

was cardiac. Pts with atrial fibrillation (AF) and cardiac thrombus 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.

#### 1108-113 Flow-Mediated Vasodilatation Predicts Outcome in Patients With Chronic Heart Failure

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**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)  $\leq$  30% despite optimised 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 HTx in a multivariate Cox model.

**Results:** Up to three years, 44 patients survived, 14 patients died and 17 patients underwent urgent heart transplantation (HTx). Univariate risk factors for adverse outcome were FMD ( $p=0.0044$ ), log BNP ( $p=0.0063$ ), log N-terminal ANP ( $p=0.0151$ ), 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 ( $p=0.0030$ ) 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% ( $p=0.0007$ ).

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

#### 1108-114 The Relationship Between the VAS on the EQ-5D and the Kansas City Cardiomyopathy Questionnaire in Patients With Acute Myocardial Infarction Complicated by Heart Failure

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**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 analogue score (VAS) on the EQ-5D, an instrument designed to measure patients' preference values for a wide range of standardized health states. Kansas City Cardiomyopathy Questionnaires (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).

	Baseline	1 month	12 months	p value
KCCQ scores	60.8 (n=1616)	68.8 (n=1516)	78.0 (n=1229)	<0.001
EQ-5D scores	59.0 (n=1551)	66.4 (n=1470)	73.0 (n=1216)	<0.001

KCCQ overall summary score quartiles ( $\leq 42.3$  (n=383),  $>42.3$  to 62.5 (n=396),  $>62.5$  to 82.3 (n=387),  $\geq 82.3$  (n=383)) were significantly associated with EQ-5D scores (46.4 $\pm$ 19.0, 56.1 $\pm$ 18.5, 63.5 $\pm$ 18.2, 70.1 $\pm$ 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 ( $r=0.45$ ,  $p<0.0001$ ).

**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.

#### 1108-115 Right Ventricular Function Recovery After Acute Myocardial Infarction: The Relation With Left Ventricular Function and Interventricular Septum Motion-The GISSI-3 Echo Substudy

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**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  $\pm$  11.8 years) from the

GISSI-3 Echo Substudy, who survived 6 months after AMI and who underwent serial echocardiograms at a mean of 36  $\pm$  8 hours from symptom onset (S1), at hospital discharge (mean 12  $\pm$  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 (16 segments): global WMSI, for the IVS (5 segments): 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  $\pm$  0.46 cm at S1 to 1.92  $\pm$  0.46 cm at S4, time effect:  $F=25$ ,  $p<0.001$ ), which was already significant at S2 (1.88  $\pm$  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 correlated with LVEF changes ( $r=0.12$ ,  $p=0.008$ ), with global WMSI changes ( $r=-0.11$ ,  $p=0.013$ ), 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 LVEF at S1. Changes in RV function during 6-month follow-up are related to global and regional LV function changes, and best to IVS-WMSI improvement. This suggests that IVS motion itself and IVS-mediated ventricular interaction are important mechanisms of RV function improvement in this setting.

#### 1108-116 Cardiac Power Output Is the Only Independent Hemodynamic Predictor of Outcome in Acute Heart Failure

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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.

Variables	7 Days Recurrent WHF		30 Days Recurrent WHF	
	RR (95% CI)	P Value	RR (95% CI)	P Value
Age	1.3 (0.65-2.7)	0.44	1.3 (0.68-2.5)	0.42
Body Mass Index	0.79 (0.41-1.5)	0.47	0.72 (0.4-1.3)	0.3
Creatinine	0.76 (0.39-1.46)	0.41	0.64 (0.35-1.12)	0.15
Cardiac Index	0.73 (0.39-1.46)	0.41	0.74(0.39-1.4)	0.32
Cardiac Output	0.68 (0.34-1.35)	0.27	0.7 (0.37-1.3)	0.26
Cardiac Power Output	0.47 (0.24-0.93)	0.0029 #	0.55 (0.3-1.03)	0.06
Wedge Pressure	1.4 (0.69-3)	0.33	1.44 (0.7-2.6)	0.36
Peripheral Vascular resistance	1.55 (0.78-3.1)	0.21	1.4 (0.7-2.6)	0.36
Mean Arterial Blood Pressure	0.6 (0.3-1.2)	0.15	0.6 (0.3-1.2)	0.15
Sex (Female)	0.63 (0.32-1.24)	0.18	0.66 (0.35-1.2)	0.19

