ment of >50% according to their cardiac thoracic ratio. On TTE, 1 patient (14%) had LV wall asynergy, and 1 patient (14%) had systolic pulmonary arterial pressure of >30 mmHg. On non-ECG gated CT, 2 patients (28%) had moderate to severe coronary calcification, but no ischemia during follow-up. These finding were similar to those in patients with plasma BNP <100 pg/mL, except for the cardiac enlargement on chest X ray. However, 3 of the 7 patients (43%) with plasma BNP [3]100 pg/mL died during follow-up from non-cardiac causes, which was greater than that in patients with a plasma BNP of <100 pg/mL (12%) (P=0.03). No one died during follow-up from cardiac causes.
Conclusions: POEMS patients with elevated plasma BNP ≥100 pg/mL show cardiac enlargement on chest X ray. The cardiac enlargement was not correlated with degree of PE, LV size, systolic and diastolic function, and pulmonary hypertension. Thus, plasma BNP levels may be a predictor of POEMS syndrome.

CHRONIC HEART FAILURE – DIAGNOSTIC METHODS

P4720
Noninvasive evaluation of single-dose intravenous 5-lipoxygenase inhibitor effect on ventricular repolarization variability in patients with mild-to-moderate chronic heart failure

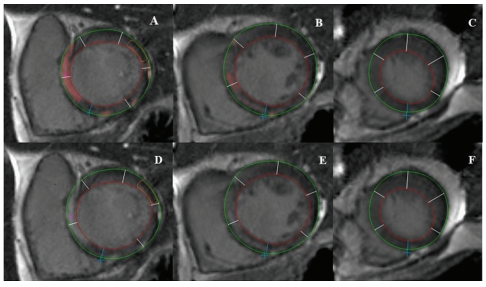
S. Kozhukhov[1], A. Parkhomenko[1], V. Sosnytskyy[2], N. Dovganych[1], T. Sosnytska[3]. *[1]NSC Institute of Cardiology, Kiev, Ukraine; [2]General Military-Medical Clinical Center, Kiev, Ukraine; [3]St. Johannisstift Ev. Krankenhaus Paderborn GmbH, Paderborn, Germany*

Background: Sudden cardiac death is a major cause of death in the growing population of patients with heart failure (HF). In addition to reduced left ventricular ejection fraction other risk markers such as abnormal repolarization or electrical instability may have better predictive value. Novel magnetocardiography (MCG) inverse approach and automated techniques were developed for imaging of cardiac spatial repolarisation dispersion (SRD) alternates.
The aim of this study was to assess the effect of intravenous 5-lipoxygenase inhibitor quercetin by evaluation of the dynamic changes of ventricular repolarization heterogeneity in patients with HF.
Methods: Eleven males' patients (mean age 67.5±2.7 years) with mild-to-moderate chronic HF (NYHA II-IV) were studied. All participants underwent a complete clinical examination, including 12-channel ECG, high-resolution ECG, echocardiography, and MCG before 20 min of infusion quercetin and were repeated after two hours of treatment. MCG was recorded by means of 9-channel MCG system in non-shielded MCG laboratory. Inverse MCG imaging at each time instant was computed for the whole duration of the heartbeat. The SRD was automatically defined as the time interval from the earliest T-wave end to the latest T-wave end by using the time evolution of current density variables map.
Results: At baseline QRS duration both in high-resolution ECG and MCG were similar and had not been changed significantly after two hours of treatment. End-systolic and end-diastolic volume indexes were also similar. Ejection fraction increased from 39.9±2.1 to 41.4±2.2%, but NS. Analyses of MGC data of the first and second measurements showed significant differences in the values of Tapex-Tend interval (156.3±15.5 vs 140.0±17.1 ms, p=0.018) and SRD (125.2±27.6 vs 61.8±19.5 ms, p<0.001). In addition, MCGs have a better capacity to identify the end point of T-wave.
Conclusions: These data confirm that Quercetin reduced the heterogeneity of ventricular repolarization in HF patients. This can positively affect the electrical and mechanical stability of the myocardium. MCG current density mapping is a promising tool for noninvasive evaluation of the dynamic changes in the cardiac electrical pathway, mainly in patients with HF and myocardial infarction.
Funding Acknowledgements: STCU and Oxford Cardiomox Ltd (UK) Partner Project grant P-624B

