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Elevated NT-proBNP in Moderate Renal Dysfunction: Decreased Clearance or Increased Cardiac Stress?

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Background/Aims: Serum levels of N-terminal pro-brain natriuretic peptide (NT-proBNP) are often increased in patients with impaired renal function. This prospective study investigated whether this increase is due to a reduced renal clearance of the peptide or a kidney-mediated excess stress burden on the heart.

Methods: The study included 696 consecutive outpatients referred for evaluation of chronic dyspnea. The patients were assigned to 4 groups according to their estimated glomerular filtration rate [eGFR (ml/min per 1.73 m^2]: group 1, eGFR <60 (n=77); group 2, eGFR 60-<75 (n=139); group 3, eGFR 75-<90 (n=191); and group 4, eGFR ≥90 (n=289). The patients were also classified into 2 categories based on the presence (n=176) or absence (n=520) of heart disease. The effect of eGFR group membership on the log-transformed values for NT-proBNP was analyzed by a multiple linear regression model with adjustment for relevant cardiac and extracardiac covariates. The eGFR group 1 was used as a reference group.

Results: In patients with heart disease, the fully adjusted values for NT-proBNP were higher in eGFR group 1 than in eGFR groups 2, 3 and 4 ($p \leq 0.01$). In contrast, the adjusted NT-proBNP values did not differ between eGFR group 1 and eGFR groups 2, 3 and 4 in the entire cohort of the patients without heart disease. Likewise, eGFR group 1 membership had no effect on the adjusted NT-proBNP values in the subgroup of patients without heart disease exhibiting NT-proBNP levels in the highest quartile.

Conclusion: A reduced renal clearance does not explain increased NT-proBNP levels in patients with moderate renal impairment and dyspnea. Our data suggest that a moderate reduction of renal function places additional stress on the heart in patients with established cardiac disease. This excess burden of stress may further reduce the exercise tolerance and contribute to the increased cardiovascular risk of cardiac disease patients with at least moderate renal dysfunction.

Pericardiectomy for Constrictive Pericarditis is Safe and Effective in the Modern Era

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Background: Constrictive pericarditis is characterized by marked thickening and dense scarring of the pericardium with pericardial sac obliteration. The standard treatment for clinically significant constriction is surgical pericardiectomy. Previous studies have demonstrated high mortality associated with this procedure.

Objective: To evaluate the outcome of patients undergoing pericardiectomy due to clinically significant constructive pericarditis.

Methods: Between 8/2006 and 9/2011 13 patients underwent pericardiectomy for constrictive pericarditis. Data was obtained from operating room and medical records, as well as pathological and echocardiography reports. Follow up (mean 12±11 mo) included clinical status, DASI (Duke Activity Status Index), and echocardiography examinations.

Results: Mean patient age was 56±21 years (range 20-78 years). Twelve of the patients were male. In most of patients the etiology for the pericarditis was idiopathic. One patient underwent previous AVR. En extensive pericardiectomy was performed without using cardiopulmonary bypass (CPB) with the exception of one patient who underwent concomitant CABG. One patient underwent concomitant Off Pump CABG. No hospital mortality was observed. Post operative course was uneventful in all patients with no low cardiac output state or neurological deficits (CVA or TIA). None of the patients required prolonged mechanical ventilation and no diaphragmatic paralysis was recorded. Mean hospital stay was 4.8±1.5 days. Follow up demonstrated all patients to be alive. Mean New York Heart Association (NYHA) was 1.4±04. No re-hospitalizations due to cardiac events were recorded. Echocardiography showed no recurrence of constriction. Median DASI score was 39 with calculated mean METS of 9.9±4.2 confirming good exercise tolerance.