#### 1108-117 Reduced Bone Mass in Men With Advanced Chronic Heart Failure Is Accompanied by Hyperparathyroidism, Andropenia, and Inflammation, and Predicts Poor Outcome

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**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  $\pm$  1 y, LVEF: 31  $\pm$  1 %, NYHA class I/II/III/IV: 10/61/40/12) and 37 men without CHF (age: 55  $\pm$  1 y, LVEF: 59  $\pm$  1 %). T-score (BMC compared to BMC of young adults, in standard deviation units [SD]) and Z-score (BMC compared to BMC of age-matched healthy men, in SD) were calculated.

**Results:** CHF pts had reduced all BMC when compared to pts without CHF (all  $p<0.05$ ). CHF severity was related to reduction of all BMC (BMC/total: 3.3  $\pm$  0.1 / 3.0  $\pm$  0.1 / 2.8  $\pm$  0.1 / 2.5  $\pm$  0.1 kg, NYHA I/II/III/IV,  $r=-0.23$ ,  $p<0.01$ ), T-score (0.5  $\pm$  0.4 / -0.3  $\pm$  0.1 / -0.4

$\pm 0.2 / -1.4 \pm 0.4$  SD,  $r = -0.24$ ,  $p < 0.01$ ), Z-score ( $0.7 \pm 0.5 / -0.2 \pm 0.1 / -0.3 \pm 0.2 / -0.9 \pm 0.3$  SD,  $r = -0.22$ ,  $p < 0.01$ ). Osteopenia (T-score  $< -1.0$ ) was found in 20% and 29% pts in NYHA I-II and III-IV, respectively, and osteoporosis (T-score  $< -2.5$ ) in 9% pts in NYHA III-IV. There were no osteopenia or osteoporosis in controls. CHF pts with osteopenia or osteoporosis compared to pts with normal BMC had reduced peak  $VO_2$  ( $13.9 \pm 0.9$  vs  $16.5 \pm 0.8$  mL/kg/min), decreased fat and lean mass ( $17 \pm 1$  vs  $23 \pm 1$  kg,  $52 \pm 1$  vs  $57 \pm 1$  kg, respectively), increased C-reactive protein level ( $48 \pm 37$  vs  $13 \pm 5$  mg/L), increased parathormone level ( $113 \pm 18$  vs  $73 \pm 10$  pg/mL), reduced levels of dehydroepiandrosterone sulphate, total, free and bioavailable testosterone ( $54 \pm 10$  vs  $97 \pm 15$   $\mu$ g/dL,  $3.0 \pm 0.6$  vs  $4.5 \pm 0.3$  ng/mL,  $9 \pm 2$  vs  $16 \pm 2$  ng/dL,  $212 \pm 49$  vs  $367 \pm 36$  ng/dL, respectively) (all  $p < 0.05$ ). During the 18-month follow-up, 18 (15%) pts died. Reduced bone mass (BMC-total  $< \geq 3$  kg) was related to poor survival in univariate analysis (RR=3.7, 95%CI - 1.2-11.3,  $p < 0.05$ ), not when adjusted for NYHA class, peak  $VO_2$ .

**Conclusions.** Bone loss accompanied by reduced fat and lean mass is observed in CHF pts, in particular in advanced stages, and is related to poor outcome. Hyperparathyroidism, adrenal and gonadal andropenia, inflammation may be important in the pathogenesis of bone loss in CHF, but further studies are needed.

