
Abstracts

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Chronic Heart Failure Leads to an Expanded Plasma Volume and Pseudoanemia, But Does Not Lead To a Reduction In The Body’s Red Cell Mass 044


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Background Chronic heart failure (CHF) is frequently associated with a decreased hemoglobin level. Although in some patients renal anemia may develop, the mechanisms underlying the decrease in hemoglobin in isolated CHF remain largely unknown. We explored robust determinants of anemia including red cell mass as well as related markers and the plasma volume in patients with CHF without renal dysfunction based on non-cardiac reasons.

Methods One-hundred consecutive CHF patients were enrolled. The total red cell volume (RCV) was determined by a 51Cr assay. Furthermore, serum ferritin, erythropoietin, hepcidin, and renal function parameters were assessed. The influence of each factor on hemoglobin concentrations was determined in a multiple regression model.

Results Mean hemoglobin concentrations were slightly lower in patients with CHF (13.7 ± 1.6 mg/dL) compared to a healthy control group (14.6 ± 1.3 mg/dL). However, the RCV was not reduced in CHF patients (CHF with decreased hemoglobin: 1716.8 ± 569.3 mL, CHF with normal hemoglobin: 1828.4 ± 641.3 mL, healthy controls: 1634.4 ± 470.8 mL), and there was no severe deficiency of iron or erythropoietin detectable in CHF patients. We found that plasma volume levels were significantly higher in patients with CHF compared to healthy individuals, suggesting the presence of pseudoanemia (p < 0.001). Correspondingly, the plasma volume was the best predictor of hemoglobin concentrations in the regression model applied (R² = 0.483; p < 0.0001).

Conclusion Hemodilution leading to pseudoanemia is the key determinant influencing hemoglobin levels in isolated CHF. The observation that the RCV is normal in isolated CHF and there is no severe deficiency of iron or erythropoietin is detectable in CHF patients. We hypothesized that guideline insertion alone, prior to balloon inflation or thrombectomy, may lead to flow restoration in the infarct related coronary artery (IRA), and that this phenomenon influences mortality. This may represent an important confounder in thrombectomy trials.

Methods Angiograms of 1012 consecutive STEMI patients between January 2003 and December 2005 were evaluated and TIMI flow was graded at the time of the initial angiogram and after guidewire insertion. The incidence of coronary flow restoration after sole guidewire insertion was assessed and patient baseline characteristics were collected by chart review. Subsequently, death and death dates of all patients with an initial TIMI 0 flow were assessed.

Results An initial TIMI 0 flow was seen in 476 (47.0 %) individuals. Of these, full angiographic data were available of 403 (84.7 %) patients. Coronary flow restoration immediately after guidewire insertion occurred in 150/403 (37.2 %) patients with an initial TIMI 0. Kaplan Meyer analysis revealed improved survival in patients with flow restoration after guidewire insertion (p = 0.17). Furthermore, in a Cox regression model, flow restoration after guidewire insertion had significant impact on mortality (p = 0.041). Finally, revascularization-guidewire insertion was more likely in the right coronary artery (HR = 2.291, CI = 1.387–3.786; p = 0.005).

Discussion Coronary flow restoration following guidewire insertion is a frequent event in emergency STEMI percutaneous coronary intervention and significantly influences long-term clinical outcome. Thus the exact time point of randomization in thrombectomy studies appears to be more important than previously expected.

Prognosis of Acute Coronary Syndrome at High versus Low Altitude Yemeni Patients 001

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Background A cohort study design was employed for this study, aimed at evaluating the prognosis of acute coronary syndrome (ACS) among Yemeni patients at high and low altitudes.

Methods 137 ACS patients from high and low altitudes were evaluated from admission to CCU up to 12 months. We evaluated the possible effect of altitude on the rate of the prevalence of ACS risk factors, in-hospital complications and one year treatment and outcome of ACS.

Results The mean age of ACS patients at low altitude region was higher (58.2 ± 6.8 years vs 55.5 ± 8.8 years; p = 0.042). The mean heart rate (HR) was higher for altitude patients (94.4 ± 19.3 beat/min vs 83.7 ± 17.1 beat/min; p < 0.0001). High altitude patients were seen to have higher mean of CK-MB, WBC, total cholesterol, LDL-C and TG than low altitude patients. The prevalence of past history
of hyperlipidaemia among ACS patients was higher for high altitude patients (56.4 % and 39.7 %; CI = 1.02–3.75; p = 0.040). Betablocker use was higher for low altitude patients (49.2 % vs 31.9 %; CI = 0.251–0.934; p = 0.02). Streptokinase, diuretics, ACE-I and statins were prescribed more frequently for high altitude patients, while heparin was prescribed more frequently to low altitude patients. The hospital and one year mortality rates were slightly higher among high altitude patients.

**Conclusion** Acute coronary syndrome occurs at a younger age at high altitude residence. During hospitalization, after 6 months and 1 year follows up, HR, SBP, DBP, incidence of HF and reduced LVEF were higher for high altitude patients. High altitude ACS patients also have more prevalent cardiovascular risk factors. They also demonstrated more severe complications and more adverse clinical outcome. These findings suggest that high altitude itself should be considered as an independent risk factor for ACS.

**Prognostic Significance of Body Mass Index and Body Fatness in Women Undergoing Coronary Angiography**

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**Purpose** We sought to evaluate the prognostic significance of simple measures of obesity (body mass index – BMI and body fatness – BF) in elderly women with known coronary anatomy. Former studies showed contradictory results concerning the relation between obesity, and total and cardiovascular mortality in coronary artery disease (CAD) patients.

**Methods** In 393 women undergoing coronary angiography for suspected CAD, BMI was calculated using standard formula, BF measured using bioelectrical impedance analysis.

**Results** Mean age was 67.2 ± 10.1 years, 20.4 % had diabetes, 75.1 % arterial hypertension, 56 % CAD and 22.6 % impaired systolic function. Mean BMI was 28.1 ± 4.7 kg/m², mean BF 39.0 ± 6.2 %. During a mean follow-up of 44.4 months, 46 patients died (24 from cardiovascular causes). We observed a tight correlation between BMI and BF (r = 0.86; p < 0.0001). BF by tertile (T) was: T1 < 37 %, T2 37–41.9 % and T3 ≥ 42 %. The unadjusted incidence of all-cause and cardiovascular mortality demonstrated an U-shaped relationship to BF, with the lowest risk for all-cause mortality (unadjusted hazard ratios: T1 3.9 [CI 1.6–6.7], T2 reference, T3 2.4 [CI 0.96–5.1]) and cardiovascular mortality (unadjusted hazard ratios: T1 1.3 [CI 1.9–14.6], T2 reference, T3 7.9 [CI 1.3–15.2]) in T2. In multivariable analysis, including age, extent of CAD, left ventricular function, diabetes and presence of malignancy as covariates, results were substantially unchanged. In contrast, we found no significant relationship between BMI and all-cause or cardiovascular mortality.

**Conclusions** In our cohort, BF analysis was a better prognostic marker than BMI. Our results come up to controversial findings that a mildly elevated BF is linked to better survival and fewer cardiovascular events in patients with CAD.

**Reference Values of NT-proBNP are Elevated in Healthy Pregnancies**


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**Objective** Serum concentration of Amino-terminal pro-B-type Natriuretic Peptide (NT-proBNP) may be used to monitor cardiac function during pregnancy. We investigated NT-proBNP in normotensive healthy pregnancies to determine normal reference values.

**Methods** Serum NT-proBNP were measured in 110 normotensive, healthy pregnant women between 18 and 45 years every 5 weeks beginning from 12th gestational week (GW) in a longitudinal study and compared to a non pregnant control group of 521 women between 18 and 45 years.

**Results** Serum NT-proBNP (± SEM) was significantly higher in pregnant women compared with non pregnant women (71.61 [± 2.79] pg/ml vs 48.37 [± 1.44] pg/ml [p < 0.001]). NT-proBNP increased during pregnancy to 95.76 (± 7.42) pg/ml in the 11 to 46 to 13 to 6 GW. However, NT-proBNP levels in the 33 to 37 to 6 GW were comparable to not pregnant levels, but increased again to 70.46 (± 7.2) pg/ml close to term.

**Conclusion** NT-proBNP is significantly higher in healthy pregnancies than in non-pregnant women. An upper cut-off value of 220 pg/ml may be used for normal NT-proBNP levels during 11 to 22 to 6 GW.

**Erste Erfahrungen mit einem MR-tauglichen Herzschrittmacher: Medtronic ENRHYTHM MRI**

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**Ergebnisse** Während der MR-Untersuchung kam es zu keiner Störung der Schrittmacherfunktion, die Reizschwellen waren unverändert. Lediglich das EKG zeigte auffällige Veränderungen, so dass bei einer MR-Untersuchung unbedingt eine simultane Puls oxymetrie notwendig ist.

**Prevention, Physical Exercise**

A. Bader, M. Hochleitner
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The Women’s Health Centre for Tyrol focuses on cardiac prevention. Numerous information events and diagnosis campaigns are offered, where heart risk profiles are drawn up. In self-assessment by our patients, on average 90 % reply that they get ample physical exercise, even though we on average do not believe it.

Our out-patient clinic for Turkish women shows that physical exercise entails special problems. This fact is known in this group and from the literature, and the patients also admit it. At 2 prevention campaigns in 2000 and 2001 we surveyed 1,536 women. Physical exercise at least three times a week for thirty minutes received a positive reply from only 1/4 (403; 26.2 %) of the women, while 3/4 (1,126; 73.3 %) denied it and 7 (0.5 %) gave no answer. Since compliance is particularly questionable in this area, we decided to make an initiative through the Turkish women’s out-patient clinic. First was a “Walk” campaign. Once a week a one-hour accompanied walk through town was made, starting from the hospital. The women were examined before and after the program for heart risk factors, and incentives were offered for them get more exercise in the hope that networks for group walking would develop. Thereafter an “Exercise Group” was started with healthy Turkish women who promised to exercise at the hospital for one hour once a week after, an “Exercise Group” was started with healthy Turkish women in the hope that networks for group walking would develop. Thereafter an “Exercise Group” was started with healthy Turkish women who promised to exercise at the hospital for one hour once a week after, an “Exercise Group” was started with healthy Turkish women in the hope that networks for group walking would develop. Thereafter an “Exercise Group” was started with healthy Turkish women who promised to exercise at the hospital for one hour once a week after, an “Exercise Group” was started with healthy Turkish women who promised to exercise at the hospital for one hour once a week after, an “Exercise Group” was started with healthy Turkish women who promised to exercise at the hospital for one hour once a week after, an “Exercise Group” was started with healthy Turkish women who prom
Possible Interaction Between Gender and Cardiovascular Risk Factors in First-Second-Generation Turkish Migrant Women

A. Bader, D. Musshauer, A. Cheosta, M. Hochleimner
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In the third year of a CVD prevention program aimed at both second- and first-generation Turkish migrant women in rural Austria 910 participants completed a questionnaire on self-assessed CVD risk factors. Second generation was defined as having gone to school in Austria. More than half of the participants (477) were young adult women between 20 and 40 years of age. As expected, results varied widely between first and second generation.

The greatest differences were found in gender- and lifestyle-related risk factors. BMI ≥ 30 (first 26.3 %/second 6.2 %), exercise 3 times a week (36.3 %/71.3 %) and healthy diet (61.7 %/83.6 %) showed significantly better results among second-generation women. Smoking (16.7%/38.5 %) showed significantly worse results in second-generation women.

Having fewer language barriers, twice as many second- as first-generation migrants consume German-language media.

Even though fewer language barriers led better awareness of health risk factors to be expected in second-generation migrants, they were less informed about their clinically measured risk factors like blood pressure, cholesterol and blood glucose levels than was the first migrant generation in the same age group. Thus, culturally coded gender expectations might be a stronger impetus for health behavior than health information for second-generation migrant women.

Healthcare providers should strengthen positive health behavior of the culture of origin and the host culture to support good CVD health of women whose gender roles are in transition.

Primary Prevention of Coronary Heart Disease in Women

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Women’s Health Centre, Medical University of Innsbruck

Heart death is the number-one killer of women in Austria. The Women’s Health Office thus offered check-ups specially for women outside the hospital and doctor’s office, namely as stop-ins. We offered health information material specifically for women and a 30-min check-up covering blood pressure, BMI, cholesterol, blood glucose and a doctor’s consultation. For further treatment the women were referred to their primary-care physician.

In 2003, 304 women (average age 53.3 years ± 16.7 years) participated. A standardized questionnaire evaluated cardiac risk. Of the respondents 118 (38.8 %) reported a family history of risk, 234 (79.9 %) sports (minimum three times per week), 274 (90.1 %) reported a healthy diet including fiber, and 43 (14.1 %) smoked. The check-up also included a questionnaire for self-evaluation of health: 285 (93.8 %) sports (minimum three times per week). 274 (90.1 %) repeated. A standardized questionnaire evaluated cardiac risk. Of the respondents 118 (38.8 %) reported a family history of risk, 234 (79.9 %) sports (minimum three times per week), 274 (90.1 %) reported a healthy diet including fiber, and 43 (14.1 %) smoked. The check-up also included a questionnaire for self-evaluation of health: 285 (93.8 %) sports (minimum three times per week).

Values measured: total cholesterol > 200 in 171 (56.3 %) women, 285 (93.8 %) wanted more health information specifically for women.

BNP in Low-Flow, Low-Gradient Aortic Stenosis is Strongly Related to Functional Capacity. Results from the Multicenter TOPAS Study

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Background We have previously reported that plasma levels of BNP (B-type natriuretic peptide) are a strong predictor of outcome in low-flow low-gradient aortic stenosis (AS). More recently, we found impaired functional capacity in the six-minute walk test to be associated with poor outcome in this challenging subset of patients. The objective of the present study was to evaluate the relationship between BNP and parameters of functional capacity in low flow AS.

Methods BNP measurements and dobutamine stress echocardiography (DSE) were performed in 71 pts with low-flow low-gradient aortic stenosis (AS). More recently, we found impaired functional capacity in the six-minute walk test to be associated with poor outcome in this challenging subset of patients. The objective of the present study was to evaluate the relationship between BNP and parameters of functional capacity in low flow AS.

Results Median BNP was 545 (inter-quartile range: 276 to 982) pg/ml. Mean DASI was 26 ± 14 and mean 6MWT distance was 316 ± 122 m. Log BNP was significantly related to DASI (r = –0.31; p < 0.01) and 6MWT distance (r = –0.56; p < 0.0001; Figure 1), as
Introduction Natriuretic peptides predict outcome in asymptomatic aortic stenosis (AS). Speckle tracking derived systolic strain has been shown to predict early deterioration of left ventricular function. BNP has been shown to relate to longitudinal strain in asymptomatic severe AS. The purpose of this study was therefore to evaluate the relationship of longitudinal systolic strain with NT-proBNP in pts with AS and whether it may have a potential for timing of surgery.

Methods Echocardiographic evaluation of left ventricular function by speckle tracking (GE Vingmed) was performed in 17 consecutive pts with severe asymptomatic aortic stenosis (age 72 ± 11 yrs, female 7 pts, mean gradient MG 72 ± 25 mmHg, valve area AVA 0.63–0.15 cm²) and plasma NT-proBNP was determined (Roche, Elecsys).

Results Left ventricular function by standard echocardiographic criteria was normal in 16 pts and borderline in 1 pt with asymptomatic AS. Mean NT-proBNP was 972 ± 690 pg/ml. Longitudinal systolic strain (avgGS) was reduced in 14 of 17 pts, and was inversely related to NT-proBNP (r = −0.64; p < 0.01).

Conclusion Elevated NT-proBNP is related to reduced peak systolic strain even in pts with asymptomatic severe AS and maintained left ventricular systolic function. Together, natriuretic peptides assessed by a simple blood test, and systolic strain, easily determined by speckle tracking in routine echocardiography, may help to identify patients developing left ventricular dysfunction who might benefit from early surgery (Figure 2).

Figure 2: J. Bergler-Klein et al.
Methods and Results In 31 patients after acute myocardial infarction (AMI) with reopened infarct-related artery unselected autologous bone marrow derived stem cells were injected percutaneously using the NOGA-Myostar catheter mapping system. The injected area (region of interest, ROI) was delineated as a best polygon by connecting the injection points marked on NOGA polar maps. The ROI was projected onto the baseline and follow-up rest maps of the 99mTc-tetrofosmin single-photon emission computed tomography scintigraphy calculating the extent and severity (expressed as the mean normalized tracer uptake) of the ROI automatically. The patients were divided into three groups according to the NOGA determined mean unipolar voltage values of the ROI. In patients with a moderate impairment in the myocardial viability (mean unipolar voltage value in the treated area between 7 and 14 mV) normalized mean activity in scintigraphy increased significantly (from 60.07 ± 1.68 to 67.07 ± 9.62; p < 0.05) 3 months after the stem cell injections. There was a trend to increase in the normalized mean activity of the injected area in patients with a normal unipolar voltage (from 66.80 ± 23.78 to 75.93 ± 17.56; p = 0.26) and no change in those with severely impaired myocardial viability in the treated area (from 54.11 ± 15.13 to 54.6 ± 12.86; p = 0.81).

Conclusions Projection of the NOGA-guided injection area onto the single-photon emission computed tomography polar maps permitted quantification of myocardial perfusion in the targeted area. On the basis of our results only myocardial areas showing moderate viability in the NOGA unipolar voltage map should be treated with intramyocardial stem cell therapy.

Unique Course of An Ischaemic Ventricular Septal Defect

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2Division of Cardiovascular Surgery, Medical University of Vienna

Background Though the establishment of early reperfusion therapy has decreased the incidence of ischaemic VSD in acute myocardial infarction to less than 1 %, the mortality in this complication is still excessive high. A spontaneous closure of an acquired myocardial infarction to less than 1 %, the mortality in this complication is still excessive high. A spontaneous closure of an acquired myocardial infarction to less than 1 %, the mortality in this complication is still excessive high.

Conclusion To our knowledge the first case of spontaneous closure of a post surgery ruptured ischaemic VSD is reported.

Epidemiologie des kardiogenen Schocks in Österreich: Das Österreichische Schockregister


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Zusammenfassung Unsere Daten weisen darauf hin, dass der KS wie andere kardiovaskuläre Erkrankungen mehr Männer als Frauen betrifft. Bei einem Durchschnittsalter von 66,5 Jahren scheint es sich nicht primär um eine Erkrankung der sehr alten Menschen zu handeln. Besonders unter diesem Blickwinkel ist die Spitalssterblichkeit mit knapp 60 % sehr hoch.

Valvular Calcification in Asymptomatic Aortic Stenosis: Prognostic and Therapeutic Implications

Clinical Department of Cardiology, Medical University of Innsbruck

Aims The prospective, randomized, placebo-controlled Tyrolean Aortic Stenosis Study (TASS) sought to characterize the natural history, risk factors and their possible modulation by new-onset atorvastatin treatment (20 mg daily versus placebo) in patients with asymptomatic calcified aortic stenosis.

Methods and Results 47 patients without previous lipid-lowering therapy or an indication for it according to guidelines at study entry were randomized to atorvastatin treatment or placebo and prospectively followed for a mean study period of 2.3 ± 1.2 years. Patient prognosis was worse than expected, as 23 (48 %) suffered from a major adverse clinical event (new onset of symptoms followed by aortic valve replacement in most cases). Mean systolic pressure gradient and an increased NT-proBNP plasma level allowed prediction of clinical outcome, which was not influenced by concomitant coronary calcification, age or initiation of atorvasta...
statin treatment. Independent risk factors, however, turned out to be aortic valvular calcification (AVC), as assessed by multidetector computed tomography (MDCT), and plasma levels of C-reactive protein. As shown in a subgroup of 35 patients (19 randomly assigned to atorvastatin and 16 to placebo), annular progression in AVC was similar in both treatment groups. Within 24 months, AVC raised from 2197 ± 1178 arbitrary units (AU) to 2749 ± 1376 AU in the placebo group, and from 2421 ± 1326 AU to 2979 ± 1228 AU in the atorvastatin group.

**Conclusion** Precise risk factor stratification of calcified aortic stenosis should include quantification of valvular calcification by MDCT and measurement of plasma C-reactive protein. This study supports the concept that the natural history in these patients is worse than previously considered. New-onset standard-dosed lipid-lowering therapy with atorvastatin could not halt progression of valvular calcification, the strongest risk factor for adverse clinical outcome in multivariate regression analysis.

**Local Complement Activation Triggers Leukocyte Recruitment to the Site of Thrombus Formation in Acute Myocardial Infarction**

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Atherosclerotic plaque rupture with subsequent mural thrombus formation is considered the main event compromising epicardial flow in acute myocardial infarction (AMI). The precise mechanisms underlying acute coronary occlusion are unknown. To search for soluble factors enriched at the culprit lesion site we compared the proteomic profiles of systemic plasma and plasma derived from fresh coronary thrombus aspirates of 34 patients (male 71 %, age 57 ± 10 years) with ST-elevation myocardial infarction. Two-dimensional gel electrophoresis and ELISA indicated a local activation of the complement system, with a selective accumulation of the complement activator C-reactive protein (CRP) and the downstream effector products C3a and C5a. CRP in coronary thrombus colocalized with C1q and C3 immunoreactivities, suggesting classical complement activation. In vitro, culprit site derived plasma enhanced leukocyte chemotaxis in a C3 dependent manner. We conclude that localized complement activation at the site of coronary thrombosis plays a key role in leukocyte recruitment, and contributes to vessel occlusion in AMI.

**Lipid Predictors of Cardiovascular Events in Statin-Treated Coronary Patients With Type 2 Diabetes**

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**Background** Vascular risk in diabetic patients remains high despite statin treatment.

**Objective** We aimed at identifying which lipid parameters drive vascular risk in this important patient population despite statin treatment.

**Methods** We recorded vascular events over 5.6 years in 491 consecutive statin-treated patients with angiographically proven stable CAD, covering 2750 patient-years.

**Results** From our patients 116 (23.6 %) had type 2 diabetes (T2DM). In the total cohort, low HDL cholesterol (standard adjusted hazard ratio [HR] = 0.73 [0.60–0.89]; p = 0.001), low apolipoprotein A1 HR = 0.77 [0.65–0.92]; p = 0.003) a small LDL particle diameter (0.76 [0.64–0.91]; p = 0.002), and high triglycerides (1.20 [1.05–1.38]; p = 0.007) significantly predicted vascular events, but not total cholesterol (p = 0.995), LDL cholesterol (p = 0.961), or apolipoprotein B (p = 0.077). Patients with T2DM were at a significantly higher vascular risk than non-diabetic subjects (38.6 % vs 24.1 %; p < 0.001). Importantly, like in the total population, low HDL cholesterol (HR = 0.58 [0.41–0.82]; p = 0.002), low apolipoprotein A1 (HR = 0.70 [0.51–0.95]; p = 0.022), a small LDL particle diameter (0.67 [0.50–0.91]; p = 0.010), and high triglycerides (1.30 [1.11–1.53]; p = 0.001) drove vascular risk in our statin treated coronary patients with T2DM.

**Conclusions** The pattern of low HDL cholesterol, low apolipoprotein A1, small LDL particles, and high triglycerides is the main lipid risk factor in statin treated coronary patients with T2DM.

**Coronary Artery Bypass and Surgical Left Ventricular Remodelling for Heart Failure in Patients with Ischemic Cardiomyopathy: Mid-Term Follow-up**

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**Background and Aim** Optimal treatment strategies for patients with ischemic cardiomyopathy remain controversial. We assessed the early and mid-term outcomes after surgical revascularisation alone vs. left ventricular (LV) remodelling combined with revascularisation in these patients.

**Methods** Between 2000 and 2002, 285 consecutive patients with ischemic cardiomyopathy were surgically treated with coronary artery bypass grafting alone (group A, n = 165) or open LV remodelling (apex resection and pericardial patch reconstruction) in addition to revascularisation (group B, n = 120). Preoperatively, the New York Heart Association (NYHA) Class, left ventricular ejection fraction and end-diastolic diameter were comparable (group A 3.2 ± 0.6, 37.7 ± 11.2 % and 59.1 ± 7.3 mm versus group B 3.1 ± 0.6, 40.9 ± 12.1 % and 57.8 ± 8.6). Early and mid-term outcomes, hemodynamic performance and quality of life were evaluated during a mean follow-up period of 70 months.

