BB, 31% were due to failure to restart BB following hospitalization. More vigilance regarding restoration of BB usage following hospital discharge is in order.

**ABSTRACTS - Cardiac Function and Heart Failure 197A**

**POSTER SESSION**

**1108 Heart Failure: Outcomes II**

**Monday, March 08, 2004, 3:00 p.m.-5:00 p.m.**

**Morial Convention Center, Hall G**

Presentation Hour: 4:00 p.m.-5:00 p.m.

**1108-109** Low Hemoglobin Is an Independent Predictor of Adverse Fatal and Nonfatal Outcomes in Both Reduced and Preserved Systolic Function Chronic Heart Failure: Findings From the Candesartan in Heart Failure Assessment of Reduction in Mortality and Morbidity Program (CHARM)

John J. McMurray, Chim C. Lang, Karl Swedberg, Jan Östergren, Christopher B. Granger, Eric Michelson, James B. Young, Bertil Ololfson, Mark Dunlap, Salim Yusuf, Marc A. Pfeffer, for the CHARMS Investigators, Western Infirmery, Glasgow, United Kingdom

**Background:** Low hemoglobin (Hb) is associated with higher mortality in patients with chronic heart failure (CHF) and a reduced left ventricular ejection fraction (LVEF). Whether Hb is an independent predictor of survival and also predicts non-fatal outcomes is unclear. The importance of Hb in CHF and preserved LVEF is unknown.

**Methods:** The 3 CHARM trials were: i) CHARM-Alternative (n=2028); LVEF < 0.40 inhibitor of an ACE inhibitor (ACE-I) ii) CHARM-Added (n=2548); LVEF < 0.40 taking an ACE-I iii) CHARM-Preserved (n=3025); LVEF > 0.40. Patients were randomised to placebo or candesartan and followed for 37.7 months. Outcomes were compared in those with Hb ≥ median and < median (13.6g/dL).

**Results:** Unadjusted outcomes are shown in the table. In a multivariate analysis Hb was an independent predictor of outcomes in both reduced LVEF and preserved LVEF CHF. For the 2 low LVEF trials combined, the hazard ratios (HR) for > median versus < median Hb were: Death: 0.62 (95% CI: 0.51-0.75) p=0.0001; CHF hospitalization: 0.72 (0.60-0.86) p=0.0005 and death or CHF hospitalization: 0.68 (0.58-0.78) p=0.001. For CHARM-Preserved the HR were: 0.63 (0.46-0.86) p=0.004, 0.62 (0.47-0.81) p=0.0005 and 0.65 (0.52-0.81) p=0.0002, respectively.

**Conclusion in overall CHARM Programme according to whether baseline haemoglobin was above or equal to/below median**

<table>
<thead>
<tr>
<th>Outcome (%)</th>
<th>Hb &gt; median (n=1368)</th>
<th>Hb ≤ median (n=2181)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>19.0</td>
<td>27.9</td>
</tr>
<tr>
<td>CHF hospitalization</td>
<td>22.5</td>
<td>30.3</td>
</tr>
<tr>
<td>Death or CHF hospitalization</td>
<td>53.5</td>
<td>44.9</td>
</tr>
</tbody>
</table>

**1108-110** Serum Hyaluronic Acid Elevation in Patients With Decompensated Congestive Heart Failure Is Independent of Left Ventricular Systolic Function

Leonardo C. Clavino, Daniel J. Cantillon, Lingyu Chen, Lurong Zhang, Michael D. Greenberg, Cynthia M. Tracy, Georgetown University, Washington, DC

**BACKGROUND:** Hyaluronic acid (HA), an extracellular glycosaminoglycan, is elevated during hepatic hypoperfusion, edema and fibro proliferative disorders. Serum HA is 90% metabolized and excreted by the liver. We have recently demonstrated that serum HA is elevated in patients (pts) with decompensated CHF (dCHF).

**HYPOTHESIS:** Serum HA elevation in pts with clinically dCHF is independent of LV systolic function (LVSF) and CHF etiology (ischemic vs. non-ischemic), thus reflecting poor hepatic perfusion and edema.

