

## P5616

## Left atrial strain improves estimation of filling pressures at rest and during exercise in heart failure

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**Aims:** Left ventricular diastolic pressure estimation is essential for characterization of heart failure (HF). Patients with normal resting left atrial (LA) pressures (LAP), but steep LAP elevation on exertion, pose a particular diagnostic challenge. Current recommendations on echocardiographic LAP estimation have limited accuracy. We hypothesized that LA mechanical alterations, assessed by LA strain (LA-GS), might contribute to non-invasive diagnostics of LAP.

**Methods and results:** 220 patients referred for right heart catheterization (RHC) due to HF symptoms were enrolled prospectively. Simultaneous echocardiography and RHC at rest and during exercise was performed. 56% had preserved ejection fraction (pEF). At rest, 97 patients displayed elevated mean pulmonary arterial wedge pressure (PAWPM); further 32 patients had normal resting- but elevated PAWPM during exercise. LA-GS demonstrated a stronger association with resting PAWPM ( $r = -0.61$ ,  $p < 0.001$ ) than any of the indices ( $E/e'$ , LAVi, TRVmax) incorporated in the currently recommended diagnostic algorithm. The diagnostic ability of LA-GS for detecting elevated resting PAWPM (AUC: 0.80,  $p < 0.001$ ) outperformed that of the recommended algorithm (AUC: 0.69). Importantly, resting LA-GS performed even better in identifying patients with pathological PAWPM either at rest or during stress (AUC: 0.90,  $p < 0.001$ ), whereas the diagnostic potential of the current algorithm was modest and limited to pEF patients (AUC= 0.72). Finally, among the noninvasive indices, LA-GS entailed the strongest prognostic value for death or heart transplantation (OR: 2.7;  $p < 0.05$ ).

**Conclusion:** LA-GS comprises a robust method for PAWPM assessment at rest. More importantly, it reliably discerns pathological PAWPM rise on exertion despite normal resting pressures.

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## P5617

## The assessment of the left ventricular diastolic function in patient after atrial septal defect closure

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**Background:** The natural history of patients after atrial septal defect (ASD) closure is not clear. On the other hands, assessment of the left ventricular diastolic function is useful to predict the prognosis of various heart disease. The purpose of this study is to assess the difference of the left ventricular diastolic function between patients with ASD closure and healthy controls.

**Method:** We studied 40 patients who underwent transcatheter ASD closure. The patients with atrial fibrillation was excluded in this study. The difference of left ventricular diastolic function was assessed in ASD closure group and healthy control group (N=922). We measured left ventricular inflow velocity, E/A, e', E/e' using conventional echocardiography six month after ASD closure. Furthermore we compared the difference of diastolic function in younger age group (<50 years) and older age group ( $\geq 50$  years).

**Results:** The average age is 33.1 $\pm$ 12.0 in ASD younger group, 66.4 $\pm$ 9.0 in ASD older group, 36.8 $\pm$ 8.0 in healthy younger group and 68.1 $\pm$ 9.8 in healthy older group.

There is no significant difference between ASD closure group and healthy control group in all parameter of left ventricular diastolic function (Table).

## Analysis of the diastolic function

	Healthy younger group	ASD younger group	p value	Healthy older group	ASD older group	p value
E	73.5 $\pm$ 16.0	77.3 $\pm$ 21.9	NS	61.2 $\pm$ 14.0	67.2 $\pm$ 19.0	NS
E/A	1.6 $\pm$ 0.5	1.7 $\pm$ 0.7	NS	0.9 $\pm$ 0.3	1.0 $\pm$ 0.4	NS
e'	14.6 $\pm$ 3.2	14.0 $\pm$ 3.9	NS	9.1 $\pm$ 2.3	8.7 $\pm$ 2.3	NS
E/e'	5.3 $\pm$ 1.5	5.8 $\pm$ 1.6	NS	7.1 $\pm$ 2.3	8.3 $\pm$ 3.2	NS

**Conclusion:** These results suggest that the left ventricular diastolic function in patient after ASD closure is same as healthy subjects.