**Results** Operative mortality was significantly lower in group B (7.5 %) compared to group A (12.8 %). Group B patients had significantly longer ventilation times, higher blood loss and need for blood transfusion. At last follow-up, survival was 74.3 ± 8.1 % in group A vs 84.2 ± 5.4 % in group B (p < 0.05). Follow-up examinations revealed greater reduction of functional class in group B with mean 2.03 ± 0.8 vs 1.7 ± 0.7 in group A (p < 0.05). Both LV ejection fraction and end-diastolic diameter improved significantly more in group B compared to group A.

**Conclusions** Patients with ischemic cardiomyopathy, in which surgical ventricular remodelling was performed, demonstrated longer ventilation times and higher postoperative blood loss, but superior early and mid-term outcomes regarding survival, functional class and quality of life.

**Hemodynamic Effects of Left Ventricular Pacing Site in an Animal Model of Heart Failure**

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**Background** Missing response to left ventricular (LV) pacing is observed in 20–30 % of heart failure (HF) patients, possibly the ideal pacing site was not reached by the coronary sinus lead. This study investigates how different epicardial and endocardial pacing sites influence hemodynamic performance in an animal model.

**Methods** In 6 adult sheep dilated HF was induced by rapid pacing. Endocardial mapping and pacing were performed using a 64-electrode basket catheter. Epicardial pacing was achieved by temporary electrodes. LV volumes and diameters were measured by Echocardiography.

**Results** Table 1 summarizes the hemodynamic and echocardiographic results.
Impact of Different Pacing Modes on Left Ventricular Function Following Cardiopulmonary Bypass

Table 1: O. Dzemali et al.

<table>
<thead>
<tr>
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<th>Baseline</th>
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<td>73.0 ± 17.7</td>
<td>82.2 ± 13.2</td>
<td>65.0 ± 16.7</td>
<td>64.0 ± 18.4</td>
<td>58.8 ± 11.6</td>
</tr>
<tr>
<td>PAPmean**</td>
<td>18.8 ± 6.9</td>
<td>19.6 ± 11.9</td>
<td>18.4 ± 5.1</td>
<td>18.8 ± 5.9</td>
<td>17.0 ± 5.4</td>
</tr>
<tr>
<td>PCWP*</td>
<td>12.4 ± 5.5</td>
<td>10.8 ± 3.6</td>
<td>14.0 ± 3.5</td>
<td>14.8 ± 3.5</td>
<td>15.6 ± 4.1</td>
</tr>
<tr>
<td>CO*</td>
<td>2.7 ± 0.4</td>
<td>3.8 ± 0.6</td>
<td>2.8 ± 0.6</td>
<td>2.7 ± 1.1</td>
<td>2.0 ± 0.9</td>
</tr>
<tr>
<td>LVDD*</td>
<td>4.87 ± 0.7</td>
<td>4.06 ± 0.8</td>
<td>5.25 ± 0.2</td>
<td>5.16 ± 0.6</td>
<td>5.91 ± 0.2</td>
</tr>
<tr>
<td>IVD*</td>
<td>1.40 ± 0.2</td>
<td>1.85 ± 0.1</td>
<td>0.99 ± 0.2</td>
<td>1.28 ± 0.2</td>
<td>0.64 ± 0.4</td>
</tr>
<tr>
<td>Epicardial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart rate</td>
<td>103.0 ± 6.7</td>
<td>102.0 ± 4.5</td>
<td>100.0 ± 0</td>
<td>96.2 ± 5.8</td>
<td></td>
</tr>
<tr>
<td>RR mean*</td>
<td>83.0 ± 16.1</td>
<td>66.2 ± 15.8</td>
<td>67.6 ± 10.2</td>
<td>56.4 ± 12.4</td>
<td></td>
</tr>
<tr>
<td>PAPmean**</td>
<td>18.4 ± 5.4</td>
<td>18.2 ± 3.9</td>
<td>19.6 ± 5.1</td>
<td>19.2 ± 4.3</td>
<td></td>
</tr>
<tr>
<td>PCWP*</td>
<td>10.6 ± 3.4</td>
<td>15.6 ± 2.8</td>
<td>15.2 ± 3.2</td>
<td>14.8 ± 3.3</td>
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</tr>
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<td>CO*</td>
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<td>2.1 ± 0.5</td>
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<td>LVDD*</td>
<td>4.56 ± 0.4</td>
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<td>5.6 ± 0.7</td>
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<tr>
<td>IVD*</td>
<td>1.79 ± 0.2</td>
<td>0.99 ± 0.3</td>
<td>1.11 ± 0.1</td>
<td>0.67 ± 0.3</td>
<td></td>
</tr>
</tbody>
</table>

LVDD = diastolic LV diameter; IVD = interventricular septum diameter

*p < 0.05; **p > 0.05

Conclusion In this sheep model with induced HF, endocardial and epicardial pacing of the lateral myocardium led to optimal systolic function and hemodynamics, right ventricular pacing induced further reduction of LV performance. As this optimal pacing site cannot always be reached via the coronary sinus, surgical implantation of epicardial electrodes should be considered in all non-responding patients.

Spherical Dilatation of the Apex in Failing Left Ventricles: A Target for Surgical Remodelling Techniques

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1Department of Thoracic and Cardiovascular Surgery; 2Department of Radiology, Medizinische Universität Wien, Wien, Austria

Background The present study investigates the geometry of failing left ventricles especially focussing on the apical deformation. A new surgical remodelling technique is presented.

Methods and Results The geometry of the left ventricle (LV) was evaluated by MRI scanning in 124 heart failure patients undergoing CABG. Besides the conventional sphericity index SI 2 further indices were calculated, a length index (LV length syst/LV length diast) and an apical conicity index (apical axis/short axis). The results were compared to 15 patients with normal LV function and 10 test persons. A new apical compression stitch was placed in 35 heart failure patients; a second MRI was performed to evaluate the remodelling result.

In failing left ventricles LV length increased (enddiastolic diameter 5.3 ± 0.6 cm/m vs 4.7 ± 0.8 cm/m in control patients and 4.6 ± 0.3 cm/m in test persons). The length index was also elevated (0.94 ± 0.06 vs 0.78 ± 0.06 and 0.81 ± 0.07). The classical systolic sphericity index was 0.56 ± 0.06 in heart failure patients vs 0.50 ± 0.05 in control patients and 0.48 ± 0.04 in test persons. The apical conicity indices were 0.71 ± 0.08 vs 0.59 ± 0.07 and 0.58 ± 0.06, thus the deformation was more pronounced at the apex. A significant remodelling was achieved in the apical stitch patients. The length index improved to 0.85 ± 0.1, the apical index to 0.62 ± 0.06.

Conclusions Detailed analysis of the geometry of failing left ventricles demonstrated reduction in longitudinal contractility as well as spherical deformation with pronounced apical dilatation. An apical remodelling stitch led to significant remodelling which was accompanied by improvement in ventricular function.

Abstract 136

Background Patients with severely impaired left ventricular (LV) function often demonstrate prolonged inter- and intraventricular conduction. This prospective study investigates hemodynamic effects and outcomes of perioperative temporary biventricular pacing in patients with heart failure undergoing heart surgery.

Methods Eighty consecutive cardiac surgery patients with a LV ejection fraction below 35 % received biventricular stimulation via temporary myocardial electrodes. Group 1 consisted of 40 patients with LV dilatation (mean-LVEDD ≥ 5 ± 5 mm), group 2 of 40 patients with normal or slightly dilated LV (mean-LVEDD ≤ 5 ± 4 mm).

Results Hemodynamic parameters were measured immediately, 6 and 24 hours after operation. An increase of cardiac index (CI) and arterial blood pressure with biventricular pacing was observed in 27 patients (group 1/67.5 %) versus 22 patients (group 2/55 %) from 2.4 ± 0.7 l/min/m² to 3.5 ± 0.5 l/min/m² (p < 0.01). This benefit persisted 6 and 24 hours postoperatively. The remaining patients already showed higher cardiac index prior to pacing (3.7 ± 0.9 l/min/m²). In group 1, responding patients required shorter times for ventilation support and intensive care. QRS duration before surgery was not predictive for the response to biventricular pacing.

Conclusions In the majority of patients with reduced LV function, temporary biventricular pacing improves CO and arterial blood pressure after surgery, especially when LV-dilatation is present.
ÖKG-Jahrestagung – Abstracts

Zusammenfassung Die Inzidenz der revascularisationspflichtigen Graftvaskulopathie nach HTX ist in dieser Serie niedrig. Der Großteil der Läsionen ist mit einem individuellen Therapiekonzept gut behandelbar. Trotz einer geringen Inzidenz an späten Therapieverzögerungen, bleibt die routinemäßige Kontrollangiographie ein unverzichtbarer Bestandteil der guten Nachsorge dieser Patienten.

Prävalenz und Verbesserung gestörter Glukosetoleranz (IGT) bei Patienten mit koronarer Herzerkrankung (KHK) während eines stationären Rehabilitationsprogrammes


Prävalenz der revaskularisationspflichtigen Graftvaskulopathie (KHK) während eines stationären Rehabilitationsprogrammes


Ergebnisse Bei Aufnahme hatten 35 Patienten (15 %) eine pathologische Glukoseintoleranz, bei 4 Patienten (0,02 %) wurde ein Diabetes mellitus neu entdeckt. Am Ende des stationären Rehabilitationsprogrammes (18 ± 4 Tage) konnte ein signifikant (p < 0,05) Gewichtsverlust gesichert werden (72 ± 14 vs. 74 ± 13 kg). Die Laktatmaximalleistung (3,36 ± 0,65 mmol/l) sowie die Leistungsfähigkeit (111 ± 33 vs. 87 ± 34 W) wurden signifikant verbessert. Bei 3 der 4 (75 %) neu entdeckten Diabetiker verbesserte sich der Leistungsvermögen von 97 ± 34 vs. 111 ± 33 W) und die Lebensqualität.


Kardiale Rehabilitation eines Patienten mit dilatativer Kardiomyopathie mit linksventrikulärem Assist Device

Einleitung Ausdauertraining ist eine etablierte Therapie für Patienten mit chronischer Niereinsuffizienz, aber nur wenig ist bekannt über die kardiale Reactivierung. Die Teilnahme an einem kardiologischen Rehabilitationsprogramm für einen Patienten mit LVAD war sicher und effektiv, und verbesserte die kardialen Parameter ebenso wie die Lebensqualität.

Blutdruckkontrolle bei Patienten mit chronischer Nierenerkrankung

Einführung Die verbesserte Kontrolle des Blutdrucks hat bekanntermaßen einen positiven Einfluss auf den Fortschritt der chronischen Nierenerkrankung, aber nur wenig ist bekannt über die Qualität der Behandlung in Erwachsenen – speziell im Hinblick auf die an den veränderten bzw. strenger Leitlinien.

Methodik Aus den Daten des LIFEinLIFE-Projektes haben wir die Einstellung von systolischem und diastolischem Blutdruck ermittelt und beurteilt, welche Faktoren diese beeinflussen können.

Ergebnisse Von den 18.565 Teilnehmern hatten 2,14 % ein Blutdruck von < 130/80 mmHg, wohingegen unter den 1659 Teilnehmern mit chronischer Niereninsuffizienz 3,98 % einen Blutdruck von < 130/80 mmHg aufwiesen. Von den Teilnehmern mit ungenügend eingestelltem Blutdruck hatten 1,79 % einen systolischen Blutdruck von < 130 mmHg mit einem diastolischen Blutdruck von > 80 mmHg, wohingegen 7,36 % einen systolischen Blutdruck von > 130 mmHg mit einem diastolischen Blutdruck von < 80 mmHg aufwiesen.

Schlussfolgerung Die Kontrolle des Blutdrucks ist in der Bevölkerung sehr schlecht, insbesondere unter Patienten mit chronischer Nierenerkrankung.
Impact of High- versus Normal-Impedance Ventricular Leads On Pacemaker Generator Longevity

K. Etsadashvili, T. Berger, M. Stühlinger, W. Dichtl, O. Pachinger, F. Hintringer
Clinical Division of Cardiology, Department of Internal Medicine, Medical University of Innsbruck

Background Pacemaker generator longevity depends on current consumption, which is directly related to current drain of the pacing lead. The use of high impedance pacing leads should therefore result in an extension of battery longevity due to a decrease in current drain. This study was aimed to evaluate the long term effects of high-impedance versus standard-impedance pacing leads on pacemaker generator longevity.

Methods In 40 patients (21 women; age 73 ± 13 years) identical pacemaker generators and atrial pacing leads were implanted. In a randomized fashion, a bipolar standard-impedance ventricular lead was implanted in 20 patients and high-impedance leads were implanted in the remaining patients.

Results The 2 patient groups did not differ with respect to atrial lead tip diameter, including current drain and in lead related complications, as well as the number of paced and sensed events, atrial and ventricular sensing and pacing thresholds. At the 39-month follow-up period, the standard-impedance lead group displayed a significant increase in battery current as compared to the high-impedance lead group (20.6 ± 1.9 vs 18.9 ± 1.1 μA; p < 0.05) and the extrapolated generator longevity was significantly increased in the high-impedance lead group (107.3 ± 8.4 vs 97.0 ± 9.0 months; p < 0.05). However, the effective pacemaker replacement time did not significantly differ between high-impedance versus standard-impedance lead group (86.0 ± 13.6 vs 88.6 ± 8.4 months; p = 0.65).

Conclusion Implantation of high-impedance pacing leads increase estimated replacement interval but does not prolong the effective pacemaker longevity.

Impact of Cryoablation versus Radiofrequency Ablation on Bidirectional Conduction Block in Isthmus Dependent Atrial Flutter

K. Etsadashvili, T. Berger, M. Stühlinger, W. Dichtl, O. Pachinger, F. Hintringer
Clinical Division of Cardiology, Department of Internal Medicine, Medical University of Innsbruck

Introduction Cryoablation (Cryo) is a treatment modality in patients with atrial flutter with potential advantages, such as improved tissue-adherence of the ablation catheter and reduction of pain, as compared to radiofrequency (RF) ablation. Bidirectional conduction block (BCB) in the inferior cavotricuspidal isthmus (ICI) is a marker for successful ablation and crucial to minimize conduction recurrence. This study aimed to test the effects of RF vs cryoablation on BCB, respectively on the recurrence rates of atrial flutter.

Methods Ablation of atrial flutter was performed in 93 pts with radiofrequency energy (58 ± 8 years, 17 female) using a 4-mm irrigated tip catheter and in 49 pts (59 ± 10 years, 9 female) with cryoenergy using a 8-mm tip catheter. Endpoint of each ablation procedure was a BCB verified by electroanatomical mapping (CARTOTM XP). The mean follow-up period was 37 ± 26 months.

Results BCB was obtained in 81.3 % (RF) vs 93.6 % (Cryo) of the patients (p < 0.05). The recurrence rate was 15 % (14/93 pts) after RF vs 4.3 % (2/49 pts) after cryoablation (p < 0.05). BCB was obtained after 13 ± 9 RF and 9 ± 4 cryoenergy applications (p < 0.01). Fluoroscopy time was 29 ± 14 (RF) vs 19 ± 6 minutes (Cryo) (p < 0.01). Procedural analgesic medication was decreased during Cryo as compared to RF ablation (1.9 ± 4 vs 3.3 ± 5 mg; p < 0.01). No difference in complication rate was obvious in between both groups.

Conclusions Cryoablation improves the achievement of bidirectional conduction block and decreases the recurrence rate of isthmus-dependent atrial flutter as compared to radiofrequency ablation.

CardioMon: Eine neue Methode zur nicht-invasiven Beurteilung der Hämodynamik bei Patienten mit akuter kardialer Dekompensation

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1Universitätsklinik für Innere Medizin, Kardiologie, Graz; 2Austrian Research Centers GmbH – ARC, eHealth systems, Graz; 3Austrian Research Centers GmbH – ARC, smart Biomedical systems, Wien


CardioMon ist ein Gerät, das über die oszillographische Messung des Blutdruckes hämodynamische Parameter errechnet. Die vorliegende Untersuchung dient der Beurteilung, ob CardioMon praktikable Informationen über hämodynamische Parameter liefern kann.


Resultate Es wurden 220 Messungen durchgeführt (18 ± 11 Messungen/Patient). Die Streubreite der gemessenen Werte war unter 2 %, jene der berechneten Werte unter 7 %. Der stationäre Aufenthalt betrug im Mittel 10 ± 5 Tage (Tabelle 3).


Objectives Based on the ESC guidelines, heart failure patients should be cared by a specialized out-patient unit. It is unclear whether the same benefit is equally seen in newly referred patients (comparable to a study population) compared to patients already cared on long-term.

Methods and Results Variables of a cohort of 511 patients with CHF were prospectively assessed (follow-up period of 12 months). 382 HF patients already treated on long-term (Group A) were compared to 129 newly referred patients (Group B). With the exception of age and heart rate, patients group were comparable. Group B patients were more severe diseased (higher NYHA functional class \( p = 0.04 \), higher Minnesota Living with Heart Failure Score \( \text{38 ± 27 vs 28 ± 23; } p = 0.001 \)) and had less pharmacological therapy (patients on target dose of recommended HF-therapy 3 % vs 42 %). A successful up-titration of recommended HF-therapy to target dosage was performed in 25 % of cases group B but only in 10 % of group A \( (p < 0.0001) \). Cardiac resynchronization therapy was more often implemented in group B \( (9 % \text{ vs } 3 %; \ p = 0.02) \). These resulted in a significant decrease of NT-proBNP at the end of the follow-up period in group B \( (1074 ± 581 \text{ pg/ml; } p = 0.04) \), whereas NT-proBNP of group A did not change over time. All cause mortality was comparable in both groups.

Conclusion Our data implicate a special benefit for newly referred patients in respect of therapy and change in NT-proBNP if managed by a specialized HF unit whereas only distinct patients might profit from long-term specialized care.

Table 4: G. Gouya et al.

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target dose achieved (n = 108)</td>
<td>Target dose not achieved (n = 111)</td>
</tr>
<tr>
<td>p</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>57 ± 10</td>
</tr>
<tr>
<td>Males (%)</td>
<td>84</td>
</tr>
<tr>
<td>Heart rate (beats/min)</td>
<td>70 ± 13</td>
</tr>
<tr>
<td>RR s</td>
<td>125 ± 18</td>
</tr>
<tr>
<td>NYHA I/II/III/IV (%)</td>
<td>31/35/34/0</td>
</tr>
<tr>
<td>Creatinin mg/dl</td>
<td>1.1 ± 0.3</td>
</tr>
<tr>
<td>NT-BNP pg/ml</td>
<td>336 ± 249</td>
</tr>
<tr>
<td>Coronary artery disease (%)</td>
<td>33</td>
</tr>
</tbody>
</table>

Conclusion Optimization of recommended neurohumoral antagonist pharmacotherapy in chronic heart failure patients results in a short-term survival benefit only in patients with severe heart failure reflected by high NT-BNP levels.

Triage of an Asymptomatic Risk Population by NT-proBNP to Exclude a Short-Term Risk for Cardiac Events in Primary Care

Department of Clinical Pharmacology and Cardiology, Medical University of Vienna

Objectives N-terminal pro brain natriuretic peptide (NT-proBNP) is used as a screening tool in the diagnosis of different cardiac diseases, mainly heart failure (HF). To determine the diagnostic properties of NT-proBNP for triage in asymptomatic high risk population with hypertension, diabetes and ischemic heart disease (IHD) (previous myocardial infarction excluded) this prospective community cohort study in primary care was conducted.

Methods After clinical diagnosis of hypertension and/or diabetes and/or IHD in patients without clinical signs and symptoms of any heart disease the patients were tested for NT-proBNP levels by the primary care physician. Patients were divided in group A (NT-proBNP > 125 pg/ml) and group B (NT-proBNP < 125 pg/ml). Outcome data were documented in both groups.

Results Of a cohort of 267 patients, 43 % were stratified to group A and 57 % to group B. Follow-up period in both groups was 4.3 ± 2.2 months. Patients in group A were older \( (62 ± 12 \text{ vs } 69 ± 10; \ p < 0.0001) \). 44 % in group A versus 55 % in group B were male \( (p = 0.05) \). Hypertension \( (94 \%) \), diabetes \( (40 \%) \) and IHD \( (22 \%) \) without previous MI were equally distributed in both groups. All cause hospitalization \( (9 \% \text{ vs } 2 \%; \ p = 0.007) \) and all over cardiac hospitalization \( (p = 0.009) \) were significantly higher in group A (hospitalization due to ischemic events was 0 vs 2.3 %; \ p = 0.04, due to heart failure 0 vs 1.6 % and arrhythmia 0 vs 1.6 %; both \ p = n. s.).

Conclusion Even on short-term NT-proBNP measurement is helpful to identify high risk patients. More important is to safely rule out a low risk population for patients’ triage. Thus, in primary care NT-proBNP might be a valuable tool for decision making about intensity of care in risk population.

NT-proBNP for Risk Stratification of Newly Presented Symptomatic High Risk Patients in Primary Care

Department of Clinical Pharmacology and Cardiology, Medical University of Vienna

Objectives N-terminal pro brain natriuretic peptide (NT-proBNP) has emerged as an important predictor of risk for mortality and hospitalization in patients with heart failure (HF). However, the optimal use of NT-proBNP measurement for risk stratification of patients...
Inter-Observer-Variabilität zur CRT-Non-Responder-
Prädisktion mittels Vektorkardiographie

J. Brandl, W. Kogelk, A. Oberbichler, T. Schaaf, T. Butter, G. Grimm

Einleitung

Methode
Bei 65 Patienten (47 m; 65,3 J.; QRS-Breite 157 ms, ± 22,9; EF 22,7 %; LVEDD 72,2 mm) wurden die VKG-Daten propektiv vor der CRT-Implantation registriert. Der TI wurde offline, unabhängig und unabhängig von 2 verschiedenen Untersuchern bestimmt. Patienten mit einem TI > 65 ms wurden als Responder zur CRT eingestuft. Die Ergebnisse wurden mit dem hämodynamisch ermittelten Respons korreliert. Invasiv, hämodynamisch wurden die Kontraktilität (LV dp/dt) und der Pulsdruck (PP) gemessen. Als positiver CRT-Response wurden eine Zunahme von > 20 % dp/dtmax und > 5 % PP, unter Stimulation gegenüber dem Ausgangswert ohne Stimulation, definiert. Eine Zunahme von > 20 % dp/dtmax und > 5 % PP wurde als exzellenter Response gewertet.

Ergebnisse
14 Patienten (21 %) wurden über die invasiv, hämodynamisch Parameter als Non-Responder bewertet. Das Vektorkontraktionsflächen-Interval (TI) bei den Non-Respondern war < 65 ms. Bei den exzellenten Respondern wurde ein TI > 90 ms gefunden. Die Qualitätskriterien für das TI als diagnostischer CRT-Prädiktor waren: Sensitivität 79 %, Spezifität 96 %, positiver prädiktiver Wert 85 %, negativer prädiktiver Wert 94 %, CRT-Responder zeigen im VKG ein typisches Depolarisationsmuster der Vektormagnitude.

Zusammenfassung
Der TI-Algorithmus ist ein valider und reproduzierbarer Prädiktor für die CRT-Responder- bzw. Non-Responder-Bestimmung. Das von beiden Untersuchern unabhängig und geblindet berechnete TI ergab eine Übereinstimmung von 88 %. Das TI als CRT-Prädiktor ist weitgehend Untersucher-unabhängig.

