regional differences.

Increased plasma level of lipoprotein(a) is a marker of increased cardiovascular risk

B4-4

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Background Available literature contains somewhat contradictory data on the significance and influence of lipoprotein(a) [Lp(a)] levels on cardiovascular risk. Recent molecular research regards Lp(a) as the so-called third cholesterol which should be treated in the same way like total and LDL-cholesterol in reduction of total cardiovascular risk. In light of this, our group investigated relationship of Lp(a) concentration as independent risk factor for arteriosclerosis, where presence of positive exercise stress testing was used as an indicator of cardiovascular risk presence.

Methods This study was performed in University Hospital Dubrava in Zagreb, Croatia. 87 patients participated with unknown preliminary coronary or peripheral vascular disease. Patient groups were stratified according to increased and normal Lp(a) levels measured from serum and all patients underwent exercise stress testing.

Results In the group with increased concentration of Lp(a) in serum (> 0.30 g/L) there were 53 patients (average age 55 years, 32 males and 21 females), and normal concentration of Lp(a) in serum (< 0.30 g/L) was found in 34 patients (average age 52 years, 20 males and 14 females). Patients with increased Lp(a) levels were significantly older than patients with normal Lp(a) levels ($p = 0.020$). Average concentration of Lp(a) in patients with negative exercise stress testing results was 0.38 g/L, and in those with positive exercise stress testing results it was 0.51 g/L, with difference among groups being significant ($p = 0.049$).

Conclusion Recently published research shows that both the amount and size of Lp(a) indicate higher risk of heart disease. This finding is supported by our results which show that patients with elevated concentration of Lp(a) in serum are significantly more likely to have positive exercise stress testing results, which indicate presence of coronary heart disease. Although this could suggest that reducing increased Lp(a) levels in plasma by treatment could decrease cardiovascular risk, more research on this topic is required.

The results of Rogers' small group method in cardiac rehabilitation

B4-5

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Background Behaviour has been identified as a risk factor that may determine the outcome of somatic diseases, and certain behavioural traits have been shown to influence rehabilitation. According to previous data, the outcome of an acute myocardial infarction (MI) as well as the further prognosis largely depends on the psychological condition, untreated depression profoundly worsens survival. These facts are of great importance, because after MI distress and depression syndrome can be observed in two thirds of the patients. The aim of the present study was to assess and to correct the psychological status of patients participating in cardiac rehabilitation.

Methods Patients entering in-patient cardiac rehabilitation after MI, percutaneous coronary intervention or heart surgery were included ($n = 32$, male = 20, age = 65.4 ± 12.7 years). Patients with mental or sensory deficit as well as with inadequate cooperation were excluded. Eight small-groups with 3–6 participants (4 ± 0.5)

were established. Small-group activity was completed in one hour, two times a week, in four sessions altogether. For baseline and post-intervention evaluation the Beck Depression Inventory (BDI), and State-Trait Inventory Spielberger (STAI- Spielberg) for feature- and state anxiety (SQ) were used. We used major elements of Rogers' method small group sessions, such as facilitated conversation, status survey, relaxation, and psychoeducation. Data are in means $\pm$ SD.

Results Baseline and post intervention BI scores were 11.0 ± 6.9 and 8.0 ± 5.2 ; respectively (37.4 % improvement, $p = 0.0003$). Baseline and post intervention SQ scores were 41.1 ± 11.4 and 38.3 ± 10.1 ; respectively (7.2 % improvement, ns).

Conclusion Psychological management and if needed psychotherapy are very important in cardiac rehabilitation. Even four small group sessions may improve the participants' mood and may reduce their anxiety. Further studies are needed to assess the role of longer duration group work and/or individual psychological conduction (guidance, psychotherapy) in cardiac rehabilitation.

New indexes for estimating dyslipidemic risk in hypertensive patients

B4-6

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Background The total/high-density lipoprotein (HDL) cholesterol ratio and the LDL/HDL cholesterol ratio are two important components and indicators of vascular risk, the predictive value of which is greater than the isolated parameters. The aim of this study was to compare lipid profiles, total/high-density lipoprotein (HDL) cholesterol ratio and LDL/HDL-cholesterol ratio between hypertensive patients with atherogenic dyslipidemia, hypertensive patients without atherogenic dyslipidemia and a control group.

Methods Plasma levels of total cholesterol (TC), high-density lipoprotein cholesterol (HDL-c), low-density lipoprotein cholesterol (LDL-c), triglycerides (TG) and total/high-density lipoprotein cholesterol ratio and LDL/HDL cholesterol ratio were analyzed in a group of hypertensive patients with atherogenic dyslipidemia ($n = 40$) or without atherogenic dyslipidemia ($n = 35$), as well as in 40 control subjects, age and sex matched.

Results It were observed significant differences for TC, HDL-c, LDL-c and TG levels, as well as for the total/high-density lipoprotein cholesterol ratio and LDL/HDL cholesterol ratio, between hypertensive with atherogenic dyslipidemia and the control subjects ($p < 0.001$) and between the hypertensive with atherogenic dyslipidemia and hypertensive without atherogenic dyslipidemia ($p < 0.001$).

Conclusion Total cholesterol/HDL ratio and LDL/HDL cholesterol ratio can be considered more sensitive and specific indexes in estimating dyslipidemic risk in hypertensive patients at any level of total or LDL-cholesterol. These new indexes can easily and cheaply identify an increased trend for atherosclerosis in hypertensive patients.

Evaluation of arterial hypertension control with antihypertensive drugs

B4-7

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Background We use national guidelines and six main pharmacological groups for treating arterial hypertension. Several trials have documented that only 20–30 % of patients have their hypertension adequately controlled, which is defined as blood pressure (BP) 140/90 mmHg or less. With non-randomised postmarketing study we evaluated which antihypertensive drugs are most widely used and the proportion of patients whose BP was controlled.

Methods A total of 607 patients with arterial hypertension were enrolled into our study. The participants were subjects of both sexes (51.6 % of them were men) with mean age 63.1 ± 10 years and 44.6 % of patients had diabetes mellitus type 2. The study was con-

ducted between October 2007 and December 2008. The sample of using antihypertensive drugs was evaluated as proportion of each pharmacological group being used and with proportion of combined antihypertensive therapy. We also compared average systolic and diastolic BP at the beginning and at the end of study for the whole population.

Results At the beginning of study the majority of patients with arterial hypertension were treated with inhibitor of angiotensin converting enzyme (57.8 % of all patients), 30.8 % of patients were treated with diuretics and 27.8 % of patients with beta-blockers. The majority had combination therapy with two antihypertensive drugs (38.7 %). In the whole population there was 7.1 % of patients without any antihypertensive therapy. At the end of study 89.3 % of patients were treated with antagonist of angiotensin II receptors, 58.5 % with diuretics and 29 % with beta-blockers. At the end the majority was treated with two antihypertensive agents (34.4 %) and the proportion of patients treated with three antihypertensive drugs was higher than at the beginning (16.0 % at the beginning and 29.0 % at the end of study). Average systolic BP at the beginning was 158 ± 15 mmHg and at the end 137 ± 11 mmHg, which is statistically significant ($p < 0.05$), while diastolic BP at the beginning was 93 ± 9 mmHg and at the end 83 ± 8 mmHg, which is also statistically significant ($p < 0.05$). In the whole population 76.7 % of patients reached systolic BP equal or lower than 140 mmHg and 90 % of all patients reached diastolic BP equal or lower than 90 mmHg.

Conclusion According to national guidelines the majority of patients were at the beginning treated with inhibitor of angiotensin converting enzyme, most frequently in combination with diuretics. At the end of study the majority was treated with antagonist of angiotensin II receptors and beside combination therapy with two drugs, there was also a lot of patients treated with three drugs (antagonist of angiotensin II receptors, inhibitor of calcium channels and diuretics), which is also in according to national guidelines. Average values of systolic and diastolic BP were lowered to target values for the whole population. We proved that with better control of BP and with combination therapy we are more successful in treating arterial hypertension, which leads to better prevention of cardiovascular events.

Risk management of diabetic patients with cardiovascular diseases at the beginning of the in-hospital cardiac rehabilitation programme

B4-8

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Background Diabetes mellitus is a strong risk factor for several chronic diseases: cardiovascular disease accounts for approximately 70 % of all mortality in people with diabetes. The Framingham study found first that the diabetes doubled the risk for cardiovascular disease in men and tripled it in women. Sudden cardiac death occurred 50 % more often than average in diabetic men and 300 % more than average in diabetic women. Some risk factors associated with diabetes increase risk more than others. For instance, the UKPDS-study showed, that most important myocardial infarction risk factor to be elevated LDL-cholesterol level, followed by elevated diastolic blood pressure, cigarette smoking, a low high-density lipoprotein cholesterol level, and a high level of glycated hemoglobin (HbA1C).

Methods Prospective multicenter study in four well-known cardiac-rehabilitation centers. Till now we randomised 221 patients (age: 66 ± 5.9 yr) taking part in an in-hospital cardiac rehabilitation programme. The duration of the diabetes was 9.3 ± 7.7 yr. We characterized all patient's data about their case history, basic laboratory parameters. We examined where come from the education's knowledge about diabetes of patients with cardiovascular disease at the beginning of the in-hospital cardiac rehabilitation programme. The patients gave an account of a self-fill-in questionnaire about their social-educations background, about QoF and exercise habits. They filled a multiple-choice test about the dietetic knowledge and we looked for a source of this knowledge. We sought a correlation between the education of patients and their laboratory data.

Results Most of patients got information from the dietitians (71.5 %), doctors (45.3 %), nurses (9.5 %), magazines (8.8 %), television, radio (6.6 %), other (5.1 %), internet (2.9 %), patient-mates (2.9 %). The knowledge of patients did not connect with their laboratory data in general, surprisingly the data showed with the level of cholesterol positive correlation ($R = 0.29$, $p < 0.001$). We did not find any correlation between the data of antropometry (BMI etc.) and the knowledge. Unfortunately the blood pressure and the cholesterol levels did not reach the targets in more than 60 % (130/80 mmHG, and < 5 mmol/l).

Conclusion When previously undetected Type 2 diabetes may be an important underlying factor in the development of coronary disease, determination of the patient's fasting blood glucose levels should be included in the laboratory examination made at the time of presentation. Most patients depend on the medical system to get their knowledge, but it is little correlation between this knowledge and their laboratory data. Therefore we have to examine more consistent the execution.

■ Session C1: Acute Coronary Syndromes I

Prediction of cardiogenic shock using plasma Nt-proBNP concentrations in ST-elevation myocardial infarction: A substudy of ASSENT IV-PCI C1-1

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Background Cardiogenic shock is one of the major causes of death in ST-elevation myocardial infarction (STEMI). We investigated in the present study, whether determination of Nt-proBNP in the acute phase of STEMI could be used for identification of patients who develop cardiogenic shock.

Methods Plasma Nt-proBNP was available in 1,014 STEMI patients when randomized to primary PCI) or to full-dose tenecteplase prior to PCI (fPCI). The study endpoint for the present analysis was in-hospital cardiogenic shock defined as systolic blood pressure less than 90 mmHg for at least 30 min (or the need for supportive measures to maintain a systolic blood pressure of greater than 90 mmHg) in the presence of a heart rate of more than 60 bpm and in association with signs of hypoperfusion (cool extremities, or urinary output of less than 30 mL/h or mental confusion, or both); or 2) a cardiac index of less than 2.2 L/min/m² in the presence of a pulmonary capillary wedge pressure of more than 15 mmHg.

Results In total, 57 (5.6 %) patients developed cardiogenic shock during index hospitalization. In-hospital cardiogenic shock increased precipitously with higher baseline concentrations of plasma Nt-proBNP (Nt-proBNP < 67 pg/ml: 1.9 %; 68–1482 pg/ml: 5.9 %; > 1482 pg/ml: 14.9 %; $p < 0.001$). Higher Nt-proBNP concentrations were predictors of in-hospital shock especially among those patients with relatively low clinical risk (no requirement of inotropic support prior to angiography, systolic blood pressure > 100 mmHg, heart rate < 100 bpm, GUSTO-Score of < 122). In multivariable Cox regression analysis, higher plasma Nt-proBNP concentrations remained significant predictors of shock in-addition to age, systolic blood pressure, heart rate and randomization to facilitated PCI and Killip-Classification. Moreover, plasma Nt-proBNP significantly predicted in-hospital shock independently of the validated GUSTO-Score ($p = 0.014$).

Conclusion Plasma Nt-proBNP concentrations measured early in the acute phase of STEMI are useful in predicting the development of in-hospital cardiogenic shock.

Routine determination of platelet reactivity in patients on long-term dual antiplatelet therapy: The WILMAA registry C1-2

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Background The WILMAA Registry was designed to evaluate the effects of long-term dual antiplatelet therapy (aspirin and clopidogrel) on P2Y₁₂ blockade and platelet aggregation in a routine setting. Low responsiveness to clopidogrel was described in up to 50 % of patients after short-term therapy. Antiplatelet activity of clopidogrel during long-term therapy in a stable clinical situation is still unknown.

Methods We performed a prospective single center registry of patients undergoing PCI and coronary stenting. All patients were on aspirin. Clopidogrel-naïve patients received a loading dose of 300 or 600 mg at least 6 hours before blood sampling. Patients received dual antiplatelet therapy (clopidogrel 75 mg/day plus acetylsalicylic acid 100 mg/day) for at least 6 months. VASP phosphorylation analysis was performed by an experienced investigator using commercially available assays. In addition, multiple electrode aggregometry (MEA) clopidogrel assay was performed on all samples. Our primary analysis compared VASP-platelet reactivity index (PRI) and MEA measurements determined at baseline versus 1, 3 and 6 months, respectively.

Results In the first 50 consecutive patients enrolled, 28 suffered from acute coronary syndrome (ACS). In ACS patients VASP-PRI was 50.67 ± 22.22 at baseline, 37.79 ± 18.42 at 1 month, 43.04 ± 23.38 at 3 months, and 44.27 ± 19.71 at 6 months ($p = 0.002$, $p = 0.021$ and $p = 0.027$ for baseline versus 1, 3 and 6 months), respectively. In stable patients, VASP-PRI was 59.00 ± 15.46 at baseline, 49.45 ± 18.85 at 1 month, 54.38 ± 25.40 at 3 months and 61.72 ± 18.93 at 6 months ($p = 0.003$, $p = 0.623$ and $p = 0.548$ for baseline versus 1, 3 and 6 months). VASP-PRI at baseline was comparable in patients with ACS and in stable patients ($p = 0.141$). In contrast MEA results remained almost unchanged during follow-up: ACS patients (33.40 ± 22.85 at baseline, 32.97 ± 19.36 at 1 month, 36.56 ± 21.31 at 3 months and 33.50 ± 19.21 at 6 months; $p = \text{ns}$); stable patients (37.80 ± 15.99 at baseline, 40.84 ± 19.60 at 1 month, 38.07 ± 12.95 at 3 months and 46.59 ± 20.94 at 6 months; $p = \text{ns}$). Again MEA results showed no significant difference between patients with ACS and stable patients ($p = 0.456$).

Conclusion VASP phosphorylation assay showed a significant and long-lasting improvement of P2Y₁₂-receptor inhibition over time in ACS patients. In stable patients the significant improvement of P2Y₁₂-blockade after 1 month was lost during long term follow up. The results of MEA remained unchanged in both groups. Because it is expected that platelet reactivity in the early phase of ACS is increased and might therefore influence the action of clopidogrel in the respective test systems, the changes over time in the VASP assay in ACS patients are more reliable compared with the stable results obtained with MEA. Further evaluation of the clinical usefulness of these assays in patients on long-term clopidogrel is therefore mandatory.