## STRESS ECHOCARDIOGRAPHY

## P5618

## The feasibility, accuracy and reliability of fully automatic analyses of left ventricular systolic longitudinal function by pocket-size imaging device

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**Background:** Mitral annular systolic plane excursion (MAPSE) is an easy and reliable measure of global longitudinal left ventricular (LV) function. We have developed an algorithm that automatically measures MAPSE from live grey scale recordings that can be implemented on pocket-size imaging devices (PSID). Automatic measurements and interpretations of findings can assist inexperienced users when evaluating LV function. This has never been evaluated on PSID, which so far have not been able to provide quantitative assessment of LV function.

**Purpose:** We aimed to study the feasibility, accuracy and reliability of automatic measurements of MAPSE on recordings performed by PSID.

**Methods:** 20 consecutive patients at a university hospital's echocardiographic laboratory were examined first with standard echocardiography by a sonographer or cardiologist using a high-end scanner. Four separate grey scale recordings, each consisting of 3 cardiac cycles, of the LV 4-chamber view were included. Immediately after the standard echocardiography, the same user recorded the LV 4-chamber view in grey scale four separate times using a PSID.

A cardiologist experienced in echocardiography blinded to all other data, measured MAPSE in the septal and lateral mitral annulus using anatomical motion mode on the reference images, and by the fully automated algorithm in the pocket-size imaging recordings. In total, 80 pairs of recordings of the average of the lateral and septal measurements from the 20 cases were used in the analyses. The measurements of the automatic method were compared to the reference measurements by the cardiologist using high-end equipment.

**Results:** The automatic method failed in two patients, leaving 72 pairs of measurements for comparison of the methods. The fully automated method underestimated MAPSE of mean $\pm$ SD 9.7 $\pm$ 2.3 mm vs reference measurements of mean $\pm$ SD 10.8 $\pm$ 2.7 mm, respectively. There was a highly significant difference of mean $\pm$ SD 1.1 $\pm$ 1.9 mm. The lower and upper limits of agreement were -5.0 and 2.7 mm, and intraclass correlation for the absolute agreement between automatic analyses and reference method was 0.78. The within measurements coefficient of variation was mean $\pm$ SD 9.6 $\pm$ 7.6% and 7.4 $\pm$ 4.1% for the automatic method and reference, respectively (p-value for difference 0.24). As seen in Figure 1 the absolute value of the measurements did not influence the accuracy.

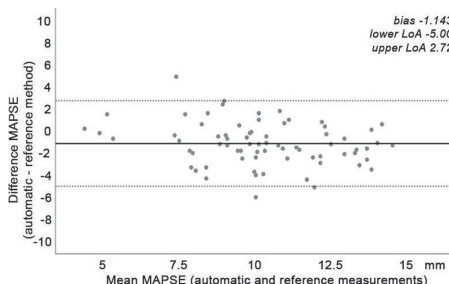


Figure 1

**Conclusion:** Fully automated quantification of LV systolic longitudinal function by grey scale recordings using PSID was feasible and reliable. The novel method yielded a small underestimation compared to reference imaging. This may allow for future quantification of LV function at the patient's point-of-care using PSID.

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## P5619

## Correlation between dobutamine stress echocardiography and invasive fractional flow reserve in patients with known moderate coronary artery stenosis

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**Background:** Dobutamine stress echocardiography (DSE) and invasive fractional flow reserve (FFR) are frequently used and accepted methods in evaluation of myocardial ischemia. There are strong evidences about the prognostic value of DSE in cardiovascular events, such as death or myocardial infarction, but similar data about FFR are equivocal.

**Purpose:** In our prospective trial, we sought to compare the DSE and FFR in patients with moderate coronary artery disease (mCAD).

**Methods:** From December 2014 to December 2016, patients were enrolled with mCAD (30–70% diameter stenosis). Enrolment was indicated by the interventional cardiologist, if mCAD was shown on the coronary angiography by visual assessment. All DSE and FFR measurements were performed within 3 months. FFR  $< 0.8$  or new wall motion abnormality in  $\geq 2$  contiguous myocardial segments on DSE was considered as abnormal. The following DSE parameters were determined: number of affected myocardial segments (AMS), affected segments' wall motion score (AMS-WMS), wall motion score index (WMSI) at rest and at peak dose of dobutamine, rest/peak WMSI ratio and delta WMSI (rest-peak). Patients