Poster Session

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Early measurement of left ventricular global longitudinal strain and mechanical dispersion predict left ventricular remodeling at 5 year follow up after STEMI: pilot study

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Background: Left ventricule (LV) function plays an important role in the pathophysiology of decompensation after acute ST elevation myocardial infarction (STEMI). LV remodeling (LVR) after STEMI is associated with development of heart failure, predicting poor clinical outcome therefore its identification is of clinical importance to set up preventive strategies. Prediction of the left ventricular remodeling (LVR) after STEMI in patients treated by primary PCI is challenging.

Purpose: Finding an echocardiographic parameter that can predict left ventricular remodeling in time

after STEMI.

Materials and methods: In this prospective study we included 30 consecutive patients, median age 60 (37-79), 76% male, with STEMI treated by primary PCI. We performed conventional 2D transthoracic echocardiography for all included patients. In addition to conventional parameters we measured LV global longitudinal strain (GLS) and LV mechanical dispersion using 2D speckle tracking imaging technique. For morphological and functional analysis of LV we used 3D echocardiography (volumes, LVEF) considering its superiority in assessment of LV. All measurements were performed at baseline (up to 7 days after STEMI) and at 5 year follow up. LVR was defined as an increase of over 15% of the LV end diastolic volume (LVEDV) in time, at 5 years after the STEMI.

Results: We obtained significant differences in time (up to 7 days after STEMI vs at 5 years) between 3D LVEF (46,48 vs 51,68, p = 0.002), LVEDV (97,12 vs 107,76, p = 0.000), 2D global strain (-11.76 vs - 14,1, p = 0.00), and mechanical dispersion (65,06 vs 57,66, p = 0.00) in all patients. LV remodeling at 5 years (15% increase in LVEDV) was observed in 36,6% of the included patients. At 5 years follow up, LVEDV mean value in the remodeling group was 130 ml and in the no remodeling group 90,21 ml (p = 0.002), 3D LVEF was 48,18 vs 54,42 (p = 0.05), global strain was - 12,33 vs -15,35 (p = 0.02) and LV mechanical dispersion 66,27 vs 55,55 (p = 0.05). Therefore patients with LV remodeling in time had lower LVEF, lower global strain and higher LV mechanical dispersion at baseline.

Using ROC analysis we identified two cut off values, one of -11.55 for global LV strain measured at baseline (Sb 81.8%, Sp 77%, AUC 0.776, CI 95%, p = 0.022) and the other one of 63.7 for LV mechanical dispersion at admission (Sb 72,7%, Sp 62%, AUC 0.734, p 0.05) to discriminate between patients with or without LV adverse remodeling at 5 years after STEMI. We also found, using regression analysis, that GLS and LV mechanical dispersion are able to predict LV remodeling in time.

Conclusion: Global longitudinal strain and left ventricular mechanical dispersion measured in the acute phase can predict which patient is likely to undergo LV remodeling at 5 years after STEMI. GLS and LV dispersion could be used as predictors for future LV adverse remodeling after STEMI. Larger scale studies are needed to validate these findings.