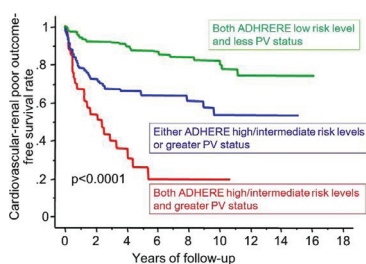


expansion plays an essential role in heart failure. Recently, it has been reported that PV is estimated by a simple formula based on hematocrit and body weight, not using radioisotope assays, and PV status provides prognostic information in ADHF patients. However, there is no information available on the long-term prognostic value of the combination of PV status and ADHERE risk level in patients admitted for ADHF.

Methods and results: We studied 301 ADHF patients discharged with survival. At admission, ADHERE risk levels were assigned by BUN (≥ 43 vs < 43 mg/dl), systolic blood pressure (≥ 115 vs < 115 mmHg), and creatinine (≥ 2.75 vs < 2.75 mg/dl). PV status was calculated as the following: Actual PV = (1-hematocrit) \times [a + (b \times body weight)] (a=1530 in males and a=864 in females, b=41 in males and b=47.9 in females), Ideal PV = c \times body weight (c=39 in males and c=40 in females), and PV status = ((actual PV-ideal PV)/ideal PV) \times 100(%). During a follow-up period of 4.8 \pm 4.2 yrs, 84 patients had cardiovascular-renal poor outcome (CVR), defined as cardiovascular death and the development of end-stage renal disease requiring renal replacement therapy. At multivariate Cox analysis, ADHERE risk levels and PV status were significantly associated with CVR, independently of serum sodium level and the prior history of heart failure hospitalization. CVR was significantly frequently observed in patients with both ADHERE high/intermediate levels and greater PV status ($\geq 7.7\%$ by ROC analysis; AUC 0.634 [0.564–0.704]) than those with either or none of them (68% vs 32% vs 16%, $p < 0.0001$, respectively). Hazard ratio for CVR in patients with both ADHERE high/intermediate levels and greater PV status was 5.8 [3.2–10.6], which was double of that in patients with either of them (2.7 [1.6–4.6]).



Conclusion: PV status would provide the additional long-term prognostic information to ADHERE risk levels in ADHF patients.

P4742 Clinical correlates and outcome of thromboembolism in takotsubo syndrome

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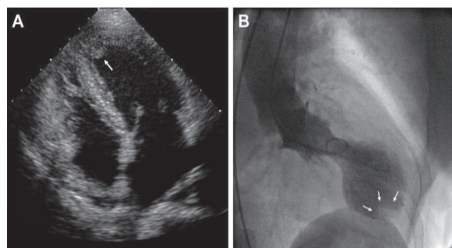
Introduction: An acute heart failure with low cardiac output in takotsubo syndrome (TTS) patients may result in thromboembolism and contribute to life-threatening complications.

Purpose: To investigate the incidence, clinical correlates and impact on outcomes of thromboembolism in a large series of TTS patients.

Methods: TTS patients were taken from an international, multicentre registry. They were assigned into two groups: I: with the occurrence of thromboembolic events caused by TTS, II: without the occurrence of thromboembolic events. Clinical characteristics were compared.

Results: Of 1676 TTS patients 59 (3.5%) presented with thromboembolism. The clinical profile of patients with thromboembolism differed from patients without: left ventricular ejection fraction (LVEF) was significantly lower (38.0% vs. 40.9%, $P=0.013$) in patients with thromboembolism. The incidence of the apical type was substantially higher (91.5% vs. 70.0%, $P < 0.001$). Troponin levels on admission (16.75 factor increase in upper limit of the normal (ULN) vs. 8.04 factor increase in ULN, $P=0.036$) were increased. White blood count on admission ($11.70 \times 10^3/\mu\text{l}$ vs. $9.66 \times 10^3/\mu\text{l}$, $P < 0.001$), as well as C-reactive protein admission values (6.70 mg/l vs. 3.80 mg/l, $P=0.011$) were elevated. A history of vascular disease was more prevalent (38.5% vs. 14.7%, $P < 0.001$).

An unfavourable in-hospital outcome for the combined endpoint, defined as a composite of cardiogenic shock, ventricular tachycardia and all-cause in-hospital death (26.3% vs. 13.0%, $P=0.004$) could be shown. The need of acute care such as invasive/non-invasive ventilation (32.2% vs. 17.0%, $P=0.002$) and catecholamine use (25.4% vs. 12.6%, $P=0.004$) was higher.