In patients with history of infection followed by cardiac symptoms analysis of global strain with 2D-speckle-tracking allows to diagnose acute coronary syndrome, but not myocarditis C1-3

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Background Because of differences between the orientation of subepicardial and subendocardial fibers subepicardial disease (e.g. myocarditis) is expected to influence other strain-qualities than subendocardial disease (e.g. acute coronary syndrome).

Methods Retrospective analysis of 114 consecutive patients with infection followed by cardiac symptoms; in these patients neither history, clinical presentation, ECG, blood samples nor conventional echocardiography allowed the differentiation between myocarditis and acute coronary syndrome. In all patients cardiac magnetic resonance has been performed (Siemens 1.5 T Vision and Avanto), in 90 patients we analyzed global strain with 2D-speckle-tracking (GE VIVID 5 and 7, EchoPac). The analysis of global strain has been limited to patients with good image quality, normal left ventricular function (EF > 45 %) and sinus rhythm with normal heart rate (50–100 bpm).

Results There have been no significant differences regarding global strain between patients without „late enhancement” and patients with subepicardial „late enhancement” (longitudinal strain 4-chamber-view: 16.65 ± 2.32 vs 16.67 ± 2.31 ($p = 0.49$), longitudinal strain 2-chamber-view: 17.1 ± 2.34 vs 15.91 ± 2.34 ($p = 0.09$), longitudinal strain 3 chamber-view: 16.12 ± 3.00 vs 16.06 ± 2.60 ($p = 0.48$), circumferential strain: 15.06 ± 2.69 vs 14.67 ± 5.01 ($p = 0.39$), radial strain: 38.51 ± 11.77 vs 37.62 ± 13.77 ($p = 0.43$), rotation: 5.81 ± 1.96 vs 5.08 ± 1.10 ($p = 0.14$)). In patients with subendocardial „late enhancement” with the exception of rotation all strain-qualities have been significantly reduced compared to patients without „late enhancement” and patients with subepicardial „late enhancement” (longitudinal strain 4-chamber-view: 10.56 ± 3.01 ($p = 0.00004$ and 0.0002 , respectively), longitudinal strain 2-chamber-view: 12.85 ± 4.41 ($p = 0.005$ and 0.05 , respectively), longitudinal strain 3-chamber-view: 12.3 ± 2.79 ($p = 0.006$ and 0.008 , respectively), circumferential strain: 8.2 ± 2.12 ($p = 0.001$ and 0.03 , respectively), radial strain: 17.5 ± 11.31 ($p = 0.01$ and 0.02 , respectively), rotation: 4.55 ± 1.06 ($p = 0.19$ and 0.27 , respectively)).

Conclusion In patients with infection followed by cardiac symptoms the reduction of global longitudinal, circumferential and radial strain in spite of preserved left-ventricular function may allow to detect acute coronary syndrome; in contrast to magnetic resonance analysis of global strain does not allow to detect myocarditis.

The medical treatment of the acute coronary syndrome (ACS) in Styria. Presentation of the data collected in the Styrian ACS registry from 2006 to 2008

C1-4

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Background Since 2006 there has been a 24 hours acute heart catheter laboratory on call in Styria. Three intervention centers are responsible for Styrian ACS patients. The clinical department of cardiology of the University of Medicine Graz collects the data of all ACS patients who are admitted to Styrian hospitals. The aim of our study was to give an overview and evaluation of the treatment of ACS patients in Styria since the initiation of the acute heart catheter laboratory on call. The data collected in the registry is the first demographic data concerning the ACS in Styria. It allows a comparison of the ACS treatment over three years in Styria, and shows the quality of ACS treatment in comparison with international guidelines. For benchmarking reasons another point of interest is to find improvement options concerning the ACS management.

Methods We retrospectively collected data of 6819 ACS patients who were treated in Styrian hospitals from 2006 to 2008. With interference statistics we give an overview over the collected data. Specific statistics were only calculated for the STE-ACS subgroup.

Results 68 % of the registered patients showed NSTEMI-ACS and 32 % showed STE-ACS. The male/female ratio was about 1.7. In the NSTEMI-ACS subgroup the NSTEMI entity outweighs the IAP entity. Among STE-ACS patients the diaphragmal infarction is the most common entity. The median age of ACS patients in Styria is 70 years. The prehospital time between onset of symptoms and first medical contact for ACS patients is 110 minutes. There was a reduction

of time between onset of symptoms and initiation of reperfusion via PPCI from 2006 to 2008. 18.2 % of all STE-ACS patients could receive reperfusion-therapy via PPCI within a period of 90 minutes from the start of the symptoms. The median contact to balloon time was 121 minutes (2006) and declined to 99 minutes (2008). 43.4 % of all patients treated via PPCI could receive the therapy within 90 minutes from first medical contact. 54.8 % were treated with PPCI within 120 minutes. Both subgroups enlarged during the study period. Urban regions show significantly shorter treatment times concerning the initiation of PPCI for STE-ACS patients in comparison with rural regions ($p < 0.01$). There is no significant difference for the important time spreads whether the initial therapy was performed through ambulance cars or under the authority of an emergency doctor ($p > 0.05$). The amount of STE-ACS patients who underwent a pharmacological reperfusion treatment declined from 19.2 % (2006) to 8.2 % (2008).

Conclusion The initiation of the Styrian 24 hours heart catheter program on call since 2006 has improved the system of care and has led to a reduction of “onset of symptoms to balloon time” and “contact to balloon time” for STE-ACS patients. Under recognition of recent guidelines and in comparison with European and international ACS registries the Styrian treatment model is satisfying, but there is potential for improvement. Concerning the management of ACS the registry represents the biggest ever used data record in Styria. The spreading of ACS entity over the observation period is equal to the usual distributions in other international registries.

Independent predictors of in-hospital heart failure in patients with ST-elevation myocardial infarction

C1-5

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Background Reperfusion therapy by primary percutaneous coronary intervention (PCI) improves survival in patients with acute ST-elevation myocardial infarction (STEMI). However, heart failure still remains an important cause of morbidity and mortality. Our aim was to evaluate predictors of heart failure, as well as 30-day and 6-months mortality in STEMI patients with heart failure.

Methods We studied retrospectively consecutive 230 STEMI patients (71.3 % men, mean age 63.5 ± 12.8 years) admitted during one year. Demographic, in-hospital laboratory data and complications, 30-day and 6-months mortality were registered and compared between patients with and without in-hospital heart failure. In-hospital heart failure was categorized as Killip classes II, III and IV. Patients without heart failure belonged to Killip class I. Independent predictors of in-hospital heart failure were estimated by multivariate logistic regression.

Results In-hospital heart failure was present in 34.2 % of STEMI patients. Between patients with and without heart failure we observed significant differences in prior stroke (8.8 % vs 1.9 %, $p = 0.03$), rate of time-to-balloon < 12 hours (59.5 % vs 75.5 %, $p = 0.037$), primary PCI (82.3 % vs 94.7 %, $p = 0.004$), mean age (66.1 ± 12.9 years vs 62.2 ± 12.6 years, $p = 0.027$), admission systolic blood pressure (120.9 ± 27.6 mmHg vs 135.2 ± 26 mmHg, $p < 0.001$), heart-rate (87.2 ± 21.9 min⁻¹ vs 77.5 ± 20.3 min⁻¹, $p = 0.002$), blood glucose (11.9 ± 6.5 mmol/L vs 8.5 ± 3.4 mmol/L, $p < 0.001$), admission Troponin I (15.9 ± 22.4 µg/L vs 8.2 ± 18.7 µg/L, $p = 0.007$), creatinine clearance by Cockcroft-Gault equation (72.7 ± 37.6 ml/min vs 94.2 ± 35.9 ml/min, $p < 0.001$), mean peak in-hospital Troponin I (58.4 ± 35.5 µg/L vs 40.9 ± 32.9 µg/L, $p < 0.001$), reinfarctions (6.3 % vs 1.3 %, $p = 0.04$), arrhythmias (53.1 % vs 27.8 %, $p < 0.001$), 30-day mortality (26.5 % vs 3.9 %, $p < 0.001$) and 6-months mortality (34.1 % vs 3.9 %, $p < 0.001$). Most significant independent predictors of in-hospital heart failure were admission blood glucose (OR 1.287; $p = 0.002$; 95 % CI 1.093 to 1.515), admission troponin I (OR 1.042; $p = 0.006$; 95 % CI 1.012 to 1.073), blood pressure (OR 0.975; $p = 0.013$; 95 % CI 0.956 to 0.995), primary PCI (OR 28.191; $p = 0.016$; 95 % CI 1.866 to 425.837) and age (OR 1.08; $p = 0.017$; 95 % CI 1.014 to 1.151) as estimated by multivariate logistic regression.

Conclusion In-hospital heart failure was associated with significant increase in 30-day and 6-months mortality in STEMI patients. Significant independent predictors of heart failure were admission blood glucose, blood pressure, admission and peak troponin I levels, age and primary PCI.

Dynamics and relationship of selected markers of inflammation in different forms of acute coronary syndrome C1-6

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Background Many questions concerning meaning and dynamics of systemic inflammatory response elements in acute coronary syndrome (ACS) remain unresolved despite the fact that numerous studies have been performed in this field in the last decade. This study examined the role of selected markers of inflammation (MOI) in one-year period after ACS episode: high sensitivity C-reactive protein (hs-CRP), neopterin, serum amyloid A (SAA), interleukin 6 (IL-6), and changes of body temperature. The aim of this study was to establish dynamic changes of MOI levels and body temperature through a one-year period after ACS, depending on the ACS subgroup; to examine relationships of MOI levels with other known risk factors for atherosclerosis; to examine the possible differences of MOI levels in relation to the therapeutic approach (invasive or conservative).

Methods 265 patients with ACS admitted to the Coronary unit (February to November 2004) participated in this study. Levels of MOI, as well as body temperature were determined at admission, 24 and 72 hours, 1, 3, 6 and 12 months after hospital admission.

Results There is significant difference of growth and decline dynamics of investigated MOI in relation to the ACS subtype during investigated periods. Extension of coronary lesion significantly affected investigated MOI levels in the first 72 hours (coronary artery occlusion – highest, non-significant coronary artery stenosis – lowest). However, there was no consistent connection between measured levels of MOI and other known risk factors for atherosclerosis (age, sex, body mass index, lipid profile). Some differences were found in smokers (higher IL-6 levels in relation to non-smokers and ex-smokers, at 1 and 3 months), in patients that had glucose metabolism disorders (higher hsCRP levels, at admission, after 24 and 72 hours) and in patients with hypertension (lower IL-6 levels at admission, after 72h and after 6 months). Conservatively treated patients had lower body temperature and investigated MOI concentrations.

Conclusion All measured MOI levels and body temperature showed growth and decline patterns. However, due to lack of consistent differences, except for hsCRP (which according to American Heart Association and some recent studies seems to be the best candidate for a useful cardiovascular risk marker), all other measured MOI, including body temperature need to have their role in ACS investigated further to help clarify their clinical impact and prognostic significance in ACS patients.

Hypertensive patients with acute coronary syndrome – risk profile and therapeutic option C1-7

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Background Comparison of basic clinical characteristics, extent of coronary affection, the effect of revascularization therapy and complications in patients (pts) with and without arterial hypertension (AH), hospitalized in the coronary care unit due to the acute coronary syndrome (ACS).

Methods We examined 313 consecutive pts (group of 200 AH pts; group of 113 pts without AH) who underwent urgent catheterization

and percutaneous coronary intervention (PCI) for ACS. Statistical analysis clinical findings and catheterization data were made.

Results Patients with AH were significantly older (53.8 ± 9 yrs vs 62.0 ± 10 ; < 0.001), significantly higher number of women (15/13.3 % vs 55/27.5 %; < 0.03), the incidence of diabetes (4/12.4 % vs 72/36.0 %; < 0.001), hyperlipidemia (25/22.1 %, vs 96/48.0 %, < 0.003), previous stroke (1/0.9 % vs 18/9.0 %, < 0.01) and more frequent involvement of all three main vessels (15/13.3 % vs 65/32.5 %, < 0.005). By contrast, the pts without AH had a more frequent one-vessel involvement (57/50.4 % vs 30/15.0 %; < 0.0001). Although coronary artery surgery was more needed (2/1.8 % vs 18/9.0 %, < 0.003) and hospital mortality was higher in AH group (4/2.0 % vs 1/0.9 %), it did not reach statistical significance.

Conclusion Despite the risk profile of AH pts with ACS thanks to prompt revascularization by PCI, CABG and modern pharmacotherapy, the incidence of hospital complications, mortality and angiographic successfulness of PCI did not differ from the group of pts with ACS but without AH. Assessment of the prognosis of high risk AH pts after successful immediate therapeutic outcome requires further follow up.

Real-time three-dimensional stress echocardiography – our first experiences C1-8

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Background Dobutamine stress echocardiography is a widely used tool for diagnosis of coronary artery disease (CAD). Real-time three-dimensional echocardiography (RT3DE) allows fast acquisition of 3-dimensional (3D) pyramidal datasets including left ventricle. The aim of our study was to evaluate the usefulness of RT3DE using dobutamine stress protocol in the diagnosis of CAD.

Methods The study comprised 45 consecutive patients with stable chest pain who underwent both noncontrast and contrast stress RT3DE and coronary angiography. A new 3D analysis software which allows side-by-side analysis of 3D datasets was also tried out during evaluations.

Results New or worsening wall motion abnormalities were detected in 17 of 28 patients with significant CAD (sensitivity 61 %), and in two of 17 patients without significant CAD (specificity 88 %). The sensitivity for detection of single-vessel CAD was 53 % (8/15 patients), for two-vessel CAD 67 % (4/6), and for three-vessel CAD 71 % (5/7). The two observers agreed on the presence or absence of myocardial ischemia in 81 of 102 coronary territories (agreement 79 %, kappa 0.28) during noncontrast 3D imaging and 92 of 102 coronary territories (agreement 90 %, kappa 0.65) during contrast-enhanced 3D imaging. With the new 3D analysis software these numbers improved to 98 of 102 coronary territories (agreement 96 %, kappa 0.69) during noncontrast 3D imaging and 98 of 102 coronary territories (agreement 96 %, kappa 0.82) during contrast-enhanced 3D imaging.

Conclusion Despite some important practical and theoretical benefits, stress RT3DE currently has only moderate diagnostic sensitivity detecting CAD due to several technical limitations. The use of new 3D analysis tool improves interobserver agreement for myocardial ischemia.

■ Session C2: Antithrombotic Therapy

Detection of clopidogrel resistance by multiple electrode platelet aggregometry (MEA) and light transmission aggregometry (LTA) C2-1

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Background Dual antiaggregation therapy is the treatment of choice for preventing thrombotic complications in patients undergoing percutaneous coronary intervention (PCI). Stent thrombosis and in-stent restenosis are still severe complications despite of cardiovascular intervention improvements. Aim of the study: Comparison of LTA and MEA with induction by ADP in concentrations from 5 to 20 µmol/L with or without prostaglandin E1 (PGE1).

