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Right ventricular echocardiographic parameters for prediction of proximal right coronary artery lesion in patients with first acute inferior wall myocardial infarction

Hanan Radwan MD, Abdelhakeem Selem MD
Zagazig University, Egypt

Background: Presence of right ventricular myocardial infarction (RVMI) imposes an increased risk of shock; arrhythmia and death in inferior wall myocardial infarction (IWMI). There are only limited studies validating usefulness of various echocardiographic parameters of RV function in assessing RV infarction and prediction of proximal RCA stenosis.

Objective: We aimed to assess the validity of echocardiographic parameters assessing right ventricular (RV) function for prediction of proximal right coronary artery (RCA) stenosis in patients with first episode of acute inferior wall myocardial infarction.

Methods: This is prospective study included 128 patients with first episode of acute IWMI who present within 24 hour of onset of symptoms. Patients with previous abnormal left ventricular function; Left Bundle Branch Block (LBBB); Atrial Fibrillation (AF); paced rhythm; pulmonary hypertension > 40 mmHg; pulmonary embolism and poor echo window were excluded. All patients were subjected to the following: ECG, cardiac enzymes (CKMB) and troponin and Transthoracic Echocardiography (TTE) which was done within 24 hours of symptom onset to assess Right Ventricular (RV) systolic function using different parameters: RV fractional area change (RV-FAC), myocardial perfusion index of RV MPI – by Pulsed Wave Doppler & by Tissue Doppler Imaging which was calculated as (MPI = IVRT + IVCT/ET). , tricuspid Annular Plane Systolic Excursion (TAPSE) and DTI-Derived Tricuspid lateral annular Systolic Velocity (S wave velocity), LV dimension (ESD, EDD) and ejection fraction. Coronary angiography performed as apart of primary PCI or within one month as an elective procedure. Patients were divided into two groups, Group 1: Patients with significant proximal RCA stenosis (included 42 patients), Group 2: Patients without significant proximal RCA stenosis, (included 86 patients).

Results: Patients with proximal RCA (group 1) had significantly lower blood pressure ($p = 0.001$) and heart rate ($p=0.0218$), higher level of troponin $p = 0.009$, there were significant difference in TAPSE (12.5 ± 2.6 vs 21.1 ± 3.3, $p = 0.0001$) , RVFAC (23.8 ± 6 vs 41.6 ± 5.2 .$p = 0.0001$), MPI-PW (0.5 ± 0.07 vs 0.28 ± 0.05 , $p = 0.0001$); MPI-TDI (0.603 ± 0.06 vs 0.39 ± 0.04, $p = 0.0001$), lower S wave velocity (10.44 ± 2.61 cm/s vs. 12.11 ± 2.94 cm/s, $p = 0.013$) . A cut-off value of ≥0.557 for MPI had a sensitivity of 95.2 and specificity of 90.7% for the diagnosis proximal RCA. A cut-off value of TAPSE ≤ 16.5 had a sensitivity of 100% and specificity of 95.3% for the diagnosis proximal RCA and A cut-off value of RVFAC ≤ 34 had a sensitivity of 100% and specificity of 95.3% for the diagnosis proximal RCA.

Conclusion: RV function parameters are useful for prediction of proximal RCA stenosis in patients with acute inferior MI.

hananradwan67@yahoo.com