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Case Report

Primary Angioplasty to Ectatic Right Coronary Artery with Sirolimus Eluting Self-Expanding Stent

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Abstract

Coronary angioplasty to large vessels is challenging, particularly in the setting of myocardial infarction. The traditionally used devices are insufficient for the treatment of vessels that exceed 4 or 5 mm in diameter, even more so in the presence of high thrombotic content. On this occasion, we present the resolution of an acute coronary syndrome with ST-segment elevation, involving a large ectasic Right Coronary artery, with the sirolimus-eluting stent X-POSITION S Stentys.

Keywords: primary angioplasty; ectasic coronary artery

Introduction

Percutaneous transluminal coronary angioplasty (PTCA) in large vessels represents a technical challenge. In elective cases, devices that allow optimal apposition of the stent struts to the vessel wall should be selected, with the goal of minimizing the incidence of acute thrombosis and in-stent restenosis. [1-3]

Acute coronary syndrome (ACS) with ST-segment elevation/ ST-segment elevation myocardial infarction (STEMI) is a scenario in which decision-making is a race against time to determine myocardial ischemia. In these cases, facing such a technical challenge can lead to suboptimal results, particularly in the absence of dedicated devices [2] [4] [5]

Clinical Case

A 57-year-old male patient presented with cardiovascular risk factors, including type 2 diabetes, obesity, and a sedentary lifestyle. He had no known prior cardiovascular history or other relevant data. He was admitted to the emergency department with a 50-minute episode of oppressive chest pain in functional class IV, with no other accompanying symptoms. An electrocardiogram revealed ST-segment elevation (ST) in the inferior wall and right leads. The infarction code was activated, and he was referred to the catheterization laboratory for coronary angiography (CA) with a possible primary percutaneous coronary intervention (PPCI). The patient was admitted hemodynamically stable, with no signs of heart failure or need for vasoactive drugs.

A right radial approach was used to perform the CA using a 5-Fr Tiger catheter (Terumo Corporation, Tokyo, Japan). The left main coronary artery ostium was cannulated, revealing a large-caliber, with out significant lesions; an ectatic left anterior descending artery (LAD), and a circumflex artery (CX) both also with out significant lesions . The right coronary artery (RCA) was then cannulated, revealing a large-caliber ectatic vessel (>6 mm) with thrombotic occlusion at the midsegment **(Figure 1).** Given the clinical picture, it was decided to proceed with PPCI to the RCA.

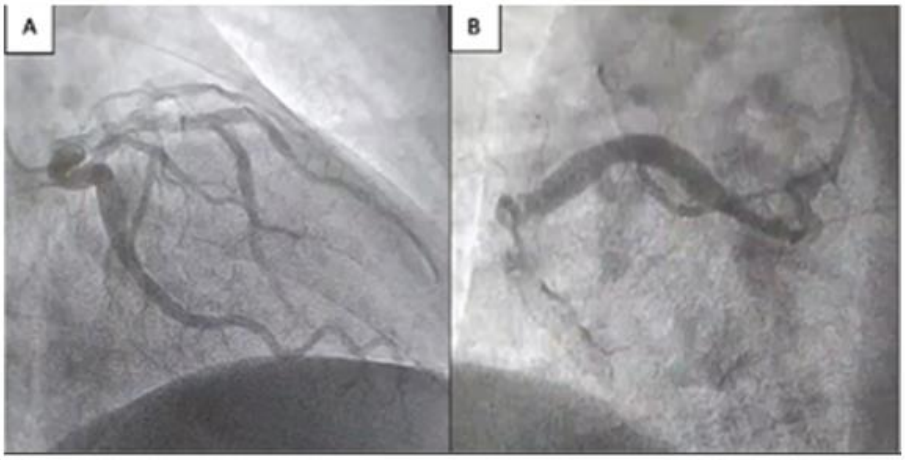

Figure 1: A. Left coronary artery without significatt lesions -Ectatic vessels. **B**. Largw-caliber ectatic coronary artery with acute thrombotic occlusion.

A 6Fr Judkins right therapeutic catheter (Boston Scientific, Massachusetts, USA) was advanced over a 0.035" J-string for cannulation of the RCA ostium. However, it was not adequately supported, so it was exchanged for an XB 3.5 therapeutic catheter (Cordis Corporation, Miami, USA). The occlusion was crossed with a 0.014" floppy coronary guidewire (Choice, Boston Scientifics, Massachusetts, USA), positioning it distally in the RCA. Given the high thrombotic load, an intracoronary bolus of a glycoprotein IIb IIIa inhibitor (Tirofiban - Agrastat, Phateon, Greenville, USA) was administered, starting a continuous infusion through peripheral access. Thromboaspiration was also performed with a Hunter catheter (IHT - Cordynamic, Iberhospitex SA, Barcelona, Spain), achieving thrombus extraction and recovering distal flow.

Because the large diameter artery, it was decided to implant three Stentys® X-POSITION S sirolimus-eluting self-expanding nitinol stents (Stentys S.A., Paris, France), measuring 6x27 mm, 5x27 mm, and 5x22 mm. An adequate angiographic result was obtained, with TIMI III flow **(Figure 2).**