Methods 84 patients (17 females), median age 60.5 years, with cardiovascular disease after coronary artery stent implantation. Comorbidities: hypertension 68 %, diabetes mellitus 26.5 %, dyslipidemia 80.9 %. Positive family history 56 %. All patients received loading dose of 300 mg clopidogrel 24 hours prior to coronary intervention followed by clopidogrel 75 mg daily. Blood sampling was provided 72 hours after PCI. LTA was performed on the APACT 4004 aggregometer (LabiTec, Ahrensburg), MEA was performed with the multiple analyzer 10–15 (Dynabyte, Munich). Control group consisted of 40 healthy blood donors with comparable sex ratio, median age 32.5 years, in order to establish cut-off values for both tests.

Results Study group: impaired individual response to clopidogrel therapy was found in 11.9 % and 10.7 % by MEA and LTA respectively.

Conclusion The sensitivity of clopidogrel resistance correlates with literature data (5 % to 30 % of clopidogrel low-responders). Our results favor implementation of ADP test with PGE1 by MEA specifically for identification of clopidogrel low responders. We also determined the aggregation using LTA, APACT 4004 on citrated platelet-rich plasma which has very similar results to MEA. However this method produces more of results very near the cut-off limit, representing 11 % of detected samples and misrepresenting the true resistance to antiplatelet therapy.

Impact of concomitant treatment with proton-pump inhibitors and clopidogrel on clinical outcome in patients after coronary stent implantation C2-2

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Background Aim of the study was to evaluate the effect of the concomitant treatment with proton-pump inhibitors and clopidogrel on the incidence of stent thrombosis, acute coronary syndrome and death in patients who underwent percutaneous coronary intervention and stent implantation.

Methods In total, 1,210 patients under dual antiplatelet therapy, who underwent PCI and stent implantation, were included in a prospective registry from January 2003 until December 2006. The patients were divided retrospectively into those with or without long-term PPI treatment (for the duration of dual antiplatelet therapy). All-cause mortality, cardiovascular death, re-hospitalization for acute coronary syndrome (re-ACS), stent thrombosis, as well as the combined endpoint all-cause death, re-ACS or stent thrombosis were evaluated over a mean follow-up period of 7.8 (± 3.63) months (range 1–12 months).

Results Propensity score analysis was performed to reduce potential selection bias and exhibited no significant difference between the two study groups with respect to all-cause mortality, cardiovascular death, re-ACS, stent thrombosis and the combined endpoint. In

pre-specified subgroup analyses performed in patients presenting with ACS and referred for acute PCI or for stable patients referred for elective PCI, receiving DES or BMS, in diabetics or non-diabetics, in males or females, and in patients older than 75 years or < 75 years of age use of PPIs had no significant impact on clinical outcome.

Conclusion Our data suggest that a combined use of clopidogrel as part of dual antiplatelet therapy (DAPT) after coronary stenting and proton-pump inhibitors does not significantly influence the clinical outcome.

Seasonal variations in hemorheological parameters and platelet aggregation – a possible association with meteorological factors? C2-3

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Background In our present study we investigated seasonal patterns in hemorheological parameters and platelet aggregability in 8552 patients treated with vascular diseases between 2001 and 2010.

Methods In a subgroup of 2694 patients treated with 100 mg acetylsalicylic acid we also investigated a potential association with meteorological factors. ADP, collagen and epinephrine-induced platelet aggregation was assessed according to the method of Born. In subgroups of patients hematocrit, fibrinogen, red-blood cell aggregation as well as plasma and whole blood viscosity were also simultaneously measured. External temperature at 8 a.m., air pressure at 8, 9 and 10 a.m., daily minimal and maximal temperatures, relative humidity and the daily amount of precipitation were measured in the local station of the Hungarian Meteorological Service.

Results Significantly higher fibrinogen levels were found in the winter months ($p < 0.01$). Red-blood cell aggregability proved to be significantly higher in the winter compared to the summer months ($p < 0.0001$). A clinically minor elevation was also observed in hematocrit levels in the winter ($p < 0.01$). Epinephrine-induced platelet aggregation was highest in April and May, while its minimum was in August and September ($p < 0.05$).

Conclusion According to this study, outdoor temperature may play a role in seasonal patterns in certain hemorheological parameters. Other investigated meteorological factors do not seem to affect hemorheological parameters directly.

Comparison of different laboratory methods for the use of detecting aspirin resistance in healthy volunteers C2-4

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Background Countless methods are available to evaluate the efficacy of aspirin therapy applied in cardiovascular prevention, which assess the incidence of aspirin resistance in different patient subsets between 5 and 30 %, respectively. Among the reasons for this observed wide difference range are a weak correlation between different laboratory methods used for the follow-up detection of aspirin effect, the lack of consensus in the applied reference values to determine resistance and, the absence of an established reference method. We aimed to compare the reference method elaborated by our working group with laboratory techniques widely applied in clinical practice and, to identify the method(s) having the greatest efficacy.

Methods Our reference method is an immunoassay to determine thromboxane B2 (TXB2) levels following arachidonic acid (AA) induced platelet activation. Besides this method, we also measured the PFA-100 closure time in the presence of collagen/ADP (CADP) and collagen/epinephrine (CEPI), the Verify Now Aspirin Assay

(VN), the platelet aggregation and ATP secretion response after administration of agonists such as AA (500 µg/ml), collagen (1 µg/ml), ADP (10 µmol/L) and, epinephrine (10 µg/ml), respectively, all of which in healthy volunteers taking 100 mg aspirin daily prior to their first dose, and 1 day and 7 days after that, respectively.

Results The mean age of participants was 34 years, 62 females and 39 males participating in the study. We established that the reference method is a sensitive and reliable marker of aspirin-induced inhibition of the enzyme cyclooxygenase (COX). In a subset of participants, markedly decreased aggregation/secretion was observable in response to epinephrine even in samples taken prior to aspirin intake; hence, this parameter is inappropriate to detect resistance. The PFA-100 CADP did not indicate at all the effect of aspirin, whereas CEPI, at variance with the previous publications, was an insufficiently sensitive marker of aspirin effect. We found only one person to be resistant to aspirin within the healthy volunteers.

Conclusion Aspirin resistance is far more infrequent than it is presumable based on literature data. Using our reference method, the best matching could be found with the aggregation and secretion induced by AA activation as well as with the VN, thus, we recommend to use these methods. The commonly applied collagen/epinephrine/ADP induced aggregation methods provide falsely high resistance values, therefore, these methods are not amenable to establish aspirin resistance.

Pulmonary embolism and neoplastic disease: role of initial screening in antithrombotic treatment options C2-5

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Background Later studies demonstrated the importance of a different antithrombotic therapeutic approach in patients (pts) with Pulmonary Embolism (PE) and associated neoplastic disease, in favour of a long term Low Molecular Weight Heparin (LMWH) treatment, with respect to oral anticoagulants, in terms of clinical outcome and survival benefit. We sought to evaluate the prevalence of neoplastic disease in a PE population in order to plan further antithrombotic treatment during follow-up.

Methods From January 2003 to December 2008 270 pts were admitted in the University Hospital of Trieste with an initial diagnosis of PE and consecutively enrolled in our PE Registry.

Results Seventy-six PE pts (28 %) had a cancer diagnosis during their natural history; in 28 of them (37 %) cancer diagnosis, as the cause of thrombophilic state, was postulated successively to the acute PE event (22 ± 21 months), suggesting a relatively long period of mislead treatment with oral anticoagulants, instead of LMWH. In fact, these pts had an elevated mortality, with respect to the non-neoplastic pts (45 % vs 23 %, $p = 0.001$), and in 50 % of cases metastasis were present at neoplastic disease diagnosis. The prevalence of thromboembolic recurrences during follow up was significantly higher in the post-PE neoplastic subgroup of pts (14 % vs 5 %, $p = 0.005$).

Conclusion Elevated mortality, both with advanced neoplastic grade in initial clinical presentation, with consequent persistence of a thrombogenic state, identify in the neoplastic-PE patient subgroup a PE population at high risk per definition; high prevalence of thromboembolic recurrences during follow-up could suggest not optimally determined antithrombotic treatment in this particular patient subgroup, as recent clinical trials suggest. An intensive initial screening in all pts with PE, in order to earlier individuate neoplastic forms could significantly improve antithrombotic treatment strategies and prognosis.

■ Session C3: Cases II

Non compact cardiomyopathy in acromegaly: unique coincidence C3-1

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Background Acromegalic cardiomyopathy is a result of increased circulating growth hormone (GH) and consequently, insulin-like growth factor (IGF) I levels. It is mainly characterized by concentric biventricular hypertrophy, dilatation and later chronic ischaemic heart disease. Non-compaction of the left ventricle (LVNC) is a disorder of endomyocardial morphogenesis that results in multiple trabeculations in the left ventricular myocardium.

Methods History was taken, laboratory examination, 12-lead and stress ECG, standard echocardiography, MRI and stress MRI, coronary CT were performed.

Results A 39-year-old man with a history of slight and treated hypertension since 2003 and trans-sphenoidal adenectomy due to GH producing pituitary tumour leading to acromegaly in 2005 presented with epistaxis, fever and tachycardia after acute upper respiratory tract inflammation. The electrocardiogram (ECG) showed sinus rhythm with negative-positive T waves and ST segment depression in leads V1–6. Cardiac biomarkers and echocardiographic findings were unremarkable. Repeated ECG was normal after 4 days. After several months he presented with recurrent episodes of burning retrosternal chest pain. Physical examination was unremarkable and the pain abated within half an hour of rest. ECG showed the same abnormalities as previously and cardiac Troponin I was negative. Stress ECG showed significant ST segment depression in inferolateral region. Coronary angiography demonstrated normal epicardial arteries. After several months echocardiography showed a slightly dilated left ventricle with normal systolic function and no wall abnormality. Coronary CT showed intact coronaries and scintigraphy showed non significant ischaemia in the inferolateral and anterobasal region. Myocardial stress MRI showed apical LVNC. GH level was normal since 2005.

Conclusion Coincidence of treated acromegaly and LVNC has not been reported. Further research is needed to determine the effect of the GH on the myocardial structure in adults with LVNC.

Aortic homograft implantation in a patient with Osler-Weber-Rendu disease and infective endocarditis of the previously implanted bioprosthesis C3-2

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Background Osler-Weber-Rendu disease (hereditary hemorrhagic telangiectasia) is an uncommon disease characterized by the presence of abnormal telangiectasias and arteriovenous malformations that cause recurrent episodes of bleeding. Because of the significant bleeding risk, any major surgery and drug therapy that affects hemostasis is challenging.

Methods We present a 72 year old male patient with Osler-Weber-Rendu disease, and a history of multiple major bleeding events. He underwent an aortic valve bioprosthesis implantation due to severe aortic stenosis in 2006. Recently he was admitted to our department with long lasting fever, anemia and heart failure. Infective endocarditis was diagnosed (Staphylococcus coag. neg.). Transesophageal echocardiography revealed an unstable ring with significant paravalvular leak, abscesses and aorto-right atrial fistula. Repeated epistaxis and GI bleedings complicated the hospital stay. Although the risk of repeated surgery was extremely high, the patient was referred for heart surgery after 4 weeks of targeted antibiotic therapy.

Results Aortic mini root homograft implantation with reimplantation of the right coronary artery was performed. After early bleeding complications, the postoperative course was uneventful. Echocardiography revealed normal valvular function, and the patient was discharged home in an excellent clinical condition. Follow-up multidetector computerized tomography examinations proved excellent valvular and coronary function, but revealed pseudoaneurysm originated from the left ventricular outflow tract. Only follow-up was offered after repeated cardiac catheterization was performed.

Conclusion Valvular heart surgery is extremely challenging in Osler-Weber-Rendu disease, and in other medical conditions where anticoagulation is contraindicated or carries a high risk. We demonstrated the safety and efficacy of a special surgical technique with the use of aortic root homograft in a very rare and complex clinical situation.

Therapeutic hypothermia after cardiac arrest: a case series

C3-3

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Background Therapeutic hypothermia (TH) to a target temperature 32–34 °C for 24 hours improves short-term neurologic recovery and survival in patients resuscitated from cardiac arrest of presumed cardiac origin and is recommended for the treatment of comatose survivors of out-of-hospital cardiac arrest when the initial cardiac rhythm is ventricular fibrillation. It may also be beneficial for other rhythms or in-hospital cardiac arrest. The technique was recently instituted in our department. We present our first experiences and results.

Methods A total number of 5 out-of- and in-hospital cardiac arrest comatose survivors with GSC < 5 (confirmed by neurologist) and VF or PEA as the initial rhythm were eligible for the treatment. Hemodynamic and rhythm stability was mandatory to initiate hypothermia. All patients were mechanically ventilated with appropriate sedation and muscle relaxation to prevent shivering. Temperature-sensing Foley catheters were used to monitor central body temperature. Arterial and central venous lines were placed for blood pressure and central venous pressure monitoring. Hypothermia was induced using cold saline infusions, cold gastric lavage and ice-packs. Once the target temperature (TT) was achieved, TH was maintained for 24 hours using ice-packs, followed by passive rewarming. Arterial blood gas and glucose level, together with electrolyte, coagulation and blood count parameters were analysed in 4- and 8-hr intervals, respectively. Head CT was done and neurology consult repeated after rewarming.

Results Patient 1: 30-year-old out-of-hospital cardiac arrest (PEA) female survivor (GCS 3) with Turner syndrome and dilated cardiomyopathy. Inotropes were required to maintain hemodynamic stability. TH was initiated within 4 hours and TT achieved in 4 hours. The treatment was complicated by pneumothorax, coagulopathy and sepsis. No neurological recovery was observed – the patient deceased 48 hours after admittance.

Patient 2: 58-year-old out-of-hospital cardiac arrest (VF) female survivor (GCS 3) with anteroseptal STEMI and PCI preceding TH. TH was initiated within 3 hours and TT achieved in 4 hours. No complications were noted during the treatment. No neurological recovery was achieved – the patient deceased during rewarming phase.

Patient 3: 26-year old out-of-hospital cardiac arrest (VF) female survivor (GCS 5) with Ebstein's anomaly. TH was initiated within 1 hour and TT achieved in 3 hours. No complications were noted during the treatment and full neurological recovery was observed within 24 hours.

Patient 4: 68-year old in-hospital cardiac arrest (pulsless VT) female survivor (GCS 3) with severe electrolyte imbalance after elective cholecystectomy. Vasopressors were required to maintain hemodynamic stability. TH was initiated within 2 hour and was complicated by sepsis; TT was achieved in 4 hours. Neurological recovery was observed after 12 days.

Patient 5: 45-year-old in-hospital cardiac arrest (VF) male survivor (GCS 3) with STEMI and PCI preceding TH. Hemodynamic stability was maintained by vasopressors. TH was initiated within 2 hours and TT achieved in 3 hours. The treatment was complicated by hemothorax and multiple VF ten hours after initiation of therapy with subsequent death.

Conclusion Therapeutic hypothermia carries a notable neurological benefit. One should be encouraged to develop a local registry to help improve the cooling protocol and identify avoidable complications.

Ablation of premature ventricular complexes originating from the left ventricular outflow tract using a novel automated pace-mapping software

C3-4

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Background Pace-mapping is an important tool during the ablation of premature ventricular complexes (PVCs). The automated pace mapping system software (PaSo module, CARTO XP v9, Biosense/Webster) allows direct comparisons between paced ECGs and the acquired PVC ECG during ablation in a reasonable time.

Methods We report our experience with the automated pace mapping system during the ablation of PVCs in the left ventricular outflow tract (LVOT).

