Images and Case Reports in Interventional Cardiology

Bioresorbable Scaffolds to Treat Spontaneous Coronary Artery Dissection

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Spontaneous coronary artery dissection (SCAD) is a rare cause of acute coronary syndromes (ACS), typically affecting female and younger individuals with no underlying atherosclerotic disease.[1] Diagnosis of SCAD has traditionally relied on coronary angiography; however, new imaging modalities, and especially optical coherence tomography (OCT), improve diagnostic accuracy and help management.[2] The optimal treatment strategy remains controversial and may vary from a completely conservative approach to percutaneous or even surgical revascularization, always guided by the clinical scenario and symptoms.[1] When percutaneous coronary intervention is chosen, metal stents are usually implanted on vessels with no significant atherosclerotic lesions.[3] Use of bioresorbable vascular scaffolds (BVS) may have an interesting therapeutic role for these patients because they disappear completely after 2 or 3 years and may allow for a complete functional recovery,[4] which is particularly appealing in SCAD, where spontaneous healing is part of the natural history of this entity. In this sense, we describe 3 documented experiences corresponding to 3 different patients with ACS caused by SCAD from 3 different coronary arteries.

Presentation of the Cases

Case 1: 58-year-old male, active smoker, with systemic hypertension and family history of coronary disease. He was admitted for presenting an inferior ST-segment–elevation myocardial infarction. Diagnostic coronary angiography (Figure 1, row 1, first column) showed an occluded right coronary artery with an image of a large dissection. The rest of the coronary tree appeared normal. Five Absorb stents were implanted with a successful result (Figure 1, second column; arrows indicate stented segment). Ten days later, the patient experienced rest angina, and coronary angiography was repeated, showing narrowing of the vessel distal to the stents. OCT revealed an intramural hematoma after the last stent (Figure 2). Another Absorb stent was implanted overlapping the previous one, with good results (Figure 2). Control angiography at 6 months with OCT showed good patency of the treated vessel and good endothelialization of the struts (Figure 1, row1, third and fourth column).

Case 2 (Figure 1, row 2): 43-year-old woman, active smoker. Admitted for a Non–ST-segment–elevation acute coronary syndrome. Coronary angiogram showed a circumflex coronary artery dissection image with poor anterograde flow. The rest of the arteries appeared normal. OCT-guided implantation of 3 Absorb stents was performed recovering patency and normal angiographic appearance of the vessel. Control study with OCT 6 months later showed satisfactory angiographic results and process of endothelialization of the stents' struts.

Case 3 (Figure 1, row 3): 55-year-old woman, former smoker. Admitted for presenting anterior ST-segment–elevation myocardial infarction. Coronary angiogram showed a left anterior descending coronary artery with dissection and sub-occlusion. On this occasion, diagnosis was facilitated by IntraVascular UltraSound imaging, which clearly showed the intimal flap. Three Absorb stents were implanted with a satisfactory result. A coronary angiography was performed after 6 months showing good angiographic appearance of the treated vessel. At that moment, intracoronary imaging was unavailable.

Discussion

These are 3 very illustrative cases of SCAD presented as high-risk ACS affecting different coronary territories that were successfully treated with BVS. Of note, the setting of high-risk ACS and the jeopardy of the coronary flow led to an interventional approach in all the 3 cases.

Just a few isolated experiences with BVS in SCAD have been published previously in single case reports, lacking follow-up in most of the cases. In only 2 of these cases was a computed tomography scan performed several months later, confirming patency of the treated vessels. To the best of our knowledge, this is the first series of patients with this pathology treated with BVS and the first report that provides detailed follow-up information through invasive imaging.

The use of intracoronary imaging aided in the diagnosis and treatment, as well as in the diagnosis of complications and in the follow-up. OCT provides better resolution to study SCAD and is often preferred.[2] It also has better performance

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when there is a suspicion of intramural hematoma as happened in case number 1. Guiding percutaneous coronary intervention treatment by OCT imaging offers several benefits, such as an accurate measurement of arterial diameter, which may be difficult in SCAD and is of special importance when choosing BVS because these will not allow an excessive expansion carrying risk of fracture.

