

## Balloon-assisted technique in complex anatomy of transulnar access route

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### ARTICLE INFORMATION

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### Competing interests

The authors declare no competing interests

### Acronyms

**Cx:** circumflex

**LAD:** left anterior descending artery

**OM:** obtuse marginal

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### ABSTRACT

Transulnar and transradial approaches have clear advantages in cardiac catheterization. However, complex anatomical variations can be the cause of failure in the use of this procedure. The case of a patient with complex arterial anatomy who underwent the balloon-assisted technique is reported. This technique is considered to be useful in selected cases.

**Key words:** Cardiac catheterization, Transulnar access, Balloon-assisted

### **Técnica de asistencia con balón en anatomía compleja de la vía de acceso transulnar**

### RESUMEN

Son claras las ventajas de las vías de acceso transradial y transulnar en el cateterismo cardíaco. Sin embargo, variantes anatómicas complejas pueden ser causa de fracaso en la utilización de este procedimiento. Se presenta el caso de un paciente con anatomía arterial compleja en quien se utilizó la técnica de asistencia con balón. Se considera que puede ser útil en casos seleccionados.

**Palabras clave:** Cateterismo cardíaco, Acceso transulnar, Asistencia con balón

### INTRODUCTION

Much has been written about the clear advantages of cardiac catheterization via transradial<sup>1</sup>, and transulnar, as a safe alternative instead of the radial in selected cases<sup>2</sup>, each case based on the proven benefit of both pathways. However, complex anatomy of the upper limb arterial tree can become an obstacle to the process and constitute causes of failure and complications.

The experience gained in the use of these pathways has enabled a successfully implement of alternative techniques to facilitate their implementation. This article reports a patient where the balloon-assisted technique was used due to the presence of a complex anatomy found in the transulnar route of access.

#### CASE REPORT

56-year-old, white woman, with a history of hypertension, ex-smoker, body mass index 29.3 kg/m<sup>2</sup> and chronic kidney disease stage 3, diagnosed with progressive worsening angina in functional class III Canadian Society of Cardiology. She underwent coronary angiography two months earlier at another center, through the right radial artery, which showed lesions in the proximal left anterior descending artery (LAD) (75%), distal circumflex (Cx) (80%), in the ostium of the first obtuse marginal (OM) branch (85%), and in the middle segment of right coronary artery (70%). The lesions in the circumflex branch were in bifurcation (0-1-1, as rated by Medina). Percutaneous coronary intervention with direct stenting technique to LAD, and 2 stents (T-shaped technique) to Cx-OM was scheduled. The right coronary artery was to be treated in a second time.

In evaluating the pulses of both upper limbs loss of the right radial pulse and a weak left radial pulse were found, so it was decided to carry out catheterization via the right transulnar approach, despite the risk of ischemia of the hand.

Once the artery was channeled, a 6 French hydrophilic introducer was placed and a 0.035" and J-tip vascular exchange guidewire was introduced, which

showed resistance to the intravascular advance, therefore iodinated contrast was injected that showed 90° tortuosity at the site of insertion of the ulnar to the brachial artery (brachial bifurcation into radial and ulnar arteries), atherosclerotic lesion at that level, and ulnar spasm (**Figure, Panel A**). Faced with this anatomical variant was decided to conduct a balloon-assisted technique. An intracoronary guidewire (0.014") was crossed towards the distal portion of the tortuosity (**Panel B**), and through a 6 French XB guiding catheter, a balloon was placed, inflated to 4 atmospheres in the catheter tip, so it would protrude about 5 mm (**Panel C**). The catheter was gently pushed and rotated clockwise, so that it was possible to cross the tortuosity (**Panel D**). Once crossed, the procedure was normally continued, the left coronary artery was catheterized and the proposed strategy was successfully performed.

#### COMMENT

Inflating a balloon at low pressure to protrude from the distal end of the catheter helps to overcome extreme curves. Its main advantage is to avoid endothelial damage with the catheter tip and prevent or minimize the occurrence of spasm.

Patel *et al.*<sup>3</sup> studied 63 patients with complex anatomy of the radial, brachial and subclavian axes, where catheterization was difficult this way, despite using the usual maneuvers. Balloon-assisted technique was used in all of them. From them, 25 (39.7%) had a small caliber radial artery; 22 (34.9%), a major radial tortuosity; 9.5%, subclavian tortuosity or stenosis, or both; and 4 (6.3%), complex loops. Technical failure was reported in only 3 patients (2 with very small caliber radials and



**Figure.** Panel A. Tortuosity in the insertion site of the ulnar to brachial artery, with atherosclerotic lesion at this level. B. Intracoronary guidewire to the distal portion. C. Inflated balloon. D. Crossing through tortuosity.

1 with a 360° loop). The authors<sup>3</sup> concluded this technique is useful in this group of patients. Similarly, its utility in patients with perforation or dissection of the artery radial<sup>4</sup> has been described.

It is considered that the balloon-assisted technique may be useful in selected patients with complex anatomy, who need catheterization through the wrist.

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