Results A 67 years old male patient with obesity, hypertension, diabetes mellitus and deep venous thrombosis in the medical history was referred to our Department because of recurrent resting atypical chest pain. A 12 lead ECG showed no signs of ischaemia, but frequent PVCs with LVOT morphology. All laboratory markers were in the normal range. Echocardiography showed a left ventricular ejection fraction of 59 % and slightly dilated chambers. A 24 hours Holter ECG revealed, that 31 per cent of the total beats were monomorphic PVCs. During exercise testing, the number of PVCs did not change. We performed a coronary angiography, which did not show any pathologic changes. We decided to perform a radiofrequency catheter ablation. A cool tip ablation catheter was advanced via the right femoral artery into the left ventricle. Next we recorded an electroanatomic and an activation map during PVCs of the left ventricle using CARTO XP v9. Then pace-mapping was performed with the PaSo module of the CARTO system: the best percent match area (94.8 %) was found in the LVOT, directly below the aortic valve and correlated with the earliest activation point of the activation map. We performed multiple ablations at that region and PVCs disappeared. The patient remained asymptomatic during the postablation follow-up.

Conclusion According to our initial experience, automated pace-mapping systems might be useful during ablation of PVCs or ventricular tachycardias. Appropriate use of the software allows more objective and faster comparisons compared with conventional manual techniques.

Paradoxical base to apex gradient during IVRT in a HOCM patient with right ventricular pacing

C3-5

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Background Implantation of pacemaker is one therapeutical modality to reduce LVOT gradient in hypertrophic obstruction cardiomyopathy (HOCM). We present a case of reversal systolic to opposite IVRT mid-cavitary gradient due to the right ventricular pacing.

Methods A 70 year old female with known HOCM, FA and DDD pacing (after AV nodal ablation) was admitted because of sudden pain in her left calf. Diagnostic evaluation revealed peripheral artery disease and ischemia due to thromboembolic event.

Results Transthoracic echocardiography revealed asymmetric HOCM (septal thickness of 25 mm). Pulse Doppler detected abnormal mid-cavitary gradient (max PG 39 mmHg) directed from the LV

base to apex during isovolumic relaxation time (IVRT), simultaneously with the formation of small apical sequestration, while systolic LVOT gradient was 12 mmHg. Further, Doppler Myocardial Imaging Strain analyses revealed late systolic thickening of lateral wall lasting after aortic valve closure until apical relaxation. Echocardiogram before pacemaker implantation revealed resting systolic mid-cavitary gradient from apex to base of 40 mmHg.

Conclusion Right ventricular pacing reduced LVOT gradient by altered LV electrical activation pattern, but as well induced base to apex IVRT gradient. Presumably, due to the delayed activation of lateral wall, mid-cavity obstruction appeared later on, during IVRT while at the same time, relaxation (initiated in the apex) formed small empty apical cavity. This in turn generated intracavitary reversal gradient followed by paradoxical flow across obstruction during IVRT.

Carotid body tumor in patient with Eisenmenger syndrome C3-6

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Background Eisenmenger syndrome represents clinical status, developing in patients with advanced pulmonary hypertension associated with shunt congenital heart disease. It represents the condition, when pulmonary arterial pressure equals or exceeds systemic arterial pressure and shunt through existing defect (intra- or extracardiac) turns being right-to-left or bidirectional, causing secondary erythrocytosis, cyanosis and all related multiorgan symptoms due to it. Surgery in patients with Eisenmenger syndrome is associated with extremely high perioperative risk. Carotid body tumors (chemodectomas) are rare neck lesions. They originate from neuroendocrine tissue in carotid body. In general, they are benign in origine, malignant form is suggested to be only in about 5–10 %. They can be asymptomatic for a long time, main signs and symptoms being slow growing pulsatile mass, at the level of carotid bifurcation and a peripheral cervical neuropathy related to largest tumors. Diagnosis is made, beside physical examination, by different imaging modalities (CCDS, CTA, MRA). Angiography is still used for detail description of tumour vascularity and for performing Matas test, too. Treatment in most cases is surgical. In some patients some percutaneous embolisation or radiotherapy is considered.

Methods Authors present the case of 47-years old patient with truncus arteriosus communis type I, Collet Edwards, unreparable, with severe irreversible pulmonary hypertension, in whom pulsatile mass formation on the left side of neck was diagnosed. It turned out to be a chemodectoma, Shamblin II, completely surrounding external carotid artery.

Results Because of rapid progression in growth and clinical symptoms appearing, patient was indicated for surgery. She had underwent series of examinations for complete evaluation of all signs of multiorgan affection with allowance to operative risk and management during surgery. Afterwards the surgery was performed in general anesthesia. Perioperative care was leaded by experienced team of specialists. After preparation of A. carotis communis and mobilisation of jugular vein, tumorous mass was extirpated from carotid bifurcation and resection of involved external carotid artery was performed. No adverse complication in perioperative period was noticed, neither in long-term follow-up.

Conclusion Carotid body tumor has a random occurrence (about 0.03 % of all neoplasm). Even being benign in most cases they needed to be intervened, because as an encapsulated tumour it adheres to and encases the vessels and nerves and compress and dislocate pharynx and even erodes the base of the skull. Patients with Eisenmenger syndrome are at high risk for developing complications during the surgery. Noncardiac surgery therefore should be provided by professionals experienced in care of patients with pulmonary hypertension and experted surgeons. Presence of both random diagnoses in one patient is unique. Review of literature describes only few case reports of carotid body tumor occurrence in patients with cyanotic congenital heart disease.

Severe myositis and respiratory failure after treatment with high-dose statin and ezetimib – case report C3-7

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Background Statins reduce cardiovascular mortality and morbidity in primary and secondary prevention of coronary heart disease. Statins exhibit a number of biologic effects that may be relevant in the setting of acute histochemic events. Besides changes in lipid metabolism they act rapidly to improve vascular endothelial function, attenuate vascular inflammation, stabilize plaques, correct prothrombotic tendencies and influence myocardial protection and remodelling. Sometimes combined inhibition of intestinal cholesterol absorption mediated by ezetimib and hepatic cholesterol synthesis via statin is a challenging therapeutic option. According to randomized controlled trials and meta-analyses the recommendations are to treat patients with coronary artery disease with high-dose statins. Moderate doses of statins are generally safe and well tolerated. But higher doses of statins were associated with greater incidence of myopathy compared with lower doses in several trials (SEARCH, A to Z trial, PROVE-IT, MIRACL).

Methods We present a 62 year old man with multiple complications of atherosclerosis (peripheral occlusive artery disease, stable coronary artery disease) with severe myositis and rhabdomyolysis after treatment with high dose atorvastatin (80 mg) and ezetimib (10 mg).

Results He was admitted to hospital with symptoms of fatigue and muscle pain. Laboratory findings revealed rhabdomyolysis (myoglobin more than 10.000 µg/l, CK 215 µkat/l) with acute renal failure (urea 19.9 mmol/l, creatinin 587 µmol/l). We proceeded with continuous veno-venous haemodialysis with ultrafiltration and because of respiratory failure intubation and mechanical ventilation was needed. All serological markers for rapidly progressive glomerulonephritis were negative. According to muscle complains we recorded EMG which was interpreted that myositis is possible diagnosis. After that muscle biopsy were performed and the diagnosis was statin myositis. After the supportive care, patient started to breathe spontaneously, was extubated and the kidney function was restored. He was discharged from hospital after two months.

Conclusion Statin-induced myopathy is usually mild and reversible upon statin discontinuation, however sometimes severe muscle damage occur, even with rhabdomyolysis as was in case of our patient. If statin-related myopathy is suspected, more common causes of symptoms and/or CK elevation should be ruled out by thorough history taking, physical examination and laboratory tests. However, when other etiologies of muscle complain is excluded, the intensity of clinical symptoms along with the magnitude of CK elevation should guide clinical management. Rhabdomyolysis with acute renal failure and respiratory failure prompts intensive care unit treatment, with all the supportive care. Considering the dose-dependent nature of statin-related myopathy, physicians should start cautiously with lower doses in the presence of predisposing conditions and weight the benefit of lipid lowering versus the potential of excess risk when up-titrating doses. However, even though randomized controlled trials did not confirm that myopathy might be the consequence of combination of statin plus ezetimib, this combination is not recommended.

■ Session C4: Heart Failure II

Coronary sinus lead reposition using a minimally invasive technique for the treatment of phrenic nerve stimulation C4-1

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Background Phrenic nerve stimulation (PNS), which is often intolerable for the patient, is a known complication of resynchronization therapy (CRT). Our aim was to develop a minimal invasive method for treating PNS.

Methods In 15 CRT patients with distal coronary sinus (CS) lead position reprogramming of the device did not terminate PNS, thus we performed minimally invasive CS lead reposition. An ablation catheter and an Amplatz left 2 type guiding catheter were introduced into the right atrium via the right femoral vein. CS was cannulated with the Amplatz catheter and on a typical guide wire a coronary stent was introduced beside the lead into the side branch in eleven cases or a bigger stent into the CS in two patients. The ablation catheter was looped around the CS lead in the atrium with bent tip, and was drawn backward together with the CS electrode. New lead positions were evaluated with electrophysiological measurements, and the suitable position was stabilized with inflation of the stent. In the two other cases only repositioning of the electrode was performed without stent implantation, in these patients CS lead was anchored with a stent during CRT implantation.

Results Pericardial effusion was not detected on postoperative echocardiography. After repositioning left ventricular pacing (LVP) threshold was not higher than 3.5 V; 0.5 ms in 14 cases. In one patient LVP was effective only using 6V; 1 ms pacing energy. PNS was not found with 7.5 V; 1.5 ms pacing. During follow-up (17 ± 10 months) stable pacing threshold values were measured, transient and reprogrammable PNS was present in only two patients. Impedance measurements did not suggest insulation damage of the electrodes.

Conclusion CS electrode reposition using femoral approach seems to be a safe and effective procedure. The technique can be used successfully if the CS lead is in a distal position.

Assessment of electrocardiographic parameters of cardiac repolarization in hypertrophic cardiomyopathy C4-2A. Orosz¹, R. Sepp², C. S. Lengyel³, I. Baczkó⁴, M. Csanády², T. Forster², J. G. Y. Papp⁴, A. Varró⁴¹Department of Pharmacology and Pharmacotherapy, University of Szeged,²2nd Department of Internal Medicine, University of Szeged, ³1st Department of Internal Medicine, University of Szeged, ⁴Department of Pharmacology and Pharmacotherapy; Division of Cardiovascular Pharmacology, Hungarian Academy of Sciences, Szeged, Hungary

Background Hypertrophic cardiomyopathy (HCM) is primary disease of the myocardium, associated with increased propensity for ventricular arrhythmias and there is an increased risk of sudden cardiac death. The aim of the present study was to analyse the repolarization parameters of ECG by a novel ECG signal processing system.

Methods 38 patients with hypertrophic cardiomyopathy and 38 age-matched healthy controls (age: 48.1 ± 2.4 vs 43.2 ± 1.9 years, male/female ratio 21/17) were enrolled in the study. ECGs were continuously recorded and all leads were acquired by an ECG signal processing system (SPEL Advanced Haemosys software v3.2, Experimetria Ltd.). Out of the repolarization parameters we analyzed the frequency corrected QT interval (QTc), the QT dispersion (QTd), the short-term variability of QT interval (ST-QTv) and the duration of terminal part of T waves (Tpeak-Tend).

Results Using many different correction formulas, the QTc was significantly longer in patients with HCM compared to controls

(Bazett: 487 ± 60 vs 434 ± 23 ms, p < 0.0001; Fridericia: 482 ± 59 vs 423 ± 19 ms, p < 0.0001; Framingham: 480 ± 59 vs 423 ± 18 ms, p < 0.0001; Hodges: 481 ± 59 vs 421 ± 18 ms, p < 0.0001). The ST-QTv was also significantly higher (4.44 ± 1.6 vs 3.21 ± 1.0 ms, p = 0.0002), such as the Tpeak-Tend duration (107 ± 27 vs 91 ± 10 ms, p = 0.0007) and the QTd (46 ± 17 vs 34 ± 9 ms, p = 0.0002). None of the parameters of repolarization correlated significantly in healthy controls. However in patients with HCM, the Tpeak-Tend duration and the ST-QTv significantly correlated with the morphological and functional factors of the disease (interventricular septum diameter [IVS], maximum LV wall thickness, LV mass, LV mass BSA, risk factors of sudden cardiac death).

Conclusion Based on the results of this study, there is significant difference in the repolarization parameters of ECG in patients with HCM. These changes can be associated with increased propensity for arrhythmias and higher risk of sudden cardiac death.

Usefulness of electroanatomical mapping during transseptal endocardial left ventricular lead implantation C4-3

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Background Cardiac resynchronization therapy is a cost-effective non-pharmacological treatment modality in patients with therapy refractory, symptomatic heart failure, left ventricular dysfunction and dyssynchrony. However, failure rate to implant the left ventricular lead transvenously is up to 5–8 %. Epicardial surgical implantation procedure is an alternative method and if not applicable, case reports and small series showed the feasibility of the left ventricular endocardial electrode implantation. No report has proven the usefulness of electroanatomical mapping systems during this procedure.

Methods Four patients had undergone endocardial left ventricular lead implantation after unsuccessful transvenous implantation or epicardial left ventricular lead dysfunction. After the transfemoral, intracardiac ultrasound-guided transseptal puncture, electroanatomical mapping system (CARTO-Biosense Webster Inc., Diamond Bar, CA, USA) was used to mark the location of the puncture. This location point guided the mapping catheter back from the subclavian access and enabled positioning the left ventricular lead. A bipolar voltage map was captured to detect the latest activation in the left ventricle to achieve the best haemodynamic benefit.

Results Active fixation left ventricular leads were used, stable sensing and pacing parameters were found during the mean of 13.2 months follow-up. The patients were maintained on anticoagulation therapy with a target INR of 3.5–4.5. During the follow-up, no thromboembolic, haemorrhagic events or infection were observed. The clinical status of the patients improved.

Conclusion Electroanatomical mapping guided left ventricular endocardial lead implantation is a feasible method. It supports identifying the location of the transseptal puncture and bipolar voltage map may be helpful finding the optimal lead positions for cardiac resynchronization therapy.

Changes in autonomic nervous system activity in hypertrophic cardiomyopathy: Dependent on body position? C4-3L. Halmai¹, R. Sepp², L. Rudas¹, M. Csanády², T. Forster²¹University of Szeged, Medical Faculty, Department of Intensive Care Medicine,²University of Szeged, Medical Faculty, Cardiology Centre, Hungary

Background Reduced heart rate (HRV), systolic blood pressure (SAP) variability and baroreflex sensitivity (BRS) are known predictors of increased risk of sudden cardiac death (SCD) after myocardial infarction, but the value of these parameters in predicting adverse events in hypertrophic cardiomyopathy (HCM) is unknown. To identify who are at risk of SCD in this patient group has been a challenge facing treating physicians. Aims: we wanted to determine

if the autonomic parameters of HCM patients are different than that of control subjects at rest. Also, we examined if there were alterations of autonomic function during adaptation to changes of body position in HCM patients.

Methods We recorded ECG and non-invasive finger arterial blood pressure values (FINAPRES, Ohmeda) in 31 HCM patients and 28 healthy, matched control subjects. The sympatho-vagal function was evaluated by spectral analysis (FFT, computed in high (0.15–0.50 Hz) and low (0.04–0.15 Hz) frequency bands), time-domain analysis (pNN50, rMSSD, SDNN) of heart rate (RRI) and systolic blood pressure (SAP) variability, calculation of BRS values (up- and down-BRS, LF-alpha) during bed rest and standard head-up tilt table testing.

