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The correlation between Quantitative Flow Ratio (QFR) and Fractional Flow Reserve (FFR)

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Purpose: Fractional Flow Reserve (FFR) is an indispensable device to identify coronary stenoses causing myocardial ischemia. But FFR is more invasive than coronary angiography and require additional cost, time and efforts. Quantitative Flow Ratio (QFR) is a novel method for rapid computation of FFR with three-dimensional quantitative coronary angiography (QCA). The aim of this study was to investigate the correlation between QFR and wire-based FFR in patients with intermediate coronary stenosis. Method: We enrolled 73 vessels (35 left anterior descending (LAD) arteries, 17 left circumflex arteries, 21 right coronary arteries) in 49 patients with stable coronary artery disease who had intermediate coronary stenosis on coronary angiography and underwent wire-based FFR measurements. QFR was computed based on the vessel anatomy and TIMI (Thrombolysis In Myocardial Infarction) frame count. Pearson correlation was used to quantify the correlation between FFR and QFR. Result: QFR correlated well with FFR ($r = 0.69$, $p < 0.005$). In LAD lesion, better correlation between QFR and FFR was observed ($r = 0.76$, $p < 0.001$) than that in non-LAD lesion ($r = 0.61$, $p < 0.005$). QFR < 0.80 predicted an FFR < 0.80 with sensitivity of 82%, specificity of 79%, positive predictive value of 82%, and negative predictive value of 79%. Conclusion: QFR can reliably predict coronary lesions causing myocardial ischemia. It may emerge as a safe, efficient, and cost-reducing device for evaluation of coronary stenoses severity during diagnostic coronary angiography.