P4721
Association of the presence and distribution of late gadolinium enhancement on cardiovascular magnetic resonance images with ventricular tachyarrhythmia in patients with heart failure

T. Liu[1], D. Song[1], W. Liu[1], J. Zheng[2], J. Liu[3], X. Ma[4], J. Dong[1]. *[1]Beijing Anzhen Hospital, Cardiology, Beijing, [2]Second Affiliated Hospital of Sun Yat-sen University, Cardiothoracic Surgery, Guangzhou, 3China PLA General Hospital, Vascular Surgery, Beijing, [4]Beijing Anzhen Hospital, Radiology, Beijing, China People's Republic of*

Background: Late gadolinium enhancement (LGE) on cardiovascular magnetic resonance (CMR) represents myocardial fibrosis which predicts the poor progress of patients with heart failure (HF). However, an association between the characteristics of the LGE and ventricular tachyarrhythmia (VT) has not been demonstrated consistently. The aim of this study was to examine whether the presence, amount and distribution of LGE on CMR images were correlated with VT in heart failure patients.
Methods: Eighty-three heart failure patients with a left ventricular ejection fraction (LVEF) of ≤50%, and either ischemic or non-ischemic etiology, who had previously undergone cardiovascular magnetic resonance imaging, were included in this study. The presence, amount, and distribution of LGE were evaluated. Ambulatory Holter ECGs and medical records were obtained within 3 months of the CMR examination.
Results: LGE was present in 68 HF patients (81.9%). Both non-sustained (NSVT) and sustained (SVT) ventricular tachyarrhythmia were more common in patients with LGE than in those without LGE (90.7% vs 72.5%, P=0.03). Multivariate analysis for both Model I (after adjusting for age, sex, and etiology of HF) and Model II (after adjusting for age, sex, QRS duration, etiology of HF, ejection fraction, atrial -fibrillation by electrocardiogram, BUN, and serum Na+) indicated that the presence of LGE was independently related to VT (Model I odds ratio [OR] 4.94, 95% confidence interval [CI] 1.12–21.79, P=0.03; Model II OR 4.83, 95% CI 1.01–23.14, P=0.04), and that LGE distribution to the basal inferoseptal, basal inferior, and basal inferolateral segments was also independently correlated with VT (Model I OR 6.48, 95% CI 2.11–19.86, P=0.001; OR 12.37, 95% CI 2.09–73.19, P=0.006; OR 5.9, 95% CI 1.6–21.7, P=0.008; and Model II OR 6.24, 95% CI 1.88–20.73, P=0.003; OR 12.58, 95% CI 1.9–83.2, P=0.009; OR 7.9, 95% CI 1.9–32.6, P=0.004). However, the amount of LGE was similar in patients with and those without VT (LGE 2SD %Myo: 44.3±23.3 vs. 38.7±22.4; LGE 6SD %Myo: 9.9±15.56 vs. 7.4±12.9, respectively; p=0.27 vs. p=0.41).



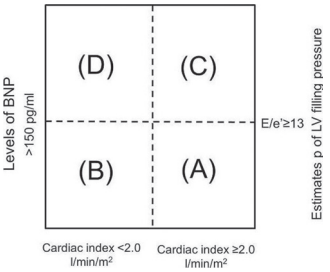
CMR images of an ICM patient

Conclusion: In HF patients (with ischemic or non-ischemic etiology), the presence of LGE was associated with a greater likelihood of VT (including NSVT and SVT) by ambulatory Holter ECG. Further, the LGE distribution of the basal inferoseptal, basal inferior, and basal inferolateral segments was also associated with VT.
Funding Acknowledgements: The National Key Research and Development Program of China (2016YFC1301002)

