

Positive Vessel Remodeling and Appearance of Pulsatile Wall Motion at Long-Term Follow-Up After Bioresorbable Scaffold Implantation in a Chronic Total Occlusion



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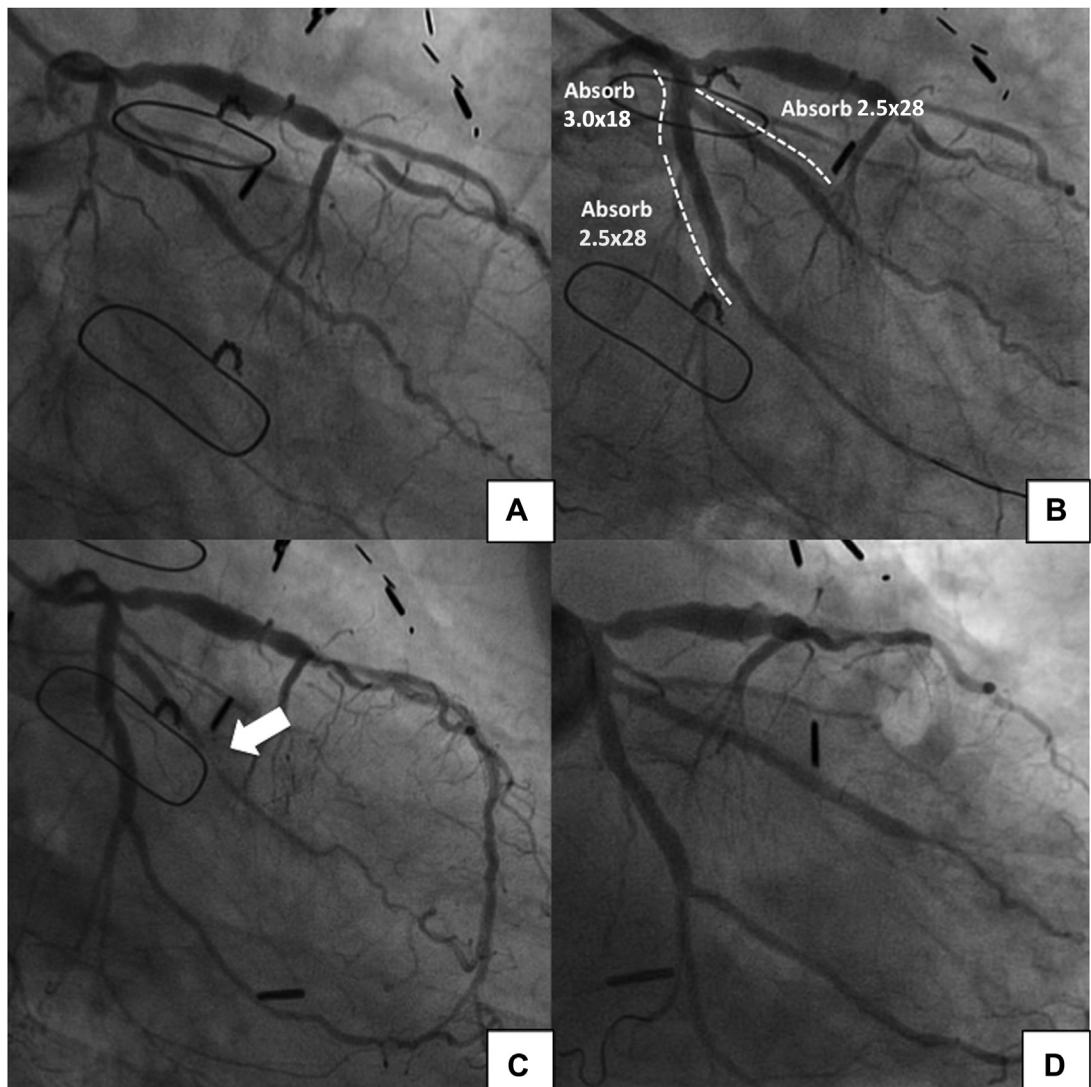
A 71-year-old man underwent successful percutaneous coronary intervention to treat a chronic total occlusion (CTO) of the left circumflex artery (LCx) with implantation of a 3.0 × 18-mm and 2.5 × 28-mm Absorb bioresorbable scaffold (BRS) (Abbott Vascular, Santa Clara, California) (Figure 1) (1). A further BRS was implanted in the first major obtuse marginal branch (OM1).

After 32 months, he presented with a recurrence of angina and underwent coronary angiography, which demonstrated distal edge restenosis of the BRS in OM1 (Figure 1C), which was treated with drug-eluting stents (Figure 1D). Further intravascular ultrasound was performed in the main branch of the LCx, which demonstrated positive remodeling of the vessel with enlargement of the lumen at the previous CTO site (Figure 2A). Additionally, pulsatile motion of the vessel was observed, suggesting restoration of some native vessel function (Figure 2B, Online Video 1). Of note, this was in the presence of some remaining struts, indicating incomplete resorption of the BRS at this time point.

The outcome data published to date after BRS implantation has been in the context of relatively “simple” lesions (2), with limited data after the treatment of complex lesions, in particular CTO. CTO lesions often result in vessel shrinkage (3), which requires the implantation of smaller stents. In this case, nearly 3 years after the index procedure, we observed positive remodeling of the vessel in conjunction with significant lumen enlargement that would have not been possible in the presence of a permanent metal cage. Furthermore, we noted pulsatile motion of the vessel wall at the BRS site. Pharmacologically induced vasomotion of the BRS segment has been shown (4), and natural pulsatile motion should recover after resorption of the BRS. This case suggests that after implantation of a BRS, even in the context of CTO lesions, vessels may positively remodel and regain some native vessel wall function.