Ein neuer Vektor-EKG-Algorismus als Prädiktor für den CRT-Response


Einleitung
Für Patienten mit schwerer Herzinsuffizienz und ventrikulären Leistungsschrumpfungen ist die kardiale Resynchronisationstherapie (CRT) eine akzeptierte, additive Therapie. Jedoch nicht alle Patienten profitieren davon, ca. 30 % der Patienten werden als Non-Responder eingestuft. QRS-Breite, LSB und echokardiographische Messungen stellen Parameter für die Indikation dar, sind aber für die Responder-Prädiktion nicht valide. Ein neuer Algorithmus, basierend auf der Vektor-EKG-Analyse (VKG), soll zur Differenzierung von Respondern und Non-Respondern beitragen. In dieser Studie wird die Effektivität des VKG-Algorithmus untersucht und mit hämodynamischen Daten verglichen.

Methoden
Bei 65 Patienten (47 m; 65,3 J.; QRS-Breite 157 ms, ± 22,9; EF 22,7 %; LVEDD 72,2 mm) wurden die VKG-Daten propektiv vor der CRT-Implantation aufgezeichnet. Aus dem VKG wurde die Vektorkontraktionsfläche berechnet und das Zeitintervall (TI) vom Maximalvektor bis zum Ende der Vektorkontraktionsfläche bestimmt. Der TI-Wert wurde mit den Ergebnissen der hämodynamischen Messungen, die nach der CRT-Implantation erhoben wurden, korreliert. Invasiv, hämodynamisch wurden die Kontraktilität (LV dp/dt) und der Pulsdruck (PP) gemessen. Als positiver CRT-Response wurde eine Zunahme von > 10 % dp/dtmax und > 5 % PP, unter Stimulation gegenüber dem Ausgangswert ohne Stimulation, definiert. Eine Zunahme von > 20 % dp/dtmax und > 10 % PP wurde als exzellenter Response gewertet.

Ergebnisse
14 Patienten (21 %) wurden über die invasiv, hämodynamischen Parameter als Non-Responder bewertet. Das Vektorkontraktionsflächen-Interval (TI) bei den Non-Respondern war < 65 ms. Bei den exzellenten Respondern wurde ein TI > 90 ms gefunden. Die Qualitätskriterien für das TI als diagnostischer CRT-Prädiktor waren: Sensitivität 79 %, Spezifität 96 %, positiver prädiktiver Wert 85 %, negativer prädiktiver Wert 94 %. CRT-Responder zeigten im VKG ein typisches Depolarisationsmuster der Vektormagnitude.

Zusammenfassung
Der TI-Algorithmus in Verbindung mit der VKG ist eine neue Methode für die Responder- bzw. Non-Responder-Bestimmung zur CRT mit einer Sensitivität von 79 % bei einer Spezifität von 96 %. Dies unterstützt die Hypothese, dass die elektro- und radiochirurgische Modulation der Vektoren zur Verbesserung der hämodynamischen Parameters das Untersucher- unberechnete TI ergab eine Übereinstimmung von 88 %.

Atainment of Local Drug Delivery of Paclitaxel with Drug-eluting Balloon in Porcine Coronary Arteries

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Background
The aim of the present study was to confirm the local drug delivery of paclitaxel-eluting balloon by percutaneous intervention of single arterial segments or bifurcations by measurement of the tissue paclitaxel concentration after Dior (2.5 μg paclitaxel/mm² balloon surface) balloon dilatation of porcine coronary arteries.
Methods After general anaesthesia, 8 domestic pigs were subjected to 2× 30 sec Diar balloon (3.0 or 2.75 mm of size, 15 mm of length) dilatation of the left anterior (LAD), left circumflex (mid portion of the fundus side branch) and proximal right coronary arteries. Bifurcation intervention followed by kissing balloon dilatation was performed in 6 arteries. Non-coated balloon dilatation of the LAD in additional pigs served as control. After euthanasia, the dilated segments of the coronary arteries, the distal and proximal reference segments were prepared for measurement of tissue paclitaxel concentration using HPLC. Plasma samples were taken 10, 20, 30, 60, 120 min while tissue samples were harvested mean 1.5h, 12h, 24h and 48h after balloon dilatation, respectively. The dilated arterial sections were subjected to TUNEL immunohistochemistry and the apoptotic smooth muscle cells were counted as a percent of total cells 48h post-dilatation.

Results The tissue paclitaxel concentration of the single dilated segment was 1.82 ± 1.60 μM/L 1.5h post-dilatation, and decreased significantly to 0.73 ± 0.27 (p = 0.032), 0.62 ± 0.34 and 0.44 ± 0.31 μM/L after 12, 24 and 48h. The bifurcation intervention resulted in 5.10 ± 1.80 μM/L tissue paclitaxel dosis of the main branch, which decreased at 12 h to 1.41 ± 1.23 μM/L (p = 0.004). The bifurcation side branch tissue contained 7.00 ± 4.80 μM/L paclitaxel 1.5h post-dilatation, which was decreased to 2.72 ± 0.40 μM/L (p = 0.034). The mean paclitaxel concentration of the reference segments decreased gradually from 0.84 ± 0.99 to 0.34 ± 0.36 μM/L (p = 0.09), and further to 0.28 ± 0.16 and 0.19 ± 0.18 μM/L tissue 1.5, 12, 24 and 48h post-dilatation, respectively. No paclitaxel was found in the peripheral blood 10, 20, 30 min, 1 h, 2, 12, 24 and 48h after Diar balloon dilatation. Mild increase in cell proliferation within the media was found in arterial segments dilated with coated and non-coated balloon. Increased number of apoptotic cells (4.4 ± 0.8 % vs 2.5 ± 0.9 %; p = 0.05) in the media was found in coated balloon-treated vessels as compared with the arteries dilated with non-coated balloon.

Conclusions Short exposition of coronary artery to paclitaxel by local drug delivery with coated balloon is sufficient to reach adequate tissue concentration of paclitaxel in order to exert antiproliferative effect.

Comparison of Early and Late Combined Cardiac Application of Bone Marrow Mononuclear Stem Cells after Myocardial Infarction: Results of the MYSTAR Prospective Randomized Study

Methods Patients with left ventricular (LV) ejection fraction (EF) < 45 % after AMI were randomized to Early or Late (32 ± 12 or 93 ± 15 days post-AMI) groups. Primary endpoints of the study are changes in infarct size and global EF 3 months after BM-MNCs therapy. Secondary endpoints include safety, feasibility, changes in LV segmental motion, myocardial viability, end-diastolic, end-systolic volume and clinical symptoms.

Results Patients in Early vs Late groups received NOGA-guided intramyocardial injections of 476 × 10⁶ (363; 840 × 10⁶) BM-MNCs compared with patients in recent acute myocardial infarction (AMI).

Background In MYSTAR study, results of combined delivery of autologous bone marrow-derived mononuclear cells (BM-MNCs) were compared in patients with recent acute myocardial infarction (AMI). Patients with left ventricular (LV) ejection fraction (EF) < 45 % after AMI were randomized to Early or Late (32 ± 12 or 93 ± 15 days post-AMI) groups. Primary endpoints of the study are changes in infarct size and global EF 3 months after BM-MNCs therapy. Secondary endpoints include safety, feasibility, changes in LV segmental motion, myocardial viability, end-diastolic, end-systolic volume and clinical symptoms.

Results Patients in Early vs Late groups received NOGA-guided intramyocardial injections of 476 × 10⁶ (363; 840 × 10⁶; median with first quartiles) vs 684 × 10⁶ (408; 956 × 10⁶) BM-MNCs followed by intracoronary injections of 2614 × 10⁶ (1996; 3795 × 10⁶) vs 3049 × 10⁶ (2223; 5086 × 10⁶) BM-MNCs into the open infarct-related artery. The mean ± SD (change (between pre-treatment and control) for the infarct size was -3.5 ± 5.1 % (95 % confidence interval [CI]: -5.5 to -1.5; p = 0.001) vs -3.9 ± 5.6 % (95 % CI: -6.1 to -1.6; p = 0.002) and in EF 3.5 ± 5.6 % (95 % CI: 1.3 to 5.6; p = 0.003) vs 3.4 ± 7.0 % (95 % CI: 0.7 to 6.1; p = 0.017) in Early vs Late groups, without significant difference between the groups. Myocardial viability and NYHA improved significantly in both groups, with no change in the other clinical secondary endpoints. Frequency distribution analysis revealed, that the infarct size decreased by at least 5 % in 36.7 % of the patients in the Early group and in 30 % of those in the Late group. An improvement of least 5 % in global EF was measured in 40 % of the patients in the Early group and 30 % in the Late group. Multivariate analysis revealed total number of intramyocardially delivered BM-MNCs and CD34+ cells to be significant predictor of improvement in infarct size and EF, respectively.

Conclusions Combined delivery of unselected BM-MNCs induce a moderate but significant improvement in myocardial infarct size and LV function, paired with significant improvement in myocardial viability.

Short- and Long-Term Outcome of Yukon DES Implantation in a Real World Setting: Results of the Single-Center Yukon Registry

Methods Sixty-seven patients (73 % male) with 73 significant coronary stenoses were included in the Registry. In accordance with the nature of the Registry, no exclusion criteria were defined. Six-month angiographic follow-up (FUP) was performed in 65 % of patients, clinical FUP in all patients. Baseline and FUP quantitative angiographic parameters were measured. The occurrences of short- (acute stent thrombosis) and long-term major adverse cardiac events (MACE, cardiac death, acute myocardial infarction and target lesion revascularization: TLR) were recorded.

Results Totally, 105 Yukon stents were implanted (34 % in LAD, 25 % in LCx, 33 % in RCA and 8 % in bypass vessels) in 28 patients (42 %) with acute coronary syndrome, 2 patients (3 %) in diabeticogenic shock and 37 patients (55 %) with stable angina pectoris. The stents/lesion ratio was 1.44 with 1.57 stent/patient ratio. There was no procedural complication. Subacute stent thrombosis occurred 6 days post-stenting in a 80 year old patient with STEMI during the index procedure. During the FUP, 3 patients died, 2 of them with initial cardiogenic shock, and one due to terminal renal insufficiency. Thus the cardiac death was 3 % (non-stent related). TLR was performed in 10 patients (14.9 %), with a composite MACE of 17.9 %. The pre, post-stent and FUP minimal lumen diameter was 1.01 ± 0.39, 2.54 ± 0.39 and 2.11 ± 0.53 mm, and the percent diameter stenosis 63 ± 12, 17 ± 8 and 24 ± 16 %. The acute lumen gain was 1.43 ± 0.97 mm, the in-stent late lumen loss 0.41 ± 0.44 mm. The binary restenosis rate was 11.4 %.

Conclusions The polymer-free coating of the stent with rapamycin results in a similar angiographic and clinical outcome as observed in other DES in real-world setting.
Einführung


Ergebnisse


Während Patienten mit klinischem Verdacht auf akute Virusmyokarditis und Enzymauslenkung eine kardiale MR nicht erhalten, der eine definitive Diagnose erhielt (ACS), konnte nach Einführung der kardialen MR in die Myokarditis-Diagnostik in 80 % der Fälle eine definitive Diagnose vergeben werden (Myokarditis oder ACS).

Schlussfolgerung

Bei Patienten mit klinischem Verdacht auf akute Virusmyokarditis und Enzymauslenkung gab es laufende Einfälle in die kardiale MR sowie die notwendige invasiven Abklärung mittels Koronarangiographie auf das absolnt notwendige Minimum reduzieren.

Dilated Cardiomyopathy in Cardio-MRI – Old Wisdom with a New Tool

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Cardio-MRI (CMRI) is the gold standard for evaluation of left ventricular volume and mass. To show, that’s not only fact in a normal left ventricular function, we compared the cardiac functional parameters of healthy volunteers with patients with dilated cardiomyopathy (DCM).

We examined 24 patients with DCM (age 62 years, 3 women, 21 men) with Cardio-MRI (1,5 T, Siemens Sonata, Fa. Siemens-Erlangen). All of them had a late gadolinium enhancement intraseptal (midwall-sign) in CMRI and a coronary heart disease was rule out in a coronary angiography. The data were compared with a healthy group (n = 100, 50 women, 50 men, age 46 years, with no cardiac risk factors).

The enddiastolic volume in the DCM group was 257 ± 85 ml, and the end systolic volume was 182 ± 75 ml, with a stroke volume of 74 ± 14 ml and an ejection fraction of 31 %. The left ventricular mass was 263 ± 56 g.

In the healthy adults the enddiastolic volume was 117 ± 29 ml, the end systolic volume was 41 ± 15 ml, stroke volume 76 ± 18 ml, and the ejection fraction was also normal with 64 ± 7 %. The normal left ventricular mass was 134 ± 27 g.

In comparison in DCM there was an increase of the enddiastolic volume by 120 %, and the enddiastolic volume rises by 343 %. The ejection fraction in DCM was only the half as in healthy persons, otherwise the stroke volume was still normal.

To reach this aim, not only the left ventricular volume rises, but also the left ventricular mass rises up to 96 %.

In the healthy group, there was a linear correlation between enddiastolic volume, as a preload parameter, and stroke volume (r = 0.67; p < 0.001). In dcm this physiological correlation was absolutely canceled (r = 0.166; p = 0.65).

With CMRI the intact mechanism of Frank-Starling could be shown in a healthy population. In patients with DCM this was canceled and an adequate stroke volume was the result of massive increase of left ventricular volume and mass. The known massive increase of the enddiastolic volume could be shown in cardio MRI.

The left ventricular dilatation and the pathophysiology of DCM was illustrated with CMRI.

Evaluation of the Aortic Valve in Cardio-MRI

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Cardio-MRI (CMRI) is a standard method for evaluation left ventricular function, detecting volume parameters and left ventricular muscle mass. Also the anatomy and the function of the aortic valve can be visualized.

We examined the aortic valve and the left ventricular function in normal persons (n = 100, age 18–44 years, 50 female, 50 male), and in 77 patients with echocardiographic known aortic valve disease (37 patients with aortic stenosis [AS] and 40 patients with aortic valve regurgitation [AR] with CMRI [Siemens Sonata, 1.5 T]).

Volume was performed in 12 short axis slices (trueFISP-Sequences) and the aortic valve was visualized in FLASH-Sequences with planimetry of the valve orifice in systole and in diastole, to get the regurgitant orifice in AR.

The normal valve orifice was 3.9 ± 0.7 cm² and the ejection fraction (EF) was 56 ± 6.8 %. At 55 % of patients lateral stroke volume (SV) 73 ± 15 ml, left ventricular mass (LVM) 97 ± 19 g. In AS the orifice was 1.0 ± 0.35 cm², and the reduction to 26 % of the normal valve area was combined.
The objective was to examine the consequences for the left ventricle due to volume and pressure overload in patients with diseased aortic valve. Planimetry of the valve orifice in systole and diastole in (AR) is easy and reproducible. The consequences for the left ventricle due to volume and pressure overload in aortic valve disease can be examined conclusively, and CMR should be integrated for making the diagnosis of the severity of aortic valve’s disease.

**Myocardial Ischemia/Reperfusion Injury in Hematopoietic Cell-Restricted β1 Integrin Knockout Mice**

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**Objective**

Evidence indicates that the intercellular adhesion molecule-1 and its counter-receptor β2 integrins are cardioprotective proteins during myocardial ischemia/reperfusion, but no data are available concerning the role of blood cell β1 integrins in this process. We studied the effects of temporary myocardial ischemia and reperfusion in cell blood-restricted β1 integrin knockout mice (β1–/–).

**Methods**

The left descending coronary artery in conditional β1 integrin –/– (β1–/–), β1 integrin +/+ (β1+/+), and β1 integrin –/– bone marrow chimeric (β1–/– BM) mice was ligated for 30 min followed by reperfusion of either 3 h or 3 weeks. Plasma levels of troponin T were evaluated as an index of cardiac cellular damage. The histological evaluation of tissue damage was performed with hematoxylin and eosin stained sections. Cell infiltrations in the ischemic area were investigated by immunofluorescence studies.

**Results**

Plasma troponin T was at a similar level in β1–/–, β1+/+, and β1–/– BM mice treated with 30 min ischemia and 3 h reperfusion. Histological analysis showed that ischemia/reperfusion resulted in marked myocardial injury in all groups of animals, but the damage score of the hearts was not significantly different between β1–/–, β1+/+, and β1–/– BM mice after 3 h of reperfusion following 30 min of ischemia (2.8 ± 0.5 vs 2.6 ± 0.5 vs 2.8 ± 0.6; n.s.). Furthermore, no difference in scar sizes in ischemia-injured hearts was found 3 weeks after ischemia. Semi-quantification of cells demonstrated that compared to β1+/+ mice, the number of infiltrating neutrophils was significantly reduced in β1–/– and β1–/– BM mice, whereas MAC-1-positive cells in the ischemic regions were similar in myotubular tissues of all groups.

**Conclusion**

Absence of β1 integrin expression in hematopoietic cells results in reduced neutrophil infiltration in the ischemic regions, but does not influence myocardial damage of ischemic hearts.

**Erhöhte Expression von iNOS und zelluläre kontraktile Dysfunktion während prolongierter akuter Myokardschämie im Schwein**

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**Einleitung und Methodik**

Chronische adrenerge Aktivierung ist verbunden mit der Progression einer myokardialen Dysfunktion, myokardialen Remodellierung und einer erhöhten Morbidität und Mortalität. Im Tierversuch führt die chronische β1-adrenerge Stimulation in β1-Adrenozeptor transgenen (β1TG) Mäusen bereits früh (im Alter von 2–4 Monaten) zu Störungen der intrazellulären Ca-Homöostase und einer verminderten Kontraktilität. Die Ursachen für den verzögerten Ca-Transport aus dem Zytosol, der durch den Na/Ca-Austauscher (NCX) und die CA2+-pumpen reguliert wird, sind derzeit noch nicht geklärt. Wir untersuchten die Ca-Homöostase (Fluo-4 AM) in stimulierten Kardiozyten (0.5 Hz-Frequenz, Raumtemp.) von jungen (3–4 Monate) β1-Adrenozeptor transgenen (β1TG) Mäusen.

**Erhöhte Expression von iNOS und zelluläre kontraktile Dysfunktion während prolongierter akuter Myokardschämie im Schwein**


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Die Bildung von Stickstoffmonoxid (NO) aus L-Argin in durch die induzierbare NO-Synthase (iNOS) ist bei chronischer Herzensinsuffizienz und im myokardialen Stauung von wesentlicher Bedeutung. Eine erhöhte NO-Pro duktion durch iNOS hemmt die kontraktile Funktion in Herzmuskelzellen. Bei akuter moderater Myokardischämie kommt es zunächst zu einer dem reduzierten Blutfluss proportionalen Abnahme der Myokardfunktion. Nach einigen Stunden nimmt jedoch auch bei konstantem Blutfluss die kontraktile Funktion im vitalen Myokard weiter ab.

Wir untersuchten in einem Modell der prolongierten Myokardischämie im Schwein, ob die kontraktile Dysfunktion der Kardiozyten vom in vivo umgebenden Gewebe unabhängig und mit einer erhöhten iNOS-Aktivität verbunden ist. In 10 narkotisierten Schweinen wurde die linke vordere Koronararterie künstlich und die mittlere koronararterielle Druck (CAP) für 6 h auf 40 % des Ausgangswertes reduziert (ISCH), 4 dieser Tiere erhielten einen iNOS-Inhibitor (AG, L-NIL), 6 weitere Tiere dienten als Kontrolle (CAP unverändert). Regionale Wandfunktion (zystolische Wandverdickung, WTh) der Herzvorderwand (VW) und -hinterwand (HW) wurden aufgezeichnet. Nach 6 h wurden aus VW und HW-Biopsien zur Bestimmung von NOS-Proteinexpression, NOS-Aktivität und NO-Metabolite (Nitrit, Nitrat, Nitrosospezies) entnommen. In simultan aus VW und HW enzymatisch isolierten Herzmuskelzellen wurden kontraktile Funktionen und Ca2+-Transienten mit und ohne Zugabe von L-Arginin (100 μM) untersucht (Feldstimulation).

Durch Hypoperfusion reduzierte sich WTh in ISCH-VW von 42 ± 4 % (N = 6, M ± S.E.) auf 16 ± 3 %, WTh in ISCH-HW und in SHAM blieb unverändert. Proteinexpression und Aktivität von iNOS, nicht jedoch von eNOS, waren erhöht, und iNOS-Expression korrelierte mit der Nitritanreicherung. Zellverkürzung (CS) war reduziert in ISCH-VW vs. Sham-VW (4,4 ± 0,3 % vs. 5,6 ± 0,3 %), L-Arginin führte zu einem weiteren CS-Abfall in ISCH-VW (auf 2,8 ± 0,2 %) und ISCH-HW (auf 3,4 ± 0,4 % vs. 5,4 ± 0,4 %), jedoch nicht in SHAM oder in Gegenwart von iNOS-Inhibitoren. Intrazelluläres Ca2+ blieb unbeinflusst. In Gegenwart von L-Arginin korrelierte VW-CS in vitro mit VW-WTh in vivo (r = 72).

**Schlussfolgerung**

Prolongierte Myokardschämie bei konstanter Hypoperfusion führt zur Induktion von iNOS und NO-abhängiger zellulärer kontraktiler Dysfunktion.

**Verminderte Aktivität des kardialen Na/Ca-Austauschers bei chronischer β1-adrenerger Stimulierung in der Maus**

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**Einleitung und Methodik**

Chronische adrenerge Aktivierung ist verbunden mit der Progression einer myokardialen Dysfunktion, myokardialen Remodellierung und einer erhöhten Morbidität und Mortalität. Im Tierexperiment führt die chronische β1-adrenerge Stimulation in β1-Adrenozeptor transgenen (β1TG) Mäusen bereits früh (im Alter von 2–4 Monaten) zu Störungen der intrazellulären Ca-Homöostase mit einem verzögerten diastolischen Abfall des intrazellulären [Ca], noch bevor sich in vivo eine Verminde rung der basalen Kontraktilität nachweisen lässt [Circulation 2004; 109: 1154]. Die Ursachen für den verzögerten Ca-Transport aus dem Zytosol, der durch den Na/Ca-Austauscher (NCX) und die CaATPase (SERCA) des sarcoplasmatischen Retikulums (SR) vermittelt wird, sind derzeit noch nicht geklärt. Wir untersuchten die Ca-Homöostase (Fluo-4 AM) in stimulierten Kardiozyten (0.5 Hz-Frequenz, Raumtemp.) von jungen (3–4 Monate) β1-Adrenozeptor transgenen (β1TG) Mäusen.

**Ergebnisse**

In β1TG war das maximale systolische [Ca] höher (496 ± 53 nM vs. 335 ± 27 nM, n = 27 bzw. 37; Mittelwert ± S.E.; p < 0,05) und wurde später erreicht (140 ± 5 ms vs. 127 ± 3 ms; p < 0,05). Der diastolische Ca-Abfall war verzögert (Zeitkonstante TAUsim: 223 ± 16 ms vs. 182 ± 9 ms in WT). Die Ca-Beladung des Zytosols, der durch den Na/Ca-Austauscher (NCX) und die CaATPase (SERCA) des sarcoplasmatischen Retikulums (SR) vermittelt wird, ist derzeit noch nicht geklärt.
NO-Eluting Introducer Sheath Prevents Arterial Vasospasms During Catheterization Procedure 097

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Purpose Inserting an introducer sheath in an artery induces vaso- spasm and transient or, in worst case, permanent vessel occlusion. Therefore the aim of our study was to evaluate the antispastic effect of an NO-eluting introducer sheath on the femoral arteries of juvenile domestic pigs, which have similar lumen size as human radial or cubital arteries.

Methods The access to the right or left femoral artery was performed through direct puncture of the arteries in 20 pigs (30–35 kg). Either a NO-coated sheath or a non-coated control device (6F) were inserted randomly into the right and left femoral arteries, respectively. After sheath placement, an angiography of the femoral arteries was carried out in order to simulate the shear stress outside the sheath, in contact with the artery. After 1 hour coronary procedure, angiography of the right and left iliaca, and femoral arteries was performed using a carotid artery access. The femoral arteries of both groups were harvested and assessed histopathomorphometrically and histopathologically.