**1108-118 Comparative Yield of Clinical, Laboratory, Echocardiographic, and Neurohormonal Predictors of Outcome in Heart Failure Patients (Val-HeFT Data)**

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**Introduction:** Numerous variables are prognostic of HF, but not all are widely available. Val-HeFT data which contain a full complement of bedside, laboratory, echocardiographic, and neurohormonal endpoints were analyzed for comparative predictive value. **Methods:** Pooled baseline data from the history (H), physical examination (PE), and laboratory from Val-HeFT included age, sex, etiology, NYHA class, symptoms, signs, laboratory, EF and LVIDd. Except for age, continuous variables were considered above and below the median. Adjusted RR for mortality at study endpoint and 95% CI from a multivariate Cox analysis with stepwise selection are presented. **Results:** Patients with all data available (N=4284) were predominantly white, aged 63 y, males/ females=4/1, 98% NYHA class II & III, 57% ischemic etiology, EF=26.8 $\pm$ 7.2% (mean $\pm$ SD), LVIDd=6.9 $\pm$ 0.9cm. 828 patients died over 23 months follow-up. BNP, LVIDd, NE and creatinine were the strongest independent predictors of mortality. The other significant predictors were variables from the H & PE. Leg, thigh or sacral edema showed a high RR but a low prevalence; high grade of dyspnea on effort increased the RR  $> 30\%$  (table). NYHA class and EF were not statistically significant. **Conclusions:** Independent markers of mortality were findings from the H & PE, review of systems, laboratory, and M-mode echocardiography. Therefore, conventional bedside evaluation with a limited set of laboratory data can provide a powerful aggregate for predicting mortality.

Covariate	Frequency(%)	RR [95%CI]	Chi-Square	p_value
BNP $\geq$ 97 pg/mL	50	1.85 [ 1.56 - 2.15]	61	<.0001
LVIDd $\geq$ 6.8 cm	54	1.49 [1.23 - 1.72]	28	<.0001
Norepinephrine $\geq$ 394 pg/mL	50	1.39 [1.21 - 1.61]	20	<.0001
Creatinine $\geq$ 107 $\mu$ mol/L	51	1.40 [1.21 - 1.61]	20	<.0001
Edema leg/thigh/sacrum	2	2.01 [1.45 - 2.77]	18	<.0001
Digoxin prescribed	67	1.40 [1.19 - 1.65]	16	<.0001
Age $\geq$ 70y	29	1.33 [1.14 - 1.54]	14	0.0002
Ischemic Etiology	57	1.32 [1.14 - 1.54]	14	0.0002
Dyspnea on effort 3+/4+	33	1.30 [1.12 - 1.50]	12	0.0004
BB not prescribed	65	1.31 [1.12 - 1.54]	12	0.0006
Paroxysmal nocturnal dyspnea	9	1.40 [1.14 - 1.72]	10	0.0014
Systolic BP<121 mmHg	49	1.23 [1.07 - 1.42]	9	0.0032
BMI $\geq$ 22 kg/m <sup>2</sup>	10	1.32 [1.08 - 1.60]	8	0.0055

**1108-119 Clinical Outcome in Patients With Preoperative Congestive Heart Failure Undergoing Coronary Artery Bypass Graft Surgery**

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**Background:** Coronary artery bypass graft surgery (CABG) is frequently performed in patients with chronic congestive heart failure (CHF). However, there have been no large-scale studies specifically examining clinical outcome in patients with pre-operative CHF undergoing CABG.

**Methods:** We extracted data from the resource and cost accounting systems of 5 U.S and 4 Canadian hospitals on 12,017 consecutive patients undergoing CABG between 1997-2001. Of these patients 1,176 (9.8%) had pre-operative CHF, and 10,841 (90.2%) did not. We examined the post-operative length of stay (LOS) and in-hospital mortality in patients with and without CHF. We performed a log transformation of LOS data, and identified independent predictors of LOS using a multiple linear regression model. We adjusted for covariates of mortality using multivariate logistic regression.

**Results:** Patients with pre-operative CHF were older ( $69.9 \pm 9.8$  years vs.  $64.9 \pm 10.2$  years), and were more likely to be female (65.0% vs. 77.2%), to have diabetes (36.9% vs. 24.9%) and to have cerebrovascular disease (10.2% vs. 5.1%). The CHF group was also more likely to undergo non-elective CABG (69.9% vs. 55.2%) and reoperation (8.9% vs. 5.6%). Compared to patients without CHF, patients with CHF had a longer unadjusted post-operative LOS ( $11.0 \pm 0.5$  days vs.  $6.8 \pm 0.07$  days). After adjusting for clinical differences, the LOS in CHF patients was 38% longer than those without CHF (95% Confidence Interval (CI) 33-43%,  $P < 0.0001$ ). Patients with CHF also had a higher unadjusted in-hospital mortality rate compared to patients without CHF (6.0% vs. 1.3%). The adjusted odds ratio for mortality was 3.52 (95% CI 2.36-5.25,  $P < 0.0001$ ).