Results During supine rest, the LF-SAP component (15.8 ± 15.7 vs 4.1 ± 2.9 mmHg², $p < 0.001$) and standard deviation (SD) of SAP were increased significantly (7.6 ± 2.7 vs 6.1 ± 1.9 mmHg, $p = 0.02$), while the rMSSD of RRI (49.3 ± 72.0 vs 58.8 ± 39.8 ms, $p = 0.05$) and the HF spectral RRI-component (667.6 ± 1143.3 vs 2253.7 ± 3617.8 ms², $p = 0.055$) diminished just in tendency of HCM patients. In tilting-up position, the BRS indices were reduced significantly (6.0 ± 4.0 vs 8.5 ± 4.7 ms/mmHg for up-BRS, $p = 0.04$ and 5.4 ± 2.9 vs 8.0 ± 3.6 ms/mmHg for down-BRS, $p = 0.03$, 5.5 ± 4.7 vs 8.0 ± 4.9 ms/mmHg for LF-alpha, $p = 0.05$) as did the rMSSD of RRI (24.5 ± 20.3 vs 39.0 ± 17.4 ms, $p = 0.01$) in patients, while the LF-SAP (44.6 ± 31.7 vs 15.7 ± 15.8 mmHg²) and SD of SAP (10.2 ± 3.3 vs 7.1 ± 2.3 mmHg) increased more in HCM patients during acute orthostasis.

Conclusion The RR-interval and baseline blood pressure values are not different in patients with HCM at rest, however, a greater extent of vagal withdrawal and a decrease of baroreflex function could be detected during acute orthostasis in patients. The results referring to increased blood pressure variability on head-up tilting can be explained by raised aortic stiffness in HCM. These data of alterations in autonomic function can add to the predictive accuracy of established risk factors in this disease.

Retrospective analysis of survival data of in-hospital and out-of-hospital resuscitated patients in the practice of Semmelweis University Heart Center C4-5

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Background Circumstances and methods of cardiopulmonary resuscitation (CPR) determine the neurologic and survival outcome. Our aim was to retrospectively analyse the data of resuscitated patients treated in Semmelweis University Heart Center. A comparison was done between the in-hospital (IHCA) and out-of-hospital cardiac arrest (OHCA) patient groups, mortality data and survival determining intensive therapeutic factors were analyzed.

Methods Statistics were done by Kaplan Meier log rank test, Chi² and t-tests. Out of the 6693 patients treated in our center 48 (34 male, 14 female) got over successful CPR. N = 31 OHCA and n = 17 IHCA indicated CPR.

Results No difference was found in survival between IHCA and OHCA groups, though short-term neurological outcome was better in IHCA group ($p = 0.009$). Survival was better ($p = 0.027$) if the initial rhythm was shockable during CPR, if the patient was male or under 60 yrs ($p = 0.04$ and $p = 0.062$ respectively). The intensive care dependency was higher in OHCA group ($p = 0.016$), the non-intensive post CPR treatment need was higher in IHCA group ($p = 0.004$). The need of catecholamines ($p < 0.0001$), the need of catecholamines during more than 24 hours ($p = 0.024$), the mechanical ventilation duration more than 48 hrs ($p = 0.014$), the severe neurological state at awakening ($p < 0.0001$) and the need of IABP ($p = 0.007$) independently predicted lower survival rates. Survival was not influenced by the existence of ST-elevation, the PCI, duration of CPR, the difference between mono- or combined catecholamine-treatment.

Conclusion Our retrospective analysis has showed that the survival and the neurologic outcome of the successfully resuscitated patients

may be sufficiently estimated on the basis of localisation of cardiac arrest, demographic data and intensive care dependency level, though further prospective, larger patient population studies are needed.

Brain Natriuretic Peptide nurse-determined in a Heart failure Clinic: a practical and important tool to determine death from progressive heart failure but not sudden death C4-6

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Background The brain natriuretic peptide (BNP) was described as a marker for prognosis and useful in the diagnosis of heart failure (CHF). However, its practical role when nurse determined and interpreted in a heart failure clinic is not defined. We tested the hypothesis that the BNP nurse determined (in pg/ml) in a Heart Failure Clinic could be a practical and useful tool in determined of prognosis and management of CHF.

Methods We studied prospectively 165 patients (pts) followed in a heart failure clinic, 122 (73 %) male, under maximal tolerated medical treatment, mean age 50.7 ± 11.8 years in a mean 407 ± 251 days follow-up. The etiology was chagasic in 31 (18.7 %) pts, idiopathic dilated cardiomyopathy in 55 (33.3 %), hypertensive 22 (13.3 %), ischemic 20 (12.2 %), alcoholic 3 (1.8 %), congenital 3 (1.8 %), valvular 4 (2.4 %), and others 14 (8.4 %). The was determined by a nurse of the heart clinic on a ambulatory visit basis.

Results The mean BNP determined by immunoassay kit (Triage, Biosite) was 379 ± 522 versus 14.6 ± 30 in a normal control group ($p < 0.0001$). The BNP in 29 pts who died was 687 ± 804 in comparison with 311 ± 386 in surviving pts ($p < 0.01$). Pts with sudden death had BNP of 443 ± 285 versus 1192 ± 1259 with death from progressive heart failure ($p < 0.01$). It was not observed statistical difference between BNP in pts with sudden death versus surviving pts. In chagasic etiology 38 % died and the mean BNP was 483 ± 450 (716 ± 499 in pts who died and 577 ± 365 in surviving pts), in IDC 20 % of pts died and the BNP was 414 ± 710 (808 ± 1170 in dead versus 388 ± 257 surviving), in ischemic 16 % died and the BNP was 308 ± 299 (447 ± 284 in dead pts versus 303 ± 318), in hypertensive none pts died and the mean BNP was 188 ± 171 (200 ± 169 in dead pts versus 200 ± 169). In chagasic and idiopathic etiology the levels of BNP were higher ($p < 0.05$). In pts receiving beta-blocker the mean BNP was 274 ± 812 versus 331 ± 368 for pts not receiving ($p = ns$).

Conclusion BNP nurse determined is an important accessible and practical tool for determination of CHF prognosis. However, the determination of BNP to predict sudden death seems to have limited value. The etiology can influence the BNP levels. The BNP nurse determined could improve the management of CHF in a heart failure clinic.

Characteristics and outcomes of patients hospitalized for acute heart failure in Slovakia C4-7

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Background Acute heart failure (AHF) represents a significant and growing mortality, morbidity and quality of life burden. Prospective surveys and registries provide a unique opportunity to accurately assess current clinical practice and outcomes and compare these with methods recommended in published guidelines. They are moreover source of data complementary to randomized controlled trials for creating guidelines and therapeutic decisions. SLOVASEZ (Slovak Acute Heart Failure Survey) is a first nationwide multicenter survey in the field of AHF. Aim of our survey was to investigate the characteristics and outcomes in a non-selected population of patients hospitalized for AHF.

Methods We conducted a nationwide multicenter survey with 860 consecutive patients enrolled in 11 hospitals throughout Slovakia – two cardiocentres with a non-stop catheterization service, two cen-

tral and 7 regional hospitals. Relevant data of 78 characteristics in 9 categories were collected between 1 May 2009 and 31 July 2009. There was a specific form designed for this survey. The collected data were subsequently transferred into the electronic database and analysed.

Results Mean age was 72 years, 52 % were male and 81 % of patients were in NYHA class III/IV. The majority of patients were admitted with decompensated heart failure (68.4 %), frequency of cardiogenic shock was 0.3 %. New-onset AHF (AHF de novo) was diagnosed in 31.1 %, of which 20.8 % was due to acute coronary syndromes. Coronary heart disease was the predominant primary aetiology of AHF (67 %), followed by hypertension (10.5 %), valvular disease (10 %) and dilated cardiomyopathy (9 %). Systolic blood pressure greater than 140 mmHg was present in 38 % of patients, hypotension (systolic blood pressure less than 100 mmHg) in almost 6 %. Rales were the most frequent physical signs (70 %), edema, increased jugular venous distension or hepatomegaly were seen in 59, 29 and 24 %, respectively. Hypertension was referred as the most frequent comorbidity (82 %), followed by atrial fibrillation (48 %), diabetes mellitus (42 %), renal failure (31 %) and anaemia (38 %). Preserved left ventricular ejection fraction (> 40 %) was observed in 57 % out of 70 % documented cases in the whole survey. QRS length >120 ms was registered in 21.4 % of patients, left bundle branch block in 18.4 %. 23.3 % of patients had a history of coronary angiography. 84.3 % of patients received intravenous treatment. Diuretics, nitrates and inotropes were given to 97.4, 21.4 and 6 % of them, respectively. The number of patients with cardiac resynchronization therapy (CRT), with or without defibrillator function, was 0.9 %. Mean length of stay was 9.2 days and in-hospital mortality was 9.1 %. At discharge, 69 % of patients were on angiotensin-converting enzyme-inhibitors (ACE-I) or angiotensin-receptor blockers (ARB), while 56 % were using beta-blockers (BB). However, the doses of drugs were mostly lower than 50 % of the recommended target values.

Conclusion Results of the survey are comparable with other observational studies, surveys and registries. Although the percentage of patients with ACE-I/ARB and BB at discharge seems promising, there is still area for improvement. This is particularly relevant at doses of drugs and the field of CRT.

■ Session D1: Acute Coronary Syndromes II

Sex-related differences in baseline characteristics, management and outcomes in patients with acute coronary syndrome without ST-segment elevation (NSTEMI-ACS) D1-1

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Background To detect sex-related differences in baseline characteristics, management and outcomes in patients with NSTEMI-ACS.

Methods Data on 813 consecutive patients admitted to our cardiology department for NSTEMI-ACS were analyzed. Early invasive therapy was defined as percutaneous coronary intervention during first hospital stay. A 4-year follow-up for the clinical endpoint of all-cause mortality could be obtained for 782 patients (342 women and 440 men, respectively).

Results The average age in women was 75.2 (± 12.0), in men it was 67.0 (± 14.0) ($p < 0.001$). Renal insufficiency was more frequently detected in female than in male patients (creatinine clearance below 60; 65 % vs. 32.4 %; $p < 0.001$). While 52.7 % of the male patients received clopidogrel at admission, it was only 43.6 % of the female patients (OR 0.69; 95 % CI 0.52–0.92; $p = 0.011$). The rate of an early invasive therapy was significantly higher among men compared with women (35.2 % vs. 27.5 %; OR 0.70; 95 % CI 0.51–0.95; $p = 0.021$). After adjustment for age and comorbidity this difference was not significant anymore (OR 0.89; 95 % CI 0.59–1.35; $p =$

0.588). Short- as well as long-term mortality was found significantly higher in female compared to male patients. However, when performing a cox proportional hazard model to adjust for baseline characteristics and therapy the worse outcome in female patients could not be detected any longer (HR 0.84; 95 % CI 0.62–1.12; $p = 0.244$).

Conclusion In patients with NSTEMI-ACS women are less likely to undergo an early invasive therapy in comparison to men due to their higher age and their comorbidities. After adjustment for age, comorbidity and therapy female gender is not a predictor for worse long-term outcome.

Impact of acute hyperglycemia on the outcome of patients suffering ACS D1-2

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Background Elevated admission glucose levels (acute hyperglycemia; AHG) have an impact on the outcome of patients suffering acute coronary syndrome (ACS). There are few reports concerning the influence of AHG on long-term course of patients with different types of ACS. Therefore we aimed to investigate the role of AHG on the outcome and cardiovascular endpoints in patients admitted with ST-elevation (STEMI-ACS) vs. non-ST elevation acute coronary syndrome (NSTEMI-ACS).

Methods 681 patients admitted to the emergency department with diagnosis of STEMI-ACS or NSTEMI-ACS who underwent acute percutaneous coronary intervention (PCI) were included in the study. Patients were divided into those presenting with AHG (admission glucose concentration > 140 mg/dl) or without (N-AHG) (admission glucose concentration less or equal to 140 mg/dl) and were followed for 19 ± 13 (mean ± standard deviation) months.

Results The study population was predominantly male ($n = 461$; 67.7 %) but AHG occurred trend-wise more frequently among female participants. AHG patients were significantly more diabetic and displayed higher incidence of chronic renal dysfunction compared to N-AHG ($P < 0.01$). NSTEMI-ACS patients showed significant higher incidence of AHG compared to those with STEMI-ACS (48 % vs. 31 %, $P < 0.001$). When comparing the impact of hyperglycemia on the outcome of ACS we found a significant mortality benefit in N-AHG patients suffering NSTEMI-ACS (0.38, CI 0.19–0.78; $P = 0.008$) but not for N-AHG patients with STEMI-ACS compared with those with AHG. There was a significant correlation between glycated hemoglobin and admission glucose levels in N-AHG and diabetic patients (0.28, $P = 0.04$ and 0.46, $P = 0.0001$) but not in those with AHG. There was no mortality difference between female and male participants of the AHG group.

Conclusion AHG occurs more frequently in NSTEMI-ACS and has a higher impact on mortality in this patient population compared to patients admitted with STEMI-ACS.

New thermo- and hemodynamic-controlled active hypothermic intensive treatment of post-resuscitated patients at Semmelweis University Heart Center D1-3

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Background Therapeutic hypothermia (TH) of 32–34 °C for at least 24 hours is recommended by the current guidelines in the treatment of patients with spontaneous circulation and unconsciousness after cardiac arrest (CA). TH is developed to achieve a significant decrease in cerebral and cardiac oxygen demand and provide a metabolic protection. However post CA myocardial dysfunction may be aggravated by TH.

Methods Our aim was to investigate the effects of a new invasive hemodynamic monitoring guided TH protocol in treatment of post CA patients in our ICU. CSZ Blanketrol III was used for TH. Cir-

cumstances of CPR, mortality and intensive therapeutic markers, neurologic outcome, achievement of goal temperature, the adverse events and hemodynamic effects of TH.

Results TH was applied at 11 patients (pts, avg. 60 ± 13.4 yrs). Initial rhythms of CA were $n = 9$ shockable rhythm, $n = 1$ asystolic, $n = 1$ PEA. Duration of CPR was 20 ± 13 min. Goal TH temperature was achieved in all of the cases, time-to-goal TH was 3.5 ± 2.8 hours, total TH duration was 35.9 ± 9.7 hours. During TH half of the pts needed a combination of at least 2 catecholamines to maintain sufficient hemodynamics beside volumetry guided fluid therapy. Early goal directed fluid management was sufficient to avoid further hemodynamic impairment due to hypothermia: CI (l/min/m²) 2.4 ± 0.8 vs 2.0 ± 0.9 ($p = 0.14$), GEDI (ml/m²) 726.9 ± 141.8 vs 703 ± 77.8 ($p = 0.34$), SVRI (dynsec/cm⁵/m²) 2529 ± 1213 vs 3000 ± 1085 ($p = 0.21$), GEF (%) 18.4 ± 8.0 vs 17.5 ± 8.6 ($p = 0.41$) ELWI (ml/kg) 11.4 ± 3.3 vs 11 ± 2.6 ($p = 0.4$). Days in ICU and on mechanical ventilation were 8.3 ± 3.5 and 5.7 ± 2.3 respectively. Intraaortic balloon counterpulsation and temporary pacing was necessary in 5 and 3 cases. During TH $n = 1$ malignant tachycardia was observed. Sepsis and pneumonia aggravated by MODS caused longer ICU stay in 1 and 2 patients respectively. $N = 2$ pts died, $n = 8$ pts left our clinic with GCS 15 and $n = 1$ with GCS 12.