Results Angiography revealed significant larger proximal and distal reference diameters of the femoral arteries after the procedure with NO-eluting sheaths as compared to non-coated control devices (prox ref. diam.: 4.27 ± 0.40 mm vs 3.77 ± 0.42 mm; p = 0.01 and dist. ref. diam.: 3.37 ± 0.46 mm vs 2.74 ± 0.53 mm; p = 0.001). Histopathological results show a trend towards lower luminal thrombosis with NO-coated devices as compared to control devices after one week (2.7 ± 3.6 % vs 4.9 ± 5.6 % thrombosis occupying the lumen; p = 0.331).

Conclusion The insertion of the NO-eluting sheath shows efficiency in preventing acute vasospasm during catheterization and resulted in a trend towards less luminal thrombosis.

Determinanten des NT-proBNP bei Mitralklappenprolapsyndrom 006

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Einleitung B-Typ natriuretisches Peptid (BNP) und N-terminales proBNP (NT-proBNP) erfassen zunehmendes Interesse auch zur Verlaufs kontrolle von Patienten mit Viten. Allerdings gibt es noch wenige größere Studien zur Rolle des NT-proBNP bei Patienten mit primärer Mitralklappensuffizienz (MI). Daher untersuchten wir NT-proBNP bei Patienten mit Mitralklappenprolaps (MKP) und MI unterschiedlicher Schweregrade.

Methodik Es wurde NT-proBNP bei 72 Patienten (50 Männer; 22 Frauen; Alter: 63,7; Min-max-Jahre) mittels eines Routinetests von Roche Diagnostics bestimmt. Eine Standardechokardiographie wurde bei allen Patienten routinemäßig durchgeführt und die folgenden Messgrößen erhoben: Diameter und Wandstärken der Herzöhlen, sPAP, LVEF, MI-Schweregrad. Das NYHA-Stadium, klinische Zeichen der kardialen Dekompensation, Rhythmus und Medikation wurden erhoben. Zusätzlich wurden alle Standardlaborparameter (z. B. Blutfarb, Hämaglobin, Nieren- und Leberwerte) routinemäßig bestimmt.


Schlussfolgerung Unsere Ergebnisse zeigen, dass die echokardiographischen Parameter der Linksventrikelfunktion und -größe keine signifikante Assoziation mit NT-proBNP bei einer primären MI zeigen. Erwartungsgemäß waren klinische Zeichen der kardialen Dekompensation, der Rhythmus, die Größe des linken Vorhofes und der MI-Schweregrad unabhängige signifikante Prädiktoren.

Das Myokardinfarkt-Netzwerk Mostviertel: 1-Jahres-Ergebnisse 011

Landesklinikum St. Pölten; Landesklinikum Mostviertel Amstetten; Landesklinikum Mostviertel Waidhofen/Ybbs; Landesklinikum Mostviertel Melk; Landesklinikum Mostviertel Scheibbs; Landesklinikum Lilienfeld


Methodik Das Netzwerk Mostviertel besteht aus 5 primär versorgenden Krankenhäusern (Lilienfeld, Melk, Waidhofen/Ybbs, Am stetten, Scheibbs) und dem PCI-Zentrum St. Pölten. Die Notarztstützpunkte der jeweiligen Krankenhäuser sowie der Stützpunkt Pöggstall (Bezirk Melk) waren in das Netzwerk ebenfalls eingebunden. In der primären Phase wurden die Behandlungsstrategien die inter- und intrahospitalen Transferzeiten und die 30-Tage-Mortalität erfasst. In der zweiten Phase wurden die Behandlungsstrategien entsprechend den internationalen Richtlinien (AHA und ESC) etab-
I. Interne Abteilung, AKH Linz

enz sind BNP erhöht gegenüber der Referenz bei P ohne Arrhythmien (p > 0,05). Dadurch ergab sich mittels BNP-Reduktion eine aufgrund der zu geringen Fallzahl jedoch keine statistische Signifikanz. PVI ergab sich in der erfolgreich behandelten Gruppe ein Trend, der gegenüber der Norm erhöht (Referenzwert: 0–125 pg/ml). Nach BNP vor PVI waren in den beiden Gruppen vergeben.


Signifikante Reduktion von NT-Pro-BNP nach Hoch-
frequenzablation von paroxysmalem und kurzzeitig persistierendem Vorhofflimmern als klinischer Erfolgsparameter

Tabelle 5: M. M. Hirschl et al.

<table>
<thead>
<tr>
<th>AUS-DEZ</th>
<th>JÄN-JUL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2007</td>
</tr>
<tr>
<td>Zahl der Patienten</td>
<td>132</td>
</tr>
<tr>
<td>Schmerz-1EKG (min)</td>
<td>378 (124)</td>
</tr>
<tr>
<td>Transportzeit nach St. Pölen (min)</td>
<td>158 (46)</td>
</tr>
<tr>
<td>1. EKG-PCI (min)</td>
<td>240 (66)</td>
</tr>
<tr>
<td>Richtlinienkonforme Therapie (%)</td>
<td>88 %</td>
</tr>
<tr>
<td>30-Tage-Mortalität</td>
<td>10,3 %</td>
</tr>
</tbody>
</table>

* Acetylsalicylsäure, Clopidogrel, Heparin (UFH oder LMWH)

Enzim. Ziel der Studie war es, die Auswirkungen des Netzerwerkes auf die Behandlungsqualität, die Transferzeiten und die 30-Tage-Mortalität zu evaluieren.

Resultate Es wurden 245 Patienten (Phase 1: 132, Phase 2: 113) mit akutem STEMI in das Netzwerk versorgt. Tabelle 5 zeigt die Transportzeiten, der Behandlungsqualität und der 30-Tage-Mortalität im Vergleich der beiden Beobachtungszeiträume.

Einleitung Im Vergleich zu Patienten (P) mit Sinusrhythmus waren Patienten mit Vorhofflimmern, möglicherweise als Ausdruck einer subklinischen Herzinsuffizienz, erhöhte NT-Pro-BNP-Werte (BNP) auf. Ziel unserer Untersuchung war es festzustellen, ob BNP durch eine erfolgreiche Pulmonalvenenisolation (PVI) beeinflusst werden können.


Ergebnisse BNP vor PVI waren in den beiden Gruppen vergleichbar (431 ± 603 pg/ml vs. 535 ± 531 pg/ml; p > 0,05), aber gegenüber der Norm erhöht (Referenzwert: 0–125 pg/ml). Nach 3 Monaten wiesen P mit klinisch erfolgreicher PVI signifikant niedrigere BNP gegenüber der Gruppe ohne erfolgreicher PVI auf (336 ± 461 pg/ml vs. 796 ± 906 pg/ml; p = 0,03). Gegenüber vor der PVI ergab sich in der erfolgreich behandelten Gruppe ein Trend, aufgrund der zu geringen Fallzahl jedoch keine statistische Signifikanz (p > 0,05). Dadurch ergab sich mittels BNP-Reduktion eine Spezifität von 67 % und eine Sensitivität von 57 % bezüglich klinischem Erfolg.

Schlussfolgerung Bei P mit AF ohne struktureller Herzkrankung und ohne klinischer Zeichen einer manifesten Herzinsuffizienz sind BNP erhöht gegenüber der Referenz bei P ohne Arrhythmien. Nach erfolgreicher PVI ist ein signifikanter Rückgang der BNP im Vergleich zu P ohne erfolgreicher PVI zu beobachten.

Randomisierter angiographischer Vergleich von Restenosierungen der Untersegmente und des vaskulären Lumenverlustes bei koronaren Stents verschiedener Art bei klinisch relevanter Hypertonie

Zusammenfassung In der Rekombinanten Granulocyte Colony-stimulating Factor Are Markers of Adverse Outcome in Heart Failure Patients (075) sind BNP erhöht gegenüber der Referenz bei P ohne Arrhythmien. Nach erfolgreicher PVI ist ein signifikanter Rückgang der BNP im Vergleich zu P ohne erfolgreicher PVI zu beobachten.
mobilization factor for hematopoietic progenitor cells, whereas monocyte chemoattractant protein 1 (MCP-1) and macrophage colony stimulating factor (M-CSF) are essential cytokines for recruitment and survival of mononuclear progenitor cells and macrophages.

**Methods**

G-CSF, MCP-1 and M-CSF protein was determined in baseline plasma of 360 patients (mean age 72 ± 13 years) with advanced heart failure with a mean BNP 678.98 ± 760.45 pg/ml and LVEF of 28.8 ± 10 % by specific ELISAs. 35 % of the patients were females. During a median follow-up period of 16 month (confidence interval [CI]: 15–17) 92 patients died (26 %), death was used as endpoint.

**Results**

While plasma levels of G-CSF were not significantly different in the event group (27.95 ± 20.25 vs 25.55 ± 21.37 pg/ml; p = 0.064) MCP-1 (103.54 ± 76.81 vs 87.46 ± 64.18 pg/ml; p = 0.036) and M-CSF (659.5 ± 413.13 vs 434.25 ± 343.88 pg/ml; p < 0.001) were significantly higher in the event group compared to the event-free group. Univariate Cox regression analysis showed a trend for a protective effect of G-CSF with a crude proportional hazard ratio (HR) of 0.70 (95 %-CI: 0.42–1.15; p = 0.161) and a significant harmful effect of MCP-1 with a HR of 1.78 (95 %-CI: 1.04–3.04; p = 0.035) for death comparing third to first tertile. Furthermore, we found a significant gradual increase of risk for death with concentrations of M-CSF with a HR of 2.31 (95 %-CI: 1.31–4.06; p = 0.004) between the second and the first tertile and a HR of 2.64 (95 %-CI: 1.51–4.62; p = 0.001) between the third and the first tertile. Applying multivariable analysis (including clinical variables and BNP) the HR was 1.84 for MCP-1 (95 %-CI: 1.05–3.23; p = 0.033) and 1.89 for M-CSF (95 %-CI: 1.05–3.4; p = 0.033) comparing third to first tertile.

**Conclusion**

Our results indicate that higher plasma levels of MCP-1 and M-CSF are associated with a higher rate of mortality in heart failure and could serve as independent markers besides BNP. Therefore we speculate that a prolonged activation of monocytes and macrophages could have detrimental effects on the injured myocardium.

**Prognostic Relevance of TIMI flow and NT-proBNP Concentrations in ST-Elevation Myocardial Infarction: A Substudy of ASSENT IV-PCI**


*Wilhelminenhospital, Vienna, Austria; Leuven, Belgium; Edmonton, Canada; Durham and Washington D.C., USA*

**Background**

We investigated the prognostic significance of NT-proBNP in addition to TIMI flow determined prior to coronary intervention in STEMI patients from ASSENT IV-PCI.

**Methods**

Plasma NT-proBNP was available in 1,037 STEMI patients when pts were randomized to primary PCI (pPCI) or fibrinolytic-facilitated PCI (fPCI), and we investigated, whether elevated Nt-proBNP in the acute phase of STEMI relates to time to reperfusion and independently predicts outcome irrespective of time.

**Methods**

Plasma NT-proBNP was available in 1,037 STEMI patients when pts were randomized to primary PCI (pPCI) or fibrinolytic-facilitated PCI (fPCI). The study endpoint was the composite of death, cardiogenic shock or congestive heart failure at 90 days. The Chi-square (Chi^2^) Automatic Interaction Detectors (CHIAD) algorithm of classification-tree analysis comprised our statistical calculations.

**Results**

NT-proBNP concentrations and time-to-treatment showed a weak but significant linear correlation (r = 0.22; p < 0.001). Using time-intervals specified by international guidelines (< 3 h vs ≥ 3 h) median NT-proBNP was significantly higher in pts with longer delay to treatment (pPCI: 90 pg/ml vs 207 pg/ml, p < 0.001; fPCI: 125 pg/ml vs 248 pg/ml, p < 0.001). Using shorter conventional time-intervals (< 2 h, 2–4 h and > 4 h) similar increases of NT-proBNP with time-to-treatment in both study arms (pPCI: 76 pg/ml vs 163 pg/ml and 237 pg/ml, p < 0.001; fPCI: 103 pg/ml 158 pg/ml and 375 pg/ml, p < 0.001) were evident. However, pts with NT-proBNP levels > 694 pg/ml (> 80th percentile) had higher 90-day event rates irrespective of time-to-treatment and the reperfusion strategy used. Among patients with NT-proBNP of ≤ 694 pg/ml, 90-day event rates increased non-significantly in both treatment groups with increasing time-delay: however they were lower when PCI was performed < 2 hours after symptom onset whereas the highest event rates were associated with pPCI treated > 4 hours (p = 0.01 for trend).

**Conclusion**

Patients with elevated NT-proBNP early in the course of STEMI have a significantly increased 90-day event rates irrespective of the treatment delay and reperfusion strategy. It is fea-

**Conclusion**

Clinical outcome of pts with high baseline plasma concentrations of NT-proBNP was poor irrespective of TIMI-flow before PCI or the assigned treatment. By contrast in pts with low NT-proBNP levels outcome appeared modulated by prePCI TIMI flow when pre-treated with fibrinolysis.

**Relation of NT-proBNP and Time to Treatment to Outcome of Patients with ST-Elevation Myocardial Infarction: an ASSENT IV-PCI Substudy**


*Wilhelminenhospital, Vienna, Austria; Leuven, Belgium; Edmonton, Canada; Durham and Washington D.C., USA*

**Background**

Survival of ST-elevation myocardial infarction (STEMI) pts depends on time between symptom onset and coronary reperfusion. In the present substudy from ASSENT IV-PCI pts were randomly assigned to primary PCI (pPCI) or fibrinolytic-facilitated PCI (fPCI), and we investigated, whether elevated Nt-proBNP in the acute phase of STEMI relates to time to reperfusion and independently predicts outcome irrespective of time.
sible that clinical outcomes of STEMI pts with low NT-proBNP on presentation might be further improved by early initiation of pPCI. Accordingly, determination of NT-proBNP in the acute phase of STEMI might be helpful in choosing the optimal reperfusion strategy (Figure 4).

Prognostische Wertigkeit des Brain Natriuretic Peptide (BNP) für Graftsklerose bei Patienten nach Herztransplantation 090

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Hintergrund Ziel der Studie war die Evaluierung der Wertigkeit von Brain Natriuretic Peptide (BNP) bei Patienten nach Herztransplantationen (HTX) und dessen Nützlichkeit bei der Ermittlung der Graftsklerose für den klinischen Verlauf.


Ein Follow-up wurde 6 Monate nach erfolgter PCI durchgeführt.

Ergebnisse Von 127 P waren 27 (21 %) Frauen, das durchschnittliche Alter lag bei 59,9 ± 13 Jahren. Die durchschnittliche Schmerzduer lag bei 340 Minuten, die Anzahl der P mit kardiogenem Schock war 16 (13 %), die Anzahl der P, bei denen eine Rescue-PCI nach erfolgloser intraveneröser Lysetherapie durchgeführt wurde, war 11 (9 %).

Der Ramus interventricularis anterior war in 67 Fällen (52 %), der Ramus circumflexus in 16 (13 %), die rechte Koronararterie in 39 (31 %), Venengrafts in 4 (3 %) sowie der Hauptstamm der linken Koronararterie in einem Fall (1 %) das Zielgefäß. Die linksventrikuläre Auswurffraktion lag bei 51 ± 13 %. Eine Mehrgefellüberkran- kung wiesen 24 P (19 %) auf. 8 P (6 %) verstarben im Rahmen des stationären Aufenthalts. Die Ergebnisse des 6-Monats-Follow-up waren wie folgt: 113 P (95 %) konnten nachkontrolliert werden; 5 Patienten waren in der Zwischenzeit verstorben. Die klinische Verdacht auf eine Restenose lag bei 36 P vor (33 %). Einige Patienten mit Instent-Restenosen fanden sich bei 14 P (13 %). Von diesen konnten 10 reinterveniert werden, 4 P wurden zur elektiven aortokoronaren Bypassoperation ge- sandt. Eine Intervention in einem anderen als dem akuten Zielgefäß der Primärintervention erfolgte bei 6 P (5 %).


High Restenosis-Risk of Drug-Eluting Stents in Patients with Low Basal Endogenous Plasma Levels of VEGF 105

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Background Drug-eluting stents (DES) reduce the rate of instant restenosis (ISR) compared to bare-metal stents (BMS) through inhibition of migration and proliferation of coronary smooth muscle cells. However, recent studies suggest that DES also inhibit endothelial cell proliferation leading to delayed healing of the endothelium and a chronic inflammatory reaction that may result in late stent thrombosis and ISR. VEGF treatment has been proved to reduce intimal proliferation through accelerated reendothelialization. The aim of this study was to evaluate whether endogenous plasma levels of VEGF are associated with development of ISR after implantation of DES.

Methods and Results We studied 85 patients that were treated with 159 DES, Blood samples for measurement of VEGF antigen were taken directly before and 24 hours after implantation of DES. Restenosis was evaluated at 6 to 8 months by coronary angiography. During the follow-up period, 2 patients (2.4 %) died of cardiovascular causes and 12 patients (14.5 %) developed ISR. Patients with ISR showed significantly lower plasma levels of VEGF compared to patients without ISR (p < 0.05). Restenosis rates declined according increasing tertiles of VEGF (25.9 %, 14.3 % and 3.6 %; p < 0.05) independently from clinical and angiographic risk factors. Interestingly, patients with ISR showed an overshooting increase of VEGF plasma levels 24 hours after PCI (± 0 % vs + 298 %; p < 0.001).

Conclusion Low endogenous plasma levels of VEGF are associated with increased ISR rates in DES possibly due to delayed reendothelialization. Whether low endogenous VEGF is also associated with late stent thrombosis needs to be further studied.
Immediate Primary Transcatheter Closure of Post-infarction Ventricular Septal Defects: A Prospective Series of 29 Cases

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Background Immediate surgical repair of ventricular septal defect (VSD) complicating acute myocardial infarction is associated with high mortality. Percutaneous device closure of postinfarction VSD appears to be safe and effective in patients treated for a residual shunt after initial surgical closure or in the chronic setting after VSD occurrence. Primary transcatheter VSD closure early after diagnosis might offer advantages over surgery.

Methods and Results Between 09/2003 and 02/2008 29 consecutive patients underwent primary transcatheter VSD closure. Clinical, procedural and outcome data were collected.

For risk assessment patients were divided into those with and those without cardiogenic shock at presentation. The median follow-up time was 730 days. The median time between VSD occurrence and closure was 1 day (interquartile range 1.0; 3.0) and the initial procedural success rate was 86 %. Procedure related complications such as major residual shunting, left ventricular rupture and device embolization occurred in 41 %. The overall 30-day survival rate was 35 %. Mortality was higher for cardiogenic shock in comparison to non-shock patients (88 % vs 38 %; p < 0.001, log-rank).

Conclusions Intervventional VSD closure is a promising technique with a high initial success rate. It might offer an alternative to surgery in particular in critically ill patients. Despite the less invasive technique, mortality of postinfarction VSD remains high in particular for patients in cardiogenic shock. Further developments in devices and delivery techniques are required.

Are there Gender-Specific Differences in NT-proBNP Levels?

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Background and Aim The diagnosis of heart failure (HF) as a clinical syndrome could be in some cases rather difficult. In the last years the use and measurement of natriuretic peptides (NP) is well established in routine clinical practice and provides additional information concerning diagnosis and prognosis. Gender-specific differences in diagnosis, therapy and management in chronic heart failure (CHF) between men and women are evident, and determination of NP could deliver complementary information in this specific aspect.

Methods Plasma NT-proBNP levels of 250 patients from our HF outpatient unit on optimized neurohumoral HF therapy were recorded. We compared the NT-proBNP values in different New York Heart Association (NYHA) classes between men and women.

Results NT-proBNP values showed a correlation to the NYHA class, but there was no significant difference between males and females in each NYHA class (NYHA I p = 0.28, II p = 0.82, III–IV p = 1.0). The NT-proBNP ranges are given in Figure 5.

Conclusions Among outpatients with stable HF elevated NT-proBNP levels are demonstrating a good relation to the functional class independent from sex. This relationship highlights the importance of measurement of NP to detect clinical severity of disease with higher NT-proBNP values without gender-specific aspects.

HK-Angiographie nach CT-Angiographie

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Die Darstellung der Herzkranzgefäße in der CT-Angiographie mittels Multislice-CT findet eine zunehmende Verbreitung. In unserer Sonderkrankenanstalt-Rehabilitationszentrum St. Radegund wur- den im Jahr 2007 44 Patienten (Pat.) mit vorbestehendem CTA-Befund zur Herzkatheteruntersuchung zugewiesen. Verglichen mit der CTA zeigen sich im HK folgende Ergebnisse:

LM:
• in CTA 39 Pat. < 50 %, davon 1 Pat. falsch negativ: im HK 1 Pat. > 50 %;
• in CTA 5 Pat. > 50 %, davon 2 Pat. falsch positiv: im HK 2 Pat. < 50 %;

LAD:
• in CTA 13 Pat. < 50 %, davon 2 Pat. falsch negativ: im HK 2 Pat. > 50 %;
• in CTA 31 Pat. > 50 %, davon 12 Pat. falsch positiv: im HK 12 Pat. < 50 %;

LCX:
• in CTA 28 Pat. < 50 %, davon 5 Pat. falsch negativ: im HK 5 Pat. > 50 %;
• in CTA 16 Pat. > 50 %, davon 5 Pat. falsch positiv: im HK 5 Pat. < 50 %;

RCA:
• in CTA 28 Pat. < 50 %, davon 5 Pat. falsch negativ: im HK 5 Pat. > 50 %;
• in CTA 16 Pat. > 50 %, davon 3 Pat. falsch positiv: im HK 3 Pat. < 50 %.


Therapieresfraktäre ektope atriale Tachykardie aus der Vena cava superior

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Fokale atriale Tachykardien sind selten, machen bei elektrophysiologischen Untersuchungen weniger als 10 % aller Rhythmusstörungen aus und haben ihren Ursprung hauptsächlich im Bereich der Crista terminalis, in den Pulmonalvenen sowie am Mitralring. Wir beschreiben eine Patientin mit einer medikamentös therapieresistenten fokalen atrialen Tachykardie mit ungewöhnlichem und refraktären fokalen atrialen Tachykardie mit ungewöhnlichem und refraktären Ursprungsort, der Vena cava superior (VCS).


Unseres Wissens ist dies die erstmalige Beschreibung einer medikamentös therapieresistenten Form einer unauflösbaren atrialen Tachykardie aus der Vena cava superior. Im Vergleich zu den Fallberichten in der Literatur wurde die VCS nicht isoliert, sondern der Fokus direkt abladiert.

Telemedizinische Nachkontrolle von Patienten mit ICDs: Zeit- und Kostenersparnis

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Hintergrund

Durch die stetig wachsende Anzahl von Patienten mit implantierbaren Kardioverter-Defibrillatoren (ICD) sind neue Strategien in der ICD-Patientennachsorge erforderlich, um weiterhin effektive Nachkontrollen durchführen zu können. Die Verwendung neuer telemedizinischer Technologien könnte eine Methode sein, um die steigende Anzahl an Patienten besser bewältigen zu können.

Ziel dieser prospektiven Studie war es, Patientenakzeptanz und Durchführbarkeit sowie Zeit- und Kostenersparnis des neuen Medtronic CareLink-Systems in der Routinenachkontrolle von ICD-Patienten zu erheben.

Methoden


Zusammenfassung

Die Fernnachsorge mit dem Medtronic CareLink-System ist eine praktikable und sichere Methode in der Routinenachkontrolle von Patienten mit implantierten Medtronic ICDs bei gleichwertiger Qualität der Nachsorge. Die Fernnachsorge ist ein kosteneffektives und zeitoptimales Konzept, das für die Zukunft eine wichtige Rolle spielen wird.

Hintergrund


Ziel dieser Untersuchung war die Etablierung der Lebensdauer der unterschiedlichen ICD-Aggregate in Abhängigkeit vom Geräte- und Hersteller.

