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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 evaluation of systolic tricuspid annular motion (SDTI) and percentage of systolic change in area in the apical four-chamber view (FSA) have been proposed as useful methods to analyse 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 inferior vena cava collapsability) and the left ventricular ejection fraction (LVEF, %). These data were compared in normal subjects (Group 1, 218 cases) and patients (Group 2, 782 cases).

Results: In all cases measurements of these 3 parameters were easily and rapidly obtained (mean time 3 min), with a low inter- and intra-observer variability. TAPSE (20±5 vs 24±6, SDTI (16±6 vs 19±4) and FSA (50±11 vs 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 mycardial infarction TAPSE (18±5) and SDTI (15±4) were significantly reduced without any correlation with LVEF. Interestingly, in pts after cardiac surgery TAPSE (13±2) and SDTI (13±2) were significantly lower in comparison with the pre-operative values (23±4, p<0.001 and 25±5, p<0.001, respectively), while FSA (from 49±5.12 to 51±11.12, p<0.001, LVEF (from 61±10 to 58±6.8 n.s.) and SPP (34.5±5 vs 53±5.7 n.s.) did not change.

In conclusion: a) TAPSE, SDTI and FSA may be easily and rapidly included in a routine echo-Doppler examination; b) TAPSE and SDTI indexes in a large series of cases showed differences in normal subjects from patients; c) 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 effect of age on right ventricular function.

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Methods: We studied 256 healthy individuals randomly selected from Umeå (Swe-den) General Population Register, 125 females and 131 males, mean age 42±12 years (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 method 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 which 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. Myocardial performance index (MPI) (Tei-index) which is a new Doppler index combining systolic and diastolic time intervals has been reported to be useful for the assessment of global right ventricular functions in adults.

The purpose of this study was to: compare the method with the conventional methods to assess the right ventricular functions and assess the correlation among respiratory function tests and arterial blood gas analysis parameters with right ventricular MPI in COPD patients.

Methods: Twenty-five patients (mean age 69±4.4 years) who have stable COPD were included to study. COPD patients were divided to 2 groups. Group I included 10 patients whose pulmonary artery pressures (PAP) -35 mmHg, group II included 15 patients whose PAP < 35 mmHg or PAP could not be measured by echocardio-graphy. Group III included healthy 16 persons (mean age 66±5.8). Right ventricular diastolic and systolic functions were evaluated with transthoracic echocardiography in groups after respiratory function tests and arterial blood gas analysis performed.

Right ventricular MPI was calculated according to following formula: MPI = izovolumetric contraction time + izovolumetric relaxation time/heart rate.

Results: Right ventricular MPI was higher in Group I (48±0.02) and II (47±8.3±0.5) than Group III (32±2.1±0.4pp-0.001). Right ventricular EF, FS, EDT and E/A ratio were not different among 3 groups. There were no correlation between right ventricular EF, FS, EDT ratio and respiratory function test and arterial blood gas analysis parameters. However, respiratory function tests and arterial blood gas analysis parameters were correlated well with MPI.

Conclusion: MPI method determined right ventricular dysfunction which could not be evaluated by conventional methods. It was determined that right ventricular dysfunction correlated with respiratory function tests and arterial blood gas analysis parameters in COPD patients.

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Right atrial dilatation is independent predictor of recidivant atrial fibrillation.

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Introduction: atrial fibrillation (AF) has most commonly been related to the dilatation of left atrium (LA), among numerous pathogenetic mechanisms. Aim of present study is to examine the relevance of the dilatation of right atrium (RA) in the genesis of AF.

Methods and Results: out of 378 patients (pts), the very first episode of nonvalvu-lar AF was present in 335 pts (group I), while 43 pts have already had intermittent AF during previous 1 to 20 years (group II). We compared the following clinical and echocardiographic features between these two groups: mean age was 54.0 years (17-78) in group I and 58.5 years (21-75) in group II. Idiopathic AF was diag-nosed in 124 pts (37.0%) and in 16 pts (37.2%) respectively. On routine transtho-racic echocardiogram (TTE) LA was normal (<4cm) in 137 pts (40.9%) of group I and in 16 pts (37.2%) of group II, RA was normal (<4.5cm) in 317 pts (94.6%) and in 37 pts (86.0%), left ventricle (LV) was not dilated in 253 pts (75.5%) and in 29 pts (67.4%), while LV ejection fraction (EF) was normal in 267 pts (79.7%) and in 29 pts (67.4%) respectively. As appeared, the group with recidivant AF (group II) was significantly older (T-test –2.418, p<0.05). These pts more commonly had decreased LVEF (Chi-square test 6.036, p<0.05) and dilated RA (Chi-square test 7.844, p<0.05). Moreover, the model of multiple logistic regression, which included all of data for 378 pts, with dependent variable ‘recidivant AF’ and independent vari-ables echocardiographic parameters as listed above, identified only the dilated RA as independent predictor of recidivant AF, with relative risk 2.18 within 95% confi-dence interval (0.7802.8.0.26072.0.0,0 0,05, RR 2.180, lower 0.9775, higher 4.8708).

Conclusions: compared to other patients with atrial fibrillation, patients with dilated 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.