was scored according to 2016 ASE/EACVI criteria. Exercise oscillatory ventilation (EOV+) was chosen as a CPET marker of high filling pressure during effort. Diagnosis of HFpEF was established by a right heart catheterization (RHC) demonstrating a pulmonary artery wedge pressure (PAWP) >15 mmHg at rest and/or a PAWP≥25 mmHg at peak exercise.

Results: Between April 2016 and December 2017, 72 patients in sinus rhythm with normal left ventricular ejection fraction (68±10 years old, 68% females, BMI 27±5 kg/m^2) were evaluated. At rest, 82% of patients had either normal diastolic function or grade I diastolic dysfunction or indeterminate diastolic function, while 18% had estimation of high filling pressure (figure 1). Exercise stress echo was positive in 5 cases (7%), while diastolic function during effort resulted "indeterminate" in 93% of patients. EOV+ was found in 15 cases (21%), i.e. in 4/5 patients with positive exercise echocardiography and in 11/67 with indeterminate diastolic function at exercise. Twenty patients (26%) underwent RHC as clinically indicated, including 19 RHC during exercise (figure 1). RHC revealed HFpEF in 17 cases (85%). Notably, all patients with PAWP ≥25 mmHg at peak had also total pulmonary vascular resistance >3 mmHg/L/min at peak. Both exercise echo and EOV+ at CPET had a 100% specificity and positive predictive value to non-invasively detect HFpEF. However, sensitivity of exercise echo was only 13%, compared with 53% of EOV+ at CPET (p<0.05).

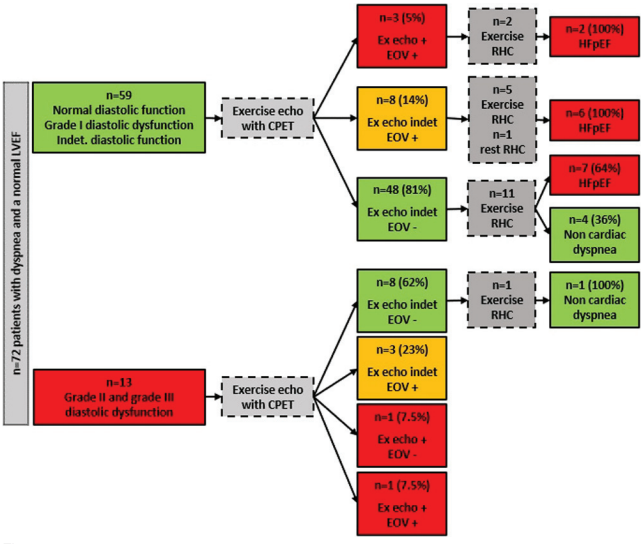

Figure 1

Conclusions: Our preliminary results: 1) confirm the limitations of echocardiography for the diagnosis of HFpEF; 2) suggest that EOV+ at CPET may have higher sensitivity than exercise echocardiography for the noninvasive detection of HFpEF, maintaining an excellent specificity.

P4705
Septal flash and rebound stretch are different entities

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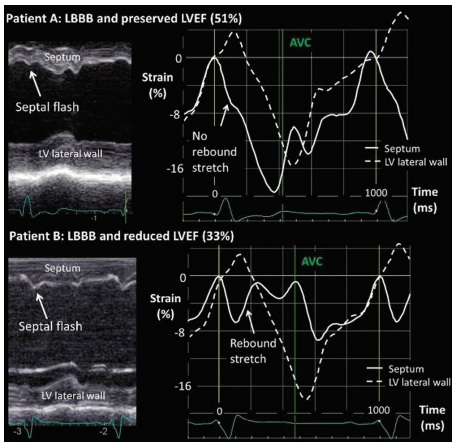
Background: Septal flash and rebound stretch are two commonly observed echocardiographic features of left bundle branch block (LBBB). Both predict response to cardiac resynchronization therapy (CRT), and have been thought to reflect the same phenomenon. Recent mathematical simulation studies, however, have indicated that they may have different underlying mechanisms.