**METHODS:** A novel enzyme linked immunosorbent assay (ELISA) was used to measure serum HA levels in two hundred pts consecutively admitted to the hospital. Fourteen pts were excluded due to chronic liver disease or renal insufficiency. All dCHF pts were symptomatic and the diagnosis confirmed by a cardiologist blinded to HA level. Based on LVSF measured by echocardiogram, gated nuclear imaging or ventriculogram dCHF pts were divided in two groups: dCHF + preserved (EF >/=40%) or dCHF + depressed LVSF (EF <40%). Ischemic cardiomyopathy was identified by the presence or absence of coronary disease in the setting of dCHF.

**RESULTS:** Admission serum HA levels were markedly elevated in pts with dCHF (259.0 ng/ml, SEM=49.5, n=32) vs. non-CHF pts (104.0 ng/ml, SEM=62, n=154), p<0.001. Serum HA levels in pts with dCHF + preserved (LVSF 348.5 ng/ml, SEM=106.2, n=14) and dCHF + depressed LVSF (189.4 ng/ml, SEM=24.4, n=18) were elevated compared to normal pts (104.0 ng/ml, SEM=62, n=154), p=0.001. The difference between dCHF with preserved and depressed LVSF was not significant (p=0.11). There was no difference in HA levels between ischemic and non-ischemic dCHF groups (293.3 ng/ml, SEM=71.9, n=21 vs. 193.3 ng/ml, SEM=41.3, n=11), p=0.27.

**CONCLUSION:** Serum hyaluronic acid level is elevated in pts with symptomatic clinically dCHF. HA elevation is independent of left ventricular systolic function and ischemic etiology. Further studies are needed to investigate the mechanisms and prognostic value of HA elevation during dCHF.

**1108-111** An Embolic Event to Death in More Than 50 Percent of Patients With Idiopathic Dilated Cardiomyopathy in End-stage Heart Failure

Antonio C. Barreto, Sr., Mucio T. Oliveve Jr, Sr., Robinson T. Munhoz, Sr., Airton R. Scipioni, Sr., Maria L. Higuchi, Jose A F Ramires, Sr., Heart Institute, (InCor), University of São Paulo Medical School, São Paulo, Brazil

**Background:** Pts with idiopathic dilated cardiomyopathy (IDC) and end stage heart failure has a worse prognosis with high mortality. Embolic events (EE) could contribute to the heart failure and bad evolution of these pts.

**Objective:** To clarify the importance of EE in the evolution of pts with IDC, we analyzed the data from necropsies of heart failure pts that died at the hospital in the last ten years. Methods: Between 1990 and 1999, 348 necropsies were performed and 118 pts had IDC. The pts mean age was 41.8 years and 74 (62.7%) were male. The echocardiogram showed a mean LV end diastolic diameter of 76.0 mm and a mean LV ejection fraction of 0.32. Results: EE were identified in 90 (76.3%) pts, 61 (51.7%) of those had pulmonary embolism (PE), 29 (24.6%) systemic embolism (SE) and 33 (14.2%) both. The great majority of EE was not diagnosis in life. Cardiac thrombus was detected in right chambers in 26 pts (22.0%) and in left chambers in 18 (24.6%). The main embolic source
was cardiac. Pts with atrial fibrillation (AF) and cardiac thrombi were more prone to present an EE. The mean heart weight was 663.3 g, with no difference between those with or without EE. There was no correlation also between LV diastolic diameter and ejection fraction and EE.

Conclusions: EE were very frequent in pts with IDC, namely more than 50% of pts with DCM that died at the hospital presented one or more EE. Our findings support the indication to anticoagulation for pts with AF and cardiac thrombi, but the degree of left ventricular dysfunction was not a good predictor of EE.

T108-I13 Flow-Mediated Vasodilatation Predicts Outcome in Patients With Chronic Heart Failure

Brietta Meyer, Martin Huelsmann, Karin Strecker, Thomas Neunteufel, Richard Pacher, Rudolf Berger, University Medical School of Vienna, Vienna, Austria

Background: Chronic heart failure (CHF) is associated with reduced endothelium-dependent, flow mediated vasodilatation (FMD). The prognostic impact of this observation, however, is unknown. The aim of the study was to assess the predictive potency of impaired FMD in patients with CHF.

Methods: 75 CHF patients with a left ventricular ejection fraction (LVEF) ≤30% despite optimized medical therapy (angiotensin converting enzyme inhibitor and angiotensin II receptor blocker 100%, beta-blocker 81%) were evaluated. Using high resolution ultrasound, FMD of the brachial artery was assessed in addition to other neurohormonal, clinical and hemodynamic variables. Age, gender, NYHA functional class, LVEF, hemodynamic variables, natriuretic peptides, medical therapy, cardiovascular risk factors and FMD were analysed for prediction of the combined endpoint death and HF in a multivariate Cox model.