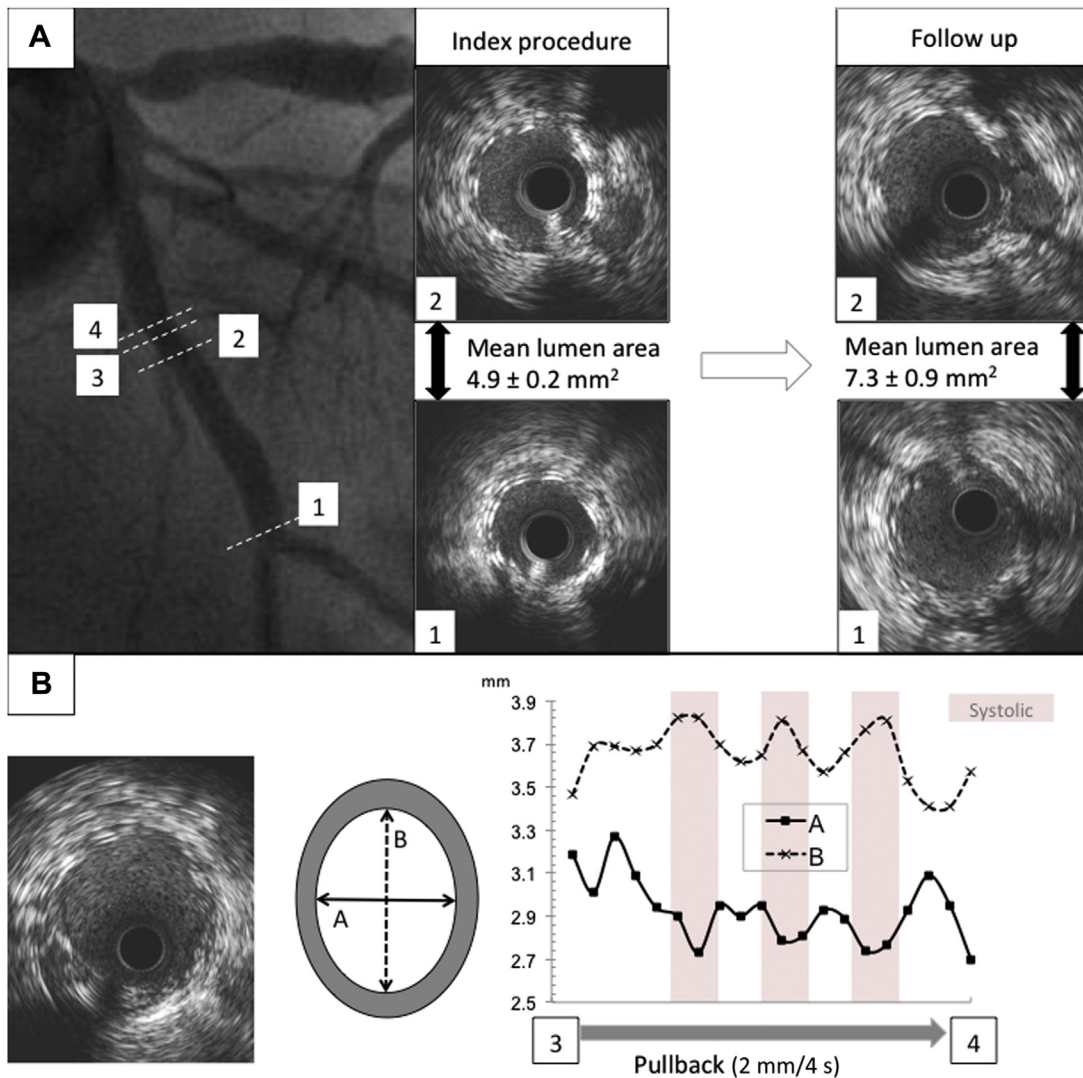
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FIGURE 1 Angiogram of the Index and Follow-Up Procedure

(A) Baseline angiogram at the index procedure demonstrating significant disease in the first obtuse marginal branch (OM1) and main branch of the left circumflex artery (LCx) including the chronic total occlusion (CTO). **(B)** The final angiogram at the index procedure after implantation of 1 bioresorbable scaffold (BRS) in the OM1 and 2 into the main branch of the LCx. **(C)** Follow-up angiography after 32 months showing distal edge restenosis of BRS in OM1 (**white arrow**) and no restenosis in main branch of LCx. **(D)** Final angiogram after DES implantation in OM1.

FIGURE 2 Comparison of IVUS Findings Between the Index and Follow-Up Procedure, and Pulsatile Motion



(A) Lumen and vessel area was measured at 18 sites at 1.0-mm intervals between boxes 1 and 2. Mean lumen area and vessel area were significantly larger at the follow-up procedure compared with the index procedure ($4.9 \pm 0.2 \text{ mm}^2$ vs. $7.3 \pm 0.9 \text{ mm}^2$, $p < 0.0001$, and $8.9 \pm 0.5 \text{ mm}^2$ vs. $12.0 \pm 1.0 \text{ mm}^2$, $p < 0.0001$, respectively). (B) Pulsatile motion of vessel wall (Online Video 1): longitudinal length and transverse length of the lumen were measured at 20 sites at 0.1-mm intervals between boxes 3 and 4 (2 mm/4 s), demonstrating pulsatile motion of vessel wall.

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KEY WORDS bioresorbable scaffold, chronic total occlusion, positive vessel remodeling

APPENDIX For the accompanying video, please see the online version of this article.