First Presentation of 3-Dimensional Reconstruction and Centerline-Guided Assessment of Coronary Bifurcation by Fusion of X-Ray Angiography and Optical Coherence Tomography

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Correct characterization of coronary bifurcations by optical coherence tomography (OCT) is essential for evaluation of lesions and treatment. Assessment is limited by the need for acquiring images in both the main branch (MB) and the side branch (SB) and the risk of OCT cross sections not being perpendicular to the true vessel centerline due to imaging wires being nonparallel to the centerline. We present a new method for evaluation of coronary bifurcations by fusion of x-ray angiography (XA) and OCT acquired in the MB. XA in 2 projections was reconstructed in 3 dimensions (3D) and fused with OCT using Medis prototype software (1). Evaluation of the SB ostium (Fig. 1, panels 1 to 5) was performed by reconstructed OCT cross sections perpendicular to the XA-constructed SB vessel centerline. In the presented case, the area of the SB ostium was 1.78 mm² by 3D quantitative coronary angiography and was 1.67 mm² by OCT in the plane perpendicular to the SB centerline (Fig. 1, panel 2).

Fusion of 3D-reconstructed XA and centerline-adjusted OCT may improve evaluation of tortuous vessels and ostial lesions, and might limit the need for SB acquisitions in bifurcation lesion assessments.

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