IMAGING AND DIAGNOSTIC TESTING

ACCURACY OF 64 SLICE CARDIAC COMPUTED TOMOGRAPHY ANGIOGRAPHY TO DETECT MYOCARDIAL INFARCTS

ACC Poster Contributions
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Background: Hypoenhanced regions on Cardiac CT Angiography (CCTA) correlate with myocardial hypoperfusion. In addition to a limited capillary density, chronic myocardial infarction (MI) commonly contains a considerable amount of adipose tissue. Our study evaluates the ability of 64 slice CCTA to detect presence of infarction as compared to nuclear myocardial perfusion imaging (MPI).

Methods: 140 symptomatic patients (age 66±12 years, 64% male) with irreversible perfusion defect (n=69) or normal/reversible perfusion defect (n=71) on MPI underwent CCTA for further evaluation. MI on CCTA was detected visually based on areas of hypo-attenuation (dark) in the myocardium and corresponding Hounsfield units (HU) in septal, antero-apical, lateral and inferior left ventricular myocardial segments were measured. The volume of infarct was also measured on CCTA.

Results: CCTA accurately detected chronic MI in 62 patients with irreversible perfusion defect on MPI yielding a sensitivity of 90%, specificity of 94%, negative predictive value (NPV) of 91% and a positive predictive value (PPV) of 94%. The mean HU of normal and infarcted LV myocardium was 55±53 and 28±55, respectively (p<0.001). LV myocardium HU detected myocardial scar with good diagnostic accuracy (AUC of the ROC curve 0.71; 95% CI 0.64-0.77), and HU above a cut-off of 28 detected presence of myocardial scar with 86% sensitivity and 59% specificity. The infarct volume measured by CCTA correlated well with the Summed Rest score (r=0.529; p<0.001) and Summed Stress score (r=0.472; p<0.001) on MPI. In a subgroup of 31 patients with clinical MI, hypo-attenuation on CCTA was present in 23 patients (sensitivity 74%). MPI showed an irreversible perfusion defect in 25 of these patients.

Conclusion: CCTA is highly accurate in detecting and quantifying MI, highlighting its novel clinical utility in addition to assessment of plaque burden and stenosis, at no additional radiation or contrast exposure to the patient. Further prospective studies are warranted to evaluate the role of CT scanning in infarct assessment for the management of at risk patients.