Editorial

Bioresorbable scaffolds and drug-eluting balloons for the management of spontaneous coronary artery dissections

Vasileios F. Panoulas[1,2], Alfonso Ielasi[3]

[1]Harefield and Royal Brompton Hospital NHS Trust, London, UK; [2]National Heart and Lung Institute, Imperial College London, London, UK; [3]Cardiology Division, Bolognini Hospital Seriate, ASST Bergamo Est, Italy

Correspondence to: Alfonso Ielasi, MD, FESC. Cardiology Division, Bolognini Hospital Seriate, Via Paderno 21, 24068, Seriate (BG), Italy. Email: alielasi@hotmail.com.

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Spontaneous coronary artery dissection (SCAD) is well recognised cause of acute coronary syndromes (ACS), typically affecting female and younger individuals with no underlying atherosclerotic disease (1). SCAD is a relatively rare presentation of ACS however its reported prevalence varies from as low as 0.2% in angiographic studies (2) to as high as 4% of ACS cases in studies using optimal coherence tomography (OCT) (3).

Diagnosis of SCAD was traditionally made with coronary angiography. However, new imaging modalities especially OCT and intravascular ultrasound, have improved diagnostic accuracy and provided new insights on management (1). The optimal treatment strategy remains controversial and undetermined, as no randomised trials comparing conservative versus revascularization strategies have been carried out (4). The management of SCAD in the majority of cases could be conservative (5), as per expert opinions, however in some specific situations revascularization should be considered (6). In particular, SCADs located at a proximal coronary segment or causing a lumen diameter limitation >70% and/or sub-optimal distal TIMI flow (<3), hemodynamic instability, ventricular arrhythmias, should be treated where feasible with percutaneous coronary intervention (PCI) or even coronary artery bypass grafting (CABG) (1). It should be however noted that the reported success rates of PCI in this patient subset vary from 47% (5) to 64% (6) and 72.5% (7) in different national registries, highlighting the multiple challenges operators face when treating these lesions.

Bioresorbable vascular scaffolds (BVS) have emerged as an alternative to metallic stents, promising to provide mechanical support and drug-delivery functions similar to those of drug-eluting stents (DES) for approximately 1 year, followed by complete bioresorption and full restoration of vessel vasomotion over 3-4 years. Recent studies (8-10) have revealed similar one-year outcomes in patients treated with BRS compared to those treated with new generation everolimus-eluting stents, albeit with some concerns on higher device thrombosis rates amongst BRS (11-13) particularly when implanted in small vessels (8). BRSs appear to be an attractive treatment strategy for patients with SCAD, given that these patients are often young and need long segments of struts coverage to contain the dissection. The "full plastic jacket" concept has been introduced in patients with long diffuse disease with acceptable mid-term outcomes (14). Recent case reports demonstrated the feasibility of "full plastic jacket" using overlapping BRS in patients with long SCAD (15-17). In the largest case series (N=18) of SCAD ACS patients treated with BRS (18), overlapping BRS were implanted in 11 (61.1%) patients whereas the vessel more often treated was the LAD (55.5% of cases). A third of patients presented with STEMI whereas 5/18 (28%) had a NSTEMI. Mean patient age was only 49 whereas 10 (65.6%) were females. At the median 18-month clinical follow-up no adverse events were reported. Intracoronary imaging was performed in 50% of patients. Concerns regarding overlapping scaffolds and higher risk of restenosis have recently been alleviated, albeit not eclipsed, by the presentation of propensity matched studies showing similar 1-year outcomes in patients treated with overlapping scaffolds and those with overlapping metallic stents (19,20).

Operators should also be aware of the increased risk of BRS thrombosis in the early stages after implantation (12), which however can be often attributed to poor implantation technique (omission of aggressive lesion preparation and post-dilatation) particularly in the STEMI setting (21,22).

In a recently published registry, Cortese *et al.* (23) for the first time suggested avoiding stents in dissected vessels with good flow, following the use of drug eluting balloon (DEB) for CAD. This intriguing study provides food for thought, as a DEB strategy, allowing for TIMI 3 flow down the dissected vessel in SCAD patients may indeed prove sufficient to allow spontaneous healing. The argument against such a strategy, however, would be that the weaker wall integrity and presence of intramural haematoma in patients with SCAD would lead to higher rates of acute recoil compared to patients with atherosclerotic CAD (24). We would rather favor BRS over DEB in patients with SCAD and coronary flow compromise, as the temporary scaffold would avoid acute vessel occlusion caused by expansion of the mural haematoma and acute recoil.

The reality is that there is no compelling randomised evidence to support the various treatment options (BRS or DEB or indeed permanent, metallic DES) available for SCAD patients with high-risk features (i.e., ongoing ischaemia with distal TIMI flow less than 3, fatal arrhythmias, cardiogenic shock). BRS and DEB are indeed very attractive strategies as SCAD is often seen in young individuals and often involves long segments of the coronary tree. Future randomized controlled trials comparing BRS versus DEB versus new generation metallic DES would be the only way forward, to identify the optimal interventional management for this relatively rare, yet daunting condition for every interventional cardiologist.

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Footnote

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