Treatment in SCAD should be tailored according to the clinical and angiographic features accompanying each case. The conservative medical management represents the strategy of choice in most patients with SCAD because it has a proven propensity to healing in the involved vessels. Performing percutaneous coronary intervention in patients with SCAD carries a high risk of procedural failure and usually implies implantation of several stents; thus, it should be justified.[3]

As mentioned earlier, BVS may have a preferential role in the setting of SCAD because they ideally allow the recovery of the endothelial function of vessels. This is more evident when several overlapped stents (full metal jacket display) are needed to treat long segments of coronary dissected vessels, which are otherwise very common in SCAD. Bioresorbable scaffolds have a worse technical performance at the time of implantation, with a higher profile and lower navigability and crossability[4]; however, the more favorable anatomy usually present in these kinds of patients (with low burden of atherosclerotic disease) overcomes this technical issue.

In our cases, mid-term angiographic controls showed no restenosis or occlusions, whereas OCT revealed good endothelialization of the absorbable struts. A longer follow-up is of interest to provide more information about the natural process of disappearance of the scaffolds, as well as to better illustrate the healing concept happening in SCAD. Larger series could yield definitive data about the role of bioabsorbable coronary stents in this particular entity.

Disclosures

None.

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Key Words: coronary angiography ■ coronary vessel anomalies ■ percutaneous coronary intervention ■ spontaneous coronary artery dissection ■ stenting ■ tomography, optical coherence

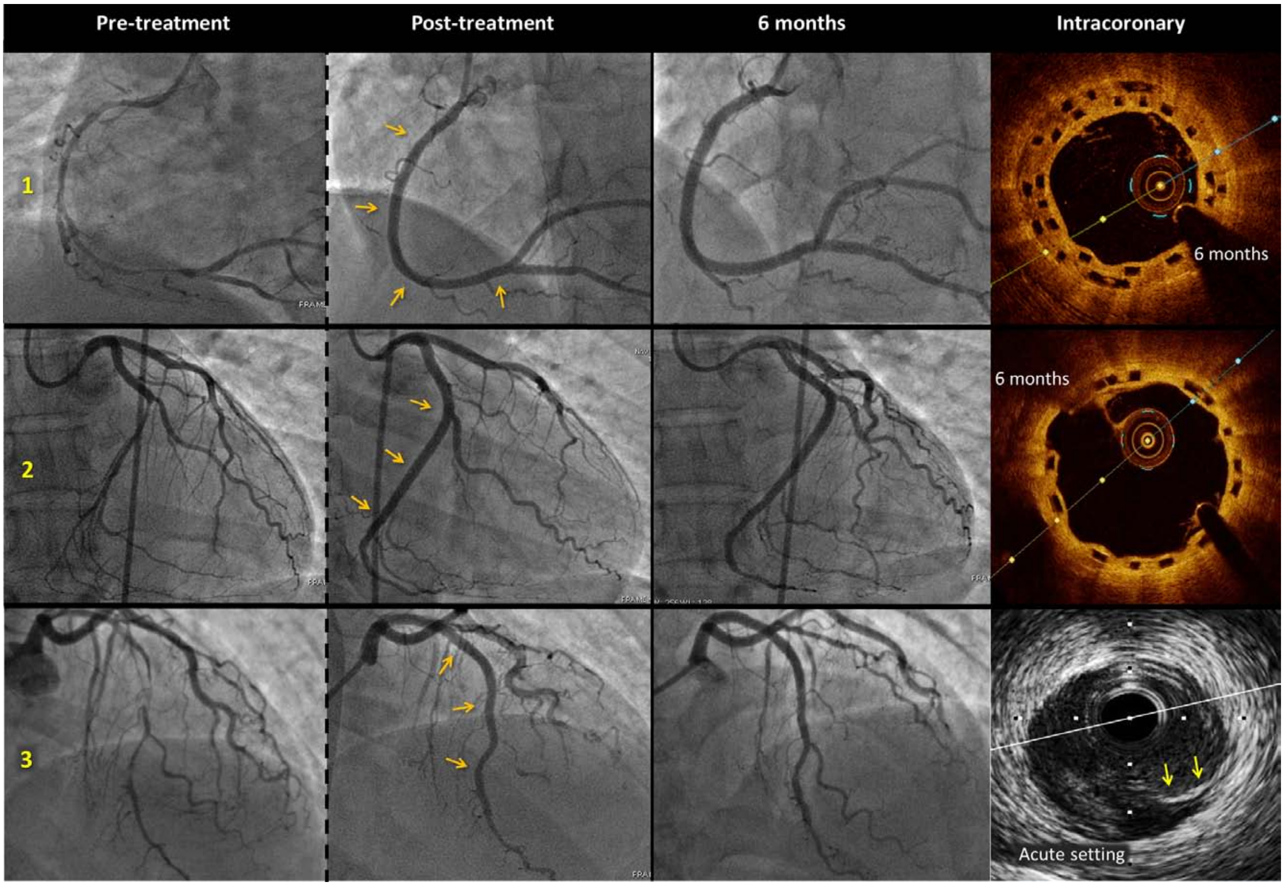

Figure 1. Each row represents a different patient's case. Arrows indicate stent allocation after implantation. Dashed lines separate angiography before and after treatment.

