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Pilot study to predict future cardio-vascular events by novel 3D-echocardiography global area strain in STEMI patients managed by primary PCI

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Background: Three-dimensional speckle tracking echocardiography (STE) is an ideal modality for accurate assessment of myocardial deformation, the Novel 4D-Global Area strain (GAS) is a very sensitive parameter in detection of subtle changes involving the myocardium as it encompasses both global longitudinal and global circumferential strains.

Objectives: To investigate the predictive value of four dimensional (4D) strain echocardiography for major adverse cardio-vascular events (MACE) in ST-elevation acute myocardial infarction (STEMI) after successful reperfusion by primary PCI.

Methods: One hundred seventy one patients who underwent successful primary PCI were enrolled and properly examined by 2D and 4D echocardiography with 4D strain parameters evaluation then followed up all-over a year for the occurrence of Major adverse Cardiovascular Events (MACE).

Results: Thirty two MACE were recorded in 170 patients who completed the follow-up period for one year, compared with those without MACE, patients with MACE had PTCA done during the index Primary PCI intervention, had multi-vessel CAD affection, higher LVEDD, higher LVESD, lower 2D- LVEF, higher WMSI, higher baseline HR, higher EDV and ESV, lower 3D- LVEF, higher 3D-GLS, 3D-GCS and 3D-GAS with lower 3D-GRS, all with p-values <0.005. Multi-variant logistic regression analysis showed that GAS was the most powerful predictor for MACE among our study population with the best cut-off value of 3D-GAS >−17, with p-value of (0.008) OR (20.668), CI (2.227–191.827) with relative risk of adverse events of 18.205 (95% CI 6.976–47.506, P value <0.001).

Conclusion: Our data supports the superiority of 4D strain echocardiography parameters specially GAS for prediction of adverse clinical events among patients managed by successful primary PCI.