In-Scaffold Restenosis in a Previous Left Main Bifurcation Lesion Treated With Bioresorbable Scaffold V-Stenting

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A 66-year-old diabetic woman, who had performed percutaneous coronary intervention (PCI) with an Absorb bioresorbable vascular scaffold (BVS) (Abbott Vascular, Santa Clara, California) in a left main bifurcation lesion with V-stenting technique (Figures 1A and 1B), presented with recurrent effort angina 5 months after the index procedure. Coronary angiography revealed significant in-scaffold restenosis in both ostia (Figure 1C). The patient refused surgical revascularization, hence the decision was made to undergo PCI. Initial optical coherence tomography (OCT) imaging demonstrated marked neointimal hyperplasia covering the scaffold with the exception of the tip of the plastic neocarina. The hyperplastic neointima exhibited a homogenous, high-backscattering morphological pattern with, however, an area of reduced backscatter adjacent to the plastic neocarina (Figure 2). In addition, there was no evidence of distinct scaffold disruption or fracture, whereas there was some evidence for scaffold recoil as indicated by a reduction in the scaffold area (0.56 mm², at the site of the minimal lumen area) (Figure 2). This figure lies within the previously reported 6-month follow-up minimal scaffold area recoil parameters from a substudy of ABSORB Cohort B (1) (0.05 ± 0.78 mm², OCT) and the study by Tanimoto et al. (2) (0.65 ± 1.71 mm², intravascular ultrasound). The contribution and impact of this amount of recoil on restenosis remain unknown. Possible causes of in-scaffold restenosis in the current case include: 1) neointimal proliferation accelerated by concomitant comorbidities, such as insulin dependent diabetes, and/or local flow disturbances producing low wall shear stress at the lateral walls of the bifurcation; and 2) thrombus formation and subsequent organization at the divider side (3), where areas of low backscatter were seen on OCT (despite dual antiplatelet therapy). It remains unknown whether: 1) strut thickness (157 × 191 µm) and design of BVS promotes more unfavorable flow disturbances compared with thin-strut metallic stents; and 2) the low backscatter on OCT adjacent to the plastic neocarina could represent organized thrombus (4).

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FIGURE 1  Angiogram of Index and Follow-Up Procedure, and Follow-Up OCT Images

(A and B) Coronary angiograms of index procedure demonstrating left main bifurcation lesion (Medina 0, 1, 1) successfully treated with bioresorbable vascular scaffold using V-stenting technique. (C) Repeat coronary angiogram revealed in-scaffold restenotic lesions (Medina 0, 1, 1). (D) Cross-sectional optical coherence tomography (OCT) images at repeat procedure demonstrating excessive neointima proliferation at the bifurcation site. **Yellow arrow** indicates uncovered struts at the tip of the plastic neocarina. **Blue asterisks** indicate calcium deposits. LAD = left anterior descending coronary artery; LCx = left circumflex coronary artery; LMS = left main stem; MLA = minimal lumen area.
FIGURE 2 Comparison of OCT Images Between the Index and the Repeat Procedure

(A) Upper line: Index procedure: optimal final OCT result demonstrating well apposed scaffolds on fibrocalcific plaque. Lower line: 5-month follow-up: OCT demonstrating restenotic lesion consisting of concentric and homogeneous, high-backscattering neointima developed even over calcified segments (blue asterisks). Numbers represent scaffold area.

(B) Left: index procedure: magnified OCT images of bifurcation demonstrating the plastic neocarina (white arrow). Right: 5-month follow-up: hyperplastic neointima with areas of low backscatter (red arrowhead), adjacent to struts. Dotted lines indicate the thickness of the neocarina. Abbreviations as in Figure 1.

REFERENCES


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