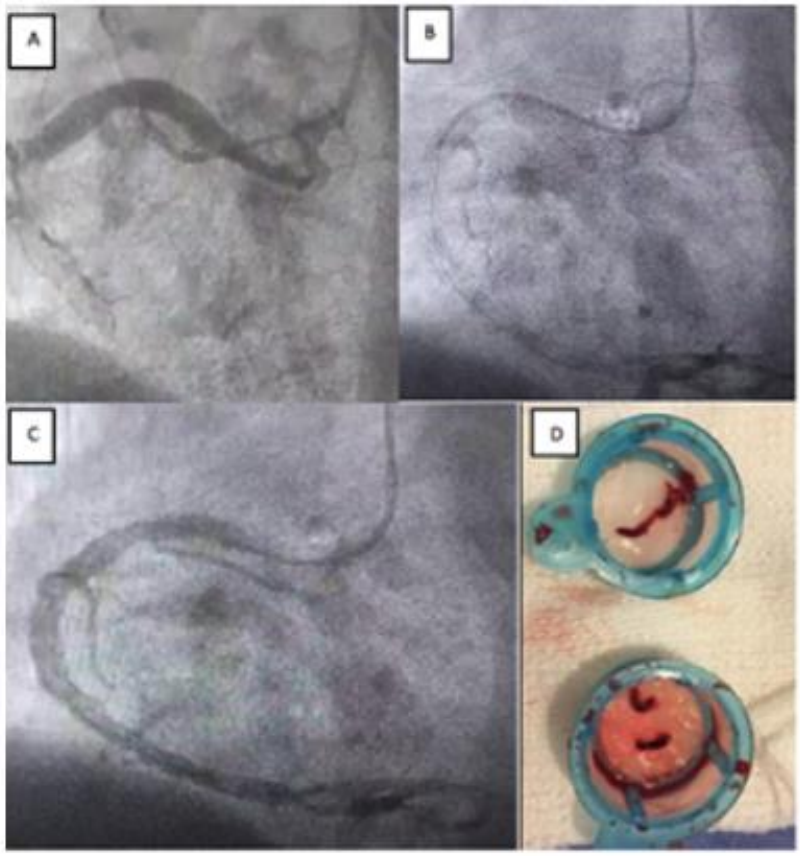

Figure 2: A Thrombotic occlusion of ectatic of ectatic right coronaryartery. B. Mechanical thromboaspiration. C . Lmplantation of three self-Expanding sirolimus-eluting stents D. Aspirated thrombus

The patient progressed favorably and was discharged 48 hours later on dual antiplatelet therapy (aspirin and clopidogrel).

Although the patient remained asymptomatic, a follow-up angiogram at 18 months revealed a patent vessel with mild to moderate distal restenosis **(Figure 3).**

Figure 3: Angiographic follow up at 18 months. Mild to moderate distal in-stent restenosis

Discussion

Coronary artery ectasia (CAE) is defined as an abnormal dilation of this vessel, associated with changes in blood flow within the vessel, resulting in increased blood viscosity and procoagulant status. Unlike coronary aneurysms, defined as a focal dilation of at least 1.5 times the diameter of the adjacent normal reference segment, in these cases the alteration is diffuse. In severals studies, it has been observed that in more than half of the cases, the compromised vessel is the right coronary artery. **(Table 1)** [1] [2] [6]

Definition	**Tipes y clasificación**
Coronary artery aneurysm: Focal dilation of at least 1.5 times the normal adjacent segment	<u>Morphology:</u> Saccular aneurysm: Transverse diameter greater than longitudinal diameter Fusiform aneurysm: Transverse diameter smaller than longitudinal diameter <u>Vessel wall structure assessed by IVUS:</u> True aneurysm: Integrity of the vessel wall preserved with all three layers (intima, media, and adventitia). Pseudoanurysm: Loss of vessel wall integrity, damage to the adventitia. Aneurysmal plaque characteristics: Stenosis with plaque rupture or spontaneous dissection. Normal aneurysmal-appearing segment: Normal segment adjacent to the stenosis. <u>Diameter:</u> Giant aneurysm: Diameter >20 mm
Coronary artery ectasia: Diffuse dilation of at least 1.5 times the diameter of the adjacent normal segment.	Type I: Diffuse ectasia of 2 or 3 vessels Type II: Diffuse disease in 1 vessel and localized disease in another vessel Type III: Diffuse ectasia in 1 vessel Type IV: Localized or segmental ectasia

Table 1 - Classification of coronary aneurysmal dilatation. From Management of Coronary Artery Aneurysms – Kawsara et al.

Percutaneous revascularization of aneurysmal or ectatic arteries is associated with a lower success rate and a higher incidence of no-reflow syndrome and distal embolism. Furthermore, in post-implant follow-up of patients with ACS whose culprit vessel had CAE, the rate of in-stent thrombosis and myocardial re-infarction was higher, as was the development of significant restenosis, a fact ruled out clinically and at angiographic follow-up at 18 months in this case. [2] [6]

One of the most important factors for achieving a successful outcome during coronary angioplasty is the appropriate choice of stent diameter. CAE represents a very particular challenge in this setting, a scenario in which self-expanding stents demonstrated a significant reduction in the malapposition rate (self-expanding balloon stent 0.07% vs. balloon-expandable stent 1.16%), achieving a larger luminal diameter compared to balloon-expandable stents. Oversizing balloon-expandable stents, aiming to achieve a diameter appropriate for the dimensions of the ectatic vessel, can lead to structural compromise, with significant alterations in the drug-eluting platform and damage to the vessel wall. Given their characteristics, self-expanding stents reduce the risk of malapposition. This, at the level of the proximal segment, reduces the incidence of intra-stent thrombosis, and at the distal level, the probability of vessel dissection, particularly when we encounter a mismatch of vascular diameters. [3] [7]

Conclusion

The resolution of acute coronary syndrome ST-segment elevation through PPCI often requires complex decisions in difficult scenarios. The balance between minimizing myocardial ischemia time and obtaining the best possible angiographic results can be affected by the anatomical characteristics of the vessel being treated and the resources available for revascularization. Coronary ectasia is a difficult condition to manage, as it is diffusely distributed, particularly in highly dilated vessels. In these

cases, the use of drug-eluting self-expanding coronary stents is a viable option with good results.

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