Results: Up to three years, 44 patients survived, 14 patients died and 17 patients underwent urgent heart explantation (HTx). Univariate risk factors for adverse outcome were FMD (p=0.0044), log BNP (p=0.0063), log NT-terminal (Apo p=0.015), mean blood pressure (p=0.0182), NYHA class (p=0.0216) and beta-blocker therapy (p=0.0429). In the multivariate analysis, only FMD (p=0.0044) and log BNP (p=0.0308) were independently related to adverse outcome. In the Kaplan-Meier plot, significantly more patients with a FMD ≤ 5.3% (median) reached the combined endpoint compared with patients with a FMD > 5.3% (p=0.0057).

Conclusion: In CHF impaired FMD is a strong, independent predictor of adverse outcome.

T108-I14 The Relationship Between the VAS on the EQ-5D and Quality of Life in Patients With Acute Myocardial Infarction Complicated by Heart Failure

Zheng Zhang, John A. Speros, Philip Jones, William S. Weintraub, Emory University School of Medicine, Atlanta, GA, MID-America Heart Institute and the University of Missouri, Kansas, MO

Background: The EPHESUS trial was designed to evaluate the effect of eplerenone on outcomes among patients with heart failure (HF) complicating acute myocardial infarction (AMI). We sought to examine the relationship between utility and HF-related health status in this patient population.

Methods: Utility was evaluated with visual analog scale (VAS) on the EQ-5D, an instrument designed to measure patients' preference values for a wide range of standardized health states. Kansas City Cardiomyopathy Questionnaire (KCCQ), a 23-item health status measure for HF, was used to evaluate HF-related quality of life. Questionnaires were administered to 2280 patients at baseline, 1 month and 1 year.

Results: Scores for both utility and KCCQ overall summary score improved significantly from baseline at 1 and 12 months (see Table).

<table>
<thead>
<tr>
<th>Baseline</th>
<th>1 month</th>
<th>12 months</th>
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<tbody>
<tr>
<td>KCCQ scores</td>
<td>60.8 (n=1616)</td>
<td>68.8 (n=1516)</td>
</tr>
<tr>
<td>EQ-5D scores</td>
<td>59.0 (n=1551)</td>
<td>66.4 (n=1470)</td>
</tr>
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</table>

KCCQ overall summary score quartiles (<=42.3 (n=383), >42.3 to 62.5 (n=396), >62.5 to 82.3 (n=387), >82.3 (n=383)) were significantly associated with EQ-5D scores (46.4 ± 19.0, 56.1 ± 18.5, 63.5 ± 18.2, 70.1 ± 18.0; p=0.0001). Multivariate analysis adjusting for age, gender and country indicated KCCQ scores to be the strongest independent predictor of the utility scores. Improvement in 1-year utility scores was significantly correlated with improved 1-year KCCQ scores (n=45, p=0.04, n=0.01).

Conclusions: While KCCQ is an important and independent predictor of utility scores in patients with HF complicating AMI, it probably can not be used as proxy measure for utility.

T108-I15 Right Ventricular Function Recovery After Acute Myocardial Infarction: The Relation With Left Ventricular Function and Interventricular Septum Motion-The GISSI-3 Echo Substudy


Background. The pattern of right ventricular (RV) function recovery and its relation with left ventricular (LV) function changes and interventricular septum (IVS) motion in low risk patients after acute myocardial infarction (AMI) have not been assessed yet.

Methods. We studied a group of 500 patients (414 men, 60.8 ± 11.8 years) from the GISSI-3 Echo Substudy, who survived 6 months after AMI and who underwent serial echocardiograms at a mean of 38 ± 8 hours from symptom onset (S1), at hospital discharge (mean 13 ± 5 days, S2), at 6 weeks (S3), and at 6 months (S4). The echocardiograms were analyzed in the Core Laboratory by experts blinded to all clinical data. Tricuspid annular plane systolic excursion (TAPSE) was measured by 2-D echocardiography for RV systolic function assessment. The wall motion score index (WMSI) was calculated for the whole LV, global WMSI, for the IVS (S4), IVS-WMSI, and for the LV free wall (11 segments). Changes in echocardiographic parameters during follow-up (S4-S1), and the determinants of TAPSE at S1 and of TAPSE changes were calculated.