Conclusion Our novel TH protocol provides effective cerebral protective option beside the conservative complex postresuscitation therapy, but further investigations are needed. The shorter time to achieve TH may cause further impairment of hemodynamics after cardiac arrest, but improved invasive hemodynamic monitoring and rapid therapeutic reaction may diminish these effects of TH.

Influence of updated guidelines on short- and long-term mortality in patients with non-ST-segment elevation acute coronary syndrome (NSTEMI-ACS)

D1-4

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Background In 2002 the ACC/AHA guidelines for the management of patients with unstable angina (UA) and non-ST-segment elevation myocardial infarction (NSTEMI) were updated. We aimed to answer whether the implementation of updated guidelines was capable of influencing short- and long-term mortality in these patients.

Methods We analyzed data on 812 consecutive patients who were admitted with either UA or NSTEMI between 2001 and 2004. Patients admitted in the two years before the implementation of updated guidelines (UA01/02 group and NSTEMI01/02 group) were compared to patients admitted in the two years thereafter (UA03/04 group and NSTEMI03/04 group). Yearly follow-up concerning all-cause mortality was obtained up to four years.

Results The rate of revascularizations, the percentage of procedures performed within 48 h of admission, and the administration of clopidogrel increased significantly. However, still many – especially high-risk – patients did not receive revascularization. Patients of both UA groups had an identical in-hospital mortality rate. Differences in mortality between groups gained statistical significance over time (four-year mortality; 15.1 % for the UA03/04 group vs. 26.5 % for the UA01/02 group, $p = 0.014$; OR 0.49 95 % CI 0.28–0.87). In patients with NSTEMI in-hospital mortality decreased from 18.4 % in the NSTEMI01/02 group to 9.6 % in the NSTEMI03/04 group ($p = 0.011$; OR 0.47 95 % CI 0.26–0.84), and 1-year mortality from 34.7 % to 25.1 % ($p = 0.038$; OR 0.63 95 % CI 0.41–0.98), respectively. Mortality rates beyond one year were still lower in the NSTEMI03/04 group as compared to the NSTEMI01/02 group but it did not reach statistical significance. Multivariate logistic regression revealed furthermore that also patients with higher age and/or renal dysfunction benefit from an early invasive strategy.

Conclusion The implementation of updated guidelines for NSTEMI-ACS had significant impact on short- and long-term mortality. However, an early invasive strategy is still withheld to a significant number of high-risk patients, who would benefit from an invasive treatment.

The comparison of standard echocardiography with 2-dimensional ultrasonic strain measurements in the detection of ischemic myocardium in patients with acute coronary syndrome

D1-5

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Background Ischemia induced left ventricular (LV) dysfunction and regional wall motion abnormalities are the earliest signs in acute coronary syndrome (ACS). Recent publications demonstrated more advantage but less limitation in the quantification of regional myocardial function by 2D ultrasonic strain when compared with the routine visual assessment. The aim of the present study was to compare the sensitivity and clinical utility of standard echocardiography with 2-dimensional ultrasonic strain echocardiography (2DSE) in the detection of myocardial ischemia during ACS.

Methods All standard LV segments were investigated in 26 patients (age 62 ± 12 years) admitted to our clinic with an acute coronary syndrome (8 STEMI, 18 NSTEMI-ACS). Segmental longitudinal 2D peak systolic strain (PSS) curves (Vivid I, AFI), visual assessment of regional wall motion abnormalities, ejection fraction (EF), and 12-lead ECG were recorded and analyzed and finally compared to the results of the coronary angiography.

Results Technically acceptable 2DSE recordings were present in 96.5 % of all segments studied. The global longitudinal PSS showed significant correlation with left ventricular EF ($p < 0.01$, $R = -0.78$). Ischemia induced regional wall motion abnormalities could be detected more precisely with segmental longitudinal PSS than with the visual assessment of wall motion by standard echocardiography when compared to the results of coronary angiography in both STEMI and NSTEMI-ACS groups (absolute deviation from coronary angiography, STEMI: 3.1 ± 0.58 vs. 7.0 ± 1.05 deviation score, NSTEMI-ACS: 4.3 ± 0.53 vs. 8.2 ± 1.04 deviation score, $p < 0.001$). There was no significant difference in sensitivity between the 12-lead ECG and the 2DSE in the STEMI group. However in the NSTEMI-ACS group the 2DSE data was shown to be a more sensitive predictor localizing myocardial ischemia than the ECG ($p < 0.05$).

Conclusion We have demonstrated that 2DSE is a more sensitive and accurate method for detecting regional myocardial ischemia in ACS patients compared to standard echocardiography.

Changes in timing and management of NSTEMI patients in the Heart Institute, University of Pécs, during the last 10 years

D1-6

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Background There is a dynamically changing evidence concerning the management of patients with acute coronary syndrome, especially in the cases of non ST elevation myocardial infarction (NSTEMI). Recent studies prefer an early invasive strategy (ISAR-COOL, TIME-ACS, ABOARD), while others showed the superiority of deferred percutaneous coronary intervention (PCI). The latest guideline of the European Society of Cardiology emphasizes the importance of scoring systems concerning the timing of PCI and the administration of antithrombotic agents in NSTEMI (to gain the peak antithrombotic effect and the least damage of the myocardium).

Methods The main changes in the management of NSTEMI were investigated systematically in our practice during the last 10 years, especially concerning the timing and the type of medications prior the PCI procedure.

Results 13,204 PCI was performed between 2001 and 2009, from which 5750 (30.34 %) were primary PCI for acute coronary syndrome. In 40.07 % of cases the diagnosis was NSTEMI, in these cases an early invasive strategy was preferred from the beginning of our practice (admission to procedure time: 46.25 min. vs. 156.01 min. for STEMI and NSTEMI respectively). We also would like to demonstrate the changes in the antiplatelet medications, the switch from ticlopidine to clopidogrel, the changes in the amount of loading

doses of clopidogrel, and the introduction of prasugrel and ticagrelor in our department.

Conclusion In the everyday practice the scoring systems (TIMI, GRACE) help us to make the best strategy concerning timing and the optimal medication in patients with NSTEMI. This presentation would like to demonstrate the above mentioned changes through the last 10 year in our department according the guidelines.

Levosimendan in patients with cardiogenic shock after acute myocardial infarction D1-7

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Background Levosimendan is recommended in Europe as inotropic support in severe acute heart failure, in particular in patients with cardiogenic shock after acute myocardial infarction (MI) in addition to percutaneous coronary revascularization, intra-aortic balloon pump, dobutamine and noradrenalin. Studies demonstrate a significant increase in cardiac index (CI) within 24 hours of treatment. Our aim was to evaluate the effect of 24-hour levosimendan infusion on CI during the next 96 hours in patients with cardiogenic shock after acute MI, where CI was estimated by Lithium dilution method (LiDCO plus).

Methods We included 7 patients (mean age 59.4 ± 13.5 years, 6 men, one woman) with cardiogenic shock after acute MI. All the patients were treated by percutaneous coronary revascularization, combined with antiplatelet and anticoagulant therapy. In addition they were all treated with noradrenalin, dobutamine and intra-aortic balloon pump. CI was estimated by LiDCO plus method before and after 12, 24, 48, 72 in 96 hours of levosimendan therapy. The efficacy of levosimendan therapy was classified as an increase in CI over 30 % from baseline. Levosimendan was administered without iv. bolus in iv. infusion 12.5 mg/24 hour.

Results 5 patients were treated by primary percutaneous coronary intervention due to acute ST-elevation MI, 2 patients by emergency coronary intervention due to non-ST-elevation MI. Mean peak troponin I was 9.0 ± 9.3 µg/l. Before levosimendan therapy mean systolic blood pressure was 88.3 ± 14.9 mmHg, serum lactate 2.0 ± 0.8 mmol/l and CI 2.0 ± 0.2 L/min/m² as estimated by LiDCO plus. In comparison to baseline levels CI increased significantly 12, 24, 48, 72 and 96 hours after the start of levosimendan therapy, being 2.9 ± 0.3 L/min/m², 2.8 ± 0.6 L/min/m², 2.86 ± 0.35 L/min/m², 3.1 ± 0.28 L/min/m² hours and 3.0 ± 0.46 L/min/m² ($P < 0.001$). Increase in CI over 30 % of baseline levels was observed 12 hours after the start of therapy (mean difference 41.5 ± 11.4 %), after 24 hours (mean difference 40.4 ± 18.6 %), 48 hours (44.4 ± 12.6 %) and 96 hours (53.2 ± 19.8 %).

Conclusion In patients with cardiogenic shock after acute MI 24-hour levosimendan therapy on top of percutaneous coronary intervention and combined antiplatelet and antithrombotic therapy, dobutamine, noradrenalin and intra-aortic balloon pump resulted in an increase of CI over 30 % in the next 96 hours.

■ Session D2: Atrial Fibrillation II

Mid-term efficacy and predictors of postablation arrhythmia recurrences in patients undergoing robotically-guided catheter ablation for paroxysmal atrial fibrillation D2-1

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Background Remote navigation systems represent novel strategy for catheter ablation of atrial fibrillation (AF). The goal of this study is to describe a single-centre experience with the electromechanical

robotic system (Sensei Robotic Catheter System, Hansen Medical) in treatment of patients with paroxysmal AF.

Methods Out of 200 patients who underwent robotically-guided ablation for AF between 2007 and beginning of 2009 at our institute, 100 patients (29 women, age 56.5 ± 10 years) had paroxysmal AF refractory to antiarrhythmic drugs. Electroanatomic mapping using NavX system (St. Jude Medical) provided anatomical shell for subsequent circumferential ablation with robotic catheter (Artisan) loaded with a 3.5-mm, open-irrigation, cool-tip ablation catheter.

Results A mean of 69 radiofrequency current applications (total duration 2082 ± 812 seconds) were delivered to achieve electrical isolation of pulmonary venous antra. Total procedural time reached 236 ± 63 min. The mean fluoroscopic time was 11.9 ± 7.8 minutes. There were no major procedure-related complications. After a mean FU of 16.3 ± 6.2 months, 63 % of the patients were free from any atrial arrhythmias longer than 30 s after the single procedure. Success rate increased to 86 % after 1.2 procedures. Multivariate analysis revealed that only predictor of recurrent AF/AT was shorter overall procedural time (207 ± 36 vs. 236 ± 64 minutes in patients with and without recurrences, respectively, $P = 0.0068$).

Conclusion This study demonstrates feasibility and safety of robotic navigation in catheter ablation for paroxysmal AF. Long-term follow-up documents success rate comparable to other technologies and potential for improvement in more extensive ablation along the ridges with thicker myocardium.

Left atrial size, function and left ventricular diastolic function after cryoballoon catheter ablation in patients with paroxysmal atrial fibrillation D2-2

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Background After successful radiofrequency catheter ablation (CA) of atrial fibrillation (AF) left atrial (LA) size can decrease, LA function can improve, due to reverse LA remodelling. In contrast, after unsuccessful CA the opposite changes can be observed. To our best knowledge comprehensive echocardiographic study of LA volume, function and left ventricular (LV) systolic and diastolic function has not been investigated prospectively in exclusively nonvalvular paroxysmal AF (PAF) patients selected for their first cryoballoon CA (CCA).

Methods Patients: 31 patients selected for their first CCA because of nonvalvular PAF (27 males, 57.4 ± 9.4 yrs, LV EF: 63.5 ± 5.2 %). In this prospective study in sinus rhythm transthoracic and TDI echo before, 3 and 6 months after CCA; transesophageal echo before CCA was performed. LAV-s, LAV index (LAVI; dilated if > 29 ml/m²), mitral inflow parameters (E, A, DT), septal and lateral early- and late diastolic and systolic velocities of the mitral annulus (Ea, Aa, Sa), systolic (S) and diastolic (D) velocities, velocity-time integral (VTI) of the pulmonary vein flow (PVF) were measured. LA function was considered abnormal if at least 2 of the following parameters were below normal value: Aasept, Aalat, LA filling fraction (VTI A/VTI E+A), LA emptying fraction (LAEF : $(LAV_{max} - LAV_{min})/LAV_{max}$), systolic fraction of PVF (VTI S/VTI S+D), peak LA appendage flow velocity (PLAAF). E, A, DT, Ea, E/Ea, S/D were used to grade diastolic dysfunction (DD). CA was considered unsuccessful if between 3–6 months on clinical/ECG/Holter exam recurrent atrial arrhythmia was recognized. Success rate was 19 vs 12 (61 %; group I vs II).

Results Before CA there was no difference between the groups regarding LA dilatation 13/19 (I) vs 9/12 (II), left atrial dysfunction 7/19 (I) vs 5/12 (II), PLAAF (65.9 ± 22 vs 67.3 ± 22.3 cm/s), and DD with elevated filling pressure 8/19 (I) vs 4/12 (II). In contrast before CA lateral Sa was higher in group I: 9.3 ± 2.7 vs 7.5 ± 0.9 cm/s; $p < 0.05$. In the 3. and 6. month LAEF was higher in group I (54.9 ± 8.1 vs 46.6 ± 8.3 %; $p < 0.05$ and 51.8 ± 9.6 vs 44.5 ± 8.7 %; $p < 0.05$). LAVI and the grade of DD didn't change significantly.

Conclusion After successful CA may improve, LA emptying fraction was better. In PAF patients better LV longitudinal systolic function might be a predictor of successful CA.

Reisolation of the pulmonary veins after cryoballoon ablation using a novel radiofrequency ablation technique

D2-3

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Background A higher rate of reconduction of the pulmonary veins (PV) after successful isolation using cryoballoon technique has been reported. Also, arrhythmia recurrence due to reconduction of the veins can occur even after a repeat cryoballoon isolation. The purpose of this study was to evaluate the efficacy of a novel radiofrequency (RF) catheter ablation technique in patients with atrial fibrillation (AF) recurrence after cryoballoon ablation.

Methods Twelve patients (9 men, age 52.5 ± 14.5 year) with recurrent symptomatic paroxysmal or persistent AF after a previous cryoballoon isolation were included. Redo ablation procedure was started with the evaluation of all PVs for conduction, using a decapolar Lasso catheter. Pulmonary vein reisolation was performed using a Pulmonary Vein Ablation Catheter with a 3 D design (PVAC; Ablation Frontiers, Medtronic Inc). This is a decapolar (3-mm electrode, 3-mm spacing, 25-mm diameter), circular, over-the-wire catheter designed to map and ablate in the ostia or antra of PVs. Ablation was performed using a special RF generator applying 60 seconds duty-cycled RF pulses in a bipolar/unipolar ratio of 4:1, 2:1, 1:1 simultaneously to all or selected electrodes with a target temperature set at 60°C. Ablation of Complex Fractionated Atrial Electrograms (CFAE) on the septum and the posterior wall of the left atrium (LA) was also performed in 3 patients using Multi-Array Septal Catheters (MASC) and Multi-Array Ablation Catheters (MAAC).

Results Reconduction of 2 veins was found in 6 patients, 3 veins in 2 patients and 4 veins in 4 patients. Reconduction of both the left superior pulmonary vein (LSPV) and the left inferior pulmonary vein (LIPV) was found in 11 patients (91.66 %), while conduction was recovered in both right sided PVs in 6 patients (50 %). The endpoint of the redo ablation, isolation of all PVs as confirmed by the absence of potentials in the PV ostium was achieved in all patients. Mean procedure time was 141.5 ± 53.82 minutes and mean fluoroscopy time 40.64 ± 17 minutes. After 4.8 ± 1 months follow-up (minimum 1, maximum 8 months) after the repeated ablation procedure, 9 (75 %) of 12 patients maintained sinus rhythm, 1 (8.33 %) patient had left atrial flutter and 2 (16.66 %) had permanent AF.

