

## Stenting of Right Coronary Artery Arising from the Left Sinus of Valsalva

Luis M. Álvarez de la Fuente, Pedro Serrano Aísa, Vicente Aguarón López and Antonio Peleato Peleato

Unidad de Cardiología Intervencionista. Hospital Clínico Universitario Lozano Blesa. Zaragoza.

We report the stenting of a long lesion situated in an anomalous right dominant coronary artery arising from the left sinus of Valsalva. The patient was referred to our unit with a diagnosis of progressive angina and no other cardiopathy. We emphasize the convenience of having a good arrangement of the guiding-catheter with the original and the initial course of the artery, and also having a suitable support for the treatment programmed.

**Key words:** *Coronary stent. Anomalous right coronary artery.*

### **Stent en la arteria coronaria derecha con origen anómalo en el seno de Valsalva izquierdo**

Se relata la implantación de un *stent* en una larga lesión localizada en una arteria coronaria derecha dominante que tiene un origen anómalo en el seno de Valsalva izquierdo. El paciente no presenta ninguna otra patología cardíaca y fue remitido con el diagnóstico de angina progresiva, con ergometría positiva para cardiopatía isquémica. Se hace hincapié en la necesidad de conseguir una buena alineación del catéter-guía con el origen y curso inicial de la arteria, logrando así un soporte adecuado para la intervención programada.

**Palabras clave:** *Stent coronario. Arteria coronaria derecha anómala.*

## INTRODUCTION

Anomalies in the origin of the coronary arteries on the sinuses of Valsalva and in their distribution have become an increasingly frequent finding in the last two decades because of the extended use of cardiac catheterization and selective coronariography in daily practice. Yamanaka<sup>1</sup> has reported the presence of anomalies in the origin of the coronary arteries in 1% of the persons undergoing diagnostic coronariography.

Congenital anomalies of the coronary orifices can be classified into three groups: missing or multiple origina, and anomalous location. Anomalies of location are classified in terms of their location in relation to the aortic sinus: on the aortic sinus, in a different aortic sinus, and in an extra-aortic location.<sup>2</sup> We report the results of stent implantation in a long lesion located in a right coronary artery arising from the left sinus of Valsalva.

Correspondencia: Dr. A. Peleato Peleato.  
Unidad de Cardiología Intervencionista.  
Hospital Clínico Universitario Lozano Blesa.  
Avda. San Juan Bosco, 15. 50009 Zaragoza. Spain  
Correo electrónico: luismial92@hotmail.com

Received 15 February 2001  
Accepted for publication 25 April 2001

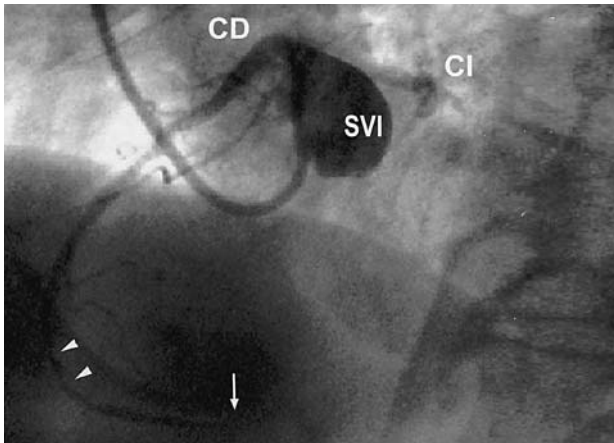
## CLINICAL CASE

The 67-year-old patient had various coronary risk factors (heavy smoker, systemic arterial hypertension, and a family history of death from ischemic heart disease), generalized arthrosis, and benign prostate hypertrophy. He was referred for coronariography due to progressive angina and exercise tests showing criteria of severe coronary artery disease.

