Bioresorbable Device Implantation in Left Main in Patients with Limitation For Long-Term Using of Dual Antiplatelet Therapy

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Case Report

Introduction

After the effectiveness achieved by drug-eluting stents (DES), the bioresorbable vascular support (BVS) brought potential benefits by reducing the inflammatory reaction, the dual antiplatelet therapy time (DAT) and target vessel revascularization. The case report shows the unconventional use of the device.

Case Report

Male 65-year-old patient, hypertensive, dyslipidemic, obese, with chronic gastric disease, who had undergone coronary artery bypass grafting surgery, was hospitalized for unstable angina, and treated with aspirin, clopidogrel, beta-blockers, nitrates, statins and anticoagulants.

Complete blood count with serum hemoglobin of 10 g/dL. Normal biochemistry and myocardial necrosis markers. Coronary angiography showed severe distal calcified left main coronary artery (LMCA) lesion involving ostial left main (LM). Anterior descending (AD) artery occluded in the middle third. Circumflex hypoplastic coronary artery with proximal occlusion (Figures 1 A and B). The distal portion of the AD was revascularized by the mammary artery. Right coronary artery with no lesions. Normal left ventricular (LV) function. The LMCA and LM ostial lesions were the culprits of the event.
Percutaneous coronary intervention (PCI) with DES was indicated from the LMCA, covering the ostium and the proximal segment of the LM, using intravascular ultrasound (IVUS). The main coronary artery protected by the mammary artery allowed greater security for PCI. The patient presented digestive hemorrhage caused by acute erosive gastritis with indication for drug treatment. Worsening of anemia. The PCI procedure was suspended. Treatment for angina was maintained, except for the suspension of DAT and anticoagulation. Over ten days in the hospital and resting, there was no angina. After correction of anemia, the patient was discharged. While in use of antianginal drugs, after 15 days the patient presented chest pain and was hospitalized again. New endoscopy revealed scarring of gastric lesions. Daily ticagrelor 90 mg and aspirin 100 mg were prescribed for seven days. With no bleeding or gastric symptoms, PCI with BVS was chosen.

**PCI Procedure**

Angiography: calcified lesion in LMCA; length of 21.9 mm. LMCA and LM diameter (3.5 mm and 2.6 mm). SYNTAX score = 28.5. IVUS: 72.8% lesion; area of 4.3 mm². Successive pre-dilatations with balloon catheters reducing residual lesions.

ABSORB BVS, 3.0 mm x 28 mm, was implanted from the middle third of the LMCA to the LM lesion. Post-dilations were conducted with more rigid balloons to impact the BVS on the vessel wall with no residual lesions (Figures 2A and B). IVUS showed a post-implantation area of 7.2 mm², confirming the success of the procedure.

In two-month clinical follow-up, the patient remains asymptomatic. The testing procedure includes: computed tomography angiography at six months, coronary angiography at 12 months and 24 months. DAT will be maintained for 12 months. Maintaining long-term aspirin prescription is being debated and will depend on the evolution of gastric condition. The drugs ranitidine and pantoprazole will be maintained at least until the end of DAT.
Discussion

The incidence of LMCA lesions in patients with stable angina undergoing coronary angiography varies from 5.0 to 7.0%. Due to the large area of myocardial irrigation and mortality of 50.0% over three years of medical treatment, surgery has become of the essence. Drug-eluting stents (DES) in the LMCA were not consolidated due to high rates of restenosis and sudden death reports. However, with the security of DES in PCI, the SYNTAX score assessed whether the treatment in the LMCA lesions would be feasible. Candidates for DES in the LMCA are favorable anatomies located at the ostium or middle portion of non-calcified trunk with low SYNTAX score (<22) or intermediate (between 23 and 32). DES for LMCA in bifurcations, trifurcations or score >32 were not favorable. Still controversial, IVUS in the PCI in LMCA appears to improve results compared to the group without IVUS.

DAT with aspirin and clopidogrel type thienopyridine is mandatory in PCI of LMCA. DAT time still raises discussion. Its use for six months to one year seems to be accepted by most authors. PCI of LMCA with DES does not offer, per se, higher risk of stent thrombosis. The most potent antiplatelet agents (prasugrel or ticagrelor) seem appropriate, especially in acute cases, although there is no evidence of their use in this particular group of PCI in LMCA.

BVS enable, in the first months, the permanence of a structure similar to stents. The drug everolimus offers the same antiproliferative action as DES. In two to three years, there is absorption by hydrolysis and it dissipates into carbon dioxide and water. There is recovery of vasomotor capacity and improvement of endothelial function.

DAT does not differ from the indication established for the DES, with use from six months to one year. Most authors recommend the use of ticagrelor or prasugrel in combination with aspirin. The BVS thrombosis rates are low (0.5%) and comparable to the latest generation DES. The permanence of the stems is a disadvantage of DES, not only for very late thrombosis, as well as for the difficulty in monitoring through non-invasive imaging methods. Furthermore, in restenosis, the need to repeat coronary artery bypass grafting offers the BVS the...
possibility of an onsite anastomosis without the metal or, if appropriate, the implantation of a new stent or BVS without overlapping structures.

BVS have been used in de novo, proximal, long and calcium-free lesions. Use in calcified, tortuous, bifurcation, saphenous vein grafts, infarction and trunk lesions is still exceptional. There are few reports of BVS in complex lesions, but in moderate complexity, results are promising and similar to DES.

The choice of BVS aimed at not employing delayed DAT with permanent suspension of at least one of the antiplatelet agents after resorption. The suspension of both antiplatelet agents was not considered, as the history of coronary artery disease determine the use of at least one of these drugs. However, in case of severe bleeding, temporary suspension of both can be analyzed, which is one of the reasons for using BVS.

Potential Conflicts of Interest
This study has no relevant conflicts of interest.

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Academic Association
This study is not associated with any graduate programs.

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