



Case report

Coronary sinus angioplasty to enable optimal left ventricular lead placement for resynchronization

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The authors report the case of an 80-year-old man with history of chronic coronary artery disease, in class III of the New York Heart Association (NYHA), despite optimal medical therapy, referred for cardiac resynchronization therapy (CRT). He suffered an anterior ST-segment elevation myocardial infarction years before, and a recent follow-up echocardiogram revealed a left ventricle ejection fraction (LVEF) of 20%. The 12-lead electrocardiogram (ECG) showed sinus rhythm with left bundle branch block and QRS width 150 ms (Fig. 1).

Using left subclavian venous access, the right ventricle (RV) electrode (Ingevity MRI™ model 7742, Boston Scientific; Massachusetts, US) was placed in the RV apex. Balloon-assisted venography of the coronary sinus (CS) revealed a posterolateral vein (PLV) as a suitable target for the left ventricle (LV) lead, even though a lumen reduction was observed in the mid portion (Fig. 2A). A 0.014-inch guidewire (ACUITY Whisper View™, Boston Scientific) was positioned along the PLV. Then, a quadripolar LV lead (ACUITY™ X4 Spiral S, Boston Scientific) was advanced over-the-wire, but not able to cross the stenosed segment. A second attempt using a sub-selective catheter (ACUITY™ Pro, Boston Scientific) for support was also unsuccessful. As this vein was deemed optimal located for LV pacing, the operating team decided to proceed to venous angioplasty. Two non-compliant angioplasty balloons (2.5 × 12mm and 3.0 × 10mm) were sequentially advanced over-the-wire and progressively inflated (until 16 and 12 atm, respectively) (Fig. 2B and C). The LV lead was then successfully advanced to the target site (Fig. 2D) with an acute stimulation threshold of 2.0V (pulse width 0.4 ms). The atrial electrode (Ingevity MRI™ model 7741, Boston Scientific) was placed in the right atrial appendage. No complications occurred and the final QRS width was 116 ms. At 6-month follow-up, the patient improved in terms of LVEF (34%) and NYHA functional class (II).

CRT is an important therapeutic option for selected patients with heart failure and reduced LVEF [1]. Besides the etiology of the cardiomyopathy (ischemic versus non-ischemic), factors such as CS anatomy, tributary distribution and final LV lead positioning highly affect the response to CRT. Anatomical obstacles in the CS network (venous valves, stenosis, tortuosity of the target vein, among others) represent a major challenge for the operator [2]. Concerning CS or branch stenosis, balloon angioplasty seems to achieve high rates of successful transvenous LV lead placement. Reported complications include vein rupture, perforation, or thrombosis [3].

Informed consent and authorization to use this clinical data and images were obtained from the patient.

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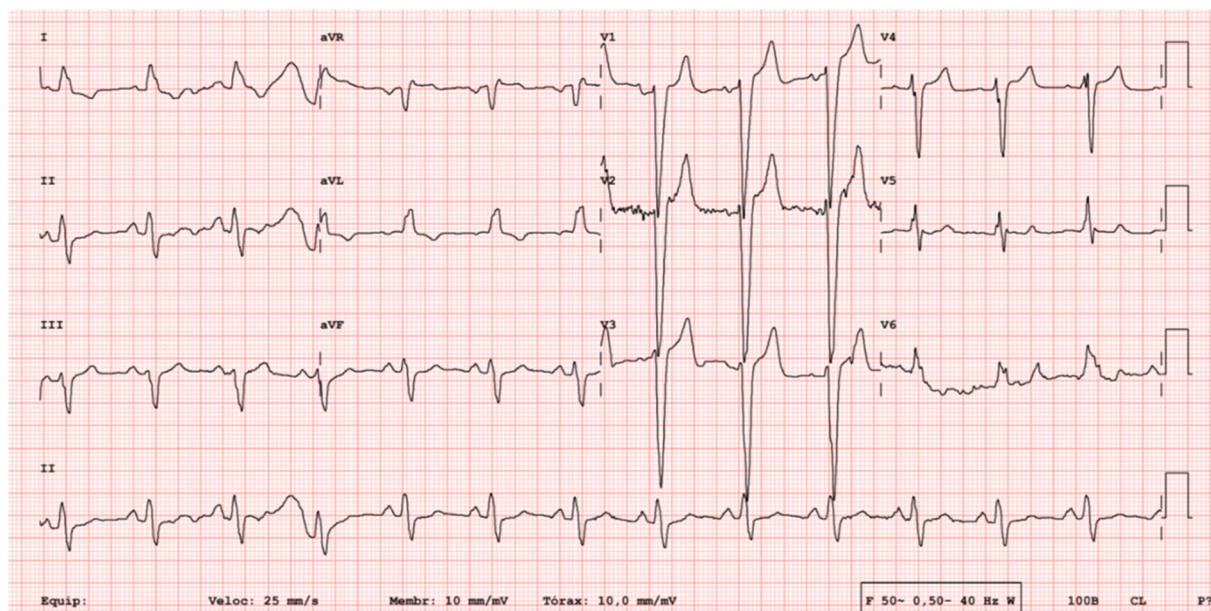


