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NON INVASIVE ASSESMENT OF MYOCARDIAL WORK: AN USEFUL TOOL FOR PREDICTING LV REMODELING AFTER MYOCARDIAL INFARCTION?

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Introduction:
Left ventricular function recovery (LV-REC) or left ventricular adverse remodelling (LV-REM) after acute myocardial infarction (AMI) play an important role for identifying patients at risk of heart failure.
Purpose:
In this study we aim to evaluate the usefulness of non-invasive myocardial work (MW), a new index of global and regional myocardial performance, to predict LV-REC or LV-REM after AMI.
Methods:
Fifty patients with AMI (mean age, 63,8 ±13,4 years), treated by primary percutaneous coronary intervention (PCI), were prospectively enrolled. They underwent a baseline transthoracic Doppler echocardiography (TTE) within 48 hours after PCI and a second TTE after a median of 31 days during the follow-up. MW was derived from the strain-pressure loops, integrating in its calculation the non-invasive arterial pressure, according to standard speckle tracking echocardiography recommendations. LV-REC was defined as an absolute improvement of left ventricular ejection fraction (LVEF) $\geq$ 5% from LVEF at baseline, whereas LV-REM was defined as an increase of $\geq$ 20% of the LV end diastolic volume (LVEDV) at 1 month follow up.
Results:
We overall found a significant improvement from baseline to one-month follow-up for values of LVEF (49,8 ± 9,5 % vs 52,8±9,3 %, p = 0.001), Global Longitudinal Strain (GLS) (-13,4 ± 3,9 % vs -18,7±5,4 %, p = 0.016), Global Work Index (GWI) (1368,6 ±435,2 vs 1788 ±493 mmHg/%, p = 0.0001), Global Work Efficiency (GWE) (89,96 ± 9,3 % vs 91,3 ± 6,4 %, p = 0.001), Global Constructive Work (GCW) (1619,16 ± 497,9 mmHg/% vs 2008,6 ± 535,3 mmHg/%, p = 0.0001), Global Wasted Work (GWW) (188,8 ± 19,8 mmHg/% vs 149,2 ± 16,5 mmHg/%). However, LV-REC at 1 month of follow-up was observed only in 36 % of the population enrolled, whereas LV-REM was described in 18% of cases. Using ROC curve analysis, we identified a cut off value of 202 mmHg/% for baseline GWW (Sensitivity 75%, Specificity 62%, AUC 0.6667, CI 95%: 0,51618 - 0,81715, p =0.0001) to identify patients with LV-REM at 1 month. With regards to conventional echo parameters, patients with LV-REC showed lower baseline Wall Motion Score Index (WMSI) than those without LV-REC (1,73 vs 1,38, p = 0.007).
Conclusions:
Among standard and advanced TTE parameters, only baseline GWW is able to predict early LV-REM at 1 month after primary PCI. Therefore, it could be used during baseline evaluation of AMI patients for a more accurate stratification of those at higher risk of heart failure. However, further larger scale studies are needed to validate these findings.