Coronary Artery Rupture after Bioresorbable Vascular Scaffold Implantation Resolved with Graft Stent: Optical Coherence Tomography Assessment.

Santiago Jesús Camacho Freire, Rosa Cardenal Piris, Jessica Roa Garrido, Antonio Enrique Gómez Menchero, Javier León Jiménez, José Francisco Díaz Fernández.

Interventional Cardiology Department, Juan Ramón Jiménez University Hospital, Huelva, Spain.

Corresponding author:
Santiago Jesús Camacho Freire.
Ronda exterior norte s/n. Postal Code: 21005, Huelva, Spain.
Postal address: C/ Miguel de Cervantes, 2-3º Izda. Écija (Sevilla). Postal Code: 41400.
Phone: 609973502.
Email: navallana@hotmail.com.

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Coronary artery perforation (CAP) is an infrequent and life-threatening complication of percutaneous coronary intervention (PCI), requiring prompt intervention because it may lead to pericardial effusion frequently accompanied by tamponade. Due to the expanding volume of PCI procedures worldwide, a rapid increase in the number of CAP cases has been observed in the last decades [1].

The case presentation
A 52-year-old male with prior history of smoking and drug consumption (cocaine and heroin) was admitted with unstable angina and mild anterior wall hypokinesia.

Due to these findings, we referred him for catheterization. The angiogram revealed diffuse calcified artery disease with severe stenosis of the mid and distal left anterior descending artery (LAD), marginal branch and distal right coronary artery (RCA) with a chronic total occlusion of the posterolateral branch, with a Syntax Score of 31.5 points. The patient refused coronary artery bypass graft surgery (CABG) so we performed PCI.

We decided to treat LAD first, we predilate with conventional and scoring balloons at high pressure (3x10 mm at 16 atm; Angiosculpt 3x10 mm at 18 atm) and we implanted 2 BVS overlapped at that level (Absorb 3x28 and 3,5x18 mm at 14 atm). Thereafter, we did postdilatation with a non compliant balloon at high presure (3,5x15 mm up to 22 atm). At that moment a type III CAP occurred and angiographic images showed massive and pulsatile extravasation from the LAD into the pericardial space (Fig. 1B). An immediate drop in blood pressure and heart rate was noted, and the patient complained of severe chest pain. Prolonged balloon inflation was performed and Protamine sulfate (60 mg) was administered intravenously to reverse the effect of heparin and an emergency pericardiocentesis was done due to acute cardiac tamponade.

After 15 minutes we deflated the balloon and the perforation was still present, so we decided to implant a graft stent (Graftmaster 3,5x19 mm at 16 atm) with subsequent complete restitution of blood flow in the LAD and termination of extravasation into the pericardial space. At that point we performed an OCT to check the results showing a correct BVS apposition distally, with no evidence of fracture, the graft stent showed backscattering not being possible to see through it the BVS struts. The more proximal BVS presented overlapped struts suggesting BVS fracture (Fig. 2A-C).

One month latter, the graft stent showed good expansión and apposition and surprisingly we could see BVS boxes through the graft stent, now without backscattering. We decide to treat the marginal branch lesion and cover the possible fracture in the proximal BVS on LAD with a new drug eluting stent (DES), (Fig.
2.D-F). One year latter, the results were excellent, with an early positive remodeling on the distal BVS (Fig 2.G-I).

**Discussion**

Coronary artery perforation is a rare but potentially fatal complication during PCI with an incidence ranging from 0.1 to 0.84% [1]. Ellis et al. classified coronary perforations based on their angiographic appearance in 3 types [1].

CAP may occur with the use of guiding catheters, guidewires, oversized balloon/stents, cutting balloons, intravascular ultrasound (IVUS) catheters, debulking techniques or following balloon rupture [1].

Therapeutic strategies include prolonged balloon inflation, covered stents, reversal of anticoagulation, embolization of the distal vessel and surgery, the choice depending on the site and severity of the perforation, the patient’s hemodynamic status and the equipment available in the catheterization laboratory [1].

In the assessment, while the use of IVUS to ensure correct stent implantation and final high-pressure balloon inflation may improve the outcome [2], the use of OCT is not well established in this acute scenario and have been only probed in the assessment of pericardium covered stents and in a case reported of aneurysm post-kawasaki disease treated with polyurethane covered stent [3, 4].

To the best of our knowledge, this is the first case reported of stent graft assessment by OCT after coronary artery perforation with a bioabsorbable vascular scaffold. In the acute phase by OCT, the backscattering does not allow see through the graft stent, nevertheless in the follow up it does. This finding may be explained by the accumulation of red thrombus between the graft stent and the vessel in the acute phase.

**Conflict of Interest.**

The authors have no conflicts of interest to disclose.

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**References**


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