Cardiac Function and Inflammatory Biomarkers in Patients with Recovered Takotsubo Cardiomyopathy

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Background:Takotsubo Cardiomyopathy (TCM) is a transient cardiomyopathy. Endothelial dysfunction is the main potential mechanism involved in the pathogenesis. Post-recovery cardiac function, endothelial progenitor cells (EPC's) and biomarkers were not evaluated in TCM yet.
Aim: To evaluate EPC's and inflammatory markers and assess cardiac function using echo techniques such as tissue Doppler (TDI) and 2D Strain (2DS) imaging in post TCM patients.
Methods: Twelve post-TCM patients were included and compared to matched controls. LV and RV function using standard echo, TDI, and 2DS was evaluated. The number of EPC's: CD34+ cells, CD34+KDR cells, vascular endothelial growth factor (VEGF) levels and inflammatory markers: hsCRP, IL6 and Ox-LDL antibodies were quantified.
Results: Twelve patients recovered from TCM (3- 12 months from the acute event, age 60±13 years, 11 women, EF 58.6±7.5%) and matched controls (age 59±7 years and EF 57.3±8.5%) were compared. On echo LV early diastolic velocities (E') on TDI (6.0±1.2 vs. 8.1±2.0, ρ=0.008) were significantly lower and E/E' (14.1±3.7 vs. 8.9±2.8, ρ=0.002) higher compared to controls. There were no differences in global longitudinal strain and higher circumferential strain (-22±3.8 vs. 16.8±3.2, ρ=0.018) was obtained in post-TCM patients. In addition, decreased RV global strain (-19±2.8 vs. -23±1.7%, ρ=0.02) and strain rate S (-1.0±0.1 vs.-1.2±0.1, ρ=0.01) were found. A significant increase in CD34+KDR (0.18±0.05 vs.0.07±0.04, ρ=0.01) was evident, with no difference in VEGF, hsCRP, IL6 and Ox-LDL between the groups.
Conclusions: In this pilot study TDI was able to identify altered LV diastolic function in recovered patients with TCM. In addition, impaired RV function by 2D strain was found compared to healthy matched controls. Enhanced recruitment of EPC's, cells that have been implicated to improve endothelial regeneration after initial vascular injury was evident even after LV recovery in patients with Takotsubo cardiomyopathy.

Left Ventricular Geometric Reconstruction

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Objective: The aim of left ventricle reconstruction, regarding all modern principles, is the maximal approximation of the intracavitary characteristics to physiological. We evaluated the results of left ventricular reconstruction in cohort of 102 patients who had undergone surgical treatment for last 10 years.

Methods:Mainly patients (79,4%) were in III-IV NYHA FC. Triple-vessel disease was observed in 51, 9% patients, double-vessel in 22, 5%, left main involvement in 10, 8%. In 55 (53, 9%) patients mural thrombi were identified. Diabetes mellitus was present in 28, 4% of the patients, lipid abnormalities in 94, 1%, hypertension in 70, 6%. Severely depressed myocardial contractility, EF≤25, was present in 26,4 % of cases, in 48 % of patients EF ranged ~ 25-40%, in 25,5% cases was ≥ 40%. Left ventricular diastolic and systolic dimensions, LV end-diastolic and end-systolic volume indexes, LV ejection fraction, sphericity index, grade of mitral regurgitation were measured by Echo and MRI.

Results:In all patients we performed circular LV restoration with autologous patch repair (V. Dor 1989). Operations were performed by 2 staff surgeons. CABG was done in all cases, average number of distal anastomosis was 2,53. Mitral valve repair was performed in 29 (28,4%). Dynamic changes of indices and parameters describing LV geometry, volumes, myocardial stiffness, chamber compliance and wall kinetics showed LV physiological shape restoration in majority of patients. The mean length of hospitalization was 12, 1 days. Hospital mortality was 5, 9 %. All 6 deaths were of cardiac origin. Actuarial survival rates at 12 months, 5 and 10 years were 97,9%, 82, 9% and 64,2% (respectively). Five-year freedom from hospital readmission for CHF was 55,2 % (53).

Conclusion:The clinical and hemodynamic effects after LV restoration can be achieved by adequate choice (individually for each patient) of the left ventricular reconstruction method.

