Abstract 125 – Table 1.

	STEMI % (95% CI)		NSTEMI % (95% CI)	
	Cardiologist	Cardiologist + pSU	Cardiologist	Cardiologist + pSU
Sensitivity	100% (63.1-100)	100% (63.1-100)	100% (93.6-100)	100% (93.6-100)
Specificity	100% (97.3-100)	100% (97.3-100)	55.3% (44.1-66.1)	56.5% (45.3-67.2)
PPV	100% (63.1-100)	100% (63.1-100)	59.6% (49.0-69.6)	60.2% (49.5-70.2)
NPV	100% (97.3-100)	100% (97.3-100)	100% (92.5-100)	100% (92.6-100)

The aim of our study was to evaluate the diagnostic influence provided by a pocket-size ultrasound (pSU) in addition to the usual evaluation (physical examination, troponin levels, and electrocardiogram) in patients hospitalized in cardiac unit for chest pain.

Methods Between December 2012 and December 2013, consecutive patients referred by the emergency department were hospitalized for chest pain in our cardiac care unit. They underwent physical examination, electrocardiogram, routine laboratory tests including troponin, chest X-ray and pSU. The diagnosis of the cardiologist who admitted the patient (cardiologist was compared to diagnosis of the cardiologist taking into account the pSU results (cardiologist + pSU) and to the reference diagnosis at the time of hospital discharge (final diagnosis).

Results Among one hundred forty one patients (91 men) included in our study, 34 patients (24,1%) had a history of coronary artery disease (CAD). The final diagnosis was non coronary chest pain in 80 patients (56.7%) and chest pain from proven coronary origin in 61 patients (43.3%) (8 patients (5.7%) with ST segment Elevation Myocardial Infarction (STEMI), 53 patients (37,6%) with Non-ST segment Elevation Myocardial Infarction (NSTEMI)).

Use of pSU confirmed the initial cardiologist's diagnosis in 21% (30 patients), corrected in only 1% (1 patient) and had no influence in 78% (109 patients). The use of pSU did not significantly change the cardiologists diagnosis in STEMI group and in NSTEMI group *(table 1).*

Conclusion In our study, use of a pocket-size ultrasound in patients admitted in cardiac unit for chest pain did not alter significantly the initial cardiologists diagnosis in comparison with the usual evaluation (physical examination, troponin levels, and electrocardiogramt).

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Changes in myocardial deformation assessed by 2D and 3D speckle tracking echocardiography in asymptomatic type 1 diabetic patients

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Aims In this study, we sought to assess left ventricular (LV) function using two-dimensional (2D) and three-dimensional (3D) speckle tracking echocardiography (STE) for the detection of preclinical diabetic cardiomyopathy, in asymptomatic type 1 diabetic patients, and to evaluate evolution over a 6-year follow-up.

Methods and results 66 asymptomatic type 1 diabetic patients with no cardiovascular risk factors were compared to 26 matched healthy controls. Conventional, 2D and 3D STE were performed at baseline. A subgroup of 14 patients underwent a 6-year follow-up evaluation. At baseline, diabetic patients had similar LV ejection fraction (60 vs. 61%; p=NS), but impaired longitudinal function, as assessed by 2D global longitudinal strain (GLS) (–18.9±2 vs. –20.5±2; p=0.0002) and 3D GLS (–17.5±2 vs. –19±2; p=0.003). At follow-up, diabetic patients had worsened longitudinal function compared to baseline (2D GLS: –18.4±1 vs. –19.2±1; p=0.03). Global circumferential (GCS) and radial (GRS) strains were unchanged at baseline and follow-up. Metabolic status did not correlate with GLS, whereas GCS and GRS showed a good correlation, suggestive of a compensatory increase of circumferential and radial function in advanced stages of the disease – long-term diabetes (GCS: –26±3 vs. –23.3±3; p= 0.008) and in the presence of microvascular complications (GRS: 38.8±9 vs. 34.3±8; p=0.04).

Conclusion Subclinical myocardial dysfunction can be detected by 2D and 3D STE in type 1 diabetic patients, independently of any other cardiovascular risk factors. Diabetic cardiomyopathy progression was demonstrated by a significant echocardiographic deterioration at follow-up, but did not extend to a clinical expression of the disease.

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Non-invasive multi-modality imaging evaluation of pulmonary arterial elastance in patients with pulmonary hypertension

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Introduction Effective pulmonary arterial elastance [(Ea: end-systolic pressure (ESP) /stroke volume (SV)] reflects a global measure of total afterload. In pulmonary hypertension (PH), ESP is best approximated by pulmonary artery mean pressure (mPAP). Along with SV, both are ideally assessed during right heart catheterization (RHC). Novel imaging modalities, mainly phase contrast (PC) MRI, may offer new insights in Ea estimation through non-invasive surrogates.