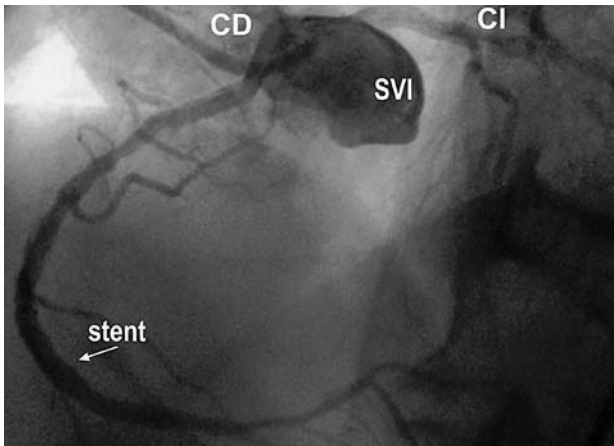
The left coronary sinus was cannulated without difficulty using conventional catheters. However, after confirming the absence of a coronary artery ostium on the right sinus of Valsalva, the anomalous origin of the right coronary arteries was identified by injecting contrast into the left sinus of Valsalva, which confirmed that both coronary arteries arose from this left sinus (Figure 1).

The right coronary artery exhibited a long stenosis of segments II and III, although sequential images did not reveal dynamic compromise of the vessel in its course between the aorta and pulmonary artery. The left coronary artery showed several severe arteriosclerotic lesions in the first diagonal and circumflex.

A Boston Scientific FL4A guide-catheter was used to implant a long stent in the right coronary artery. The lesion was cannulated with a Balance BMW 0.014"



**Fig. 1.** The left sinus of Valsalva (LSV), where the left (LC) and right (RC) coronary arteries arise, is visualized using an AL II catheter. On the right is a long, stenotic lesion in segments 2 and 3 (arrowheads). Flow distal to this point is scant.



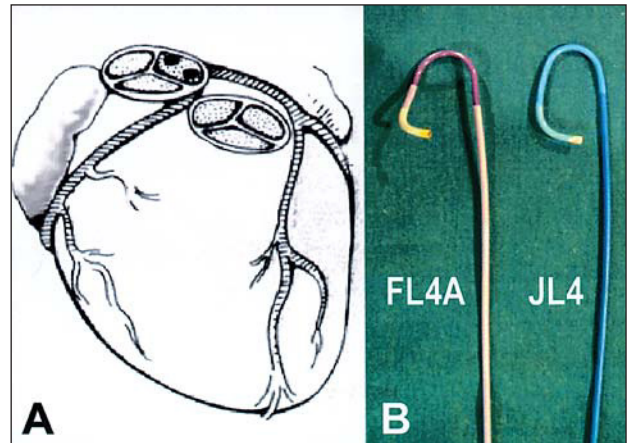
**Fig. 2.** The FL4A catheter was introduced selectively into the right coronary ostium, allowing a long stent (3.5-30 mm) to be implanted.

guide and predilation was performed with a 30-mm balloon. A 3.5-mm caliber, 30-mm long AVE stent was implanted (Figure 2).

In a second session scheduled one month later, the lesions of the left coronary branches were treated and the initial results of the implanted stent were checked.

## DISCUSSION

In the general population the incidence of coronary arteries with an anomalous aortic origin is unknown, ranging from 0.64% reported by Topaz<sup>3</sup> to 1.2% reported by Bass.<sup>4</sup> In the series of Kimbiris,<sup>5</sup> 45 cases (0.64%) of anomalous origin of one or both coronary arteries on the aorta were found among 7000 patients. In 26% of these cases, the right coronary artery arose from the left sinus of Valsalva. In a later study by Yamanaka<sup>1</sup>, the frequency was 22%.



**Fig. 3.** A: Diagram of the course of the right coronary artery where it arises from the left sinus of Valsalva. B: The tip of the FL4A catheter is bent forward with respect to the JL4 catheter, which allows the vessel located in an anterior situation on the left sinus of Valsalva to be cannulated.

When the right coronary artery arises from the left sinus of Valsalva, its ostium is located ahead and above the ostium of the left coronary, next to the commissure separating the left and right sinuses of Valsalva. The artery then turns forward, with a sharp initial inflection, and reaches the right atrioventricular sulcus. The final distribution is normal (Figure 3A).