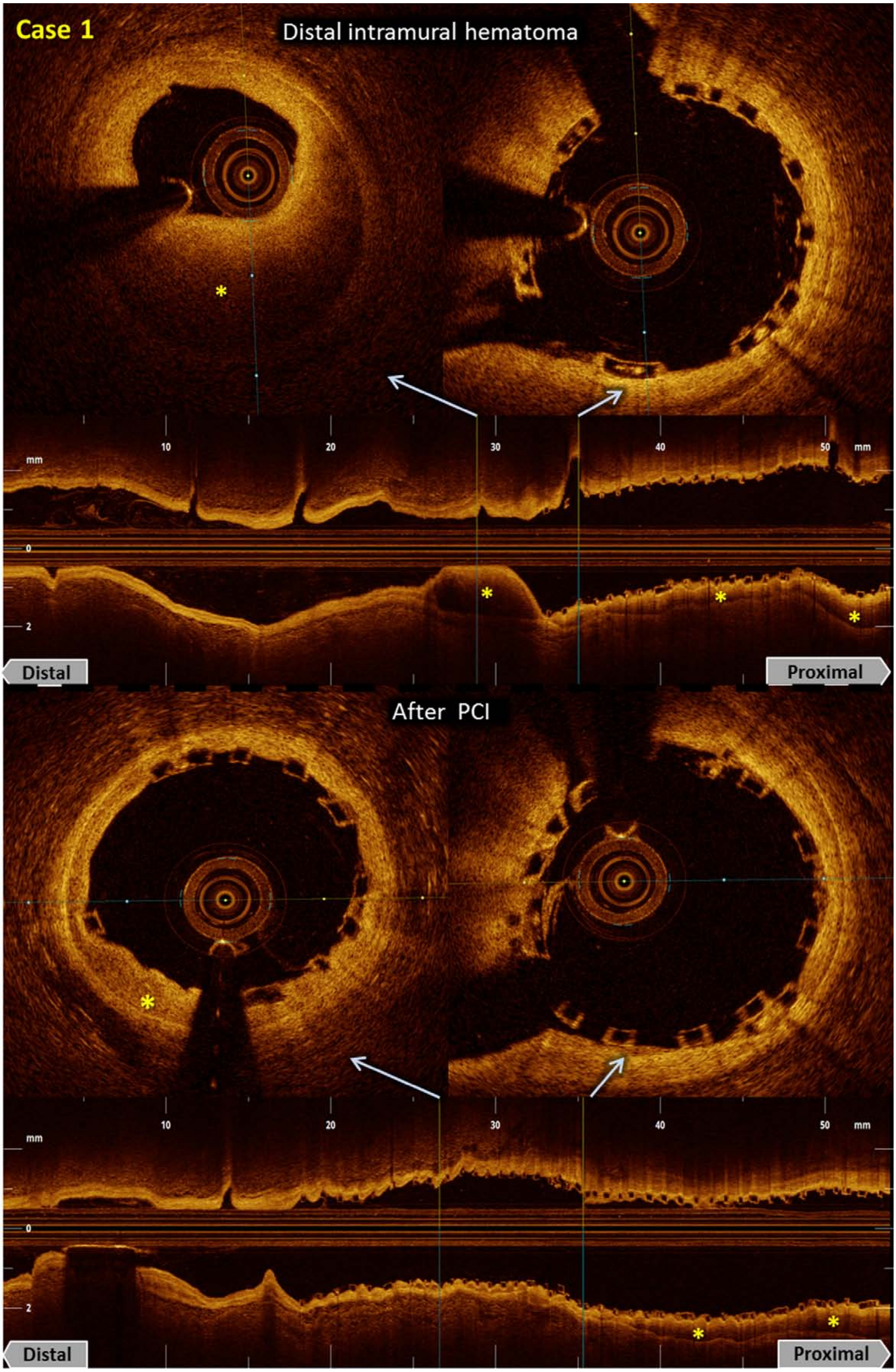

Figure 2. Longitudinal and transversal optical coherence tomography (OCT) imaging illustrating diagnosis (**top**) and treatment (**bottom**) of an intramural hematoma that occurred in the case number 1. Asterisk indicates the hematoma within the artery wall.

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