Purpose To test if pulmonary artery elastance can be assessed non-invasively as the ratio of mean pulmonary artery pressure issued from trans-thoracic echocardiography (TTE) to stroke volume estimated either by PC-MRI or TTE.

Methods 121 patients were evaluated for group 1 and 4 PH with multimodal imaging and RHC within 48 hours. mPAP was estimated using 2 validated methods: the Chemla's formula (mPAP=0.61 x sPAP + 2 mmHg), mean tricuspid regurgitation (TR) gradient added with estimated right atrial pressure based on inferior vena cava. Right ventricle (RV) SV was either measured by PC MRI or extrapolated from Doppler left ventricle (LV) output track SV.

Results There were good correlations and concordances between RHC and non-invasive derived Ea using TTE mPAP/MRI RV SV (TR: n=96, r2=0.805, Chemla's formula, n=100, r2=0.807). Correlations were significant but weaker when using TTE derived LV SV (TR: n=98, r2=0.630; Chemla's formula: n=102, r2=0.673).

Conclusion Ea defined as the ratio of echocardiographic mPAP (mean TR gradient or Chemla's formula) and PC-MRI SV correlated well with gold-standard RHC invasive values. Added to other parameters of RV morphology and performance, non-invasive Ea may help further estimation of right ventriculo-arterial coupling in PH.

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Diagnostic accuracy of cardiovascular screening using pocket-size ultrasound in patients with dyspnea in the emergency setting

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Purpose Dyspnea in the emergency department (ED) setting requires a rapid and accurate diagnosis to start an appropriate treatment. We aimed

to determine the diagnostic accuracy of the ED doctor, the cardiologist and the resident in cardiology using a pocket-size ultrasound (pSU) as an additional tool, versus the final diagnosis, in patients referred for dyspnea in the ED.

Methods Between February 2014 and April 2014, patients presenting at the emergency room in the ED with dyspnea were included. They underwent physical examination, ECG, routine laboratory tests including BNP and chest X-ray. The ED doctor and cardiologist gave their diagnosis based on these data. The resident in cardiology performed an examination using the pSU-pocket-size ultrasound (pUS) and gave his diagnosis, blinded from the previous diagnoses. Sensitivity, specificity, negative (NPV) and positive predictive values (PPV) of the 3 primary diagnoses, were compared to the diagnosis at the time of hospital discharge.

Results Thirty patients (18 men, 42.6 + 14.6 years) were included in this pilot study. Examination by pSUUS took 10.3 minutes (IQR= 8.7-11.4). Final diagnosis was heart failure in 20 patients, infectious pneumonitis in 2 patients, mixed cardio-respiratory decompensation in 2 patients, pulmonary embolism in 4 patients and an other diagnosis in 2 patients. For the diagnosis of heart failure, the ED doctor had a sensitivity, specificity, NPV and PPV values of 50.0, 90.0, 90.9 and 47.4% respectively; the cardiologist 80.0, 90.0, 94.1 and 69.2%; and the resident in cardiology with pocket-size ultrasound had 100, 90.0, 95.2 and 100%, respectively.

Conclusion Our pilot study demonstrated that the use of pocket-size ultrasound in patients with dyspnea in the ED improved the diagnostic accuracy of the cause of acute dyspnea. Further and larger studies are needed before implementing the care of such patients with such ultraportable devices.

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Pulmonary vascular capacitance as assessed by echocardiography in PAH

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The purpose of this study was to determine pulmonary vascular capacitance (PVC) using tricuspid regurgitation and to assess its prognostic value in pulmonary arterial hypertension (PAH).

PVC assessed by echocardiography using pulmonary regurgitation (PR) predicts mortality in PAH patients. However, the PR is not accessible in most patients whereas tricuspid regurgitation (TR) is a quite accessible flow.

Capacitance was measured as the ration of stroke volume divided by pulmonary pulse pressure (SV/PP). We retrospectively gathered data on 53 PAH and 29 chronic thromboembolic pulmonary hypertension (CTEPH) patients who underwent right heart catheterization (RHC), echocardiography and cardiac magnetic resonance (CMR) in a delay less than 48h. Non-invasive measure of PVC was correlated with invasive measure and was further analyzed as a predictor of mortality.

Non-invasive and invasive measures of PVC were well correlated ($r=0.635$; $p<0.001$) and had a good agreement. The echocardiographic PVC presented a strong negative correlation with invasive pulmonary vascular resistance (PVR) ($r=-0.679$; $p<0.001$). PVC did not predict mortality on a mean follow-up of 3.2 years. Predictors of mortality in a multivariate analysis were right atrium pressure (RAP), right ventricle myocardial performance index (RVMPI) and 6-Minute walk distance (6-MWD).

The PVC as assessed by SV/PP was easily obtained by echocardiography using TR and was well correlated with invasive measure of PVC. However, PVC did not predict mortality. RAP, RV myocardial performance index and 6MWD were only independent predictors of outcome.