Obesity effects on right ventricular function
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Objectives.— The effect of obesity on left ventricular (LV) characteristics has been previously documented, but much less is known about its effects on right ventricular (RV) function. The aim of this study is to assess the effects of obesity on right ventricular (RV) morphology and function.

Methods.— To study the effect of obesity alone, all participants underwent polysomnography to exclude sleep apnea. We included 19 healthy obese subjects (BMI > 30 kg/m²) (group 1) and 19 healthy controls (BMI < 25 kg/m²) (group 2). All included subjects had no evidence of hypertension, diabetes mellitus or ischemic heart disease. The 2 groups had similar mean ages, mean blood pressures and glucose levels. We used standard echocardiography and tissue Doppler imaging.

Results.— RV diastolic diameter, RV ejection fraction, the Tei index and pulmonary arterial pressure were similar in both groups. The tricuspid annulus systolic velocities obtained at the basal RV free wall were significantly decreased in obese subjects (7.0 ± 2.1 cm/s vs. 13.6 ± 2.3 cm/s, P < 0.01) reflecting the better sensitivity of tissue Doppler to identify subclinical RV systolic dysfunction. Also tricuspid annulus early diastolic velocities were markedly reduced in obese subjects (7.0 ± 1.8 cm/s vs. 11.1 ± 1.9 cm/s, P < 0.01) with lower ratio of early to late diastolic velocities reflecting impaired relaxation of the RV in obesity (0.69 ± 0.17 vs. 1.29 ± 0.23).

Conclusion.— Our data show the presence of subclinical RV dysfunction in obese subjects that was not related to other comorbidities such as sleep apnea. Tissue Doppler imaging is a useful tool to demonstrate RV abnormalities.

Assessing right ventricular function: Cardiac MSCT scan versus transthoracic echocardiography (TTE)
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Objectives.— Assessing right ventricular (RV) function is still a challenge. MRI is considered as gold standard but not available in many times. We used a strategy based on systematic multiparametric approach to assess RV function compared with MSCT scan evaluation known to be well correlated to MRI.

Patients and methods.— From December 2009 to April 2010, 57 patients (mean age 56.7 ± 13, male 63,15%) have been referred to our institution to perform non invasive coronary arteries angiography using 64-MSCT. Three-dimensional RV ejection fraction (RVEF) and LVEF were measured at both baseline and 6 months by echocardiography. Various parameters of the right ventricular function were measured: Simpson RVEF, surface shortening fraction, right ventricular outflow tract (RVOT %), TAPSE (mm), S’ wave with tissue doppler (S’ dti cm/s), and the Tei index. The threshold of significativity was fixed at 5%. Bisoprolol was up titred during six months by a preestablished protocol to a target dose of 10mg/Od. Mean age was 65.7 ± 16.3 years. Baseline RVEF was 25.6 ± 5.2% and baseline LVEF was 20.8 ± 6.4%. Mean Bisoprolol dose reached was 25 ± 12.5 mg daily. At 12 months, RVEF was significantly increased by 7.5% (95% confidence interval, 3.9–10.2; P = 0.0001) and LVEF also increased significantly by 7.5% (95% confidence interval, 4.0–11.9%; P = 0.0003). All the parameters of the right ventricular function were significantly improved: TAPSE (15.5 ± 12.7; P = 0.078), Doppler S’dti cm/s (10.7 vs 8.2; P = 0.002), Tei index (54.10 vs 81.45; P = 0.0008, RVOT % (27.1 vs 19.3; P = 0.036), dp/dt RV (721 vs 505; P = 0.05). The efficacy and good tolerance of bisoprolol is demonstrated in this study on chronic heart failure with right ventricular dysfunction when administered in a precise pattern.

References
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Results. — Hemodynamic conditions were similar before both exams. We found good correlations between: RVEF measured by MSCT scan and RV FAC in TTE (Rho = 0.53; P = 0.002); RV FAC measured by MSCT scan in axial view and RV FAC in TTE (Rho = 0.59; P = 0.0006); RV FAC measured by MSCT scan in apical 4 chambers view and RV FAC in TTE (Rho = 0.58; P = 0.0007); TAPSE scan measured by MSCT scan in axial view and Sa tricuspid annulus in TTE (Rho = 0.60; P = 0.0002); TAPSE scan measured by MSCT scan in apical 4 chambers view and Sa tricuspid annulus in TTE (Rho = 0.63; P < 0.0001). Assessing RV function by systematic multiparametric TTE strategy had a 50% sensibility and a 89.7% specificity to predict RVEF less than 35% in cardiac 64-MSCT scan with a 94.59% negative predictive value. Conclusion. — We showed that TTE parameters used to assess RV function had good correlations with modern parameters derived from a standard 64-MSCT cardiac scan. A systematic multiparametric strategy in TTE had a high negative predictive value of RVEF dysfunction assessed by 64-MSCT cardiac scan. The prognostic value of such a strategy should be evaluated in prospective studies in different clinical issues like risk stratification before cardiac adult surgery or after a pulmonary embolism.

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Echocardiographic assessment of the right ventricle during inferior myocardial infarction

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Objectives. — The right ventricle infarction (RVI) may complicate 40% to 50% of inferior myocardial infarction. The purpose of this study was to evaluate the contribution of echocardiography to detect right ventricle ischemia during an inferior myocardial infarction.

