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 (FFR-CT) may be useful in these situations, however the association of FFR-CT with clinical outcomes has not been well established. The purpose of this study is to evaluate the association of FFR-CT with clinical outcomes in patients with stable coronary artery disease.

Methods: A literature search was conducted for studies reporting the association between FFR-CT measurements and all-cause mortality, major adverse cardiac events (MACE), acute myocardial infarction (AMI), and need for revascularization. FFR-CT value of ≤0.80 was considered positive, FFR-CT 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 FFR-CT positive vs 4000 FFR-CT 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 FFR-CT positive lesions compared to FFR-CT negative lesions (OR 1.53, 95% CI 0.62-3.79; p=0.35). However, FFR-CT 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 FFR-CT negative patients was low compared to FFR-CT positive patients (2.8% vs 31.7%).

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