Methoden


Ergebnisse

Im Beobachtungszeitraum zwischen 1995 und 2008 wurden insgesamt 758 ICD-Implantationen durchgeführt, davon 191 (25,2 %) Aggregatwechsel. Bei 161 erfolgte der Austausch wegen Batterieerschöpfung (VVI 78, DDD 56, CRT-D 27). Die mittlere Lebensdauer lag bei 58,3 ± 17 Monate (VVI 59,6 ± 17,6; DDD 58,8 ± 17,3; CRT-D 53,6 ± 14,4 Monate). 14 Aggregaten hatten eine Lebensdauer unter 3 Jahren, bei 9 betrug sie mehr als 7 Jahre (maximale Lebensdauer 102 Monate). Die Lebensdauer der ICD-Aggregate vervielfachte sich in Abhängigkeit von der Hersteller, so dass die Früherkennung von neuen Implantationen erforderlich ist.

Zusammenfassung

In unserem Kollektiv war die durchschnittliche Lebensdauer der ICD-Aggregate nahezu 6 Jahre. Bei den unterschiedlichen Gerätetypen konnte eine signifikante Beeinflussung der Lebensdauer nachgewiesen werden, ein signifikanter Unterschied konnte jedoch nicht zwischen den verschiedenen Herstellern beobachtet werden.
Atrial Fibrillation is a Strong and Independent Predictor of Death and Coronary Events in Angiographed Coronary Patients

VIVIT Institute, Feldkirch

Background The impact of atrial fibrillation on future coronary events is uncertain. In particular, the prognostic impact of atrial fibrillation in the clinically important population of angiographed coronary patients is unknown.

Objective The aim of our study was to investigate 1.) the prevalence of atrial fibrillation, 2.) its association with coronary atherosclerosis, and, 3.) its impact on future events in angiographed patients.

Methods In a consecutive series of 613 patients who underwent coronary angiography we evaluated electrocardiograms. Prospectively, we recorded death and cardiovascular events over 4.0 ± 0.6 years.

Results From our patients, 37 (5.9 %) at baseline had atrial fibrillation, and 576 (92.6 %) exhibited sinus rhythm. Presence of atrial fibrillation was associated with a lower prevalence of coronary artery disease and of significant coronary stenoses ≥ 50 % at the baseline angiography. However, prospectively, patients with atrial fibrillation were at a strongly increased risk of all-cause mortality (adjusted hazard ratio [HR] = 0.15 [2.36–11.26]; p < 0.001), coronary death (HR = 8.16 [2.89–23.09]; p < 0.001), and major coronary events (HR = 3.80 [1.45–9.94]; p = 0.007).

Conclusions Although inversely associated with the presence of angiographically determined coronary atherosclerosis, atrial fibrillation is a strong predictor of death and future coronary events in angiographed coronary patients.

Prevalence of Pulmonary Hypertension in Patients after Splenectomy

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Background Patients after splenectomy are at increased risk of developing chronic thromboembolic pulmonary hypertension (CTEPH). However, the prevalence of CTEPH among splenectomized individuals is unknown.

Methods In the context of the pulmonary hypertension (PH) screening program at the Medical University of Vienna, 1100 general practitioners and internal medicine specialists in Vienna and Lower Austria were invited to refer patients (pts) at least one year after splenectomy. Screening was performed by transthoracic echocardiography with Doppler. In cases of elevated systolic pulmonary arterial pressure (sPAP > 40 mmHg) and absence of left ventricular outflow tract obstruction and valvular dysfunction, right heart catheterization was performed.

Results Between November 2006 and October 2007, 91 patients were referred (50 males/41 females). Mean age was 52.6 ± 14.2 years. Median time since splenectomy was 143 months. Reasons for splenectomy were trauma (n = 39), hematological disorders (n = 18), surgical complications (n = 18) and others (n = 16). CTEPH was newly diagnosed in 4 pts who had suffered from exertional dyspnea.

Table 6: A. Martischnig et al.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Patients (n = 13)</th>
<th>Controls (n = 8)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>72.8 ± 8.4</td>
<td>54.4 ± 18.7</td>
<td>0.023</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>4</td>
<td>4</td>
<td>0.239</td>
</tr>
<tr>
<td>mDCs (%)</td>
<td>0.19 ± 0.07</td>
<td>0.10 ± 0.52</td>
<td>0.012</td>
</tr>
<tr>
<td>pDC (%)</td>
<td>0.97 ± 0.10</td>
<td>0.06 ± 0.03</td>
<td>0.282</td>
</tr>
<tr>
<td>TNF-α (%)</td>
<td>53.73 ± 13.06</td>
<td>32.76 ± 24.07</td>
<td>0.048</td>
</tr>
<tr>
<td>IL-1β (%)</td>
<td>52.90 ± 4.94</td>
<td>41.93 ± 23.37</td>
<td>0.478</td>
</tr>
</tbody>
</table>

Conclusion CTEPH was diagnosed in 4.4 % of pts after splenectomy. Echocardiographic screening for CTEPH is useful after splenectomy, especially in pts with unexplained dyspnea.

The Role of Myeloid Dendritic Cells in Calcific Aortic Stenosis

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Background The degree of valvular calcification predicts disease progression in calcific aortic stenosis (CAS). Recently, dendritic cells (DCs) that ingress from circulating blood have been identified in aortic valves expelled from patients with CAS. We hypothesized that the number of circulating DCs is increased in affected individuals and correlates with the degree of valvular calcification.

Methods Venous blood and aortic valve tissue were obtained from 13 otherwise healthy patients undergoing valve replacement surgery for CAS. Eight healthy individuals served as controls. Circulating myeloid DCs (mDCs) defined as CD14–CD16–CD85+CD123+, plasmacytoid DCs (pDCs) defined as CD14–CD16–CD85+CD123+ and respective cytokines, such as interleukin-1, interleukin-2 and tumor necrosis factor α (TNFα) were analyzed using 5-color flow cytometry. After explantation, the degree of aortic valve calcification was quantified by computed tomography utilizing the Agatston score.

Results Compared with controls, CAS patients displayed higher numbers of circulating mDCs with increased levels of corresponding cells-bound cytokines interleukin-1 and TNFα. There was a borderline correlation between the number of peripheral blood mDCs and the Agatston score (p = 0.66, p = 0.07).

Conclusion The number of circulating mDCs and corresponding cell-bound cytokines are increased in CAS and may serve as biomarkers for calcification and disease progression in affected patients (Table 6).

Chronic Thromboembolic Pulmonary Hypertension and Associated Medical Conditions

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Rationale CTEPH is characterized by nonresolving pulmonary thromboemboli. Although traditional thrombosis risk factors are generally absent, specific CTEPH-predisposing medical conditions, such as splenectomy, ventriculo-atrial (VA-) shunt and certain inflammatory disorders have been identified.

Objective We sought to confirm known and to identify novel CTEPH risk factors in a large cohort of prevalent CTEPH cases collected in 3 European centers offering pulmonary endarterectomy.

Methods and Measurements Data from CTEPH patients were compared with pulmonary arterial hypertension cohorts at the participating institutions utilizing logistic regression analysis.

Main Results The study population comprised 585 patients assessed at the time of diagnosis between 1996 and 2007. Among 401 patients with CTEPH were 53 % females, mean age was 56 ± 14 years and the median (lower quartile, upper quartile) pulmonary vascular resistance was 822 (571, 1095) dynes·cm⁻⁵. Data confirmed that patients with VA-shunts and patients with infected
NT-proBNP Early After Acute Myocardial Infarction: Relation to Infarct Size, Myocardial Function and Serial CK-MB/cTnT Measurements

**Background** The aim of the present study was to correlate N-terminal brain natriuretic peptide (NT-proBNP) concentrations determined 48 and 72 hours after admission for acute myocardial infarction to infarct size and functional parameters determined by cardiac magnetic resonance (CMR) imaging. Furthermore we compared the results to those obtained with serial creatine kinase (CK) and cardiac Troponin T (cTnT) measurements.

**Methods** Therefore we performed CMR in 37 consecutive patients (32 male) within 1 to 6 days after first acute myocardial infarction and primary angioplasty. Infarct size was determined as percent of LV tissue on delayed Gadolinium enhanced phase-sensitive IR-SSFP sequences. End-diastolic (EDV) and end-systolic (ESV) volume as well as ejection fraction (EF) and myocardial mass (MM) were obtained from short-axis cine-MR sequences. Blood was routinely drawn 24, 48 and 72 hours after admission. CK-MB and cTnT values were determined after 23 ± 4, 46 ± 6 and 68 ± 6 hours. NT-pro BNP was determined after 45 ± 60 and 69 ± 6 hours. Mean and maximum values were determined for all laboratory measures.

**Results** NT-proBNP values significantly correlate positively with infarct size. The strongest correlation was observed if blood was drawn early (r: 0.522 at 48 hours vs r: 0.431 at 72 hours; all p < 0.002). Further NT-proBNP values at 48 hours were inversely correlated with EF and positively with EDV (r: –0.427 and r: 0.349; all p < 0.05) but not with EDV and MM (all p > 0.05). Mean and maximum values seemed not to be superior to measurements at 48 hours. NT-proBNP levels at both timepoints were significantly correlated with CK and cTnT values (all p < 0.01). Mean and maximum CK and cTnT values showed the highest correlation to infarct size (r: 0.610 to 0.706; all p < 0.001).

**Conclusion** NT-proBNP values determined 48 hours after admission may provide a useful tool in the estimation of infarct size and myocardial functional with similar performance than CK or cTnT determination.

NT-proBNP has a High Negative Predictive Value to Rule-Out Short-Term Cardiovascular Events in Patients with Diabetes Mellitus

**Purpose** Although it is widely recognized that the absolute risk of cardiovascular events varies among individuals with diabetes mellitus there is a lack of reliable short-term predictors to guide timely and individualized management. This study evaluated the predictive value of NT-proBNP for patients with diabetes and compared the prognostic aptitude of this neurohumoral marker to traditional intermediate and long-term markers of cardiovascular events.

**Methods** A prospective observational study in 631 patients with diabetes mellitus. The composite endpoint consisted of unplanned cardiovascular hospitalization and death within the observation period of 9.1 ± 4.7 months.

**Results** NT-proBNP was significantly associated with an increased risk of reaching the composite endpoint in the entire population (p < 0.0001). The association was maintained for patients without a history of cardiovascular disease (p < 0.0001). Of all variables analyzed (age, gender, history of hypertension, history of ischemic heart disease, history of any cardiovascular disease, NYHA-class, Dyspnoe Score, Minnesota Living with Heart Failure Questionnaire, history of smoking, duration of diabetes, body mass index, blood pressure, LDL-cholesterol, HbA1c, blood glucose, serum-creatinine, glomerular filtration rate, microalbuminuria), NT-proBNP gave the most potent information in the stepwise logistic regression model (p < 0.0001, with NYHA-class and glomerular filtration as additional independent variables) as well as in a stepwise Cox-regression analysis (p < 0.0001, with duration of diabetes, Dyspnoe Score and glomerular filtration rate as additional independent variables).

**Conclusions** This European database confirmed previous knowledge on CTEPH risk factors, and identified thyroid replacement therapy and a history of malignancy as novel risk factors. Therefore we performed CMR in 37 consecutive patients with chronic heart failure and compare it to the current benchmark markers.

**Comparison of Copeptin, B-type Natriuretic Peptide, and Amino-Terminal pro-B-Type Natriuretic Peptide in Patients with Chronic Heart Failure: Prediction of Death at Different Stages of the Disease**

**Purpose** Vasopressin has demonstrated to be increasing with the severity of chronic heart failure. Copeptin is a fragment of pre-pro-vasopressin, which is being synthesized and secreted in equimolar amounts to vasopressin. Both hormones have a short life time in vivo – similar to b-type natriuretic peptides – but in contrast to Vasopressin, Copeptin is very stable in vitro. The predictive value of Copeptin has been shown in advanced heart failure, where it was superior to BNP to predict 24-month mortality. Our aim was to evaluate the predictive value of Copeptin over the entire spectrum of heart failure (HF), and compare it to the current benchmark markers, BNP and NT-proBNP.

**Methods** Long-term observational study in 786 HF patients from the whole spectrum of heart failure (NYHA I–IV, BNP 688 ± 948 pg/ml [range 3–8536 pg/ml] LVEF 25 ± 10 % [range 5–65 %]).

**Results** NYHA-class was the most potent single predictor of 24-month outcome in a stepwise Cox-Regression model. BNP, Copeptin and glomerular filtration rate were related to NYHA-class (for trend p < 0.0001). Copeptin was the most potent single predictor of mortality in patients with NYHA-class II (p < 0.0001) and NYHA-class III (p < 0.0001). In NYHA-class IV the outcome of patients was best predicted by serum-sodium, but again, Copeptin added additional independent information.

**Conclusion** Increased levels of Copeptin are linked to excess mortality, and this link is maintained irrespective of the clinical signs of severity of the disease. Copeptin was superior to BNP or
Predictive Value of Repetitive Measurement of Copeptin in Patients with Chronic Heart Failure

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Purpose Vasopressin and Copeptin – a fragment of pre-pro-vasopressin – has demonstrated to be increasing with the severity of chronic heart failure. The predictive value of Copeptin has been shown in heart failure. Our aim was to investigate the predictive value of repetitive measurements of Copeptin.

Methods Long-term observational study in chronic heart failure patients that were admitted for an episode of cardiac decompensation. Copeptin was measured at time of discharge and after 3 months.

Results Copeptin was measured in 181 consecutive patients. Mean age was 70 ± 12 years, body mass index 27.4 ± 4.9 kg/m²; LVEF 29 ± 8 %, NYHA class III/IV was 0/25/46 %. Copeptin at index time was 23.5 ± 24.7 pmol/l and after 3 months 15.4 ± 16.4 pmol/l on average. Copeptin decreased by 8.1 ± 19.4 pmol/l on average. Building a stepwise Cox-regression analysis – corrected for age and gender – Copeptin values at follow-up (Exp [B] 1.031; p < 0.007) was the best predictor of death and neither baseline Copeptin nor changes over time contributed additional independent information. In a similar model regarding hospitalization due to heart failure Copeptin values at follow-up was again the most potent single predictor (Exp [B] 1.042; p < 0.001). Only age could provide additional independent information. The combined end-point death and hospitalization based on heart failure was best predicted by age (Exp [B] 1.051; p < 0.0001) in a Cox regression model, but Copeptin at follow-up revealed additional independent information (Exp [B] 1.032; p < 0.016).

Conclusion Increased Copeptin levels measured at follow-up after an episode of cardiac decompensation is a better predictor of outcome than baseline Copeptin levels. Interestingly, changes in Copeptin over time did not reveal additional independent information.

Comparison of Two Cardiac Imaging Modalities: Contrast Enhanced Magnetic Resonance and Echocardiography


Background The purpose of this study is to compare two cardiac imaging modalities, cardiovascular magnetic resonance (CMR) and echocardiography, by using the AHA 17-segments model and to assess the improvement of left ventricular function in patients treated with primary angiography (p-PTCA) for acute myocardial infarction.

Methods We performed CMR and echocardiographic investigations in 64 patients with first AMI shortly after p-PTCA and four months thereafter. Global (EF, %) and regional (systolic wall thickening, %) left ventricular function was determined from Cine-MR images. In echocardiography the global (EF, %) left ventricular function and regional wall motion abnormalities were determined. A segment was scored as infarcted if it was > 50 % hypokinetic.

Results EF in echocardiography correlates with EF MRI at baseline (r: 0.357; p < 0.004) and at follow-up (r: 0.553; p < 0.001). The total number of infarcted segments in echocardiography correlates with the total number of segments which show a systolic wall thickening (SWT) < 30 % (r: 0.503; p < 0.001) at baseline and (r: 0.541; p < 0.001) at follow-up. The number of infarcted segments in echocardiography correlates with the number of LE segments and the infarcted mass in grams at baseline (r: 0.468; p < 0.001) and at follow-up (r: 0.383; p < 0.002, and r: 0.561; p < 0.001). Out of 1024 evaluated segments the following parameters improvement was highly significant (p < 0.001) after a four month period. The total number of infarcted segments in echocardiography decreased from 141 to 78. At baseline the mean EF Echo was 50.67 ± 8.33 % and at follow-up 53.84 ± 8.33 % (p < 0.01). The mean EF MRI increased from 43.61 ± 11.09 % to 48.05 ± 11.19 %.

Conclusion CMR and echocardiography correlate well in the assessment of regional wall motion abnormalities and left ventricular function. Systolic wall motion thickening at less than 30 % can be used as a cut-off value to define a pathologic, infarcted segment.
Einleitung

Patienten und Methodik
Eingeschlossen werden Hypertoniker mit oder ohne medikamentöser Vortherapie mit Blutdruck (BD-) Werten von > 160 mmHg systolisch und > 95 mmHg diastolisch oder 140/90 mmHg und einem New Zealand Risc Score von 315 %. Für die Schulung werden Ärzte für Allgemeinmedizin und Fachärzte für Innere Medizin sowie Diabetesberaterinnen und Diplom Krankenschwestern herangezogen, die eine standardisierte Ausbildung absolvierten mussten. Die wissenschaftliche Evaluation dieses Projektes wird mittels der „herz.leben-Studie“ (clinicaltrial.gov NCT 00453037) durchgeführt.

Ergebnisse
Bisher wurden 580 Patienten in 22 Zentren geschult. Die Auswirkungen der Schulung bei 174 Patienten (Alter 63,8 ± 10,8 [Mittelwert ± Standardabweichung] Jahre, 55 % weiblich) nach einem einjährigen Follow-up (FU) im Vergleich zum Zeitpunkt des Einschlusses in das Schulungsprogramm (Baseline [B]) werden in der Folge dargestellt.

Der systolische BD wurde von 161 ± 20 mmHg auf 142 ± 17 mmHg (minus 20 ± 21 mmHg; p < 0,001), der diastolische BD von 90 ± 11 mmHg auf 82 ± 10 mmHg (minus 8 ± 11 mmHg; p < 0,001) signifikant reduziert werden. Weiters wurde ein Trend zu einer Reduktion des Körperformgewichts (B: 83 ± 15 vs. FU 82 ± 15 kg [minus 1 ± 4; p = 0,005]) beobachtet. Alle weiteren ermittelten Parameter (BMI, Blutzucker, Blutfette) erfuhren keine signifikante Veränderung. Die Verschreibungshäufigkeit der antihypertensiven Medikamente änderte sich von B vs. FU nicht signifikant. Nicht-medikamentöse Therapiemaßnahmen nahmen von 31,1 % auf 76,7 % (p < 0,001) signifikant zu.

Zusammenfassung und Konklusion

Serum Catecholamine and Endostatin Levels During Bicycle and Mental Stress Test: Gender Aspects

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Background
Stress is a well known, independent risk factor for the development of cardiovascular diseases (CAD). However, data on gender-specific differences on hemodynamic and neurohumoral responses to mental and physical stress are limited. Endostatin, a type XVIII collagen fragment, has been identified as a potent angio-static and anti-atherosclerotic factor, fighting against the development and progression of CAD. Recently it was observed, that Endostatin release was significantly increased in men during physical exercise. So the aim of this present study was to show (1) if the hemodynamic response to physical and mental stress of women are different compared to men and (2) if mental and physical stress affect Endostatin, Prolactin and Cortisol release differently in both sexes.

Methods and Material
We studied 20 women and 19 men (aged between 18 and 35, healthy, non-smokers) through a bicycle stress-test to exhaustion and a controlled mental stress-test (Stroop-Test). Blood pressure, heart rate and blood samples were taken at different intervals for analysing Endostatin as well as other representative stress hormones (Norepinephrine, Cortisol, Prolactin).

Results
Both tests resulted in a proper increase in the typical stress parameter norepinephrine, confirming that all subjects were equally subdued to a sufficient stress level. The results show that under physical stress, Endostatin increases in women by the same equivalent as in men. In addition, an increase of Endostatin in men during mental stress remained statistically insignificant (Figure 6).

Discussion
Regular physical activity counts among the most important lifestyle modifications in the prevention of cardiovascular diseases. The fact that Endostatin is an important inhibitor of atherosclerosis development and that it increases under physical stress both leads to the conclusion that it plays a major part in the prevention of cardiovascular diseases through the means of physical exercise. This study shows that this connection between exercise and the protection from pathological developments applies in the same amount to men and women.

Cell-specific Deletion of VEGF-R2/Flk-1-Results in a Failure of Thrombus Resolution

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Background
Chronic thromboembolic pulmonary hypertension (CTEPH) is characterized by occlusive vascular remodelling of pulmonary thromboemboli. The mechanisms underlying misguided
Methods

We enrolled 759 consecutive patients with angiogenesis in this clinically important patient population. To investigate the association of the MetS with inflammation in patients with established coronary artery disease (CAD) has not been investigated yet. Importantly however, after adjustment for age, gender, smoking and LDL cholesterol by means of analysis of covariance only the low HDL cholesterol criterion (F = 21.99; p < 0.001) remained significantly associated with hsCRP. The significant and independent association between the MetS traits (F = 23.59; p < 0.001).

Conclusions We conclude that among patients with angiographically proven stable CAD, low HDL cholesterol drives the association between the MetS and subclinical inflammation. This observation is well in line with the paramount role of low HDL cholesterol as a marker of cardiovascular risk in this important patient population.

Background Impaired kidney function is associated with cardiovascular disease. However, it is uncertain, in as far a current decrease in the estimated glomerular filtration rate (eGFR) predicts consequent vascular events in angiographed coronary patients.

Objective We aimed at investigating the impact of a current decrease in eGFR on future vascular events.

Methods At baseline and after 2 years we measured serum creatinine in 400 consecutive men undergoing coronary angiography for the evaluation of stable coronary artery disease (CAD); the eGFR was calculated by the Mayo clinic quadratic equation (MCQE). Vascular events were recorded over 6 years from baseline.

Results Baseline eGFR levels significantly predicted vascular events in our cohort of angiographed men after adjustment for age, BMI, hypertension, diabetes, LDL-C, HDL-C, and smoking (standardized adjusted HR = 0.808 [0.673–0.971]; p = 0.023). Importantly, also a decrease in kidney function from baseline to the follow-up visit at 2 years later significantly predicted vascular events in the following 4 years independently from the baseline eGFR (standardized adjusted HR = 1.472 [1.162–1.865]; p = 0.001).

Conclusions Independently of the baseline eGFR a decrease in eGFR over two years strongly and significantly predicts vascular events over the consequent 4 years in men undergoing coronary angiography.

Albuminuria, the Glomerular Filtration Rate, and Angiographically Determined Coronary Atherosclerosis

VIVIT Institute, Feldkirch

Background A recent finding in the Cardiovascular Health Study was that microalbuminuria was associated with cardiovascular events but not with atherosclerosis (as measured by carotid intima-media thickness), leading the authors to conclude that microalbuminuria may be associated with plaque destabilization rather than with atherosclerosis itself.

Objective We aimed addressing this issue in a large population of 856 consecutive patients undergoing coronary angiography for the evaluation of (CAD).

Methods The urinary albumin/creatinine ratio (ACR) was determined and the eGFR was calculated by the Mayo clinic quadratic equation.

