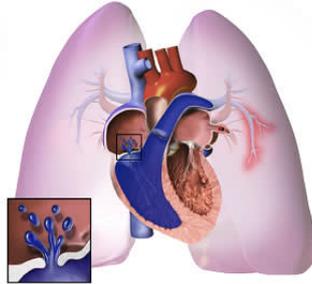

Echo indices for RVEF monitoring in pulmonary hypertension



Serial assessment of right ventricular ejection fraction (RVEF) predicts the clinical outcome of patients with pulmonary hypertension (PH). Cardiac magnetic resonance imaging (CMRI) enables RVEF monitoring, but its applicability is limited in clinical practice. In a new study, researchers assessed the correlation between changes in CMRI-derived RVEF with those in echocardiographic indices in patients with precapillary PH. They found that echocardiographic indices modestly correlated with the changes in CMRI-derived RVEF in precapillary PH patients.

The latest guidelines for PH introduce CMRI as an accurate modality for the evaluation of RV morphology and function. However, the clinical application of CMRI for RV evaluation is still limited because of the need for a dedicated facility, analysis application, expertise, and contraindications in patients with implanted devices. In contrast, echocardiography is a noninvasive and accessible modality suitable for repeated evaluation of RV morphology and function. The clinical relevance of evaluating RV function by echocardiography has also been reported in various types of PH, including pulmonary arterial hypertension (PAH), left heart disease-associated PH, and lung disease-associated PH.

In this retrospective study, researchers examined the accuracy of echocardiographic indices for monitoring RV systolic function in medically treated patients with precapillary PH. CMRI and echocardiographic indices of RV systolic function were evaluated at baseline and follow-up in 54 consecutive patients with precapillary PH (pulmonary arterial hypertension (PAH), $n = 23$; non-PAH, $n = 31$). During follow-up, medical treatment was optimised according to the guidelines for PH. Using CMRI-derived RVEF as the gold standard, researchers examined the accuracy of five echocardiographic indices by correlation analysis and receiver operating characteristic (ROC) analysis and by calculating sensitivity, specificity, and positive and negative predictive values.

After an average period of 9.5 months, CMRI-derived RVEF improved from $30.2\% \pm 10.6\%$ at baseline to $41.4\% \pm 11.3\%$ at follow-up. These changes, the researchers note, significantly correlated with those in the five echocardiographic indices, i.e., %RV fractional shortening ($r = 0.27$), %RV area change ($r = 0.46$), tricuspid annular plane systolic excursion (TAPSE) ($r = 0.84$), RV myocardial performance index (RVMPI) ($r = -0.72$), and systolic lateral tricuspid annular motion velocity (TVlat) ($r = 0.66$).

Of these indices, %RV area change, TAPSE, and TVlat significantly correlated with those of CMRI-derived RVEF in both PAH and non-PAH subgroups. ROC analysis showed that improvement in echocardiographic indices predicted a prespecified improvement in CMRI-derived RVEF ($>2.9\%$), with TAPSE and TVlat showing better accuracy over the other three indices.

"Such superiority of TAPSE and TVlat has been reported in cross-sectional studies and the present study indicated a similar promising value of the two indices for serial assessment," the authors write. "These results may be associated with the methodological features of TAPSE and TVlat measurement; these two parameters reflect longitudinal plane movement, which is more predominant in the right ventricle than in the left ventricle, which contracts predominantly along the short-axis plane."

There were several limitations to this study, including the small number of patients with diverse etiologies of PH, which may have caused inconsistent results. Also, PAH and non-PAH groups were not matched in demographics and pulmonary haemodynamics. This, along with the limited reproducibility/variability of the echocardiographic indices, may have caused inconsistent results between the two groups.

The clinical relevance of serial echocardiographic evaluation of RV systolic function in PH patients needs to be further addressed in future adequately-powered prospective studies, according to the authors.

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