Three-Dimensional Reconstruction of the Post-Dilated ABSORB Everolimus-Eluting Bioresorbable Vascular Scaffold in a True Bifurcation Lesion for Flow Restoration

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A 68-year-old male patient presented to our catheterization laboratory with a non-ST-segment elevation myocardial infarction. Coronary angiography suggested a significant true bifurcation lesion in the mid left anterior descending (LAD) artery, appearing to involve the second diagonal side branch (SideB), measuring 1.7 mm in maximal diameter (Medina classification: 1, 1, 1). Both the main branch (MainB) lesion and the SideB were crossed with 0.014-inch Hi-Torque Pilot guidewires (Abbott Vascular, Santa Clara, California) (Fig. 1A). Pre-dilation of the lesion was undertaken with a Trek-compliant balloon (Abbott Vascular) and implantation of a single 3.0 × 18-mm ABSORB bioresorbable vascular scaffold (BVS) (Abbott Vascular) in the LAD across the second diagonal vessel opening was undertaken with nominal inflation pressures. After scaffold implantation, Thrombolysis In Myocardial Infarction (TIMI) flow grade 3 was maintained in the LAD; however, TIMI flow grade 1 immediately became evident at the second diagonal branch with angiographic evidence of pinching of the ostium (Fig. 1C). The patient developed chest pain with mild ST-segment elevation on the chest electrocardiogram. A 1.5 × 12 mm Trek-compliant balloon was subsequently used to cross the cells of the ABSORB BVS toward the SideB (Fig. 1H) and post-dilation of the second diagonal branch was undertaken. This led to immediate restoration of TIMI flow grade 3 without significant myocardial damage (Fig. 1E). The following 30-day outcome was uneventful.

Conventional percutaneous coronary intervention for bifurcation lesions, compared with the rest of the lesion types, is associated with greater event rates. Plaque shift (the so-called snow-plough effect) or the carina shift phenomena are the major contributors for the acute events during bifurcation stenting (1). van Geuns et al. (2) recently described the feasibility of crossing the polymeric struts of a fully ABSORB BVS with double wire in a bifurcation lesion.

Offline 3-dimensional reconstructions of the MainB and the SideB constructed using 2-dimensional (2D) frequency domain (FD) optical coherence tomography (OCT) images are a novel approach to visualizing these lesions. The possibility of online use of such imaging modalities for bifurcation lesions or other lesion types may help improve our treatment strategies.

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