Results From our patients, 278 had an eGFR < 90 ml/min/1.73 m², and 204 had an elevated ACR (≥ 30 mg/g). When compared to subjects with both normal eGFR and normal ACR (n = 67), the prevalence of significant coronary stenoses (i.e. stenoses with lumen narrowing ≥ 50 %) was significantly higher in patients with normal eGFR and elevated ACR (n = 111) and in those with decreased eGFR and elevated ACR (n = 93), but similar in those (n = 185) who had decreased eGFR but normal ACR (51.8 vs 64.0 %, p = 0.021; 51.8 vs 65.8 %, p = 0.015; and 51.8 vs 49.2 %, p = 0.545, respectively). Concordantly, in logistic regression analysis the ACR but not the eGFR predicted significant coronary stenoses after multivariate adjustment, with odds ratios (OR) of 1.26 (95 %:CI: 1.02–1.56); p = 0.032 and 1.05 (0.86–1.28); p = 0.63, respectively. The association between the ACR and significant coronary stenoses remained significant after further adjustment for eGFR (OR = 1.28 [1.03–1.60]; p = 0.025).
Das Hospital Screening Projekt (HSP): Lipidprofil und Therapiestatus in der Sekundärprävention bei Patienten mit klinisch manifeste Atherosklerose und/oder Diabetes mellitus mit hohem kardiovaskulären Risiko in Österreich

M. Roden, K. Huber* für die HSP-Projektgruppe

Einleitung

Ergebnisse
Von 9152 Patienten (Alter [Mittelwert ± SD]: Frauen 69 ± 13, Männer 65 ± 12 Jahre) wiesen 6838 ein sehr hohes Risiko (Risikogruppe 1) mit einem LDL-C von 99 ± 38 mg/dl und 2314 ein hohes kardiovaskuläres Risiko (Risikogruppe 2) mit einem LDL-C von 108 ± 39 mg/dl auf. Von den 4886 Statin-behandelten Patienten erreichten 48 % nicht das Therapieziel für Risikogruppe 1 (LDL-C < 70 mg/dl) bzw. für Risikogruppe 2 (LDL-C < 100 mg/dl). Dennoch wurde bei 68 % dieser Patienten die Therapie nicht adaptiert. In der Gruppe der 4266 medikamentös nicht vorbehandelten Patienten verfehlten 62 % ihr LDL-C-Ziel, wobei 1555 dieser Patienten (58 %) trotz Betreuung in einem Zentrum weiterhin unh behandelt blieben. Die Ursachen dafür sind vielfältig, wobei organisatorische Gründe und die fehlende Bereitschaft zur Dosistitation in der niedergelassenen Bereich im Vordergrund standen.

Zusammenfassung
Das Ergebnis der Untersuchung bestätigt, dass zur Erreichung der geforderten LDL-C-Zielwerte in Österreich eine konsequente Nachjustierung der lipiden sichenden Therapie erforderlich ist, wobei die gewählten Maßnahmen (Hochtitration, Anwendung stärker wirksamer Statine oder Kombinationstherapien) durch die gültigen Behandlungsrichtlinien (basierend auf klinischen Endpunktdaten) bestimmt sein sollten.

Pigment Epithelium-Derived Factor (PEDF): A New Anti-Angiogenic Player in the Human Heart

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Introduction
The pigment epithelium derived factor (PEDF), a 50KD secreted glycoprotein, is a non-inhibitory member of the serpin family. It is widely expressed in different human adult tissue such as brain and eye, and it is also found in plasma. Its role is pleiotroApic acting as a neuroprotective, neurotrophic, anti-tumori- genic and also anti-angiogenic factor. PEDF inhibits endothelial cell growth and migration and suppresses ischemia- and VEGF-in- duced retinal neovascularization. Due to the fact that angiogenesis plays a crucial role in the revas- cularization of human heart after myocardial infarction we investi- gated the expression of PEDF in human heart and human cardiac cells and assessed the hypothesis that PEDF is associated with poor prognosis in heart failure patients.

Methods
Protein and RNA were isolated from explanted heart tis- sue from healthy donor hearts unsuitable for transplantations and from explanted hearts from patients undergoing heart transplan- tation. Human adult cardiac myocytes (HACM) and fibroblasts (HACF) were cultivated and exposed to inflammatory stimuli, an- oxic conditions and CoCl2, respectively for 48 hours. Protein expres- sion was determined by a specific ELISA, by Western blotting or by immunohistochemistry. RT-PCR was used to determine mRNA lev- els employing specific primers. For the clinical study we enrolled 306 patients suffering from chronic heart failure (age: 52 ± 13 years, female: 35 %, LVEF: 28.8 ± 10 %, BNP 678.98 ± 760.45 pg/ml). A combined endpoint of rehospitalization and/or death was observed in 174 patients (48 %) during a median follow-up period of 16 months (95% confidence interval [CI]:15–17 month). PEDF protein was determined at baseline in plasma samples with a spe- cific ELISA.

Results
We could detect PEDF expression in human heart tissue on the protein and RNA level. Both HACM and HACF secreted PEDF constitutively in vitro. The PEDF secretion was reduced...
down to 40 % by anoxia in HACM and HACF from 4 different donors. CoCl₂, which by stabilizing hypoxia inducible factor-1-alpha mimics anoxic conditions reduced PEDF secretion dose dependently. The data could be confirmed at RNA level. Analysis of plasma samples of patients suffering from advanced heart failure showed that PEDF was a predictive marker for the combined endpoint with crude proportional hazard ratios of 1.58 (95 %-CI: 1.07–2.32; p = 0.021) and 1.94 (95 %-CI: 1.33–2.84; p < 0.001) in the second and third tertile compared to the first.

Conclusion We could show PEDF expression in human heart tissue and the regulation in human adult cardiac myocytes and fibroblasts by anoxia. Our clinical analysis showed that PEDF is independently associated with an elevated risk of death andrehospitalization in patients with advanced heart failure. Due to our findings we suggest a role of PEDF in the regulation of angiogenesis in the ischemic human heart e.g. after myocardial infarction.

Body Mass Index and Waist Circumference as Predictors of the Incidence of Type 2 Diabetes Among Angiographed Coronary Patients

VVIT Institute, Feldkirch

Background No data on the impact of body mass index (BMI) and of waist circumference on the incidence of type 2 diabetes (T2DM) among angiographed coronary patients are available.

Objective To investigate in as far BMI and waist circumference predict incident T2DM in this clinically important patient population.

Methods The incidence of T2DM was recorded over 6 years in a population of 503 consecutive non-diabetic patients undergoing coronary angiography for the evaluation of stable coronary artery disease.

Results During follow-up, T2DM was newly diagnosed in 86 (17.1 %) of our patients. In logistic regression analysis both baseline BMI (standardized adjusted odds ratio [OR] = 0.28 [1.01–1.63]; p = 0.041) and baseline waist circumference (OR = 1.54 [1.19–1.99]; p = 0.001) significantly predicted the incidence of type 2 diabetes after multivariate adjustment when entered separately into the regression models. When BMI and waist circumference were entered simultaneously into a logistic regression model, waist circumference after adjustment for BMI remained significantly predictive of T2DM (OR = 1.66 [1.14–2.41]; p = 0.008), whereas the association of BMI with incident T2DM after adjustment for waist circumference was no longer significant (p = 0.585).

Conclusions We conclude that among angiographed coronary patients a large waist circumference predicts the incidence of T2DM independently from BMI, whereas BMI does not predict T2DM independently from waist circumference.

Type 2 Diabetes Significantly Modulates the Cardiovascular Risk Conferred by the PAI-1 -675 5G/4G Polymorphism in Angiographed Coronary Patients

VVIT Institute, Feldkirch

Background The association of the -675 5G/4G polymorphism of the plasminogen activator inhibitor-1 (PAI-1) gene with cardiovascular disease in patients with type 2 diabetes (T2DM) is unknown.

Objectives To investigate the association of the PAI-1 -675 5G/4G polymorphism with angiographically determined coronary artery disease (CAD) and its impact on future vascular events in patients with T2DM and in non-diabetic subjects.

Methods Genotyping was performed in 672 consecutive Caucasian patients undergoing coronary angiography for the evaluation of stable CAD. Vascular events were recorded over 4 years.

Results Genotype distributions were similar in non-diabetic subjects (n = 24) and in patients with T2DM (n = 148). In non-diabetic subjects, the homozygous PAI-1 4G/4G genotype was significantly associated with significant coronary stenoses ≥ 50 % (adjusted odds ratio [OR] 1.85 [95%-CI: 1.20–2.85]; p = 0.005); however, no such association was observed in T2DM patients (OR 0.81 [0.33–1.93]; p = 0.627). An interaction term T2DM × 4G4G genotype was significant (p = 0.014), indicating a significantly stronger association of the polymorphism with CAD in non-diabetic subjects than in patients with T2DM. Also prospectively, the 4G4G genotype conferred an increased risk of vascular events in non-diabetic subjects but not in T2DM patients, with adjusted hazard ratios of 1.76 (1.13–2.74); p = 0.014 and 0.68 (0.30–1.54); p = 0.360, respectively. Again, the interaction T2DM × 4G4G genotype was significant (p = 0.018).

Conclusions Presence of T2DM significantly modulates the vascular risk conferred by the PAI-1 -675 5G/4G polymorphism in angiographed coronary patients.

Cardiology Training in Europe: the EBSC Survey 2006

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Background and Methods The European Board for the Speciality of Cardiology (EBSC) strives to harmonize standards in cardiology training in Europe. Therefore the EBSC developed European criteria for accreditation as specialist in cardiology [EHJ 1996; 17: 996–1000], including a total training duration of 6 years, which includes a common trunk of internal medicine (at least of 2 years). Furthermore a basic cardiology training of at least 3 years will be recommended. Trainees must keep a personal log-book. Each training programme should be assessed at least every 5 years.

To achieve a picture as accurate as possible of cardiology training in Europe EBSC surveyed national authorities in 49 ESC member states containing questions regarding the training in internal medicine, cardiology training and about the infrastructure of training centers.

Results 27 (55 %) of the replying ESC countries, among them 22 EU/EFTA (71 % of all EU/EFTA) countries responded. Cardiology as an independent mono-speciality is recognized in 15 (55 % of all responders) countries. In further 7 (26 %) countries (NOR, PL, AT, SE, BG, BLR, BIH) internal medicine is a prerequisite for a cardiologist. 5 (19 %) countries did not answer.

The minimum of 2 years training in internal medicine (common trunk) is usual in 22 (82 %) countries. These criteria are not fulfilled in 4 (15 %) countries: 1 year BLR and ES; 1.5 years CZ and FR; no reply: EE.

A minimum of 3 years in cardiology training is obligatory in 22 (82 %) countries. 5 (18 %) countries have different training durations in cardiology: 2 years in BG, BIH, BLR, LV and PL.

A training logbook is used in all but 5 (18 %) countries: DE, FR, ISR, SUI, TR; no reply: GB.

Most countries have an assessment procedure at the end of training. Providing a standardised patient care and free move-
Endothelial Progenitor Cells Are Reduced in Type 2 Diabetic Patients with Microalbuminuria and Macroalbuminuria

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Type 2 diabetic (T2D) patients presenting with microalbuminuria (Mi-A) or macroalbuminuria (Ma-A) have an increased risk for cardiovascular morbidity and mortality. Endothelial progenitor cells (EPC) are bone marrow derived cells involved in adult neovascularisation and endothelial homeostasis and may predict macrovascular disease and mortality. Thus, it was of interest to investigate the potential role of EPC in T2D patients presenting with Mi-A or Ma-A.

138 patients with T2D were included: 72 No-A, 42 Mi-A and 24 Ma-A. The patients in the 3 groups were carefully matched and did not differ (by ANOVA) for the following: age (65.0 ± 10.6 years), diabetes duration (13.1 ± 9.5 years), HbA1c (7.8 ± 1.6 %), BMI (29.8 ± 5.1 kg/m²), systolic and diastolic blood pressure, total cholesterol, LDL-cholesterol, triglyceride as well as serum creatinine (1.2 ± 0.4 mg/dl) (given are mean of all patients). Circulating progenitor cells (CPC; CD34+/CD133+) and EPC (CD34+/CD133+/CD309+) were enumerated by flow cytometry in peripheral blood.

EPC were decreased in patients presenting with Mi-A compared with patients with No-A (102 ± 54 vs 144 ± 84; p = 0.01). In patients with Ma-A the number of EPC was even more decreased (53 ± 29 vs 144 ± 84; p < 0.001). Patients with Mi-A or Ma-A were also significantly different for the number of EPC (102 ± 54 vs 53 ± 29; p < 0.001). By contrast, total circulating progenitor cells, which have mainly an important role in hematopoiesis, were not significantly different among the 3 groups of T2D patients with No-A, Mi-A or Ma-A (p = 0.16).

Multivariate regression analysis revealed that EPC were independently associated with diabetes duration (Beta = 0.165; p = 0.036) and history of cardiovascular disease (Beta = −0.203; p = 0.01) but strongest with status of albuminuria (Beta = −0.380; p < 0.001).

In conclusion, this is the first study demonstrating decreased numbers of endothelial progenitor cells in T2D patients with microalbuminuria or macroalbuminuria. Since low EPC are important predictors of future cardiovascular morbidity and mortality in nondiabetic high risk patients, these new findings could be relevant for the understanding of the high cardiovascular risk of T2D patients with microalbuminuria or macroalbuminuria.

Der transfemorale Aortenklappenersatz – Interimsanalyse der kardiologischen Abteilung der Medizinischen Universität Wien

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Aim
The study investigated the extent of QTc variability due to imprecise heart rate correction and inaccurate expression of RR interval in the correction of QT interval.

Methods
24-hour continuous 12-lead ECG recordings were obtained in 54 male healthy volunteers. In each recording, ~ 200 ECG intervals of 10-sec duration were obtained throughout the whole day-time recordings period, all preceded by relatively stable heart rates (fluctuations ≤ ± 2 bpm). In each of the ECG samples, QT interval was measured in 1000 Hz sampled superimposed images of all 12 leads by two independent cardiologists. The measurement was repeated and reconciled by a third cardiologist in case of disagreement. Four different RR interval expressions were used: (a) average of 3 first RR intervals of the ECG sample, (b) average of all RR intervals in the 10-sec sample, (c) average of 250 RR intervals within and preceding the 10-sec sample, and (d) these 250 RR intervals processed by an independently established QT/RR hysteresis profile optimised for each subject separately. With all RR interval expressions, the QT intervals were corrected by Fridericia correction and by individually optimised curvature correction. The variability of QTc interval was expressed by intra-individual standard deviation.

Results
With Fridericia correction and the RR expressions (a)–(d), the QTc variability obtained was (a) 8.6 ± 1.5 ms, (b) 6.9 ± 1.4 ms, (c) 6.3 ± 1.7 ms, and (d) 5.6 ± 1.7 ms, while with individually corrected QTc interval variability was (a) 7.4 ± 1.5 ms, (b) 5.8 ± 1.3 ms, (c) 5.2 ± 1.3 ms, and (d) 4.4 ± 1.3 ms. All differences (b) vs (a), (c) vs (b), and (d) vs (c) were highly statistically significant (p < 1.0E-10 in all cases).

Conclusion
The previously reported QTc variability was largely resulting from methodological imprecision. Providing the ECG signals are measured accurately and the QT interval is corrected for RR interval expressing the appropriate heart rate, there is practically no QTc variability in day-time recordings of healthy subjects.
Stellenwert des MS-CT (64-Zeiler) im Management der suspekten KHK: Auswirkungen auf die Interventions-/Ausschlussrate im Herzkatheterlabor

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Einleitung In ca. 20–35 % der Herzkatheteruntersuchungen (HK), die mit einer Morbidität von 1 % und Mortalität von 0,1 % verbunden sind, erfolgt ein Ausschluss einer obstruktiv wirksamen koronaren Herzkrankheit. Rezente Studien belegen den MSCT bei einem selektioniertem Patientengut einen sehr hohen negativen Vorhersagewert („negative predictive value“, NPV > 90 %), damit könnte diesen Patienten eine invasive Untersuchung erspart werden.


Ergebnisse Von 1374 Patienten, welche einer Koronarangiographie unterzogen wurden, erfolgten bei 564 Patienten (730) percutane Interventionen (PCI). Davon wurden 342 Patienten (60 %) wegen eines akuten Coronary syndroms (ACS), interveniert (130 STEMI, 192 NSTEMI). Von 52 Patienten, deren Erstprozedur in 5 verschiedenen österreichischen Zentren durchgeführt wurde, zeigten 19 Patienten ein ACS (STEMI 9, NSTEMI 10). Von diesen 19 Patienten hatten 8 einen Drug-eluting Stent (DES), 9 einen Bare-metal Stent (BMS) und 2 einen antikörperbeschichteten Stent (AKS). Es zeigten sich 2 akute STT (1 DES, 1 BMS), 4 subakute STT (1 DE, 2 BMS, 1 AKS), 7 Spätthrombose (3 DE, 3 BMS, 1 AKS) und 6 sehr späte STT (3DES [range 1–3 Jahre] und 3 BMS [range 1–10 Jahre]). Die intravaskuläre Ultraschalluntersuchung (IVUS, Volcano, Eagle Eye® Gold) zeigte bei (75 %) eine suboptimale Expansion des Stents bzw. ein Malapposition der Stentstruts und in 25 % eine hochgradige Intimahyperplasie. Die häufigste Risikokonstellation war eine DE-Stentimplantation während einer ACS bei der Erstprozedur.

Zusammenfassung Stentthrombosen zeigen sich bei DES und BMS und sind möglicherweise Folgen einer suboptimalen Implantationsttechnik.
Stellenwert der kardialen Magnetresonanztomographie im Management der KHK

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Methode 60 selektionierte Patienten (45 Männer) mit Grenzwertstenosen nach einer Koronarangiographie und 15 Patienten (7 Männer) mit einer fraglichen KHK wurden mit der MR (MAGNETOM Expree 1.5 T, Siemens) bestehend aus Cineaufnahmen, Stress- und Ruheperfusion sowie LE untersucht. Die MPERF wurde mit 0,1 mmol/kg Gadolinium (GE-Healthcare) und Adenosin (140 μg/min/kg KG) für mindestens 3 Minuten durchgeführt. Die Bilder wurden in Kooperation von Kardiologen und Radiologen visuell ausgewertet.

Ergebnisse Die Stress-PERF war in 3 Patienten nicht auswertbar (inadäquate Reaktion auf Adenosin). Alle Untersuchungen hatten diagnostisch ausreichende Bildqualität. Die mittlere Untersuchungszeit betrug 45 (± 11) min. Die Prävalenz einer Perfusionssstörung betrug 44 %, die des LE 60 %. Ähnlich wie bei der Druckdrahtuntersuchung zeigte sich bei ca. 75 % der Grenzwertstenosen kein Perfusionseffekt. Aufgrund einer fehlenden Perfusionssstörung wurde bei 13 Patienten auf eine HK- Untersuchung verzichtet. Aufgrund einer fehlenden Perfusionsstörung dachte sich bei ca. 75 % der Grenzwertstenosen kein Perfusionsdefizit. Aufgrund einer fehlenden Perfusionssstörung betrug 44 %, die des LE 60 %. Ähnlich wie bei der Druck- und Ruheperfusion war die mittlere Untersuchungszeit 45 (± 11) min. Die Prävalenz einer Perfusionssstörung betrug 44 %, die des LE 60 %.

Zusammenfassung Die kardiale Magnetresonanztomographie (MR) mit Perfusion und Infarktdarstellung stellt eine im klinischen Alltag sowie 2.) die Bestimmung des prognostischen Wertes einer negativen Stressperfusion.

Incidence of Arrhythmogenic Right Ventricular Dysplasia Assessed by Cardiac Magnetic Resonance Imaging

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Background Arrhythmogenic right ventricular dysplasia (ARVD) is a lipid-fibrotic remodelling of the right ventricle with subsequent ventricular arrhythmias (extrasystoles or tachycardia). Incidence is anticipated about 1/10,000 in the general population. In our institution, susceptible ARVD is the most frequent reason for assignment to cardiac magnetic resonance imaging (CMRI). Thus, we aimed to investigate the incidence of ARVD as assessed by CMRI.

Methods In this analysis, we included all patients assigned to CMRI for susceptible ARVD. Evidence of ARVD was defined by right ventricular dyskinesia with a lipidic remodelling and/or positive late contrast-enhancement 10 minutes after intravenous application of gadolinium.

Results Between March 1996 and November 2007, 1572 patients were examined with CMRI in our institution. Overall 473 of them (51 % male; age: 39.9 ± 17.1 years) were assigned to CMRI because of susceptible ARVD (30.1 % of all assignments). Allocated patients suffered from ventricular tachycardia (49.5 %), ventricular extrasystoles (37.5 %), echocardiographic right ventricular dyskinesia (7 %), wide complex tachycardia (4 %), or were sudden death survivors (2 %). CMRI evidence of ARVD was found in 14 patients (3 %). In these patients, ventricular tachycardia was the most frequent finding before assignment (78 %).

Conclusion Even though ARVD was the most frequent reason for assignment to CMRI, incidence of ARVD might be less common than expected. Thus, a more detailed rhythmologic (e.g. by event recorder) and clinical examination (e.g. by echocardiography) should be performed prior to assignment for CMRI.

Incidence and Causes of Inappropriate Shocks in Patients with Implantable Cardioverter/Defibrillator

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Background Implantable cardioverter/defibrillator (ICD) are today’s therapeutic option for primary and secondary prevention of sudden cardiac death due to ventricular arrhythmias. Inappropriate shocks (InS; e.g. due to atrial fibrillation, T-wave oversensing or artefacts by electrical interference) are the main complication of ICD therapy.

Methods The aim of this single center retrospective analysis was to investigate the “real world” incidence of ICD interventions in an overall collective (66.4 % with coronary artery disease, 18.5 % with non-ischemic cardiomyopathy, 15.1 % with other indications such as hypertrophic obstructive cardiomyopathy or Brugada syndrome).

Results Between June 1988 and October 2007, ICD were implanted in 1061 patients (82.3 % male; age at implantation 58.9 ± 13.6 years, range 4–90 years), of which 36 were lost to clinical follow-up after implantation (3.4 %). Within a follow-up period of 52 ± 48 months in the remaining 1025 patients, overall mortality was 29.6 % (304 patients). Overall, 204 patients (19.9 %) had inappropriate shocks, whereof 118 patients (11.5 %) exclusively underwent InS. Single-chamber ICD had a significantly higher incidence of InS than dual-chamber devices (p = 0.32). Causes of InS were atrial fibrillation (37.9 %), other supra-ventricular tachycardia (26.1 %), lead dysfunction (10.3 %), non-sustained ventricular tachycardia (7.4 %), T-wave oversensing (7.1 %), artefacts due to electrical interference (3.5 %) and others (7.7 %).

Conclusions ICD therapy saves lives indeed. However, inappropriate ICD therapies are still a major problem, with atrial fibrillation being the most important underlying cause, and resulting in considerable ICD associated morbidity.

Long-term Outcome in Patients with Chronic Heart Failure and Implantable Cardioverter/Defibrillator

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Background Implantable cardioverter/defibrillators (ICD) have become a cornerstone therapy for primary and secondary prevention of sudden cardiac death by ventricular arrhythmias. The degree of left ventricular impairment is an important prognostic marker of
Influence of Left Ventricular Impairment on Shock Occurrence in Patients with ICDs

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Background The implantable cardioverter-defibrillator is effective in improving survival in high risk cardiac patients. The degree of left ventricular ejection fraction (LVEF) is an important prognostic marker of long-term survival. The purpose of this study was to determine the influence of heart failure, as reflected by LVEF, on shock occurrence in a large cohort of ICD recipients.

Methods Between June 1988 and October 2006, 947 patients underwent ICD implantation in our institution (82 % male; age at implantation 58.9 ± 13.6 years), of which 34 were lost to clinical follow-up after implantation (3.6 %). Data on LVEF and mortality were available in 877 patients. In the collective with impaired LVEF (438 patients), 333 suffered from iCMP (76 %) and 105 from non-iCMP (24 %).

Results Within a follow-up period of 51 ± 44 months, overall mortality was 31.8 % (290 patients, of which LVEF was not available in 11 patients). Mortality of patients with impaired LVEF was 186/438 (42.5 %), while it was 93/439 (21.2 %) in patients with preserved LVEF (p < 0.001). 5 and 8 year mortality rates were 38.2 % and 53.6 % in patients with reduced LVEF compared to 17.6 % and 34.8 % in patients with preserved LVEF (p < 0.001), respectively. In the collective with impaired LVEF, mortality among patients with iCMP was 151/333 (45.3 %) while it was 35/105 (33 %) in patients with non-iCMP. Five and 8 year mortality rates were 40.9 % and 54.1 % in patients with iCMP whereas subjects with non-iCMP showed mortality rates of 27.6 % and 52 % (p = 0.014), respectively.

Conclusion Although there were highly significant differences in long-term mortality between patients with impaired and preserved LVEF, mortality rates between patients with iCMP and non-iCMP did not differ significantly.

