Utility of fractional flow reserve computed tomography angiography in patients with stable coronary artery disease

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Introduction: Coronary CT angiography (CTA) has been established as an effective non-invasive modality for evaluation of patients with low-intermediate pretest probability of coronary artery disease (CAD). The utility of CTA is limited due to certain lesion characteristics. Fractional Flow Reserve Computed Tomography (FFRCT) may be useful in these situations, however the association of FFRCT with clinical outcomes has not been well established. The purpose of this study is to evaluate the association of FFRCT with clinical outcomes in patients with stable coronary artery disease.

Methods: A literature search was conducted for studies reporting the association between FFRCT measurements and all-cause mortality, major adverse cardiac events (MACE), acute myocardial infarction (AMI), and need for revascularization. FFRCT value of \( \leq 0.80 \) was considered positive, FFRCT value \( >0.80 \) was considered negative. The search included the following databases: Ovid MEDLINE, EMBASE, Web of Science, and Google Scholar. The search was not restricted to time or publication status.

Results: A total of 10 studies with 10919 patients with stable CAD (6919 FFRCT positive vs 4000 FFRCT negative) were included; mean follow-up was 17 months (ranging 3-56 months). There was no difference in risk of all-cause mortality in patients with FFRCT positive lesions compared to FFRCT negative lesions (OR 1.53, 95% CI 0.62-3.79; \( p=0.35 \)). However, FFRCT positive lesions were associated with increased risk of MACE, AMI, and need for revascularization with PCI or CABG (OR 2.37, 95% CI 1.48-3.80; \( p<0.01 \); OR 4.6, 95% CI 1.58-13.41; \( p<0.01 \); OR 9.56, 95% CI 3.18-28.71; \( p<0.01 \)). The overall incidence of revascularization in FFRCT negative patients was low compared to FFRCT positive patients (2.8% vs 31.7%).

Conclusion: FFRCT is a useful adjunctive modality for further risk stratification of patients with stable CAD. FFRCT positive lesions are associated with increased risk of MACE, AMI, and coronary lesions requiring revascularization.
Figure 1