LV-thrombus in takotsubo syndrome

Conclusion: Patients suffering from thromboembolic events caused by TTS show a less favourable clinical course and in-hospital outcome. Therefore, the role of oral anticoagulation in this malady must be assessed.

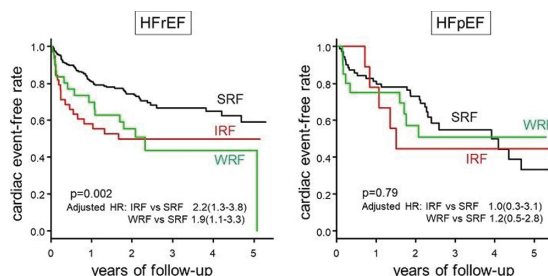
P4743 The prognostic impact of worsening and improved renal function in acute decompensated heart failure with and without reduced left ventricular ejection fraction

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Background: Recent studies showed that both worsening renal function (WRF) and improved renal function (IRF) during hospitalization are associated with poor prognosis. However, there is little information about the difference of prognostic impact of WRF and IRF in acute decompensated heart failure (ADHF) patients, relating to left ventricular ejection fraction (LVEF).

Methods: We prospectively studied 352 patients admitted for ADHF (HFref [LVEF $< 50\%$, n=252] and HFpEF [LVEF $\geq 50\%$, n=100]). Patients who needed dialysis during hospitalization were excluded. Patients were divided into three groups according to the change of serum creatinine level (sCr) from hospitalization to discharge; stable renal function (SRF; < 0.3 mg/dl absolute sCr-change), WRF (≥ 0.3 mg/dl increased sCr) and IRF (≥ 0.3 mg/dl decreased sCr). The endpoint of this study was cardiac events defined as cardiac death and readmission due to worsening heart failure.

Result: During follow up period of 2.1 \pm 1.5 years, 92 and 43 patients had cardiac events in HFref and HFpEF group, respectively. In HFref group, multivariate Cox analysis showed that WRF and IRF were independently and significantly associated with cardiac events ($p=0.03$ and 0.004 , respectively). Kaplan-Meier analysis revealed that patients with WRF or IRF were significantly higher risk of cardiac events than those with SRF. On the other hand, in HFpEF group, WRF and IRF were not independently associated with cardiac events.



Conclusion: WRF and IRF during hospitalization could predict poor outcomes in ADHF patients with reduced LVEF, not in those with preserved LVEF.

P4744 Correlation of acoustic cardiography parameters with PV loop and echocardiographic measurements in an acute porcine heart failure model

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Introduction: Acoustic cardiography involves the automated analysis of simultaneously acquired ECG and heart sounds to produce measurement of first (S1) and second (S2) heart sound intensity, diastolic third (S3) and fourth (S4) sound strength, and systolic time intervals including electromechanical activation time corrected (EMATc, Q onset to S1 interval / cardiac cycle length) and left-ventricular systolic time corrected (LVSTc, S1 to S2 interval/cardiac cycle length). Previous work has correlated these parameters with cardiac catheterization and echocardiography measurements in humans. This study investigated the correlation of acoustic cardiography parameters with pressure-volume (PV) loop and echocardiography results during changes in LV systolic and diastolic function due to balloon occlusion of the distal left circumflex artery and rapid volume overload.

Methods: Domestic pigs (50 \pm 2 kg) were anesthetized using isoflurane and ventilated. The animals were instrumented to record real-time left ventricular PV data (CD Leycom) including stroke work (SW), LV end-diastolic pressure (EDP) and ejection fraction (EF). Transesophageal Doppler sonographic transvalvular and annular mitral systolic (velocity time integral, VTI) and diastolic functional (E deceleration time, E/A ratio) and intravascular VTI of ascending flow measurements were collected. Continuous acoustic cardiography and cardiac output data were recorded. Measurements were made at baseline, during and after balloon occlusion, and during and after ≥ 3 L intravenous saline injection to produce volume overload.

Results: Balloon occlusion of the left circumflex and volume overload independently produced changes in LV systolic and diastolic function as confirmed by PV loops, intra-vascular and transesophageal echocardiography. EMATc corre-