P4722
Echo-derived hemodynamic profiles and BNP are useful to risk stratify patients with chronic heart failure and reduced ejection fraction

N.R. Pugliese[1], I. Fabiani[1], A. D'Agostino[1], G.G. Galeotti[1], D.A. Luisi[2], G. Pestelli[2], C. Santini[1], I. Rovai[1], D. Mele[2], F.L. Dini[1]. *[1]Cisanello Hospital, Department of Cardiac-Thoracic and Vascular, Pisa, Italy; [2]University Hospital of Ferrara, Cardiac Unit, Ferrara, Italy*

Background: Doppler echocardiography is useful for noninvasive determination of left ventricular filling pressure (LVFP) by the ratio of mitral E peak velocity and averaged e' velocity (E/e') and it can also provide reliable and repeatable measures of cardiac index (CI): this information can be used to identify hemodynamic profiles. Integration of echocardiographic estimates of LVFP with B-type natriuretic peptide (BNP) circulating levels and measures of CI can be utilized to predict outcome of heart failure (HF) patients in an ambulatory setting.
Aim: We analysed different hemodynamic profiles based on echo assessment of LVFP and CI, together with BNP levels, to risk stratify patients with chronic HF and reduced ejection fraction (HFrEF).
Methods and results: A population of 310 outpatients (age: 66±12 years, EF: 33±8) with chronic HFrEF were classified according to the echo-derived hemodynamic profile: A) well-perfused, without congestion: CI ≥2.0 l/min/m^2 and E/e'<13; B) low-perfused, without congestion: CI <2.0 l/min/m^2 and E/e'<13; C) well-perfused and congested: CI ≥2.0 l/min/m^2 and E/e'≥13; D) hypo-perfused and congested: CI <2.0 l/min/m^2 and E/e'≥13. The best outcome was observed in patients with profile A (90% survival at 60-months), while profile D was associated to the worst prognosis (54%; p<0.0001). In order to assess whether the predictive value of hemodynamic profiles was improved by the assessment of BNP, patients were further stratified according to BNP levels (Figure). Patients with profile A and BNP <150 pg/ml had a 94% survival at follow-up (p<0.0001). Moreover, BNP >150 mpg/ml provided additional information (c2=51.9; p=0.005) to



Hemodynamic profile

an interactive stepwise model that included demographic and clinical parameters (c2=30.6), EF<30% (c2=37.6; p=0.003) and hemodynamic profile D (c2=48.8; p=0.007).
Conclusion: Survival analyses showed that echo-directed hemodynamic profiles and BNP significantly predict outcome in HFrEF.

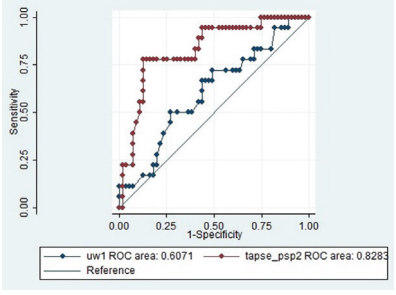
P4723
Estimation of right ventricular-arterial coupling can better predict acute right ventricular failure after heart transplantation than right heart catheterisation

E. Espinosa, I.M. Bluro, S. Sanchez Bustamante, R.G. Marenchino, M.L. Falconi, P.F. Oberti, C.A. Belziti. *Italian Hospital of Buenos Aires, Cardiology, Buenos Aires, Argentina*

