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Validation of quantitative flow reserve and residual quantitative flow reserve to predict fractional flow reserve post stenting from the DOCTORS study population

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Background: Quantitative flow reserve (QFR) is a computation of fractional flow reserve (FFR) based on angiography without use of a pressure wire. The ability to predict post-PCI FFR using residual QFR after virtual stenting (pre-PCI), and using QFR (post-PCI) remains unknown. We sought to evaluate the correlation and diagnosis accuracy of residual QFR and post-PCI QFR to predict post-PCI FFR.

Methods: From the DOCTORS (Does Optical Coherence Tomography Optimize Results of Stenting) study population, we blindly analyzed the following from angiography, and compared them to post-PCI FFR: pre-PCI residual contrast QFR (cQFR) and fixed QFR (fQFR), and post-PCI cQFR and fQFR.

Results: 93 post-PCI QFR measurements and 84 residual QFR measurements were compared to post-PCI FFR measurements in 93 patients. Compared to the post-PCI FFR mean value of 0.92 ± 0.05, mean values of residual cQFR, residual fQFR, post-PCI cQFR and post-PCI fQFR were, respectively: 0.94 ± 0.05, 0.93 ± 0.05, 0.93 ± 0.06 and 0.93 ± 0.05 (p values >0.05 for all pairs except for residual cQFR versus FFR (p=0.01)). Pearson correlation coefficients of residual cQFR, residual fQFR, post-PCI cQFR and post-PCI fQFR compared with post-PCI FFR were, respectively: 0.62, (95% CI: 0.46–0.73); 0.61, (95% CI: 0.45–0.73); 0.75, (95% CI: 0.64–0.83) and 0.73, (95% CI: 0.62–0.81). Area under the curves for these indices with a post-PCI FFR cutoff value of 0.90 were, respectively: 0.79, 0.78, 0.85 and 0.84.

Conclusions: cQFR and fQFR correlated well and had similar diagnostic performance. Pre-PCI QFR analysis with virtual PCI, and post-PCI QFR analysis, correlated well with post-PCI FFR, and had similar diagnostic accuracy. Further studies are needed to prospectively validate a QFR-guided PCI strategy.

Diagonal segments are produced by ties.