Serum Levels of MicroRNAs in Patients with Heart Failure

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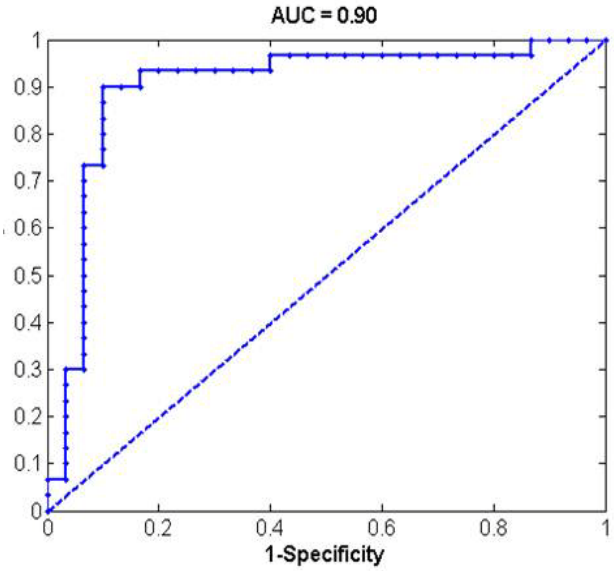

Background: Diagnosis and risk stratification of patients with heart failure remain a challenge. The small noncoding RNAs known as microRNAs, regulate gene expression and seem to play an important role in the pathogenesis of heart failure. In the current study we aim to characterize the levels of microRNAs in the sera of chronic systolic heart failure patients versus controls and assess the possible correlation between elevation in the levels of specific microRNAs and clinical prognostic parameters in heart failure patients.
Methods and results: The levels of 186 microRNAs were measured in the sera of 30 stable chronic systolic heart failure patients and 30 controls using qRT-PCR. The differences in microRNA levels between the two groups were characterized and a score, based on the levels of 4 specific microRNAs with the most significant increase in the heart failure group (miR-423-5p, miR-320a, miR-22, and miR-92b), was defined. The score was used to discriminate heart failure patients from controls with sensitivity and specificity of 90% (Image-1). Moreover, in the heart failure group, there was a significant association between the score and important clinical prognostic parameters such as elevated serum natriuretic peptide levels, wide QRS, and dilatation of the left ventricle and left atrium (r=0.63, p=3e-4; p=0.009; p=0.03; p=0.01 respectively).
Conclusions: Elevated serum levels of specific microRNAs: miR-423-5p, miR-320a, miR-22,and miR-92b, identify systolic heart failure patients and correlate with important clinical prognostic parameters.

Lung Impedance-Guided Preemptive Treatment of Chronic Heart Failure Patients in Outpatient Clinic

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Background: Decreasing re-hospitalizations for Acute Heart Failure (AHF) in patients with chronic heart failure (CHF) is an important medical and economic goal.
Aim: We evaluated the feasibility that the policy of Lung Impedance (LI) guided preemptive therapy in CHF patients followed in the outpatient clinic may decrease re-admissions for AHF and improve survival. Methods: LI was measured by a new noninvasive device based on transverse distribution of electromagnetic energy through the chest. LI decrease reflects increase in pulmonary congestion. Changes in the clinical status of patients and LI were concurrently recorded at each outpatient heart failure clinic visit (29±19 days).
Results: 163 CHF patients (72±10 years) at NYHA II/III/IV (60/73/30) were randomized to LI-guided preemptive treatment (Group 1, n=82) or to conventional therapy administered by clinical evaluation (Group 2, n=81) according to current guidelines. A LI decrease >15% from baseline was used to initiate early preventive therapy since it has been shown previously that decompensation begins at this level of LI decrease. LVEF and NT-proBNP in groups 1 and 2 at study onset were 22±7%, 5714±2421 pg/ml, and 22±6% and 5752±2501 pg/ml, respectively (p=NS). Rate of re-hospitalizations was lower in group 1 (0.57 vs. 1.02/per patients per year, $p<0.01$). More patients in group 2 were hospitalized for AHF during the follow up period than in group 2 (45 vs.32%, p=0.08). During follow up period cardiovascular mortality in group 1 was lower than in group 2 (11 vs. 24, $p<0.01$, respectively). As a result of the higher mortality in group 2, follow up time was longer in group 1 (30.7±25.5 vs. 20.7±14.7 months, $p<0.01$).
Conclusions: Noninvasive lung impedance-guided preemptive treatment of CHF patients in an outpatient clinic resulted in fewer hospitalizations for AHF and improved survival.