Background: Elevated pulmonary vascular resistance (PVR) is a major risk factor for morbimortality after orthotopic heart transplantation (OHT), especially regarding acute right ventricular failure (RVF), and has been cited as a relative contraindication in guidelines.
Echocardiographic estimation of right ventricular-arterial coupling through TAPSE/PAPs ratio has demonstrated to be a good predictor of CV events in group 2 PH
Purpose: To evaluate the ability of TAPSE/PAPs ratio to predict RVF in adult patients undergoing OHT, in comparison with invasive hemodynamic evaluation
Methods: Retrospective, single-centre study. 134 patients who underwent OHT between 2012 and 2017 were identified. Those with incomplete data in medical records (eg.: no PAPs or TAPSE reported), multiple-organ transplantation, prior OHT or congenital heart disease were excluded. 74 patients were included in the analysis
Results: Population basal characteristics are described in table 1. Global 30-day mortality was 5.5% (n=4). No hemodynamic or echocardiographic variable was significantly associated with postoperative death. RVF was present in 24% of patients (n=18). Elevated pretransplant PAPs and PAPm, and low TAPSE/PAPs were all univariate significant predictors of RVF. PVR showed a near significant association with RVF (OR 1.42; 95% CI 0.97 - 2.08; p=0.071). TAPSE/PAPs ratio≤0.26 showed a sensitivity of 78% and specificity of 87%, and the best discrimination (AUC ROC 0.83). After multivariate analysis, TAPSE/PAPs was the only independent predictor of RVF.
The incidence of RVF was not significantly associated with 30-day mortality (11.1% vs. 3.6%; OR 3.39; 95% CI 0.44–25.8; p 0.24), but it was significantly associated with a longer need of inotropic support (3.5 vs. 2 days; p 0.01)

Table 1

Male sex	74%
Age (years)	54 (IQ 45–59)
Ischemic ethiology	27%
EF	0.23 (IQ 0.18–0.28)
PAPm (mmHg)	30±9
PVR (Wu)	2.9 (IQ 2.16–3.7)
PAWP (mmHg)	17±7
TAPSE (mm)	15±3
RV dysfunction	68%



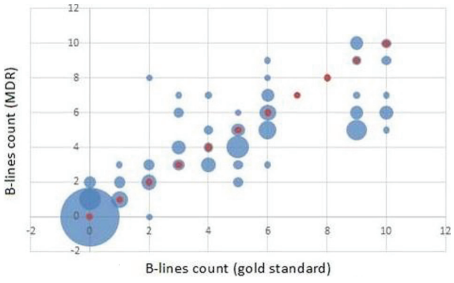
ROC curves TAPSE/PAPs vs PVR

Conclusions: TAPSE/PAPs ratio demonstrated a significantly better ability to predict RVF after OHT, when compared with hemodynamic variables obtained by right heart catheterisation

P4724
Lung ultrasound B-Lines readings by medical residents: the need of training and quality control

M.A.R. Torres[1], T.F. Texeira[1], C.C.A. Bellagamba[1], B. Iplinski[1], M.C. Scali[2], C. Carpeggiani[2], P. Colonna[2], L. Cortiggiani[2], L.C. Danzmann[1], A.I. Heidemann Junior[1], A.D. Dikic[1], Q. Ciampi[2], E. Picano[2]. *[1]Hospital de Clínicas de Porto Alegre, Porto Alegre, Brazil; [2]Institute of Clinical Physiology, CNR, Pisa, Italy*. On behalf of Stress Echocardiography 2020

