1-Year Follow-Up Optical Coherence Tomography of a “Hybrid” Neocarina After T-Stenting With Small Protrusion Technique Using a Bioresorbable Vascular Scaffold and a Metallic Stent

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A 75-year-old man with stable angina underwent coronary angiography demonstrating significant stenosis at the bifurcation of the left anterior descending coronary artery (LAD) with a diagonal branch (Figure 1A). Following predilation, a 3.5 × 28-mm bioresorbable vascular scaffold (BVS) (Absorb, Abbott Vascular, Santa Clara, California) was implanted in the LAD. This was followed by post-dilation with a 3.5-mm noncompliant balloon and subsequent “T kissing” inflation. Because of an extensive dissection in the proximal segment of the diagonal (Figure 1B), a 2.5 × 28-mm everolimus-eluting stent (EES) was implanted using the T-stenting with small protrusion (TAP) technique followed by “T kissing” inflation (Figures 1C and 1D). A post-procedural angiography showed an excellent result (Figures 1E and 1F). Optical coherence tomography (OCT) demonstrated a 1.9-mm-length “hybrid” neocarina consisting of BVS and EES struts with no evidence of BVS disruption (Figures 2A to 2I). Follow-up angiogram at 14 months demonstrated an excellent result at the bifurcation treated with hybrid TAP (Figure 2A'). The patient was still on dual antiplatelet therapy at the time. OCT showed neointima formation with homogeneous hyperplasia from the base of the neocarina towards its peak (Figures 2B' to 2I') with no evidence of thrombi. The top edge of the neocarina (peak), consisting only of metallic struts, was not fully covered by neointima (Figures 2B' and 2C').

Provisional single stenting is considered the preferred strategy for the treatment of coronary bifurcation lesions (1). In cases where the flow to the side branch is compromised following main-branch stenting, stent implantation in the side branch should be considered (2). This strategy should be adopted even when BVS has been implanted in the main branch. However, in some cases, the delivery of
additional BVS into the side branch may be difficult because of the strut thickness (157 μm). In these cases, the combination of BVS implantation in the main branch and conventional drug-eluting stent in the side branch should be considered.
FIGURE 2  Angiography and OCT Images at the End of the Index Procedure and at 14-Month Follow-Up

(A) Post-procedural angiography showing an excellent result after hybrid TAP using a BVS in the LAD and EES in the diagonal branch. (B) OCT image indicating that the peak of the neocarina consists merely of metallic struts (indicated with arrows). (C and D) OCT images showing the metallic part of the hybrid neocarina (indicated with arrows). (E and F) OCT images showing the hybrid body of the neocarina (BVS struts are indicated with arrowheads; EES struts are indicated with arrows). (G) OCT image showing the base of the hybrid neocarina (BVS struts are indicated with arrowheads; EES struts are indicated with arrows). (H) Longitudinal OCT view showing the 1.9-mm-length hybrid neocarina (the BVS is indicated with green dotted lines; the EES is indicated with red dotted lines). (I) A 3-dimensional (3D) reconstruction OCT image after the hybrid TAP technique. (A’) Follow-up angiography at 14 months showing an excellent revascularization result after hybrid TAP. (B’) OCT image showing no neointima coverage at the peak of the neocarina, which consisted merely of EES struts (indicated with arrows). (C’) OCT image showing partial neointima formation at the part of the neocarina consisting merely of EES struts (indicated with arrows). (D’) OCT image showing complete neointima formation of the part of the neocarina consisting of EES struts with no evidence of thrombi (indicated with arrows). (E’–G’) OCT images showing complete neointima formation (homogeneous neointimal hyperplasia) of the part of the neocarina consisting of both BVS (indicated with arrowheads) and EES struts (indicated with arrows) with no evidence of thrombi. (H’) Longitudinal OCT view showing partial neointima formation of the hybrid neocarina from base (right side) to peak (left side). (I’) A 3D reconstruction OCT image showing neointima formation of the hybrid neocarina. The OCT images B to G at post-procedure and B’ to G’ at 14-month follow-up correspond with each other. CAG = coronary angiography; OCT = optical coherence tomography; other abbreviations as in Figure 1. Green dotted lines = BVS; red dotted lines = EES.

REFERENCES


KEY WORDS: bioresorbable vascular scaffold, coronary bifurcation, neocarina, optical coherence tomography, T-stenting with small protrusion technique.