Abstract: 1175

Comparison of fractional myocardial mass, a vessel-specific myocardial mass-at-risk, with coronary angiographic scoring systems for predicting myocardial ischemia

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Topic(s):
Imaging: Coronary Artery Disease

Citation:
Aims The burden of coronary artery disease has been assessed by various semi-quantitative angiographic scores, which are frequently different each other. A non-invasive and quantitative modality may substitute angiographic scores for prognostic implication and decision of revascularization strategy. We compared fractional myocardial mass (FMM) with angiographic scores for predicting myocardial ischemia.

Methods In this multicenter registry, 411 patients who underwent coronary computed tomography angiography (CCTA) were followed by invasive coronary angiography and FFR measurement. CCTA–derived %FMM with diameter stenosis =70% (%FMM-70) or =50% (%FMM-50) were compared with 9 angiographic scores (APPROACH, Duke Jeopardy, BARI, CASS, SYNTAX, Jenkins, BCIS-1, Leaman, Modified Duke) and were tested regarding their performance for predicting FFR=0.80. Predictive performance of %FMM or angiographic scores for FFR = 0.80 established in derivation cohort (N=250) and tested in validation cohort (N=161).

Results The performance of %FMM-70 and %FMM-50 were similar to most angiographic scores (%FMM-70, c-statistics=0.76; %FMM-50, 0.71; angiographic scores, 0.68 – 0.79). The frequency of FFR=0.80 increased consistently according to %FMM-70, %FMM-50, and all angiographic scores (p<0.001, all). The optimal cutoff of %FMM-50 and %FMM-70 for FFR=0.80 were =34.5% and =9.8%, respectively. The sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of %FMM-50 were 83%, 56%, 73%, 70%, 72%, and of %FMM-70 were 72%, 78%, 75%, 75%, and 75% using these cutoffs. Validation cohort showed consistent results.

Conclusion %FMM correlated well with angiographic scores and had a potential to be used as a non-invasive alternative to the angiographic scores. The integration of the severity of stenosis and the amount of subtended myocardium may improve the detection of clinically significant coronary artery stenosis.
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