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Routine evaluation of three echo-Doppler and DTI indexes provides a simple and accurate measure of right ventricular function.
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Echocardiographic assessment of the right ventricular (RV) systolic function is very difficult owing to the complex geometric shape of the ventricle. In the last years tricuspid annular plane systolic excursion (TAPSE), Doppler tissue imaging (DTI) and Doppler tissue imaging (DTI) are well validated for the assessment of RV systolic function. However, it is important to evaluate right ventricular functions in patients with chronic obstructive pulmonary disease (COPD) because of the presence of right ventricular failure has an important value on prognosis. However, all invasive and non-invasive imaging techniques which evaluate the structure and functions of the right ventricle have important limitations due to right ventricular complex geometry. Moreover, with the development of more specific invasive and non-invasive techniques which evaluate the structure and functions of the right ventricle have been proposed as useful method to assess RV function, however they have been validated in small series of cases.

Aims of this study were: a) to evaluate the routine use of these 3 echo-Doppler and DTI parameters as a measure of RV systolic function in a series of 1000 consecutive patients; b) to determine the relationship between these and other echo-Doppler RV and LV function indexes. During a routine transthoracic examination TAPSE (mm), SDTI (cm/sec) and FSA (%) were measured in the apical view and correlated with the systolic pulmonary pressure (SPP, mmHg calculated through the tricuspid velocity and inferor vena cava collapsability) and the left ventricular ejection fraction (LVEF, %). These data were compared in normal subjects (Group I, 218 cases) and patients (Group II, 782 cases).

Results: In all cases measurements of these 3 parameters were easily and rapidly obtained (mean time 3.5 ± 1.9 minutes) with a low inter- and intra-observer variability. TAPSE (20.5 ± 4.6), SDTI (16.6 ± 19.4) and FSA (50.11 ± 54.10) were significantly lower in Group 2 in comparison with Group 1. Each parameter correlated with the other two and with LVEF. TAPSE and SDTI correlated negatively to SPP. Sub-analysis of selected groups showed that in pts with inferior myocardial infarction TAPSE (18.5) and DTI (15.5) were significantly reduced without any correlation with LVEF. Interestingly, in pts after cardiac surgery TAPSE (13.2) and SDTI (12.1) were significantly lower in comparison with the pre-operative values (23.4 ± 4.001 and 20.5 ± 0.001, respectively), while FSA (from 49.5 ± 12.0 to 51.1 ± 11.5). LVEF (from 61.10 to 58.5 ± 8.9 n.s.) and SPP (34.5 ± 5 vs 33.5 ± 7 n.s.) did not change. In conclusion: a) TAPSE, SDTI and FSA may be easily and rapidly included in a routine transthoracic examination; b) TAPSE and SDTI are very sensitive indexes of RV systolic function showing changes of longitudinal shortening of the RV in pts with inferior myocardial infarction and after cardiac surgery independently on LVEF and SPP values.

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Effect of age on the right ventricular function. A Doppler tissue imaging study. The Umeå general population heart study.
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Purpose: In the Western Countries the aging population is increasing rapidly. Aging is responsible for important changes in cardiac and vascular function. Therefore, it is sometimes a great challenge to distinguish between physiological changes due to normal aging from those due to different cardiac diseases. While much is known about the effect of age on left ventricular function, little has been documented about the right ventricle. The aim of the present study was to assess the regional and global RV function in a wide population.

Methods: We studied 256 healthy individuals randomly selected from Umeå (Swe- den) General Population Register, 125 females and 131 males, mean age ± SD, 58 ± 19 (range 22-89) years. Doppler tissue imaging was used to record myocardial velocities at 3 levels across the RV free wall, basal, mid cavity and apical, taken from the apical 4-chamber view. Systolic, early (E) and late (A) diastolic velocities were measured at each segment and RV E/A ratio was calculated. Conventional Doppler filling velocities of the RV was used to assess global RV function.

Results: While systolic myocardial velocities were conserved over ages, there was a decrease in E/A ratio with age at basal (r = 0.67, p < 0.001) and mid level (r = 0.62, p < 0.001) and modest reduction at apical level (r = 0.28, p = 0.01). Similar relation was found in RV filling velocities with a reduced E/A ratio (r = 0.57, p < 0.001). Furthermore, a significant correlation was found between global and regional E/A ratio at basal (r = 0.59, p < 0.001) and mid cavity (r = 0.46, p < 0.001) but not at apical level.

Conclusions: Right ventricular function is determined mainly from its basal segment. Systolic velocities behave independently of age whereas diastolic ones seem to be age related regionally as well as globally. These differences are important when interpreting data in patients with different cardiac diseases and for the understanding of age related cardiovascular changes.

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Assessment of right ventricular functions with myocardial performance index in patients with chronic obstructive pulmonary disease. Comparative study with healthy subjects.
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It is important to evaluate right ventricular functions in patients with chronic obstructive pulmonary disease (COPD) because of the presence of right ventricular failure has an important value on prognosis. However, all invasive and non-invasive imaging techniques which evaluate the structure and functions of the right ventricle have important limitations due to right ventricular complex geometry. Moreover, the model of multiple logistic regression, which included dependent variable ‘recidivant AF’ and independent variables echocardiographic parameters as listed above, identified only the diluted RA as independent predictor of recidivant AF, with relative risk 2.18 within 95% confidence interval (0.867, 4.602).

Conclusion: compared to other patients with atrial fibrillation, patients with diluted right atrium have 2.2 times greater risk of recidivant arrhythmia, independently of other echocardiographic parameters. This may have important implications in decision-making regarding the treatment of such patients.