Patients and methods. — This is a prospective study including all patients hospitalized for a first inferior myocardial infarction (RVI group) between January 2010 and November 2010. A right ventricle infarction was defined by an ST elevation of 1 mm or more in right ventricular lead. TAPSE was obtained from an apical 4-chamber view focused on the RV and Sa tricuspid annulus in order to obtain the highest systolic velocity of tricuspid annulus and the basal RV free wall in TTE (Rho = 0.63; P < 0.0001). Among patients, the TAPSE was significantly lower in patients than healthy subjects (P group = 0.001). The movement of the tricuspid annulus T APSE was significantly lower in patients compared to healthy subjects (P group = 16.24 mm, S group = 21.32 mm, P < 0.001). Among patients, the TAPSE was significantly lower in case of RVI (RV+ = +12.22; RV− = +18.16, P < 0.001). Similarly, the systolic wave velocity at lateral wall of the tricuspid annulus was significantly reduced in patients compared to healthy subjects (P group = 12.13 cm/s, S group = 17.56 cm/s, P < 0.05), and was even lower in patients with RVI compared to the others patients (RV+ = 11.87 cm/s; RV− = 13.5 cm/s, P < 0.001).

Conclusion. — Our study demonstrates that the TAPSE and the systolic wave velocity at tricuspid annulus are simple methods for the early diagnosis of right ventricle ischemia during an inferior.

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Importance of challenging right side ventriculo-arterial interactions in advanced heart failure patients

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Objectives. — Pulmonary hypertension (PH) and right ventricular (RV) systolic dysfunction are two prognostic factors in advanced heart failure (AdHF). RV and pulmonary artery coupling is one of the main determinants of global RV systolic function. Assessment of PH reversibility is routinely performed and uses different pharmacological protocols. Conversely, RV contractile reserve response during such pharmacological challenges has not been described. Our study compared RV contractile reserve during isolated inhaled nitric oxide (INO) challenge or comprehensive pharmacological test with diuretics, nitrates and positive inotropes in AdHF patients (pts) addressed for PH reversibility testing.

Methods. — Al AdHF pts addressed in our institution for PH reversibility testing from November, 2009 till July, 2010 were screened. We included after informed consent every pts with a mean pulmonary arterial pressure (PAP) ≥ 25 mmHg. INO testing was performed after basal measurements, followed by a comprehensive pharmacological test after 15 minutes of wash-out. RV systolic function was assessed at each step from transthoracic echocardiography with TAPSE and the maximal velocity of the systolic wave of tricuspid annulus in tissue doppler (Sa), Contractile reserve was defined as the difference between post-test TAPSE or Sa and basal or post-wash out TAPSE or Sa (ΔTAPSE, ΔSa).

Results. — Nineteen pts were included. Mean left ventricular ejection fraction was 22 ±3%. Mean PAP was 40 ±6 mmHg; pulmonary vascular resistances (PVR) were 4 ±2 Wood Units. TAPSE was 14 ±5 mm, Sa was 10 ±3 cm/s, iNO had no significant effect on both PAP and PVR, and RV systolic function. Comprehensive pharmacological testing showed a significant decrease in mean PAP (−38.1, P < 0.001), PVR (−39.6, P < 0.03), and a significant RV contractile reserve (TAPSE: +22%, P < 0.004; Sa: +12%, P < 0.03). In a subgroup of 11 pts with basal Sa <10 cm/s, PAP and PVR at baseline were not different from the whole population of the study, and iNO did not reverse PH but led to a significant RV contractile reserve (ΔTAPSE: +2.5 ±2 mm; ΔSa: +1 ±0.05 cm/s). ΔSa with INO was correlated with Δsystolic PAP (r = −0.619, P = 0.04) and Δ transpulmonary pressure gradient (r = −0.533, P < 0.05).

Conclusion. — As previously described by our team, isolated INO challenge fails to prove PH reversibility in AdHF pts. However, INO induces a significant RV contractile reserve in pts with the more altered RV, which is correlated to PAP and PVR decrease. These findings underline the importance of targeting ventriculo-arterial interaction in RV failure in AdHF, particularly in the more severe pts.

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Assessing right ventricular systolic function in a population of unselected patients before cardiac surgery: A multiparametric approach is mandatory


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Background and aim. — Assessment of right ventricular (RV) function is of prognostic value in patients undergoing cardiac surgery. In recent American guidelines, 2 definitions for the diagnosis of RV dysfunction are validated: (1) peak systolic velocity during ejection period (Sa) <10 cm/s (2) RV fractional shortening (RVFS) < 35%. The aim of our study was to assess these recent recommendations in a large non-selected cohort of patients awaiting cardiac surgery.

Methods. — Two hundred and sixty seven patients (means values of age and LVEF respectively: 69 years [33–88] and 64% [10–89]) were screened. We included after informed consent every pts with a mean pulmonary arterial pressure (PAP) ≥ 25 mmHg. INO testing was performed after basal measurements, followed by a comprehensive pharmacological test after 15 minutes of wash-out. RV systolic function was assessed at each step from transthoracic echocardiography with TAPSE and the maximal velocity of the systolic wave of tricuspid annulus in tissue doppler (Sa), Contractile reserve was defined as the difference between post-test TAPSE or Sa and basal or post-wash out TAPSE or Sa (ΔTAPSE, ΔSa).

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Conclusion. — As previously described by our team, isolated INO challenge fails to prove PH reversibility in AdHF pts. However, INO induces a significant RV contractile reserve in pts with the more altered RV, which is correlated to PAP and PVR decrease. These findings underline the importance of targeting ventriculo-arterial interaction in RV failure in AdHF, particularly in the more severe pts.