Purpose: We aimed to investigate if septal flash and rebound stretch would appear to be different in LBBB-patients with normal and reduced ejection fraction (EF), respectively.

Methods: LBBB-patients with preserved EF (n=11) and reduced EF (n=16) underwent full echocardiographic examination. All were non-ischemic. EF was calculated by the biplane Simpson's method. Septal flash was determined visually by M-mode in the parasternal short axis view as an abnormal early systolic left-right motion of the interventricular septum. Rebound stretch was defined as a stretch during early systole following pre-ejection shortening in the septum, and was measured by strain from speckle-tracking echocardiography.

Results: EF was 56±6 and 31±5% (p<0.001) in the two groups, respectively. Septal flash was present in all patients. However, only 4 of the 11 patients with preserved EF showed rebound stretch, while 12 of the 16 patients with reduced EF did (figure). The amplitude of the stretch was also significantly lower in the group with preserved EF compared to the group with reduced EF (0.2±0.2% and 2.9±3.2%, p=0.009).



Two representative patients

Conclusions: Septal flash was evident in all LBBB-patients, independent of LV function. Rebound stretch, however, was associated with reduced LVEF. These findings support previous findings from a mathematical simulation model that septal flash and rebound stretch are different entities, although they are both features of LBBB. Future studies should investigate if rebound stretch could improve current CRT-selection criteria.

P4706
Phase-related variations in cardiopulmonary hemodynamics throughout cheyne-stokes respiration in patients with heart failure

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Background: Cheyne-Stokes respiration (CSR) is an oscillatory phenomenon; the direct effects of cyclical hyperventilation and apnea on cardiopulmonary hemodynamics have been poorly investigated.

Objectives: The aim of the study is to examine the echocardiographic changes associated with CSR phases in a group of patients with systolic heart failure (HF) and daytime CSR.

Methods: 14 HF patients (age 69.9±9.3 years, LVEF 24.4±4.9) underwent 24-hour respiratory polygraphy, chemoreflex evaluation by rebreathing technique and neuro-hormonal assessment. Furthermore, they underwent a simultaneous echocardiographic and respiratory monitoring embedding the respiratory signal in the echocardiographic machine.

Results: All patients had daytime CSR (diurnal apnea-hypopnea index, AHI: 18.5 IR 14.3–39.5 events/hour). During CSR, systolic pulmonary artery pressure and pulmonary vascular resistances (PVR) were higher during apnea compared to hyperventilation (52.4±13.8 vs 45.3±11.4 mmHg, p=0.004, and 3.4±2.5 vs A 5.3±3.2 wood units, p=0.0002, respectively), while acceleration time of the pulmonary artery was lower (92.0±19.9 vs 110.1±19.8 ms, p=0.001). During apnea a reduction of right and left ventricular outflow tract VTI (right VTI: H 12.8±4.9 versus 9.9±3.1, p=0.002; left VTI: H 26.9±8.8 versus A 22.8±7.9 mm, p=0.006) and a reduction in tricuspid annular plane systolic excursion (H 15.9±4.4 versus A 14.4±4.1 mm, p=0.005) were also observed. Notably, PVR variation strongly correlated with chemosensitivity to hypercapnia (R=0.84, p=0.005) and norepinephrine levels (R=0.83, p=0.003).

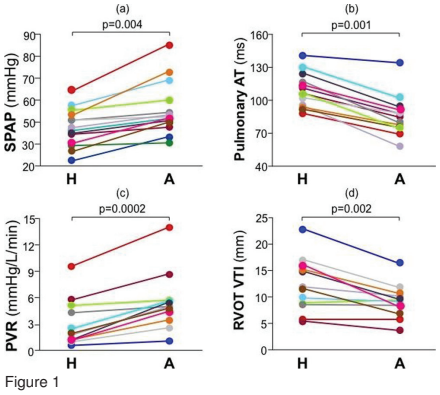

Figure 1

Conclusions: In HF patients with CSR, an increase in pulmonary pressure and pulmonary vascular resistances was observed during apnea, despite a decrease in stroke volumes. Pulmonary vasoconstriction strongly correlated with chemosensitivity to hypercapnia and adrenergic indexes.