Fig. 1. Baseline 12-lead ECG revealing sinus rhythm, heart rate of 78/min and left bundle branch block, with a QRS width of approximately 150 ms.

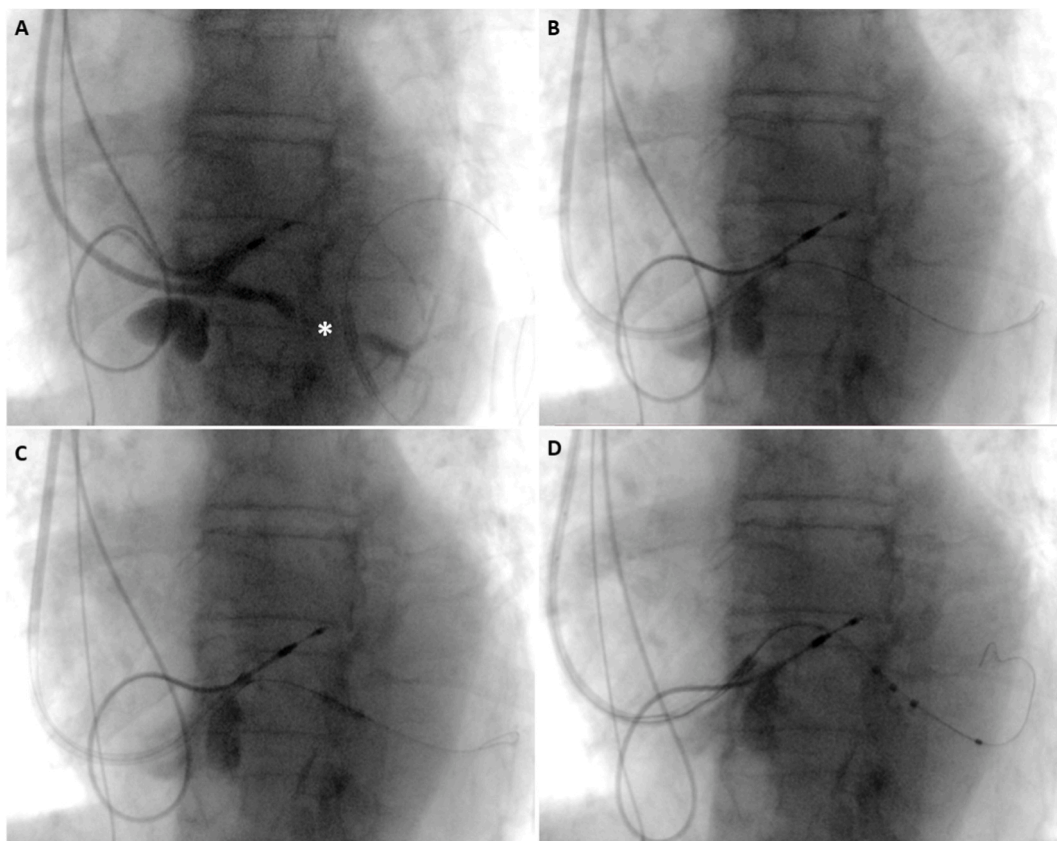


Fig. 2. Fluoroscopy-guided LV lead placement. (A) CS venography revealing a stenosed segment (*) in a posterolateral tributary. (B) Guidewire positioning along the posterolateral vein. (C) Balloon inflation in the stenosed segment. (D) Final position of the quadripolar LV lead.

Production notes

Author contribution statement

All authors listed have significantly contributed to the investigation, development and writing of this article.

Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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