Results. There was a significant increase in TAPSE during follow-up (from 1.79 ± 0.46 cm at S1 to 1.92 ± 0.46 cm at S4, time effect: F=25, p<0.001), which was already significant at S2 (1.88 ± 0.47 cm, time effect: F=26.7, p<0.001). LV ejection fraction (LVEF) was the best correlate of TAPSE at S1 (r=0.15, p<0.001). Although at univariate analysis TAPSE changes were correlated with LVEF changes (r=0.12, p=0.008), with global WMSI changes (r = - 0.11, p=0.03), and with IVS-WMSI changes (r = - 0.12, p=0.005), by multivariate analysis IVS-WMSI changes emerged as the only independent predictor of TAPSE changes during follow-up (r = - 0.12, p=0.007).

Conclusion. In low-risk patients after AMI, recovery in RV function occurs throughout 6-month follow-up and is already significant at discharge. TAPSE is significantly related to LV ejection fraction at the stratification of patients with acute heart failure has diminished, primarily since cardiac hemodynamics showed rather poor correlation with outcome.

Methods. The purpose of the present study was to assess the predictive value of hemodynamic variables at admission in conjunction with clinical variables in 120 patients admitted with acute heart failure that underwent right heart catheterization at admission. Patients were in the placebo arms of two multicenter international studies. We assessed hemodynamic and clinical variables up to 30 days. In addition cardiac power output (CPO) was calculated as CO *mean arterial blood pressure (MAP) and expressed in Watt units.

Conclusion: Cardiac Power Output was the strongest hemodynamic predictor of recurrent heart failure events in patients admitted due to acute heart failure. Wedge pressure had no correlation with recurrent events.

T108-I16 Reduced Bone Mass in Men With Advanced Chronic Heart Failure Is Accompanied by Hyperparathyroidism, Andropenia, and Inflammation, and Predicts Poor Outcome

Ewa A. Jarzynska, Agnieszka Kus, Justyna Jakubaszko, Jackey Majda, Waldemar Banach, Stefan Anker, Piotr Ponikowski, Military Hospital, Wroclaw, Poland, National Heart and Lung Institute, London, United Kingdom

Background: Cardiac cachexia in patients (pts) with chronic heart failure (CHF) is defined as deficiency of lean and fat tissues. Bone status as marker of cachexia in CHF has not been studied.

Methods. We examined bone mineral content (BMC) in arms, legs, trunk, total body using dual energy X-ray absorptiometry in 123 consecutive male CHF pts (age: 59 ± 1 y, BMI: 25 ± 1 kg, NYHA class III/IV: 10/64/40/12) and 37 men without CHF (age: 55 ± 7 y, BMI: 23 ± 1 kg). A univariate analysis for BMC compared to BMC of age-matched healthy men, in SD was calculated.

Results. BMC of CHF pts had reduced BMC compared to BMC of healthy men (all p<0.05).

T108-I17 Cardiac Power Output Is the Only Independent Hemodynamic Predictor of Outcome in Acute Heart Failure

Rod Carter, Nir Ufeli, Loic Percheren, Edo kaluksi, Isaac Kohrin, Aline Frey, Olga Milo, Alex Bax, Shoshana Kaplan, Zvi Vered, Guillermo Torre-Amoire, Assaf-Harofeh Medical Center, Zerifin, Israel, Methodist Hospital at Baylor College of Medicine, Houston, TX

In recent years the use of right heart catheterization for the stratification of patients with acute heart failure has diminished, primarily since cardiac hemodynamics showed rather poor correlation with outcome.

Methods. The purpose of the present study was to assess the predictive value of hemodynamic variables at admission in conjunction with clinical variables in 120 patients admitted with acute heart failure that underwent right heart catheterization at admission. Patients were in the placebo arms of two multicenter international studies. We assessed hemodynamic and clinical variables up to 30 days. In addition cardiac power output (CPO) was calculated as CO *mean arterial blood pressure (MAP) and expressed in Watt units.

Conclusion: Cardiac Power Output was the strongest hemodynamic predictor of recurrent heart failure events in patients admitted due to acute heart failure. Wedge pressure had no correlation with recurrent events.