Predictors of fractional flow reserve/instantaneous wave-free ratio discordance documented during functional coronary stenosis assessment: impact of tailored diagnostic cut-offs on long-term outcomes

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Funding Acknowledgement: Type of funding source: None

Background: Patient- and lesion-related factors may influence concordance between instantaneous wave-free ratio (iFR) and fractional flow reserve (FFR), potentially affecting safety of revascularization deferral.

Methods: Consecutive patients with at least an intermediate coronary stenosis evaluated by both iFR and FFR were retrospectively enrolled. Revascularization was at physician's discretion. The agreement between IFR and FFR at their diagnostic cut-offs (FFR 0.80, iFR 0.89) according to patient- and lesion-level characteristics was assessed. Multivariate analyses were carried to identify the independent predictors of discordance. Tailored iFR cut-offs according to predictors of discordance best matching an FFR of 0.80 were identified by receiver-operating characteristic (ROC) curves. The impact of reclassification according to tailored iFR cut-offs on major cardiovascular events (MACE: cardiovascular death, myocardial infarction or target lesion revascularization) among deferred lesions was investigated.

Results: 299 coronary stenosis (diameter stenosis 54±14%, FFR 0.84 [0.78–0.89], iFR 0.91 [0.87–0.95], left main/left anterior descending [LM/LAD] vessel 67.6%) of 260 patients were studied, and 46.5% were revascularized. Discordance rate was 23.4% (10.7% iFR-negative discordant, 12.7% iFR-positive discordant). Independent predictors of discordance were LM/LAD disease, multivessel disease, non-ST-elevation myocardial infarction presentation, smoking, reduced glomerular filtration rate and hypertension. Lesion reclassification with tailored iFR-cut-offs based on patient-level predictors carried no prognostic value among deferred lesions. Reclassification according to lesion location, which was entirely driven by LM/LAD lesions (iFR-cut-offs: 0.93 for LM/LAD, 0.89 for non-LM/LAD), identified increased MACE among lesions deferred based on a negative FFR, between patients with a positive as compared to a negative iFR (19.4% vs. 6.1%, p=0.044), while the same association was not observed with the conventional 0.89 iFR cut-off (15.0% vs 8.6%, p=0.303).

Conclusion: Tailored vessel-based iFR cut-offs carry prognostic value among FFR negative lesions, suggesting that iFR may more safely defer revascularization of LM/LAD lesions than FFR and that a single iFR cut-off might be clinically unsatisfactory.