PROGNOSTIC VALUE OF 3D MYOCARDIAL CONTRAST ENHANCED STRESS ECHOCARDIOGRAPHY

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Background: Patient dependent factors can limit image quality and adversely affect accuracy in Dobutamine stress echocardiography (DSE).

Methods: We included 146 consecutive patients indicated for DSE (GE Vivid-7). All patients had a standard 2D acquisition as well as 3D-triplane and full volume acquisitions with and without myocardial contrast (MCE, Sonovue, single shot 0.4 ml given at rest and peak stress) for left ventricular opacification. Chi-square test was done to assess the relationship between echo result and early revascularization. Kappa statistic was performed to assess agreement between 2D and 3D echo studies, and logistic regression analysis was done to predict late events (late percutaneous intervention, coronary bypass grafting, myocardial infarction, cardiac death) at a follow up of 36 months.

Results: The mean age was 63±12 years (61% males, BMI 26.4±4.3) and 78/146 (53%) with known coronary artery disease. Only one third of the patients had excellent image quality, which improved consistently in others after administration of echo contrast. The 2D studies showed abnormal DSE in 42/146 patients, and 57/146 abnormal DSE with 3D MCE. The kappa statistic of agreement between 2D and 3D MCE was 0.106 which is a low agreement. For the 2D DSE, early revascularization was performed in 12/42 (29%) of the abnormal studies and 16/104 (16%) of the normal studies, showing borderline significant relationship between 2D DSE result and early revascularization (X2 = 3.25, df =1, p = 0.0712). While for the 3D-MCE, none of the normal studies, and 28/57 (49%) of the abnormal studies got early revascularization showing significant relationship between 3D-MCE DSE result and early revascularization (X2 = 50.47, df =1, p < 0.0001). After correction for early revascularization logistic regression analysis did not show a significant association between the 2D DSE result and late events (p = 0.9908), while there was a significant association between 3D-MCE DSE result and late events (OR = 3.69 (95% CI 1.54 - 8.87), p = 0.0035).

Conclusion: The data showed higher diagnostic accuracy of 3D-MCE DSE compared to 2D DSE for early revascularization. The probability of a late event was higher when 3D-MCE DSE was abnormal.