

CLINICAL VIGNETTE

Different absorption times of two absorb BVSs implanted in the same artery: insights into the mechanisms of late scaffold failure

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We present an illustrative case of different absorption times of two absorb bioresorbable vascular scaffolds (BVS; Abbott Vascular, Santa Clara, CA, USA) implanted in the left anterior descending artery (LAD) (Fig. 1). It has been previously demonstrated that the appearance of polymeric scaffolds in optical coherence tomography (OCT) correlates with the integration and absorption processes [1]. In general, it is considered that the speed of bioresorption is homogeneous in coronary arteries because the primary mechanism of biodegradation is hydrolysis, which is a chemical process. Histological studies demonstrated complete bioresorption approximately 36 months after implantation, whereas in OCT strut footprint is visible as a black box for up to 36 months [2, 3]. In our case, initial predilation of the lesions before implantation of both scaffolds was performed. However, no intravascular imaging guidance was used during baseline procedures. The distal scaffold was implanted with subsequent postdilation 25 months ago in the medial LAD. The proximal scaffold was implanted with subsequent postdilation 38 months ago in the proximal LAD. Twelve months ago metallic drug eluting stent was implanted due to scaffold restenosis and two months ago balloon angioplasty due to thrombotic occlusion was performed. OCT images were recorded using the ILLUMIEN PCI Optimisation System (St. Jude Medical, St. Paul, MN, USA). Paradoxically, OCT imaging demonstrated more advanced bioresorption and no restenosis of the distal scaffold (25 months old) compared to the proximal scaffold (38 months old) with visible struts and abnormal vessel wall remodeling. Interestingly, the bioresorption process in the whole artery was somehow accelerated and the process of the vessel wall integration of the distal scaffold was completed earlier than expected. On the other hand, the two re-interventions in the proximal scaffold might have resulted in fracture or embolisation, thus slowing down the bioresorption process.

References

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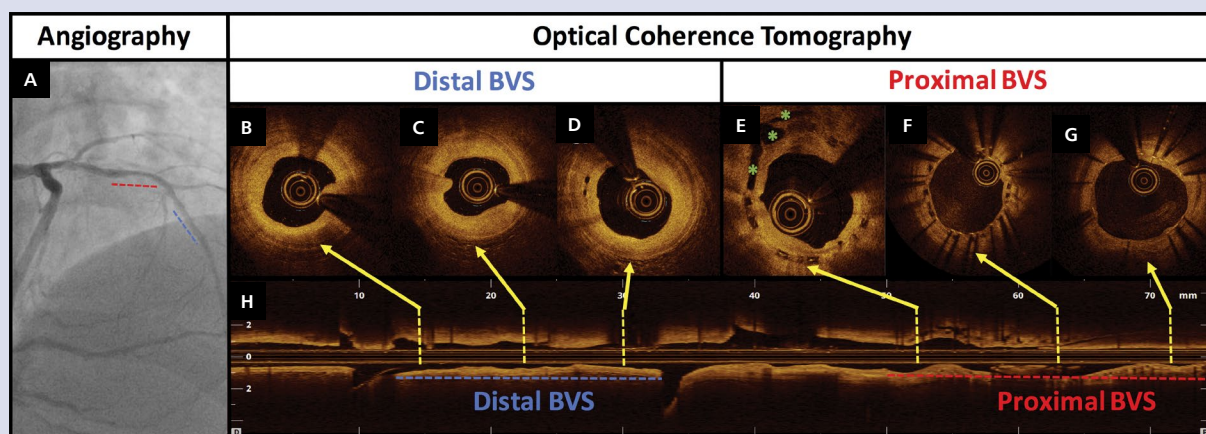


Figure 1. Angiography demonstrated no restenosis of the distal scaffold while in proximal scaffold a 50% obstruction was present (A). Optical coherence tomography (OCT) imaging of the distal bioresorbable vascular scaffold (BVS) revealed completed vessel wall integration process with only two visible struts and the appearance of a “golden tube” (B–D). OCT imaging of the distal segment of the proximal BVS revealed the presence of preserved strut cores and an empty area behind struts (green asterisk), which might suggest suboptimal implantation of the device resulting in underexpansion of the scaffold (E). Also, in the segment with overlapping BVS and drug eluting stent (DES), preserved struts were present (F). In the segment implanted only with DES mild neointimal proliferation was found (G). Longitudinal OCT view is presented in figure (H).

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