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Performance or iFR compared to FFR in evaluating intermediate lesion patients: a real-world single center prospective experience

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Background: iFR has been compared to FFR in evaluating intermediate lesions. We aimed to confirm iFR and FFR agreement and identify its most useful and accurate cutoff value in a series of consecutive patients referred for elective PCI to a single high-volume center.
Methods: Both iFR and FFR were performed in intermediate lesions (50-70%). Hyperaemia was induced by intracoronary adenosine. Receiver operating characteristic (ROC) curves were used to assess the accuracy of the most-accepted cutoff points for iFR (0.86 and 0.89) in predicting positive FFR using both DEFER and FAME thresholds (0.75 or 0.80). Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) were determined. Patients were treated according to FFR results.
Results: 53 patients (77% males) were included (89 lesions). The mean age was 68 ±11 years. Clinical presentation was stable angina in (63%) or NSTE-ACS (37%). Most patients (89%) had multivessel disease. Mean diameter stenosis at quantitative coronary analysis (QCA) was 62±9%. The best cut-off points for iFR and FFR were identified in 0.89 (iFR) and 0.80 (FFR), with both sensitivity and NPV of 100%; specificity was 87% and PPV 78%. According to these cutoffs 43 lesions (48%) had positive iFR and only 7 of them had discordant FFR. General agreement between the two techniques was good (R=0.84; p< 0.0001). At ROC analysis the area under the curve approximated the unity (0.96) with a sensitivity of 98% and specificity of 72%. The Bland-Altman plot clarifies these results, with a mean difference between the FFR and iFR values of 0.02 ± 0.11. According to FFR result, PCI was perfomed in 23 patients (43%), and deferred in the rest. At clinical follow up (ranging from 3 to 8 months), all patients remained asymptomatic from angina pectoris and none of them experienced major adverse cardiovascular events.
Conclusions: These data support the significant correlation between the two iFR and FFR in real-world elective patients and confirm that 0.89 iFR cutoff is optimal in predicting FFR positivity with a threshold of 0.80. Large clinically-oriented trials will be essential to support its everyday use in the cath-lab decision making process.

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Comparison of Fractional Flow Reserve, Instantaneous Wave-Free Ratio, and Hyperemic Instantaneous Wave-Free Ratio Values in Patients with Intermediate Coronary Stenosis

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Background: Coronary pressure-derived indices, such as fractional flow reserve (FFR) and instantaneous wave-free ration (iFR), are based on the fundamental principle that the trans-lesional pressure ratio approximates coronary flow when microvascular resistance is minimized. Then, physiologic indices calculated by distal coronary pressure divided by proximal coronary pressure should be the lowest to assess coronary flow and myocardial ischemia. The aim of this study was to test the hypothesis that hyperemic iFR calculated by hyperemic coronary pressure in diastole would be lower than both FFR by hyperemic averaged coronary pressure over the entire cardiac cycle and iFR by diastolic coronary pressure without hyperemia when assessing the same coronary stenosis.
Methods: We measured three physiological indices of FFR, iFR and hyperemic iFR in 35 intermediate coronary stenoses of 20 patients.
Results: Mean value of hyperemic iFR was the lowest among three physiological indices (FFR = 0.79 ± 0.14, iFR = 0.85 ± 0.19, hyperemic iFR = 0.68 ± 0.20, respectively, p < 0.001). Hyperemic iFR value was lower than iFR in 34 of 35 (97%) and than FFR in 33 of 35 (94%) lesions.
Conclusions: Hyperemic iFR was the lowest among FFR, iFR, hyperemic iFR in assessing the same intermediate coronary stenosis. Microvascular resistance was thought to be minimized in diastole with hyperemia. Physiological index measured during diastole with hyperemia such as hyperemic iFR is the most theoretically relevant pressure-derived index to evaluate coronary flow in patients with intermediate coronary stenosis.
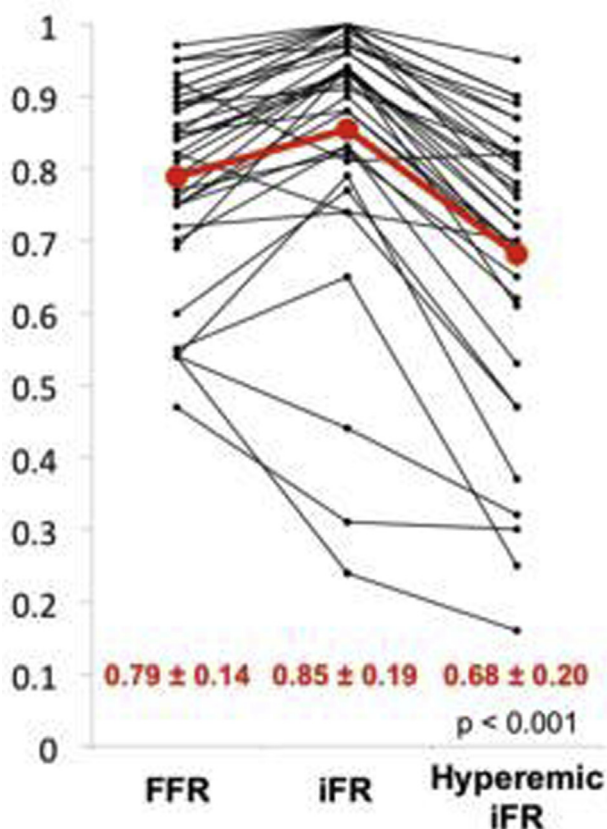
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Assessment Of Stent Edge Dissections By Fractional Flow Reserve

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Background: Edge dissections after stent implantations have been assessed by various imaging modalities such as coronary angiography, intravascular ultrasound, and optical coherence tomography. However, physiologic assessment and fractional flow reserve (FFR)-based decision making for stent edge dissections have not been evaluated. We sought to investigate the relation between FFR and angiographic type of edge dissections and to assess the outcomes of FFR-guided decision making in patients with edge dissections after stent implantation.
Methods: Fifty-one stent edge dissections assessed by FFR were included in this study. The measured FFR values were evaluated for each type of edge dissections and compared with quantitative coronary angiographic findings. Clinical outcomes according to the FFR guided decision making were evaluated.
Results: Dissections were classified as type A in 47.1% (24 of 51), type B in 41.2% (21 of 51), type C in 2.0% (1 of 51), and type D in 9.8% (5 of 51). Dissections found in stent proximal and stent distal were 25.5% (13 of 51) and 74.5% (38 of 51), respectively. The FFR values for type A to type D were 0.87 ± 0.09, 0.86 ± 0.07, 0.72 and 0.57 ± 0.08, respectively. All type C and D dissections (7 of 51) had FFR value of ≤ 0.8 and treated with additional stent. For FFR > 0.8, all dissections were left untreated except one case which had long dissection. There were no major adverse cardiac events (death, myocardial infarction and target lesion revascularization) during the hospitalization and at the follow-up of median 217 days (IQR 42-354 days).
Conclusions: FFR is well correlated with the angiographic type of stent edge dissections. Therefore, angiographic findings are sufficient for decision making in severe dissections such as type C and D. The FFR-guided decision making for stent edge dissection seems to be safe and effective for mild dissections such as type A and B.