Shock Occurrence in ICD Patients with Ischemic and Non-Ischemic Cardiomyopathy

Mortality benefit from implantable cardioverter-defibrillator therapy in ischemic (ICM) and non-ischemic dilated cardiomyopathy (NICM) is well defined. The aim of this study was to determine the actuarial incidence of appropriate and inappropriate shocks in these two groups of patients.

Methods Between June 1988 and October 2006, 743 patients with ischemic or non-ischemic cardiomyopathy underwent ICD implantation in our institution (82 % male; age at implantation 58.9 ± 13.6 years). Patients were eligible for our study when LVEF was less than 35 percent.

Results From 418 patients (56.2 %) with impaired LVEF, 321 patients (78 %) had coronary artery disease (CAD), the remaining 97 patients (22 %) had dilated cardiomyopathy. At the end of follow-up, 64.5 % of patients with ICM compared to 48.5 % with NICM were free of appropriate shocks. The 1- and 3-year incidence of appropriate shocks was 14.7 %/29.5 % in patients with ischemic CMP and 30.7 %/43.6 % in patients with non-ischemic cardiomyopathy, respectively. In patients with appropriate shocks, the mean period to the first appropriate shock averaged 31.5 ± 3.0 months in patients with ICM and 22.2 ± 3.7 months in patients with NICM (p < 0.001).

Conclusion We found a high incidence of appropriate and inappropriate shocks. Patients with NICM received appropriate and inappropriate ICD discharges earlier and at a greater rate than patients with ICM.

Timing of Blood Sampling Determines the Platelet Reactivity in Patients Undergoing Percutaneous Coronary Intervention

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Background Non-responsiveness to anti-platelet therapy is associated with increased platelet reactivity, which corresponds to an increased risk of major adverse coronary events (MACE).

Objectives To investigate the variability of platelet reactivity in patients undergoing percutaneous coronary intervention (PCI) with four different test assays at two different time points.

Methods Platelet function was assessed by the Vasodilator Stimulated Phosphoprotein (VASP) phosphorylation assay, Impedance Aggregometry (Multiplate Analyzer), Platelet Function Analyzer (PFA-100®) and Cone and Platelet Analyzer (CPA, Impact®). Measurements were performed during percutaneous coronary intervention (PCI, after implantation of the first stent and after 250 mg of injectable acetyl-salicylic acid had been given intravenously) and 1 day thereafter (20–24 h) in 17 patients, who had been pre-treated with Clopidogrel and aspirin.

Results Inhibition of platelet function by Clopidogrel and aspirin was less during PCI than one day after PCI as measured with the VASP assay and the aggregometry: the platelet reactivity index (PRI, VASP assay), the adenosine diphosphate/prostaglandin (ADP + PG) and the arachidonic acid (AA) induced platelet aggregation were 36 % (p = 0.035), 140 % (p = 0.047) and 70 % (p = 0.025) higher during PCI than one day after PCI, respectively. Both tests showed a higher prevalence of high post-treatment platelet reactivity (HPPR) during PCI than 1 day thereafter: VASP assay 41 % vs 0 % (p = 0.002), aggregometry: 76 % vs 29 % (p = 0.016). The col-
Impaired Glucose Tolerance Strongly and Significantly Increases the Risk of Future Vascular Events in Angiographed Coronary Patients


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Background: The prevalence of impaired glucose tolerance (IGT) in angiographed coronary patients is extremely high; it is unknown whether IGT increases the risk of future vascular events in this important patient population.

Objective: We aimed at investigating the association of IGT with incident cardiovascular events in angiographed coronary patients.

Methods: We enrolled 1040 patients (374 women, 666 men; mean age 63.7 ± 10.2 years) who underwent coronary angiography for the evaluation of established or suspected stable coronary artery disease. An oral glucose tolerance test was performed in subjects without known diabetes. Prospectively, we recorded vascular events over 3 years.

Results: From our patients, 394 had a normal glucose tolerance (NGT), 190 IGT, and 456 type 2 diabetes (T2DM; in 244 previously known and in 212 newly diagnosed). When compared with the event rate of NGT subjects (8.9 %), the incidence of vascular events was significantly higher in IGT patients (14.9 %; p = 0.029) as well as in patients with T2DM (13.4 %; p = 0.004). Vascular risk was not significantly different between IGT and T2DM patients (p = 0.778). Multivariate adjustment in Cox regression analysis confirmed these results, with adjusted hazard ratios of 1.89 (95 %-CI: 1.11–3.24); p = 0.020 for patients with IGT and of 1.731 (1-10-2.74); p = 0.019 for patients with T2DM.

Conclusions: Impaired glucose tolerance strongly and significantly increases the risk of future vascular events among angiographed coronary patients. Therefore, an oral glucose tolerance test should be performed in these patients for cardiovascular risk stratification.

ÖKJ-Jahrestagung – Abstracts
Methods and Results LVHT was diagnosed in 102 patients (30 female, age 53 ± 16 years) between June 1995 and November 2006. A specific NMD was diagnosed in 21, a NMD of unknown etiology in 47, the neurologic investigation was normal in 14, and 20 patients refused. The 15 patients with AF were older (65 versus 51 years; p < 0.01), suffered more often from exertional dyspnoea (100 vs 62%; p < 0.01), diabetes mellitus (33 vs 12%; p < 0.05) and heart failure (100 vs 57%; p < 0.01) than patients without AF. The prevalence of NMD was slightly higher in patients with than without AF (87 vs 82%; p = n.s.). AF patients had more frequent ECG abnormalities (2.3 vs 1.4; p < 0.01), valvular abnormalities (93 vs 48%; p < 0.01), lateral wall LVHT (87 vs 37%; p < 0.01), more extensive LVHT (2.1 vs 1.5 ventricular parts; p < 0.05), a worse left-ventricular fractional-shortening (14 vs 25%; p < 0.01) and higher mortality during 3.8 years.

Conclusion LVHT-patients with AF deserve special care because they have a worse prognosis than LVHT-patients without AF.

Cardiac and Neurologic Implications of Left Ventricular Hypertubulation/Noncompaction Affecting the Septum

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Left ventricular hypertubulation/noncompaction is mainly detected by echocardiography. Left ventricular hypertubulation/noncompaction is commonly associated with cardiac and extra-cardiac disorders, preferentially neuromuscular disorders. Left ventricular hypertubulation/noncompaction is mainly located within the left ventricular apex, lateral, posterior and anterior wall but only rarely in the medial and basal portions of the interventricular septum.

Aim of the present review is to summarize the knowledge about septal affection in left ventricular hypertubulation/noncompaction. Septal affection in left ventricular hypertubulation/noncompaction is a finding in predominantly children and adolescents. Septal left ventricular hypertubulation/noncompaction occurs more in females than in males. Patients with septal left ventricular hypertubulation/noncompaction have a poor prognosis. Septal left ventricular hypertubulation/noncompaction is most likely congenital. The association of septal left ventricular hypertubulation/noncompaction with extracardiac abnormalities and neuromuscular disorders remains unclear. Presumably left ventricular hypertubulation/noncompaction does not represent a cardiac manifestation of a neuromuscular disorder.

Significant Reduction of Radiation Exposure Using a Protection Cabin for Electrophysiological Procedures

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Background Fluoroscopy is the main visualization technique for intracardiac catheter positioning in electrophysiology. This may result in high cumulative operator radiation exposure with potential stochastic and deterministic sequelae. Traditional radiation protection is frequently associated with discomfort and leaves unprotected body parts. Thus a radiation protection cabin (RPC) shielded with 2 mm lead-equivalent walls was tested as an alternative protection tool (Cathpax, Lemer Pax). The main objective was to compare radiation doses inside the RPC vs. outside the RPC.

Methods The X-ray system used was either a biplane or a monoplane Philips Allura Xper FD10 system. Significant air kerma reduction was achieved with pulsed fluoroscopy at 3 to 7 frames/s and entrance dose limitation. Cumulative dose-area product (DAP) and total fluoroscopy times were measured. To assess the scattered radiation to the operator inside the RPC an electronic personal dose-
Ein neuer elektronischer Algorithmus zur Lokalisation einer akzessorischen Leitungsbahn im Oberflächen-EKG bei WPW-Syndrom

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Resultate Insgesamt konnten in den elektrophysiologischen Untersuchungen von 15 Linkssseitige, 2 rechtsseitige und 13 septale akzes- sorische Leitungsbahnen identifiziert werden. Durch eine gering ausgeprägte Präexzitation betrug die QRS-Breite in 5/30 EKGs unter 100 ms, und die PQ-Zeit bei 10/30 EKGs über 120 ms. Wenn die wahrscheinlichste Lage von LocAP berechnet wurde, konnte die Lokalisation von 20/30 AP (66,6 %) richtig berechnet werden. Die richtige Einschätzung stieg weiter an, wenn Patienten mit wenig Präexzitation von der Auswertung ausgeschlossen wurden (20/25 [80 %] bei QRS-Breite > 120 ms und 17/20 [85 %] bei PQ-Zeit < 120 ms). Verglichen mit den bestehenden Algorithmen schritt LocAP damit in der Berechnung der Lage der AP (Milstein 33,3 %, Arruda 40 %, Fitzpatrick 50 %) signifikant besser ab.

Long-term Outcome after Drug-eluting Stent Implantation in Patients With or Without Diabetes mellitus

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Background Diabetes mellitus is associated with an increased risk of death and clinical in-stent restenosis after percutaneous coronary interventions. Aim of our study was to evaluate the impact of diabetes mellitus on all-cause mortality and clinical in-stent restenosis (ISR) in patients undergoing drug-eluting stent (DES) implantation in a routine “real world” clinical setting.

Methods 457 consecutive patients, who underwent PCI and DES implantation, were included in this prospective registry from January 2003 until December 2006. Patients were divided retrospectively into two groups, diabetics and non-diabetics. All-cause mortality, ISR, and the combined endpoint death and ISR was evaluated during a mean follow-up period of 24.56 ± 12.49 months (range 6–52 months).

Results Gender, hyperlipidemia, as well as history of MI, PCI, CABG, cancer, smoking, PAOD, heart failure, previous cerebral insult, and presence of acute coronary syndrome (ACS) during intervention were not different between groups. Significant differences were found for age (diabetics: 64.53 ± 12.64 vs non-diabetics: 61.34 ± 12.53; p < 0.001), and arterial hypertension (82.2 % vs 72 %; p = 0.028), respectively.

5.9 % of patients with diabetes and 5.6 % without diabetes died during the follow-up (p = 0.9). No differences in mortality could be demonstrated between DES and BMS treated patients with or without diabetes mellitus.

ISR was observed in 6 patients with diabetes and 27 without diabetes (5.1 % vs. 8.3 %; p = 0.3)

Using the combined endpoint (all-cause death and ISR), 11 % of patients with diabetes and 13.6 % without diabetes (p = 0.4) had an event during the follow-up.

Conclusions Our results obtained in a “real world” clinical setting demonstrate that diabetes mellitus does not affect the long-term clinical outcome (all-cause mortality and ISR) after DES implantation.

G148A – A Non Conservative Polymorphism of the Glycoprotein 130 Associated with Coronary Artery Disease

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Purpose The cytokines of the interleukin-6 (IL-6) family have been proven to play a pivotal role in inflammation, regulating the development and progression of atherosclerosis. They are characterized by their functional redundancy and pleiotropy, sharing a common signal transducing receptor subunit: glycoprotein 130 (gp130). The importance of individual variation in inflammatory response for atherosclerotic risk is becoming an increasingly interesting and exciting new frontier in cardiovascular research. Such variation is partially triggered by single nucleotide polymorphisms (SNPs). Therefore we investigated whether a non conservative SNP (G148A) of the gp130 gene affects the functional properties of the gp130 receptor and its possible association with coronary artery disease.

Methods 522 patients, scheduled for elective coronary angiography were enrolled in this study. Absence (n = 53) or presence (n = 469) of coronary artery disease was assessed by coronary angiography. DNA was extracted from whole blood and gp130 polymorphism was detected by restriction fragment length analysis. We calculated structure refinement and solvent accessible surface of the gp130 using an in silico model.

Results CAD was confirmed in 394 out of 445 (89 %) carriers of the common G148G allele, in 70 out of 72 (97 %) carriers of the heterozygous (G148A) and 5 out of 5 (100 %) homozygous (A148A) carriers of the Arg allele. For hetero- and homozygous carriers of the Arg allele, univariate logistic regression revealed an odds ratio of 4.85 (95 %-CI: 1.15–20.37; p = 0.03) for coronary artery disease. This association remained significant after correction for age, sex, body mass index, diabetes, smoking, family history, hypertension, triglycerides, and total cholesterol levels in a multivariate logistic regression model. Using an in silico model, we could show that the G148A polymorphism induces a change in the solvent accessible surface of the gp130 receptor.

Conclusion The role of the immune system in atherosclerosis is as complicated as the disease itself, and the majority of the complex immunological influences and interactions remain to be fully elucidated. Exactly this complexity, however, offers an explanation for the subtle, yet significant alteration in individual susceptibility to CAD caused by a protein alteration secondary to this SNP. The G148A polymorphism of gp130 correlates significantly with CAD. We speculate that this effect may derive from an alteration in the extracellular binding region of the receptor, resulting in a change in the affinity of the receptor for its ligands.
In patients with unstable angina (Tn negative) the per-
Results in our outpatients ward or from the Mortality Statistics Austria.
2004 were analyzed. Data concerning 1- and 2-year mortality were
cardial infarction (NSTEMI) between January 2001 and December
come in consecutive patients admitted to our department before
implementation of the new guidelines (2001–2002) and thereafter
patients with NSTE-ACS. We aimed to compare the clinical out-
Background and Aim In 2002 updated guidelines recommend
an early invasive and pharmacologically more aggressive treatment in patients with NSTE-ACS. We aimed to compare the clinical outcome in consecutive patients admitted to our department before implementation of the new guidelines (2001–2002) and thereafter (2003–2004).
Methods In a systematic retrospective review of clinical records data on 813 patients admitted to our cardiology department for either unstable angina (UA) or non-ST-segment elevation myocardial infarction (NSTEMI) between January 2001 and December 2004 were analyzed. Data concerning 1- and 2-year mortality were received either from hospital records in patients regularly controlled in our outpatients ward or from the Mortality Statistics Austria.
Results In patients with unstable angina (Tn negative) the percentage of an invasive strategy increased from 32.0 % before to 63.6 % after implementation of guidelines (p < 0.001). While 23.8 % of patients admitted 2001/2002 received early invasive therapy within 48 hours, it was 53.7 % of patients admitted 2003/2004 (p < 0.0001). The administration of clopidogrel increased from 34.1 % to 67.2 % (p < 0.001). In-hospital mortality rate was not different between both treatment periods (1.6 % vs 1.6 %; p = 0.967). After 1 year mortality decreased from 11.7 % to 7.0 % (p = 0.152), a result which was statistically significant after 2 years (19.4 % vs 7.8 %; p = 0.003), respectively.
In patients with non-ST-segment myocardial infarction (Tn positive) the rate of interventions increased from 31.8 % to 47.9 % (p = 0.001). In 2001/2002, 28.6 % of the interventions were performed within 48 hours but reached 51.5 % in 2003/2004 (p = 0.007). Administration of clopidogrel on admission increased (44.2 % vs 66.2 %; p < 0.001). In-hospital mortality was reduced from 17.5 % to 9.4 % (p = 0.014) and 1-year mortality decreased from 33.1 % to 24.5 % (p = 0.057) due to a more aggressive and early invasive approach. 2-year mortality was still lower in patients treated in 2003/2004 but did not reach statistical significance any longer (29.6 % vs 36.0 %; p = 0.149).
Conclusion The increase of an early invasive and pharmacologically more aggressive therapy in patients with NSTE-ACS led to beneficial results of short- and long-term mortality in all subgroups (Figure 8). Despite a more aggressive treatment (including early PCI within 48 hours) this therapeutic option, however, is still withheld in a relatively high number of high-risk patients most obviously due to an expected increased rate of side effects (e.g. elderly patients and/or individuals with co-morbidities). According to these data, more patients of this high-risk group should receive an early invasive and pharmacologically more aggressive treatment.
Aortic, but not Brachial Systolic Blood Pressure Predicts Survival in Cardiomyopathy

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Rationale Blood pressure (BP) has been inversely linked to mortality in patients with impaired systolic function. Recently, a superior prognostic value of the aortic as compared to the brachial BP has been suggested in hypertensives. We tested the prognostic implications of aortic versus brachial BP in patients with cardiomyopathy.

Methods In 150 patients with impaired systolic function and known coronary anatomy, brachial BP was measured, and aortic BP was derived non-invasively, using radial application tonometry and a validated transfer function. Patients were followed prospectively, primary endpoint was all-cause mortality, secondary endpoint cardiovascular mortality. Statistics was univariate and multivariate Cox proportional hazards regression analysis.

Results Mean age was 65.1 ± 10.9 years, 30.6 % were female, 82.6 % had ischemic etiology. Mean ejection fraction was 40.3 ± 10.9 %. After a follow-up of 45.9 ± 16.0 months, 39 patients had died (29 of cardiovascular causes). Analyzing BP as a continuous variable revealed a 17.3 % (95 %-CI: 0.2–31.4 %) decrease in all-cause mortality (p = 0.04) as well as a 23.1 % (95 %-CI: 4.0–38.4 %) decrease in cardiovascular mortality (p = 0.02) for every 10 mmHg increase in aortic systolic BP. In contrast, brachial systolic BP did not predict total (p = 0.16) or cardiovascular (p = 0.10) mortality. After adjustment for age, gender, presence of coronary artery disease, and degree of systolic impairment, a 10 mmHg higher aortic systolic BP was associated with a 19.2 % (95 %-CI: 1.1–33.9 %) lower all-cause mortality (p = 0.04) and a 25.5 % (95 %-CI: 5.1–41.6 %) lower cardiovascular mortality (p = 0.02).

Conclusions Aortic systolic BP, the pressure that is actually “seen” by the heart, is a better predictor of outcome than brachial systolic BP in cardiomyopathy patients.

Plasma Levels of Asymmetric Dimethylarginine (ADMA) Predict All-Cause Mortality in Patients Undergoing Coronary Angiography

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Background Asymmetric dimethylarginine (ADMA) is an independent cardiovascular risk factor in renal patients. We aimed to study the association between ADMA and mortality in patients undergoing coronary angiography.

Methods In 255 patients, we measured plasma levels of ADMA, using a validated ELISA assay, at the time of the angiogram. Patients were followed prospectively, primary endpoint was all-cause mortality. Statistics was univariate and multivariate Cox proportional hazards regression analysis.

Results Mean age 65.7 ± 9.5 years, 51.7 % were men, 15.7 % had diabetes, 51 % coronary artery disease, 87.8 % normal systolic function, 19.6 % underwent coronary interventions. Mean ADMA levels were 0.63 ± 0.16 micromol/l. During a follow-up of 52.5 ± 8.2 months, 12 patients died. Analyzing ADMA as a continuous variable revealed a 44.8 % increase in mortality (95 %-CI: 5.5–98.7 %; p = 0.02) for every 0.1 micromol/l increase in ADMA levels. In a multivariable regression model (p < 0.0001), ADMA (47.7 % increase in mortality per 0.1 micromol/l increase in ADMA levels; CI: 3.1–111.7 %; p = 0.03), log NT-proBNP, and age predicted the primary endpoint, whereas gender, presence of coronary artery disease, and systolic function did not.

Conclusions In relatively low risk patients undergoing coronary angiography, plasma levels of ADMA are independent predictors of all-cause mortality.
Vienna STEMI patients were treated with Taxus® (n = 202) or Genous® (n = 54) stent implantation. From November 2005 to August 2007, 256 consecutive STEMI patients after PCI with DES (Taxus®) or EPC cap-tihuman CD 34) that captures endothelial progenitor cells (EPCs) to coronary intervention (PCI) with drug-eluting stent implantation.

A Non-Randomized Single Center Experience

A Non-Randomized Single Center Experience

Conclusion Genous® stent implantation appears safe and effective with low rates of TLR and no late stent thrombosis in selected higher risk patients, especially with ACS and STEMI. Statin therapy might reduce MACE rates after Genous® stent implantation. The higher non cardiac mortality in our elective patient cohort reflects the higher comorbidity in this selected patient group.

Comparison of Percutaneous Coronary Intervention with Implantation of Drug-Eluting Stents (Taxus®) versus Endothelial Progenitor Cell Capture Stents (Genous®) during ST Elevation Myocardial Infarction: A Non-Randomized Single Center Experience

Background Although recent data suggest that percutaneous coronary intervention (PCI) with drug-eluting stent implantation (DES) in ST elevation myocardial infarction (STEMI) provides better clinical outcomes compared to bare-metal stenting, there still exist concerns about DES safety issues in this patient population. The Genous® Bio-engineered R stent is coated with an antibody (antihuman CD 34) that captures endothelial progenitor cells (EPCs) to accelerate the natural healing process including reendothelialisation and seems therefore of potential benefit in this patient population.

Objectives This study evaluated the clinical outcomes of consecutive STEMI patients after PCI with DES (Taxus®) or EPC capture stent (Genous®) implantation.

Methods From November 2005 to August 2007, 256 consecutive STEMI patients were treated with Taxus® (n = 202) or Genous® (n = 54) stent implantation. Stent choice was left to the discretion of the operator.

Results High-risk patients (cardiogenic shock or cardi pulmonary resuscitation) comprised 16 % of the Taxus® group and 19 % of the Genous® group (p = 0.68). Mean age in the Taxus® group was 59 ± 13 years, 76 % male, LAD involvement in 48 % (LM 2 %) and in the Genous® group 60 ± 13 years, 77 % male, 44 % LAD treatment (LM 2 %) (p = n.s., in all cases).

The 30-day major adverse cardiac event (MACE) rate for Taxus® and Genous® was 7.9 % and 3.7 % (p = 0.28), respectively. 30 day mortality was 5 % and 0 % (p = 0.09), subacute stent thrombosis (ST) occurred in 1.5 % and 1.9 % (p = 0.85), coronary artery bypass graft operation (CABG) was performed in 2.0 % and 1.9 % (p = 0.95). The mean follow-up was 444 ± 183 days in the Taxus® group and 406 ± 195 days in the Genous® group (p = 0.33). The overall long term MACE-free survival was 85 % in the Taxus® group and 82 % in the Genous® group (p = 0.51). The mortality rate after 30 days was 3.5 % and 5.6 % (p = 0.52), myocardial infarction occurred in 1.1 % and 5.8 % (p = 0.04), late ST occurred in 0.5 % and 0 % (1 vs 0; p = 0.61) and target lesion revascularization (TLR) was performed in 2.7 % and 7.7 % (p = 0.09) in the Taxus® group and Genous® group, respectively.

Conclusion PCI with DES (Taxus®) implantation in acute STEMI offers equivalent long term safety with higher efficacy compared to Genous® stent implantation in an all comers population. The initial observed higher 30 day MACE rate in the Taxus® group was statistically not significant and seems attributable to the rather small number of Genous® patients. Long term MACE rate was in favor of Taxus® with lower rates of M1 and TLR, despite one case of late ST.

Our data do not support concerns that DES implantation in STEMI might cause additional harm, however, to draw final conclusions the results of the worldwide randomized HORIZONS Trial should be awaited.

Echokardiographische Bestimmung der koronaren Flussreserve bei Patienten nach Ross-Operation und mechanischen Aortenklappenersatz

Hintergrund Die koronare Flussreserve (CFR) ist ein wichtiger Parameter der Langzeitprognose bei Patienten nach Aortenklappenersatz (AKE). Der AKE führt zu einer Verbesserung, aber nicht vollständigen Normalisierung der CFR.

Eine reduzierte CFR kann Ursache für eine erhöhte kardiale Komplikationsrate, höhere Mortalität und reduzierte linksventrikuläre Funktion sein.

Ziel der Studie war die Bestimmung der CFR bei Patienten nach Ross-Operation im Vergleich zu Patienten nach mechanischem AKE.