Conclusion Conduction recovery after cryoballoon pulmonary vein isolation occurs at a higher incidence in the left sided PVs. Redo procedure using 3 D RF ablation catheters resulted in mid-term clinical success in the majority of patients.

Properties of the transient outward, ultra-rapid delayed rectifier and acetylcholine sensitive potassium currents in isolated atrial myocytes from dogs sinus rhythm and tachypaced model of chronic atrial fibrillation

D2-4

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Background Atrial fibrillation (AF) is severe arrhythmia, which largely affects the quality of life. The main form of treating AF is still pharmacological. The development of new antiarrhythmic drugs for treating AF would be promoted by a dog AF model. Therefore, the aim of present study is to investigate the properties of three currents which determine atrial repolarization, the transient outward (I_{to}), ultra-rapid delayed rectifier (I_{Kur}) and acetylcholine sensitive potassium current (I_K, ACh) in isolated atrial myocytes originated from normal (SR) and tachypaced atrial fibrillating (PF) dogs.

Methods Transmembrane ionic currents were investigated by applying the whole cell patch clamp technique at 37 °C.

Results We have identified in all atrial canine myocytes a chromanol 293B (100 μM) sensitive current. The current amplitude was

1300 ± 236.22 pA (measured at 50 mV) and the current inactivation was best fitted by two exponentials with the following components: $\tau_{au1} = 111 \pm 18$ ms and $A1 = 349 \pm 33$ pA; $\tau_{au2} = 12.4 \pm 2.6$ ms and $A2 = 866 \pm 189$ pA. Chromanol 293B accelerated the inactivation in the following manner: $\tau_{au1} = 62 \pm 28$ ms and $A1 = 91 \pm 15$ pA; $\tau_{au2} = 1.62 \pm 0.25$ ms and $A2 = 256 \pm 78$ pA. Selective I_{Kur} blocker 100 μM aminopyridine (4-AP) was applied as pharmacological tool for identify I_{Kur} measured as a sustained current activated by depolarizing pulses to positive potentials. 100 μM 4-AP did not significantly change either the peak or the steady state current in dog atrial myocytes. I_K,ACh was activated by cholinergic agonist carbachol. In sinus rhythm (SR) carbachol activated a large current either at inward or outward directions (current amplitude at -100 mV, was -78.7 ± 9.4 pA vs -269 ± 39 pA, before and after carbachol, respectively). Selective I_K,ACh blocker tertiapin (10 nM) blocked by 57 % the carbachol induced current. In atrial myocytes from PF dogs we could measure the presence of a constitutively active I_K,ACh, which could be blocked by 26 % with 10 nM tertiapin (-301 ± 25 pA vs -217 ± 31 pA before and after tertiapin, respectively, *p < 0.05, n = 5).

Conclusion The presence of the constitutively activated I_K, ACh in tachypaced dogs indicates the presence of electrical remodelling, thereby we concluded that the applied chronic tachypaced model induced chronic AF in dogs. It seems that I_{Kur} plays a less significant role in the canine atrial repolarization than that was reported in human atrial myocytes. However, understanding the cause for these interspecies differences requires further investigations.

Anticoagulation therapy in chronic atrial fibrillation. What can we do for a better anticoagulation quality for stroke prevention in a busy Emergency Department?

D2-5

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Background Chronic atrial fibrillation (AF) is a prevalent and growing problem in Hungary too, which significantly increases the risk of ischemic stroke. The number of newly diagnosed stroke patients has been increasing. It is well documented in literature that anticoagulation therapy is underprescribed. The aim of our study was to survey the anticoagulation therapy (AT) rates in atrial fibrillation, the adherence with AF guidelines in clinical practice in our County Hospital. And to present how we educate our patient in the Emergency Department (ED) to improve patient's knowledge of AF for better anticoagulation quality.

Methods We examined medical records of all patients presented with AF in ED between Jan 2009 and Dec 2009. Pts were enrolled if an ECG documenting AF within the past 12 months was available. Subjects with newly diagnosed AF or with another indication for AT were excluded. According to the CHADS₂ score, pts were divided into a low (CHADS₂ = 0), an intermediate (CHADS₂ = 1) and a high risk (CHADS₂ > 2) group. The CHADS₂ score is a clinical classification scheme for predicting stroke in nonvalvular atrial fibrillation (AF). CHADS₂ is an acronym for congestive heart failure, hypertension, age > 75 years, diabetes, and prior stroke.

Results 822 pts were screened. 78 pts were classified as low risk, 120 pts as intermediate risk, and 624 were proved to be high risk pts. 402 pts were on acenocumarol or warfarin medication, 126 pts were on aspirin or clopidogrel, 36 pts were on LMWH. Contraindications to anticoagulation were documented in only 20 patients. 238 pts were not anticoagulated at all although 32 pts of them had intermediate risk and 156 pts from this group had high risk CHADS₂ score! 183 patients INR values were outside the therapeutic range which is 45 % of all anticoagulated pts!

Conclusion Our survey confirms that adherence to anticoagulation guidelines for patients with atrial fibrillation, who are at intermediate or high risk of embolic stroke, is inadequate. Inspite the fact that oral anticoagulation therapy has been proved to be evident, in clinical practice it seems to be resistant to change. Considering the result of our assay, we try to individual educate the patients in the Emergency Department to improve they knowledge of AF and about the

importance of the stroke prevention by anticoagulation therapy. In addition we send a letter to the patient's GP to call the doctor's attention to the insufficient treatment. We hope that these efforts will make changes in the patients' and the doctors' compliance in case of this very important condition.

■ Session D3: Cases III

Subacute stent thrombosis: How to manage in the daily routine? D3-1

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Background Stent thrombosis (ST) is one of the most serious complications of stent implantation (PCI). It usually manifests in high-mortality (~50 %) myocardial infarction. Basically two main problem could cause ST, namely: unperfect position of the stent (malapposition) and/or ineffective antiplatelet therapy. Our aim is to demonstrate the two most common causes of ST and the possibilities how it could be managed.

Methods Two typical cases of subacute ST (according to the ARC definition both of them were definitive) are presented in these case reports. Routine coronary angiogram was performed followed by PCI and platelet optical aggregometry was routinely performed. Based on the morphology of coronary angiogram – in case of possibility of malapposition – IVUS examination was performed.

Results The first patient was admitted with anterior STEMI to the cathlab, and successful LAD PCI was performed using a bare metal stent with virtually good result. The patient was discharged on double antiplatelet therapy. However, he was readmitted on day 2 with anterior reinfarction, and the coronary angiography revealed the total occlusion of the stent. Manual thrombectomy and another BMS implantation restored the flow. On day 4, another reocclusion reoccurred. IVUS examination confirmed the malapposition of the first stent. After IVUS-controlled balloon dilatations, no adverse event (re-)occurred. The second patient was admitted to the cathlab with inferior STEMI, and successful reopening of the RCA was performed. According to the post-PCI aggregometry assessment, the patient had high platelet reactivity after 75 mg clopidogrel. Thereby, he was discharged on 150 mg clopidogrel daily. On the 4th day, he was readmitted with inferior reinfarction. After successful PCI, both high-dose clopidogrel and ticlopidine were ineffective, and prasugrel therapy was started. Potent platelet inhibition with prasugrel was confirmed by the platelet aggregation measurement, and the patient was discharged without any adverse event.

Conclusion Both malapposition and the ineffective antiplatelet therapy contribute to the development of ST (together 60–70 %). Operators should be aware of these factors to prevent ST and to think about treatment of ST.

Angina pectoris in patient with chronic calcified pericarditis and delayed coronary filling without obstruction of the coronary arteries – Case Report D3-2

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Background Pathogenesis of angina pectoris is generally caused by myocardial ischemia due to either increased myocardial oxygen requirements (demand angina) or secondary to transiently decreased oxygen supply (supply angina).

Methods Man, 65 years, admitted due to exercise angina pectoris (CCS II) and dyspnea. Angina occurred during atrial fibrillation and flutter paroxysms as well as during exercise test on sinus rhythm. There were pleuropericarditis 30 years ago, hypertension, hyper-

lipidemia and hyperurikemia in personal history. Complex non-invasive as well as invasive examinations were provided.

Results ECG: sinus 70/min, chronic T wave inversion I, aVL, V3–6. RBBB on exercise with ST 1 mm depression V3–6. Echocardiography: normal left ventricle systolic function. SPECT: negative – due to proportional reduction of coronary blood flow during exercise coronary angiography: no coronary stenosis, delayed filling of ramus interventricularis anterior in comparison with contrast agent in peripheral part of ramus circumflexus. Transient ST depression on ECG monitoring during examination. Magnetic resonance and computer tomography: calcified pericardium with thickening up to 7 mm in close relationship with coronary arteries especially ramus interventricularis anterior, ramus marginalis sinister.

Conclusion Transient myocardial ischemia is possible to explain by periodicity of coronary blood flow decrease during cardiac cycle caused by thickened pericardium. Conservative strategy is preferred at present time because there was so far no clinical as well as echocardiographic sign of myocardial restriction, propafenone was effective for rhythm control strategy.

Patent foramen ovale diagnosed in a young male patient with acute peripheral arterial embolisation and recurring pulmonary embolism D3-3

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Background Paradoxical embolism is a distinct clinical entity, in which thrombi of the venous system cause arterial embolisation, through any right-to-left shunt. Most frequently, the pathological finding behind these shunts is patent foramen ovale (PFO). The existence of PFO should be suspected when deep vein thrombosis and/or pulmonary embolism are present concomitant with systemic embolisation. According to certain clinical data, the prevalence of PFO can be as high as 30 % in young adults.

Methods Our case presentation is about a young sportsman with recurring pulmonary embolism and PFO discovered after being hospitalized for acute right lower extremity embolism.

Results Patient was admitted to the emergency room with signs of acute right femoral arterial embolism. Medical history revealed prior investigation for symptoms of recurring dyspnea and chest discomfort without any convincing result (echocardiography, coronarography and cardiac MRI were completed). At admission, immediate transthoracic echocardiography was performed which showed marked elevation of right ventricular systolic pressure with further indirect signs of pulmonary embolism. Urgent chest CT scan performed thereafter proved subtotal occlusion of the pulmonary arteries. The simultaneous presentation of both pulmonary and systemic embolisation raised the possibility of PFO, which was later confirmed by transesophageal echocardiography. According to the patient's medical history and clinical findings, we hypothesized that recurring pulmonary embolism was the underlying disease responsible for the patient's former complaints of dyspnea.

Conclusion In conclusion, our goal was to emphasize the importance of urgent transthoracic echocardiography in emergency settings, like this typical of patent foramen ovale, an infrequently diagnosed pathological condition

Mysterious inappropriate ICD shocks ending up in end of system status D3-4

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Background A 66-year old female patient with a medical history of atrial pacemaker implantation and a dual chamber ICD-upgrade due to inducible ventricular tachycardia was referred to our department with “numerous inappropriate ICD discharges without clinically relevant arrhythmias”. Further medical records show a medically treated three vessel coronary disease as well as several heart failure episodes. Amiodarone treatment was started at the time of the

ICD implantation and 5 years later a generator exchange was performed. The latest follow-up one year prior to recent hospital admission did not show ventricular arrhythmias or system malfunctions.

Methods The recent ICD discharges were observed without any relevant arrhythmias and complaints at the time of first response. The sedated and intubated patient arrived to our department without the need for cardiac resuscitation. The first ICD interrogation showed an end of system status. Ventricular arrhythmia detection was disabled and no data could be gained regarding device impedance, statistics, Holter function and serial number. Due to insufficient bradycard pacing a transient pacemaker wire was inserted into the right atrium showing a first degree AV block. Echocardiography revealed moderately decreased left ventricular ejection fraction, laboratory findings showed a cardiac CK level 3 times above normal with severely decreased renal function. According to the coronangiography findings no cardiac revascularisation intervention was necessary.

Results Our patient was previously involved in a home monitoring system; the messenger was turned on and was with the patient. The reports showed fifteen red alerts on the previous two days and a notice for elective replacement indication. The ICD home monitoring system gave us no further information regarding the real cause of the shocks, but showed higher shock lead impedance and an ECG strip suggesting distinct noise between normal QRS complexes. A second ICD interrogation proved to be more successful showing numerous charges and automatic reforms as well as aborted shocks in the past two days, however lead impedance remained unobtainable. The final clue in investigating the real cause of the inappropriate shocks was the successfully interrogated intracardiac electrogram strip clearly showing artefacts as signs of the ventricular lead break which ended up causing this “pseudoelectrical storm”.

Conclusion The recommendations in approaching an electrical storm with ICD actions without proper detection suggest sedation with intubation and ventilation, hemodynamic stabilization and magnet placement over device. Administered antiarrhythmic medication and temporary pacemaker therapy should be considered. ICD interrogation as well as seeking the etiology is hallmark of the correct procedure and home monitoring is often helpful if previously available.

Acute heart failure after rupture of posterior leaflet of mitral valve – case report D3-5

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Background Acute heart failure is defined as a rapid onset of signs and symptoms of heart failure in the need for urgent therapy. The cardiac dysfunction may be related to cardiac ischemia, cardiac rhythm disturbances, valvular disease, pericardial disease, increase in filling pressures or increase in peripheral vascular resistance. Rupture of chordae of papillary muscle of mitral valve is a rare cause of acute heart failure.

Methods We present a 43-year old patient with chest injury in car accident.

Results Symptoms and signs of heart failure began several days after the injury. With echocardiography the diagnosis of rupture of posterior papillary muscle of mitral valve was established. Because he was haemodynamically unstable the intubation, mechanical ventilation, intraaortic balloon pump and vasoactive drugs were needed. After the urgent open heart surgery with mitral and tricuspid valve correction and suture of papillary muscle the patient was stable.

Conclusion The goals of the initial management of acute heart failure are hemodynamic stabilization, support of oxygenation and ventilation and symptoms relief. During initial management it is important to identify the cause for acute failure and if the cause is reversible immediately proceed with therapeutic procedures, as in our case the urgent open heart surgery with tricuspid and mitral valve replacement was life saving.

Patients admitted to an Internal Department during night-shift's hours D3-6

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Background In the last decade the management of patients with chronic (internal) diseases changed. The number of beds decreased and mean hospital stay was greatly reduced.

Methods We offer here an analysis of admitted patients during night-shift's hours in our Internal Department (1st Internal Department, University Hospital Bratislava, period: 01.10.–31.12.2008, day time: 3:30 pm–7:00 am and week and free days): from 1051 patients there were 302 (28.7 %) admitted.

Results Among cardiovascular reasons of admission on the top was acute heart failure in patients suffering from chronic heart failure, succeeded by acute coronary syndrome patients. Among non-cardiovascular reasons of admission were patients with infections and diabetes complications. These patients were old and polymorbid, their co-morbidities contributing to their high morbidity, mortality and rehospitalisations.

Conclusion The change of management of these patients (prolonged stay in hospital, better treatment of comorbidities, uptitration of treatment) can increase the quality of life of patients and can reduce the number of rehospitalisations.