Background: Lung ultrasound B-Lines (LUS) identification is presently an evolving method for identification and follow up of extravascular lung water accumulation. Although it had been increasingly used, its limitation relates to the dependency of the reading skills of the operators, necessary to levelling their report, that can impact on its diagnostic accuracy.
Purpose: We sought to determine the accuracy of an in-training group of medical residents (MDR) of various specialties that routinely use LUS everyday in bedside practice to determine presence and grading of pulmonary congestion.
Methods: Ten MDR in three University hospitals read a set of 20 video-clips of LUS of different patients. For each set they gave an answer of number of B-Lines varying from 0 (black lung, only A-Lines) to 10 (white lung, coalescent B-lines). Diagnostic reference pattern (gold standard) was considered the concordant answer of two experts in this setting and very experienced readers. The answer was considered correct if equals to gold standard ± 1 (e.g. gold-standard 5 B-lines; correct answer 4, 5 and 6). Sixty naive cardiologists qualified for B-lines reading working in 52 centers (16 countries) of a network of studies of stress echocardiography that also read the set of videos after taking an obligatory online course of 2-hours duration, also read the same set of 20-video-clips and served as the reference group for comparison of the readings of the group of MDR. Comparison between percentages of correct answers of MDR and the controls was done with t test (program WINPEPI, software version 11.65).
Results: Mean diagnostic accuracy of readings of the MDR readers (group A) and 60 quality controlled cardiologists (group B) was, respectively, 81.5% ± 0.085 and 95% ± 0.05 as compared to gold standard. Differences between mean values (group A - group B) was -13.500 (p<0.001). Another comparison, now made only between group of residents vs gold standard readings, showed that the most disagreement evidenced by higher dispersion among readers in zones with more accentuated fluid accumulation, and was smaller in regions with normal patterns of A-lines as demonstrated in balloon graph (see Figure).



Agreement between MDR and gold-standard

Conclusion: B-line assessment is simple but a standardized training, specific certification and audit are warranted to harmonize reading criteria and optimize the potentially important clinical impact of the technique.

P4725
The additive value of left ventricular global longitudinal strain in predicting cardiac death and ventricular tachyarrhythmias in patients with heart failure and reduced ejection fraction

G.G. Galeotti[1], N.R. Pugliese[1], I. Fabiani[1], R. Citro[2], P. Colonna[3], V. Manupelli[4], F. Antonini-Canterin[5], F. Benedetto[6], F.L. Dini[1]. *[1]University of Pisa, Cardiac, Thoracic and Vascular Department, Pisa, Italy; [2]University Hospital St. John of God, Salerno, Italy; [3]University of Bari, Cardiology Department, Bari, Italy; [4]University of Foggia, Cardiology Department, Foggia, Italy; [5]Riabilitation Hospital O.R.A.S, Motta di Livenza, Italy; [6]Bianchi Melacrino Morelli Hospital (BMM), Division of cardiology, Reggio Calabria, Italy*. On behalf of ULTIMATE study group of the Italian Society of Echocardiography and Cardiovascular Imaging

Background: A reduced left ventricular (LV) ejection fraction (EF) is a known predictor of ventricular tachyarrhythmias in patients with chronic heart failure (HF), but lacks in sensitivity and specificity, potentially leading to inaccurate selection of candidates to implantable cardioverter defibrillator (ICD) in primary prevention.
Purpose: We sought to investigate whether other echocardiographic parameters beyond LV EF, including LV global longitudinal strain (GLS), are valuable in the prediction of tachyarrhythmic events and cardiac death in patients with HF with reduced EF (HFrEF).
Methods and results: We enrolled 240 outpatients (mean age 66±11 years, 78% males) with HFrEF (mean EF 32±7%). 30% of them have been previously implanted with an ICD. All patients underwent a complete echocardiographic examination including GLS assessment by analyzing standard views with 2D speckle tracking technique. The end point was a composite of cardiac death and sustained ventricular tachycardia (VT) or ventricular fibrillation (VF). During a median follow up of 39 months, 30 patients died and 26 had VT/VF. Univariate predictors of the composite end point were age, estimated glomerular filtration rate, BNP, LV EF, end-diastolic and end-systolic volume indexes, GLS and the ratio of mitral E peak velocity and averaged e' velocity (E/e') ratio. In a multivariate Cox proportional hazards model, only GLS (Hazard ratio [HR] 0.84; p=0.0004) and E/e' (HR 1.04; p=0.046) resulted to be independent predictors of outcome. Receiver operating curve analyses showed that GLS ≤ -10% was the best cut-off value for outcome prediction (AUC = 0.69, p<0.0001). At Kaplan-Maier estimates, patients with GLS ≤ -10% showed the worst event free-survival (log-rank c2 =26.42; p<0.0001). GLS ≤ -10% significantly improved chi square (c2 = 21.9; p=0.001)