Comparative analysis of fractional flow reserve and instantaneous wave-free ratio: Results of a five-year registry

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Abstract

Introduction and Objective

Assessment of coronary lesions by the instantaneous wave free ratio (iFR) has generated significant debate. We aimed to assess the diagnostic performance of iFR and its impact on the decision to use fractional flow reserve (FFR) and on procedural characteristics.

Methods

In this single-center registry of patients undergoing functional assessment of coronary lesions, FFR was used as a reference for assessing the diagnostic performance of iFR. An iFR value <0.86 was considered positive and a value >0.93 was considered negative.

Results

Functional testing was undertaken of 402 lesions, of which 154 were assessed with both techniques, 222 with FFR only, and 26 with iFR only. Using a cut-off of ≤0.80 for iFR, the area under the curve was 0.73 (95% CI 0.65-0.81), with an optimal value of ≤0.91. FFR was undertaken in 93 out of 94 lesions with an inconclusive iFR and was performed in 69.1% of the remaining iFR-tested lesions. Concordance between iFR and FFR was 87% (chi-square=22.43; p<0.001). Notwithstanding, there were four out of 13 cases (30.7%) of positive iFR with negative FFR and three out of 42 (7.1%) cases of negative iFR and positive FFR. This difference was significant (p=0.026). iFR had no impact on procedure time, fluoroscopy time or radiation dose.

Conclusion

iFR had a reasonable diagnostic performance. Operators often chose to perform FFR despite conclusive iFR results. iFR and FFR were highly concordant, but a non-negligible proportion of lesions classified as ischemic by iFR were classified as non-ischemic by FFR. iFR had no impact on procedural characteristics.

Keywords

Instantaneous wave-free ratio Fractional flow reserve Invasive functional assessment of coronary lesions