Patients with chest pain – case reports D3-7

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Background Chest pain is an unpleasant subjective sensation with a lifetime prevalence of approximately 39 % in the general population [1]. Each year, more than 2 % of patients present to health care facilities with acute chest pain [2]. There may be various causes – cardiovascular, pulmonary, gastrointestinal, musculoskeletal or psychogenic. The differential diagnosis has to exclude life-threatening conditions such as acute coronary syndromes, pulmonary embolism or acute aortic syndrome. The diagnosis is often a problematic, time-consuming and costly process. Non-cardiac chest pain accounts for approximately 33 % of the cases [1]. In about 20–39 % of patients with chest pain, the results of selective coronary angiography are negative or non-significant [1].

Methods The authors present two case reports of patients with chest pain.

Results The first is a 90-year old patient in whom the pain was due to Herpes Zoster. The second is a 66-year old patient with Tako-tsubo cardiomyopathy.

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■ Session D4: Heart Failure III

Is there separate diastolic dysfunction in hypertrophic cardiomyopathy or systolic leads the pack?

D4-1

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Background Hypertrophic cardiomyopathy (HCM) is associated with myocardial hypertrophy and fibrosis that may interfere with myocardial force generation and relaxation. In HCM, diastolic dysfunction is an important part of the pathophysiology of the disease. The known influence of systolic function on early diastolic phase properties questions the value of standard diastolic assessment in these patients. Myocardial deformation imaging (DMI) has been a tool to quantify regional and global ventricular mechanics. We measured myocardial velocities and strain (S) to evaluate local and global diastolic LV properties in patients with HCM. Aims: We wanted to assess if DMI parameters offer any additive value over conventional indices into the evaluation of diastolic function in HCM and whether they can reflect the relative extent of diastolic changes to systolic parameters.

Methods 26 patients with HCM and 25 gender and age-matched control subjects were examined. Beyond conventional 2D and PW-Doppler measurements (chamber diameters, EF, mitral E-, A-velocities, IVRT, pulmonary inflow data), longitudinal and circumferential systolic and diastolic myocardial deformation indices (tissue velocities and Strain) were examined on 6 basal, mid- and 4 apical segments in apical views and in midventricular segments (parasternal views).

Results EF was comparable in both groups (75.1 ± 2.9 in HCM vs 70.3 ± 6.1 % in controls), the left atrium was more dilated in patients (volume of 33.5 ± 3.5 vs 21.2 ± 1.2 ml/m², $p < 0.05$). The longitudinal average systolic S values were less in HCM patients ($Sm -8.1 \pm 6.2$ vs -14.3 ± 5.6 %), while circumferential S increased ($Sm -33.1 \pm 7.2$ % vs -20.2 ± 6.9 , $p < 0.01$, respectively) compared to controls. The similar pattern was observed in early diastole (circumferential Em -14.6 ± 5.0 % in patients vs -6.8 ± 3.1 %, $p < 0.001$ and longitudinal Em: 7.6 ± 0.8 in patients vs 12.5 ± 1.6 in controls, $p < 0.01$). The diastolic-to-systolic S-ratio were less in patients (longitudinal Em/Sm 0.86 ± 0.33 vs 1.1 ± 0.2 , circumferential 0.96 ± 1.0 , $p < 0.01$, respectively).

Conclusion We demonstrated that systolic strain decrease longitudinally and increase circumferentially in patients with HCM. Early diastolic strain changes occurred in the same direction. Thus, lower longitudinal potential energy (lower peak systolic Sm) was converted to lower relaxation velocities (Em). Similarly, higher circumferential potential energy was converted to higher circumferential diastolic velocities. The evaluation of the relative extent of systolic and diastolic changes demonstrated that the Em/Sm strain ratio was < 1.0 in patients with HCM, and lower in symptomatic and obstructive patients, indicating the presence of independent diastolic dysfunction in HCM.

Blood urea nitrogen (BUN) predicts all-cause mortality in chronic stable heart failure in addition to plasma Nt-proBNP and cardiac troponin T

D4-2

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Background Kidney function is a strong determinant of survival of patients with chronic heart failure (CHF). Blood urea nitrogen (BUN) is shown to be a strong prognostic marker in patients with acute decompensated heart failure but its predictive power in CHF has not been investigated yet.

Methods We measured BUN, serum creatinine, troponin T and plasma Nt-proBNP concentrations in 184 patients with CHF. Patients were followed for all-cause mortality during a median time of

1,282 days. The glomerular filtration rate (eGFR) was estimated by the MDRD formula. Optimal cut-off concentrations for prediction of mortality were determined using classification and regression tree analysis.

Results During the follow-up period 64 (34 %) patients died. Plasma concentrations of Nt-proBNP ($p < 0.001$), troponin T ($p < 0.001$), BUN ($p < 0.001$) and serum creatinine ($p = 0.015$) were significantly higher and eGFR ($p = 0.008$) significantly lower in patients who died compared to those who survived. In multivariate Cox regression analysis, adjusted for age, sex, Nt-proBNP and troponin T concentrations, BUN of > 33 mg/dl (HR: 1.96 $p = 0.017$) but not eGFR of < 60 ml/min/1.73 m² (HR: 0.73 $p = 0.25$) was a significant predictor of mortality. Higher BUN concentration was also significantly associated with outcome in the group of patient with eGFR > 60 ml/min/1.73 m² ($p = 0.009$). Moreover, patients with BUN concentrations of > 33 mg/dl and Nt-proBNP of $> 1,760$ pg/ml had substantially worse outcome than patients with either marker elevated or with both markers below the respective cut-offs ($p < 0.001$).

Conclusion In the present study we could show that in contrast to eGFR, BUN, a generally available and routinely determined marker of renal function, is a strong and independent predictor of long-term outcome in CHF in addition to plasma Nt-proBNP and cardiac troponin T levels.

Effect of an education and monitoring sequential program over quality-of-life components in heart failure

D4-3

F. D. Cruz, V. S. Issa, J. R. Lanz, L. F. Moreira, G. E. C. Sousa, P. R. Chizzola, S. A. Ferreira, F. Bacal, E. A. Bocchi
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Background Trials involving disease management programs (DMP) in heart failure (HF) have shown controversial results regarding quality of life. We hypothesized that a DMP applied in the long-term could produce different effects on each of the quality of life components.

Methods We extended the prospective, randomized REMADHE Trial, which studied a DMP in HF patients; we analyzed changes in Minnesota Living Heart Failure Questionnaires (MLHF) components in 412 patients, 60.5 % male, age 50.2 ± 11.4 years, left-ventricle ejection fraction 34.7 ± 10.5 %.

Results Follow-up was 3.6 ± 2.2 years, 6.3 % of patients were submitted to heart transplantation and 31.8 % died. Global quality of life scores improved in intervention group, as compared to controls, respectively: 57.5 ± 3.1 vs 52.6 ± 4.3 at baseline, 32.7 ± 3.9 vs 40.2 ± 6.3 at 6m, 31.9 ± 4.3 vs 41.5 ± 7.4 at 12m, 26.8 ± 3.1 vs 47.0 ± 5.3 final – $p < 0.01$; similarly, the physical component (23.7 ± 1.4 vs 21.1 ± 2.2 at baseline, 16.2 ± 2.9 vs 18.0 ± 3.3 at 6m, 17.3 ± 2.9 vs 23.1 ± 5.7 at 12m, 11.4 ± 1.6 vs 19.9 ± 2.4 final – $p < 0.01$), the emotional component (13.2 ± 1.0 vs 12.1 ± 1.4 at baseline, 11.7 ± 2.7 vs 12.3 ± 3.1 at 6m, 12.4 ± 2.9 vs 16.8 ± 5.9 at 12m, 6.7 ± 1.0 vs 10.6 ± 1.4 final – $p < 0.01$) and the additional questions (20.8 ± 1.2 vs 19.3 ± 1.8 at baseline, 14.3 ± 2.7 vs 17.3 ± 3.1 at 6m, 12.4 ± 2.9 vs 21.0 ± 5.5 at 12m, 6.7 ± 1.4 vs 17.3 ± 2.2 final – $p < 0.01$) were better (lower) in intervention. The emotional component improved earlier than the others. Post-randomization quality of life wasn't associated with events.

Conclusion Components of the quality of life responded differently to DMP. These results indicate the need for individualized DMP strategies in patients with HF.

The result of coronary revascularization in case of major systolic heart failure and chronic total coronary occlusion

D4-4

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Background We have hardly any data about the importance of coronary revascularization among the patients who have reduced left ventricular function and besides this CTO. We know that, the identification of viable myocardium is important in selecting patients who will benefit from coronary revascularization. Aim: We have done a survey if there is reduced left ventricular function and CTO at the same time, is there a clinical benefit of the percutaneous coronary intervention of CTO in a patient even without any angina? As well as with dobutamin stress Echo examination how many capable of viability segments should be exist to improve the left ventricular function after successful intervention?

Methods We did standard dobutamin stress Echo and viability examination with 11 consecutive patients with reduced systolic left ventricular function (EF < 40 %) and CTO before the percutaneous coronary intervention and after it with 6–9 months. We examined the patients left ventricular function parameters with echo (ejection fraction, number of akinetic segments, wall motion score). We only did the percutan intervention if there was viable myocardium. With the controll examination we measured the changes of the number of the akinetic and hypokinetic segments after intervention.

Results Ejection fraction before PCI 29.0 % ± 6.82, after PCI 45.2 % ± 8.38. Wall motion score before PCI 33.3 ± 5.45 after 24.2 ± 5.54. The numbers of akinetic segments before PCI 4.27 ± 2.42, after 2.64 ± 1.30. All of the differences are significant. The dobutamin stress Echo examination after the CTO intervention showed us in every case that there is hypokinetic segment in rest which movement can improve more significantly to the effect of dobutamin and in every patients at least 1–2 akinetic segment became hypokinetic in rest.

Conclusion Dobutamine stress echocardiography provides a simple, cost-effective method of identifying viable myocardium, and predicting improvement in left ventricular function after coronary revascularization. We can reach a well-measurable improvement of left ventricular function in patients with CTO with opening the coronary artery if the viable myocardium is proved even if the patients had not angina only heart failure. It was enough to intervene only one viable segment for the measurable improvement.

The influence of obstructive sleep apnea syndrome treatment applied by continuous positive airway pressure (CPAP) on heart function – evaluation of left and right ventricular TEI index and tissue Doppler imaging evaluation

D4-5

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Background The aim of the study was to evaluate the effects of CPAP treatment in patients with obstructive sleep apnea (OSA), indicated to CPAP treatment, on systolic and diastolic parameters of left and right ventricle after one year of therapy.

Methods 44 patients (36 males), average age 55.0 ± 10.18 (males 54.0 ± 10.57, females 59.5 ± 7.09), with OSA, average BMI 35.22 ± 6.11, AHI (apnea-hypopnea index) 53.15 ± 21.51, 34 patients (28 males) with hypertension were examined. The echocardiographic evaluation was done with the VIVID 7GE device at the beginning of the treatment and after one year of CPAP therapy. We studied the parameters of global cardiac function (left and right ventricular TEI index) and diastolic function (by tissue Doppler imaging evaluation-

TDI ratio E/A on mitral and tricuspidal annulus) and interventricular delay RV, LV. The pathologic value of TEI index left ventricular (LV) has been stated as > 0.47, the pathologic value of TEI index right ventricular (RV) has been stated as > 0.37. Pathologic value of TDI E/A has been stated as < 1.0. Patients with decreased ejection fraction of the LV, arrhythmia, significant cardiac valve disease, lung hypertension and serious pulmonary disease were excluded from the study. The results were statistically evaluated using the Wilcoxon non-parametric pair test.

Results Patients after one year of treatment showed lower TEI index in LV and RV (TEI LV 0.19 ± 0.17; 0.16 ± 0.11, TEI RV 0.26 ± 0.15; 0.24 ± 0.14). The lower value was statistically not significant (TEI LV p = 0.804, TEI RV p = 0.56). Also the diastolic heart function did not improved after one year of treatment evaluated by TDI E/A on mitral and tricuspidal annulus (TDI E/A on mitral annulus 1.09 ± 0.43; 1.02 ± 0.48, TDI E/A on tricuspidal annulus 0.814 ± 0.25; 0.85 ± 0.24; p = 0.18, p = 0.14). There were no changes in interventricular delay RV LV (15.02 ± 11.07; 15.59 ± 13.11, p = 0.883).

Conclusion The scientific literature occasionally mentions positive effect of CPAP on cardiac function especially in otherwise healthy patients [Baham NA et al, 2009]. Taking into account our results, we will enlarge the file and correlate the cardiac function parameters to the apnea scale and the period of use of CPAP.

Components of life quality evaluation in heart failure clinic

D4-6

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Background Heart failure (HF) is a high prevalence syndrome, pledging the quality of life (QL). We tested the hypothesis that a sequential program of education and monitoring (DMP) may modify the components of Minnesota Heart Failure Living Questionnaire (MLHFQ) on outpatient patients with HF.

Methods This research is an extension of the REMADHE study, prospective, randomized with an intervention group (IG) subjected to a DMP, versus a control group (CG). QL was evaluated by MLHFQ applied the inclusion in the study, every six months to the following-up two years, and thereafter annually. We included 412 patients, 60.5 % were male, and 34.7 ± 10.5 % of left ventricle ejection fraction.

Results In GI, there was a significant improvement in all MLHFQ components (53 ± 23 vs. 29 ± 19, p = 0.007), physical dimension (24 ± 10 vs. 13 ± 9, p = 0.0002), emotional dimension (13 ± 7 vs. 9 ± 7, p = 0.02) and other issues (21 ± 9 vs. 11 ± 7, p = 0.001). In GI, there was an improvement in event-free survival (death and hospitalization) (p < 0.001) there was a relation between the QL scores after inclusion and survival, but not with the life baseline QL (p = 0.7). Quality of life proved to be an independent factor in determining event-free survival. In genres assessment, both showed significant improvement, but in males the improvement occurred late in relation to females.

Conclusion This education and monitoring program continues for a long term to improve QL and its components on the follow up of outpatient patients. However, the components of QL may respond differently to intervention.

Differential diagnosis of electrocardiographic ST segment depressions

D4-7

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Background The presentation aims at providing a comprehensive overview of all known and reported situations leading to ECG changes in ventricular repolarization, either as depressions or elevations of this segment. Given the multifactorial etiology electrocardiographic changes, it is of no surprise that they are contributed to by

both cardiac and, much more frequently, non-cardiac diseases. The idea is to inform about the potential pitfalls of interpreting all ST segment elevations simply as manifestations of the acute phase of acute myocardial, as well as ST depressions of the ST segment in abnormal ventricular depolarization.

Methods The presentation is based solely on a large set of our own original material, a collection of unique ECG findings in particular cases in which the actual etiology of ST segment changes was frequently identified only from the subsequent clinical course or autopsy findings. These are compared with the published ECG images associated with this particular etiology.

Results The ST segment represents the most variable and, from the point of view of interpretation, the most difficult part of the ECG trac-

ing. This phase of ventricular repolarization is affected by both the character of preceding ventricular depolarization and other potentially independent influences. Manifestation of the changes may be relatively specific and more or less typical for a particular pathology but also completely non-specific and defined only at the level of a general differential diagnosis.

Conclusion Electrocardiographic ST segment changes are commonly associated with the signs of acute or chronic ischemic heart disease. However, the differential diagnosis is much broader, involving a wide range of both cardiac and non-cardiac diseases. The correct interpretation of ECG tracing results in early and etiologically oriented therapy without procedures that are useless and often risky for the patient.

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