**Conclusions:** Compared to patients without pre-operative CHF, patients with pre-operative CHF have a longer post-operative LOS, and a more than 3-fold higher in-hospital mortality rate following CABG.

**1108-120 A Gap in Care: Heart Failure Patients Undergoing Major Noncardiac Surgery**

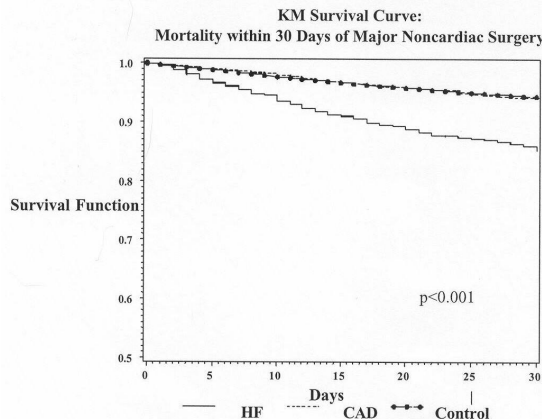
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**Background:** Perioperative care has reduced the complications in patients with coronary artery disease (CAD) undergoing major noncardiac surgery but outcomes of heart failure (HF) patients are unknown.

**Methods:** Using the 1997-98 Standard Analytic File 5% Sample of Medicare beneficiaries, we identified pts with an index HF admission. From this cohort, we identified pts with a subsequent major noncardiac surgery within one year of the index HF hospitalization. We used a multivariable logistic regression model to provide adjusted mortality and readmission rates in pts after noncardiac surgery. Patients hospitalized with CAD and later had a major noncardiac surgery as well as the remaining pts (Control) who had similar surgery served as reference groups.

**Results:** There were 23,340 HF pts and 28,710 CAD pts who were hospitalized and survived to discharge. In the next year, there were 1,532 HF pts (6.56%) and 1,757 (6.12%) CAD pts who underwent surgery. There were 44,512 pts in the Control group. After accounting for demographics and comorbid conditions, the risk adjusted inpatient and 30-day mortality in discharged pts was HF-15.8%, CAD- 8.0% and Control-7.3% ( $p < 0.001$ ). The risk-adjusted 30-day readmission rate was HF- 21.0%, CAD-14.3% and Control-11.0% ( $p < 0.001$ ).

**Conclusion:** HF patients undergoing major noncardiac surgery suffer significant morbidity and mortality despite advances in perioperative care while patients with CAD have similar mortality compared to a more general population.



**1108-121 Survival Benefit With Spironolactone Therapy Is Not Related to Reduced hsCRP Levels in Severe Congestive Heart Failure: Results From a RALES Substudy**

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In the RALES study, Spironolactone (Spiro), an aldosterone receptor antagonist, decreased mortality and morbidity in patients with severe congestive heart failure. To clarify the mechanism of action, particularly the role of inflammation on progression of heart failure and cardiovascular events, the effects of Spiro (25 mg/daily) on plasma concentrations of high sensitivity C-reactive protein (hsCRP) were assessed in a subset of 113 patients (NYHA III-IV, mean EF : 25%) at entry (T0) into study, at 3 months (T3) and at 6 months (T6) and compared the changes to the Placebo group. 54 patients were included in the Spiro group and 59 in the Placebo group. Results were expressed in mg/dL, geometric mean [95% CI] and data were compared using a Student t-test on a logtransformed scale. The hsCRP changes from baseline are expressed by the ratios T3/T0 and T6/T0 (see table).

At baseline, hsCRP levels were elevated with no significant differences between groups. During follow-up, similar hsCRP reductions from baseline were observed in Placebo and Spiro groups reaching statistical significance at T6 (-40%,  $p = 0.02$  and -41%,  $p = 0.02$ , respectively), with values close to normal. None of the between groups comparisons reached statistical significance. Thus, in this small cohort of patients with severe congestive heart failure, there was no