Another important finding was that the artery branching off the aorta at an angle. This placed traction on the ostium, which had a vertical slit appearance instead of a circle.<sup>6</sup>

The selective cannulation of anomalous arteries is a challenge because a good point of support is needed for vascular interventions. Other aspects to be considered are the configuration of the ostium, angle, initial trajectory, location of the lesion, and device to be used.

Using semiselective injections of contrast in the left sinus of Valsalva, the anomalous vessel can be visualized well enough to establish a correct diagnosis. Problems appear during therapeutic procedures because the guide-catheter must be correctly aligned with the initial course of the artery in order to obtain good support for introducing the device, particularly in ectopic vessels or those with high-grade stenosis.

In a search of the medical literature for 1992-2000 (Medline) using the keywords «anomalies of the coronary arteries, angioplasty, and stent» few references were found to angioplasty and only three to stent implantation in coronary arteries arising anomalously from the coronary artery ostia.

Conventional Judkins, Amplatz, and Williams LR catheters, as well as adaptations of these catheters, have been used to improve leverage, etc.<sup>6-12</sup>

In our patient, adequate vessel alignment and good support were obtained using a Boston Scientific FL4A catheter. The primary (distal) curve of this catheter is

bent forward, thus enabling it to avoid the normal left coronary ostium (Figure 3B).

Given the limited experience in the treatment of arteriosclerotic lesions in such cases, we concluded that a Judkins catheter with a forward-bent tip is very useful, particularly when good support is needed for pushing the device vigorously.

## REFERENCES

1. Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn* 1990; 21: 28-40.
2. Petit i Guinovart M, Reig i Vilallonga J. Orificios arteriales coronarios. Ediciones Científicas y Técnicas, S.A. Arterias coronarias. Aspectos anatómo-clínicos. Barcelona: Masson-Salvat Medicina, 1993; 19-37.
3. Topaz O, Di Sciascio G, Goudreau E, Cowley MJ, Nath A, Kohli RS et al. Coronary angioplasty of anomalous coronary arteries: notes on technical aspects. *Cathet Cardiovasc Diagn* 1990; 21: 106-111.
4. Bass TA, Gilmore PS, Ceithami EL. Rotational atherectomy in anomalous coronary arteries. *Cathet Cardiovasc Diagn* 1992; 17: 322-324.
5. Kimbiris D, Iskandrian AS, Segal BL, Bemis C. Anomalous aortic origin of coronary arteries. *Circulation* 1978; 58: 606-615.
6. Musial B, Schob A, Marchena E, Kessler KM. Percutaneous transluminal coronary angioplasty of anomalous right coronary artery. *Cathet Cardiovasc Diagn* 1991; 22: 39-41.
7. Charney R, Spindola-Franco H, Grose R. Coronary angioplasty of anomalous right coronary arteries. *Cathet Cardiovasc Diagn* 1993; 29: 233-235.
8. Yeoh JK, Ling LH, Maurice C. Percutaneous transluminal angioplasty of anomalous right coronary artery arising from the ascending thoracic aorta. *Cathet Cardiovasc Diagn* 1994; 32: 254-256.
9. Mooss AN, Heintz MH. Percutaneous transluminal angioplasty of anomalous right coronary artery. *Cathet Cardiovasc Diagn* 1989; 16: 16-18.
10. Yabe Y, Tsukahara R. Percutaneous transluminal coronary angioplasty for culprit lesions in patients with post myocardial infarction angina based on dextrocardia and anomalous coronary arteries. Case reports and methods. *Angiology* 1995; 46: 431-440.
11. Chakraborty B, Chan CN, Tan A. Percutaneous transluminal coronary angioplasty of an anomalous right coronary artery arising from a separate ostium in the left sinus of Valsalva. A case report. *Angiology* 1995; 46: 629-632.
12. Fournier JA, González-Barrero A, Fernández-Cortacero JAP, Sánchez A. Coronary angioplasty of anomalous right coronary artery originating from the left sinus of Valsalva. *Int J Cardiol* 1995; 49: 284-286.