Methodik Die CFR wurde bei 34 Patienten mit der transthorakalen Doppler-Echokardiographie (TTDE) im Mittel 7,5 Jahre nach der Operation bestimmt.

Im Rahmen einer randomisierten Studie wurde zwischen 1999 und 2001 bei 16 Patienten ein mechanischer AKE (Gruppe A) und bei 18 Patienten eine Ross-Operation (Gruppe B) durchgeführt; 10 ge-sunde Probanden (Gruppe C) dienten als Kontrollgruppe.

Die Bestimmung des Koronarflosses wurde in Ruhe und nach 5-mi-nütiger Stresstestung mit Adenosin (140 mg/kg/min) durchgeführt.

Ergebnisse In Ruhe bestand kein signifikanter Unterschied bezüglich der mittleren koronaren Flussgeschwindigkeit (CFV) zwischen den Gruppen A vs. B vs. C. Unter Stresstestung mit Adenosin zeigt sich ein signifikanter erniedrigerter Anstieg (p < 0,005) der CFV in der Gruppe A (24,4 ± 3,3 cm) verglichen mit den Gruppen B (45,7 ± 6,1 cm) und C (51,4 ± 6,0 cm).

Die CFR war signifikant erniedrigt in der Gruppe A (1,56 ± 0,18; p < 0,005) verglichen mit den Gruppen B (2,52 ± 0,2) und C (2,68 ± 0,16).

Immediate and Long-term Clinical Outcome After Percutaneous Mitral Valvuloplasty (PMV) in Austria

Division of Cardiology, Department of Internal Medicine II, Medical University of Vienna

Introduction
Since its introduction in 1984 by Inoue, the technique of percutaneous balloon mitral valvuloplasty (PMV) has been confirmed as a safe and effective procedure, and is still first-line therapy in patients with symptomatic mitral stenosis (MS) and suitable valve morphology.

Background
Vascular endothelial growth factor (VEGF) is present in atherosclerotic lesions and involved in blood vessel growth and in the regulation of the expression of prothrombotic and proinflammatory mediators in monocytes and endothelial cells at these sites. Oncostatin M (OSM) is a member of the glycoprotein 130 (gp130) receptor cytokine family. It is controversial whether interferon-γ (IFN-γ), which is expressed at high levels in atherosclerotic lesions, promotes or attenuates vascular remodelling in hyperproliferative vascular disorders, such as neointima formation after balloon injury.

Methods
Human coronary artery smooth muscle cells (HCASMC) and human aortic SMC (HASMC) were treated with the gp130 ligands OSM, cardiotoxin-1 (CT-1), cardiotoxin-like cytokine (CLC), ciliary neurotrophic factor (CNTF), IL-6, IL-11 or leukemia inhibitory factor (LIF). VEGF-A protein was determined by a specific ELISA and mRNA specific for VEGF-A, gp130, OSM receptor (OSMR), IL-6 receptor (IL-6R) and LIF receptor (LIFR) was detected by RT-PCR.

Results
Only OSM increased VEGF production significantly in both HCASMC and HASMC up to 7-fold in a dose- and time-dependent manner. The effect of OSM on VEGF production was reproducible in the preparation of HCASMC and HASMC derived from different donors (n = 9 for HCASMC, n = 6 for HASMC). OSM upregulated also mRNA specific for VEGF in these cells. OSM induced Akt and p38 MAPK phosphorylations in HASMC. PI3K inhibitors and p38 MAPK inhibitors reduced OSM-induced Akt and p38 MAPK phosphorylation, and VEGF upregulation. HCASMC and HASMC were shown to express gp130, OSMR, IL-6R and LIFR. IFN-γ, but not IL-4 or IL-10, dose-dependently reduced OSM-induced VEGF production on protein and mRNA levels in both HCASMC and HASMC. We found a culture-condition-dependent effect of OSM and IFN-γ on proliferation of these cells.

Conclusion
We show here that OSM induces VEGF production in vascular SMC. Since activated T-cells and macrophages have been found in atherosclerotic lesions we hypothesize that OSM produced by these cells could induce VEGF production thereby contributing to plaque angiogenesis and destabilization. IFN-γ attenuates OSM-induced VEGF production by vascular SMC.

Immediate and Long-term Clinical Outcome After Percutaneous Mitral Valvuloplasty (PMV) in Austria

Division of Cardiology, Department of Internal Medicine II, Medical University of Vienna

Aims
We evaluated immediate valvular changes (mitral valve area and mean mitral valve gradient) after PMV performed between 1990 and 2005 at the General Hospital of Vienna, and long-term clinical outcomes.

Methods and Results
We report the immediate procedural results of 141 patients (mean age 51.5 ± 16 years; range 17 to 82), the long-term clinical outcomes in 90 patients over a mean observation period of 73.3 ± 56 months (range, 3 to 199 months). Echocardiographic follow-ups were available in 89 patients after a mean observation period of 62.7 ± 49 months (range, 1 to 194 months). Kaplan-Meier analysis was performed to estimate event-free survival (death and mitral valve replacement).

There were 6 (4.3 %) unsuccessful PMV procedures, and one (0.7 %) urgent mitral valve replacement. No procedure-related deaths occurred. PMV resulted in an immediate increase in mitral valve area from 1.04 ± 0.56 to 1.69 ± 0.38 cm² (p = 0.372), and in a change of mean mitral valve gradient (mGrad) from 13.56 ± 11.08 mmHg to 5.59 ± 2.80 (p = 0.002). Mitral area loss was 1.44 ± 0.34 (p = 0.0001) at 62.7 ± 48 months after PMV, and mGrad had increased to 7.62 ± 2.84 mmHg (p = 0.01). Mean NYHA functional class was III prior to and II at 73.3 ± 56 months after PMV after (p = 0.34). Atrial fibrillation was present in 50 patients (35.5 % of 117; 42.7 % valid %) and in 59 patients (41.8 % of 76, 77.6 % valid %) after PMV (p = 0.34). Survival free of mitral valve replacement (MVR) was 75.4 %, 53.9 %, 44.3 % and 24.2 % at 1, 5, 10 and 15 years, respectively (n = 61, number of MVR: 36, Figure 9). Survivals were 100 %, 89.4 %, 86.6 % and 70.7 % at 1, 5, 10 and 15 years, with 7 reported deaths.

Conclusions
Immediate and long-term clinical and echocardiographic results of PMV in Austria, including many elderly patients are good. PMV is an effective procedure to increase mitral valve area, to decrease symptoms of MS (NYHA functional class) and to
Gender Differences in Risk Factors Including C-reactive Protein in a Large Consecutive Patient Cohort Undergoing Elective Coronary Angiography

Department of Cardiology, Innsbruck Medical University; *Department of Internal Medicine II, Rudolfstiftung Hospital, Vienna

Background Little information is available about gender differences concerning the presence and influence of cardiovascular risk factors including C-reactive protein (CRP) in consecutive patients undergoing coronary angiography (CA) for the evaluation of coronary artery disease (CAD).

Methods 5,641 consecutive patients (33.1 % women) undergoing elective CA were analysed. Cardiovascular risk factors were assessed by standardised questionnaire and routine blood chemistry. CAD was graded by visual estimation of lumen diameter stenosis. Significant stenoses were defined as lumen diameter reduction ≥ 70 % in at least one major coronary artery. Coronary angiograms were graded as non-significant CAD, as 1-, 2- or 3-vessel disease or as non-CAD.

Results Women were older than men (65.2 ± 11.0 vs 63.1 ± 11.0 years; p < 0.001) and had more often a positive family history for premature CAD (30.2 vs 24.5 %; p < 0.001). The number of risk factors was higher in men (2.4 ± 1 vs 2.3 ± 1; p = 0.01) and smoking was more common in men (55.9 vs 35.0 %; p < 0.001). In addition, CRP levels were higher in men (0.82 vs 0.97 mg/dl; p = 0.02). The prevalence of hypertension (76.1 vs 77.5 %; p = 0.25), hypercholesterolemia (68.5 vs 69.4 %; p = 0.47) and diabetes (17.6 vs 17.4 %; p = 0.86) was not different between gender. CAD was more often found in men (80.0 vs 59.1 %; p < 0.001). In multinomial logistic regression analyses including age, total cholesterol, HDL-cholesterol, CRP, diabetes, hypertension and prior statin use in men all variables except hypertension were independent predictors of CAD. In women total cholesterol and hypertension were not independently associated with CAD. According to Wald statistics, CRP was a much stronger independent predictor of CAD in men than in women.

Conclusion In this large consecutive patient cohort women and men have almost similar risk factor profiles when referred for CA. The influence of traditional risk factors on the prevalence of CAD is similar between gender, but CRP is a stronger independent predictor of CAD in men.

Climate Change and Acute Coronary Angiographies in an Alpine Country

Department of Cardiology, Innsbruck Medical University

Background Weather conditions are known to aggravate symptoms in chronic stable coronary artery disease (CAD). Whether the ongoing climate change with rapid temperature increase year by year may also influence the incidence and outcome of non-ST-elevation (NSTEMI) and ST-elevation (STEMI) myocardial infarctions referred for acute coronary angiography (CA) is less clear.

Methods According to weather data from the Institute of Meteorology and Geophysics, Innsbruck University, the winter 2005/2006 was very cold (CW) and the winter 2006/2007 extraordinarily warm (WW). Patients referred for acute CA suffering an acute STEMI or NSTEMI, their risk factors and in-hospital mortalities in these two consecutive winters were recorded.

Results As expected, average temperature was lower (–1.6 vs +5.9 °C; p < 0.001) and humidity was higher (82 vs 79 %; p < 0.012) in CW compared to WW with no significant differences in other weather conditions (rain/snowfall: 59 vs 39 days; sunshine: 3.9 ± 2.5 vs 4.3 ± 2.5 hours/day; air pressure: 713.0 ± 6.7 vs 713.8 ± 7.1 hPa). There were no differences in the number of overall CA (987 vs 983) in these two winters, whereas the number of acute CA (12.9 % vs 10.4 % of overall CA; p = 0.046) and the diagnosis of STEMI as indication for acute CA (74.0 % vs 62.7 %; p = 0.046) were higher in CW. Furthermore, patients in CW were younger (58.2 ± 12.4 vs 61.7 ± 11.7 years; p < 0.03), had higher LDL-cholesterol (134.8 ± 44.6 vs 116.7 ± 36.0 mg/dl; p < 0.003) and were less frequent hypertensives (52.8 % vs 70.6 %; p < 0.01). In-hospital mortality (2.4 % vs 1.0 %; p = n. s.), patients' nationalities (Austrians: 78.0 % vs 77.5 %), delays in STEMI treatment (3.9 ± 3.5 vs 3.8 ± 3.1 hours) and other traditional risk factors were not different between WW and CW.

Conclusion The dramatic average temperature increase of 7.5 °C from the cold to the warm winter was associated with a decrease in acute coronary angiographies and a lower incidence of STEMI referred for primary percutaneous intervention. However, in-hospital mortality was not different between the cold and the warm winter, probably due to the generally low mortality.
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Long-Term Clinical Follow-Up of Drug-Eluting Coronary Stents After Successful Treatment of Bare Metal Stent Instant Restenosis

Krankenhaus der Stadt Linz, Abteilung Innere Medizin I, Austria

Background Different trials have demonstrated a dramatic reduction in incidence of in-stent restenosis (ISR) following implantation of drug eluting stents (DES) compared with bare metal stents (BMS). The clinical outcome following successful (no re-restenosis after 6 months) implantation of a DES for BMS ISR is less well defined. The aim of this study was to assess the safety and efficacy of DES (sirolimus and paclitaxel) in the treatment of patients with BMS ISR which had angiographically less than 50 % restenosis at 6 months after implantation of DES.

Methods and results All 204 patients (mean age 66 ± 10, 52 female, 152 male) who received a DES (120 sirolimus, 84 paclitaxel) for treatment of BMS ISR from May 2002 to December 2004 at a single institution were entered into a prospectively collected database. Six month angiographic follow-up and long term clinical outcomes (36–60 months) were collected. At baseline, the most common target vessel was the left anterior descending coronary artery (41 %), and 3 % of lesions were in the left main (LM). Multivessel disease was present in 82 (40 %) of patients. Saphenous vein grafts were excluded. The mean reference diameter was 2.79 ± 0.6 mm and the mean lesion length was 18.1 ± 11 mm. There was one acute lethal stent thrombosis three days after implantation of a sirolimus stent. No additional procedural or in-hospital major adverse cardiac events (MACE — cardiac death, myocardial infarction or target lesion revascularisation) occurred. In patients who were symptomatic at the time of controll angiography, 25 (12.2 %) had significant (> 60 %) restenosis. In all of these patients a new DES was implanted. At this point of time, a paclitaxel eluting stent was implanted in pts. previously treated with a sirolimus eluting stent and vice versa. The six month MACE rate was 12.2 %. Of the remaining 179 (100 %) patients long term clinical follow-up (36–60 months) was available in 177 (98.8 %) patients. The 36–60 months MACE rate was 17.4 %. Late stent thrombosis occurred in 4 (2.3 %) of patients. There were 7 (4 %) cardiac death and 3 (1.7 %) non-cardiac deaths.

Conclusion Stenting of restenosis after BMS using a DES evolves as an option with acceptable short-term and mid-term results. Whether a change of stent type (paclitaxel to sirolimus and vice versa) during treatment of re-restenosis is of further benefit has to be defined.

Fourteen-Month Follow-Up of Acute Myocardial Infarcts With Contrast-enhanced Cardiac Magnetic Resonance: Size and Function

Department of Cardiology, Innbruck Medical University, Austria

Background Cardiac magnetic resonance (CMR) imaging is a unique tool to study infarct size and cardiac function with high accuracy and reproducibility. Nevertheless data on long-term investigations in acute myocardial infarction is limited.

Methods We performed CMR in 28 patients (age: 55 ± 12 years, 23 male) within 2.14 ± 1.8 days after first acute myocardial infarction and primary angioplasty as well as ± 1 and ± 14 ± 1 months thereafter. Infarct size was determined as percent of LV tissue on delayed Gadolinium enhanced phase-sensitive IR-SSFP sequences. Ejection fraction (EF) as well as left ventricular myocardial mass (MM) were obtained from short-axis cine-MR sequences.

Results Mean infarct size at baseline was 10.8 ± 2.1 %. Two patients were excluded from further evaluation because the increase in infarct size exceeded that of the rest by ≥ 2SD and therefore recurrent ischemia could not be ruled out. Infarct size measures between baseline and the follow-ups showed an excellent agreement (r = 0.740 and r = 0.886, p < 0.001) while infarct size decreased to 11 ± 2 % after 4 months (p < 0.05) and 10.2 ± 6.5 % after 14 months (p < 0.002, p = ns versus 4 months). Large infarcts showed a greater reduction in size as expressed by the linear correlation of initial infarct size with the percentage in size reduction (r = −0.856, p < 0.001).

EF increased from 45.7 ± 9.0 % to 51.9 ± 8.9 % (p < 0.001) and 50.8 ± 8.3, respectively (p < 0.001, p = ns versus 4 months) whereby the separate measures showed good correlations (baseline to 4 months r = 0.704, baseline to 14 months r = 0.763, p < 0.001). Patients with initially lower EF recovered myocardial function moderately better as indicated by the inverse correlation of baseline EF to the increase in EF during follow-up (r = −0.455, p < 0.02).

Conclusion Our pilot study shows that CMR is a useful research tool for the long-term follow-up of acute myocardial infarctions although its clinical impact in this setting has to be further determined.

Percutaneous Aortic Valve Replacement for Severe Symptomatic Aortic Stenosis: Patient Selection and Management

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Division of Cardiology, Department of Medicine, Medical University Graz, Austria

Background Degenerative aortic stenosis (AS) is currently the most frequent heart valve disease in industrialised countries with surgical aortic valve replacement as the treatment of choice. Since comorbidities increase the operative risk of surgical valve replacement, particularly in elderly patients, percutaneous aortic valve replacement (PAVR) might be a suitable alternative therapy for high risk patients. However, patients need to be selected very carefully.

Methods Between April 2007 and January 2008, 63 patients (25 males, 38 females, age 79 ± 7 years) with severe symptomatic AS (aortic valve area 0.55 ± 0.15 cm², peak transvalvular aortic pressure gradient 95 ± 32 mmHg, mean transvalvular aortic pressure gradient 58 ± 20 mmHg) and various comorbidities (St. p. coronary artery bypass graft, St. p. mitral valve replacement, severe chronic obstructive pulmonary disease, end-stage renal failure, haematoletic diseases) were admitted to our institution in order to assess the eligibility for PAVR with the self-expanding CoreValve bioprosthesis. Risk calculation revealed a logistic EuroSCORE of 28 ± 15 %. Further to clinical assessment echocardiography, cardiac catheterisation, and computed tomography were performed.

Results 52 patients were found to be eligible for PAVR. Neverthe less, in five of these patients surgical aortic valve replacement was recommended due to an acceptable individual risk score. In 20 patients PAVR was performed successfully within two months following initial admission. Four patients refused PAVR, another five deceased prior to PAVR being on the waiting list, and 18 are still waiting for PAVR. Eleven patients were not suitable for PAVR since the diameter of the aortic valve annulus was < 19 mm (four patients), the ascending aorta was dilated > 45 mm at the sino-tubular junction (one patient), and vascular access was impossible due to severe peripheral arterial disease (six patients), respectively.

Discussion PAVR emerges as a suitable alternative treatment for severe symptomatic AS, particularly in elderly patients with high risk of surgical valve replacement. However, thorough patient selection is mandatory including clinical assessment, echocardiography, cardiac catheterisation, and computed tomography.
Percutaneous Aortic Valve Replacement for Severe Symptomatic Aortic Stenosis: an Emerging New Treatment Option for High-Risk Patients

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Background Degenerative aortic stenosis (AS) is currently the most frequent acquired heart valve disease in industrialised countries. In symptomatic patients with severe AS, operative aortic valve replacement is the treatment of choice. However, not only symptomatic AS becomes more prevalent in elderly patients, but also comorbidities that increase the risk for operative valve replacement. Therefore, percutaneous aortic valve replacement (PAVR) might be an alternative therapy for high-risk patients.

Patients and Methods In our institution, 20 patients (6 male, 14 female; mean age 80 ± 6 years) with symptomatic severe AS underwent PAVR between May 2007 and February 2008. Aortic valve area was 0.5 ± 0.1 cm², logistic EuroSCORE 28 ± 15 %. The procedure was performed in the catheterization laboratory via a bifemoral percutaneous approach under local anaesthesia and analgesic sedation without surgical cut-down and hemodynamic support. After balloon valvuloplasty the self-expanding CoreValve prosthesis (diameter 26 mm, n = 15; 29 mm, n = 5) was implanted using the current 18 French delivery catheter system.

Results Acute procedural success rate was 100 %. Device implantation resulted in a significant reduction of mean aortic transvalvular gradient (59 ± 16 mmHg vs 11 ± 3 mmHg, p < 0.0001) and a marked decrease of NT-proBNP 30 days after PAVR (5645 ± 6319 pg/ml vs 2610 ± 2753 pg/ml, p = 0.07). Postprocedural aortic regurgitation was trivial or mild in 16 patients and moderate in four patients. Permanent pacemaker implantation was necessary in two patients due to complete atrioventricular block. There was no myocardial infarction but one periprocedural stroke in a patient who died from multiorgan failure two days later. Another patient died 27 days after PAVR due to pneumonia (overall 30-day mortality rate 10 %). The remaining 18 patients had an uneventful postprocedural course with marked clinical improvement over a total of 72 patient-months.

Conclusion PAVR with the self-expanding CoreValve bioprosthesis is an emerging alternative treatment for high-risk patients with symptomatic severe AS. Complication rate is acceptable, and mortality rate is lower than predicted by risk calculation.

Mid-Term Results of the Freedom Solo® Stentless Pericardial Aortic Valve Prosthesis

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Objective Implantation of stentless prostheses in patients with severe aortic valve disease provides several advantages in haemodynamics, as low transvalvular gradient and a more physiological blood flow, furthermore short cross-clamp time and no need for permanent anticoagulation. The Freedom Solo® pericardial aortic valve prosthesis (Sorin Biomedica, Saluggia, Italy) is a new stentless bioprosthesis for supra-annular insertion by running suture. This study provides mid-term results of a patient series treated in our institution.

Methods This is a prospective single-center observational study to investigate survival and haemodynamic parameters such as transvalvular aortic gradient in patients treated with the above mentioned aortic valve prosthesis. Therefore patients underwent transthoracic echocardiography before surgery, at time of discharge an after about 18 months. Transvalvular gradient was measured using continuous-wave Doppler signal and aortic regurgitation was judged by colour Doppler imaging.

Results Between October 2004 and February 2007, 50 patients (25 male, mean age 77 ± 4 years) underwent first time aortic valve replacement with the Freedom Solo valve due to severe aortic stenosis. Twenty of those (40 %) had to undergo simultaneous bypass grafting. Ejection fraction was 62 ± 12 % before surgery. Mean cross-clamp time was 66 ± 19 min. in the entire group and 54 ± 7 min. in the valve replacement only group.

At a mean follow-up period of 20 ± 9 months 42 patients (84 %) were alive. Three patients (6 %) died in the very early period (one due to low cardiac output, two patients due to bleeding of ruptured aorta), five more patients (10 %) died in the remaining follow-up time. Regarding haemodynamic parameters, mean transvalvular gradient was 11 ± 5 mmHg and ejection fraction was 65 ± 7 % at 20 months. Transvalvular regurgitation occurred in 20 patients (40 %). It was trivial in 16 patients (32 %) and mild in the remaining four (8 %).

Conclusion Mid-term results of the Freedom Solo aortic valve stentless prosthesis are encouraging. Transvalvular gradients are low and survival is acceptable with respect to the age and risk of the patient population. Larger studies and results of long-term follow-up have to be expected.

High Rate of Esophageal Ulceration after Ablation of Atrial Fibrillation in a Subgroup of Patients with General Anesthesia

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Background Atrioesophageal fistula is an uncommon but often lethal complication of atrial fibrillation (AF) ablation. The incidence of asymptomatic esophageal ulceration (EU) detected by endoscopy is high (35.7–46 %) as recently reported. The purpose of our study was to investigate if direct visualisation of the esophagus and energy titration at the posterior atrial wall (PW) can prevent EU.

Methods 83 patients (52 paroxysmal, 31 persistent) were randomized into three groups and underwent oesophagogastroscopy 24 hours after ablation:

Group 0: AF ablation without real-time esophageal visualization, 25W power limit at the PW (n = 47).
Group 1: Direct visualization of the esophagus using barium swallows (gastric tube in patients in general anesthesia) and energy reduction to 15W at the PW (n = 12).
Group 2: Direct visualization of the esophagus and energy reduction to 25W and a maximum of 10 seconds energy delivery at the PW (“short burns”) (n = 19).

Ablation was performed with a 3.5 mm tip open irrigation catheter with a target temperature of 43 °C. For navigation in the left atrium (LA) we used a 3D mapping system with CT integration. Conscious sedation with midazolam and propofol was used in 70 patients (84 %) and general anesthesia in 13 patients (16 %). In the latter group we used a nasogastric tube for visualisation of the esophagus in 6 patients.

Results In total we found 5 of 83 patients presenting EU on endoscopy (6 %). 2 patients were from the paroxysmal, and 3 from the persistent group. Out of five 3 patients belonged to the subgroup with general anesthesia and esophagus visualization with a nasogastric tube. A patient belonged to the group 0 without visualization and 4 patients to the group 2 with visualisation (p = 0.027). Patients with general anesthesia and esophagus visualization with a nasogastric tube developed EU in 50 % of cases (p = 0.013). We found no significant difference between energies delivered on the PW comparing groups with and without EU.

Conclusions Ablation guided by real-time visualisation of the esophagus was not able to prevent EU, but with the power limitation to 25W on the PW we found a much lower rate of EU than reported in other series. With a power setting of 15W no EU was reported at all. We identified a subgroup of patients with general anesthesia and nasogastric tube as a high risk population for EU.
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