

How to proceed?

Leadless pacemaker placement to overcome bilateral subclavian vein occlusion

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We present the case of a 76-year-old man referred for dual chamber pacemaker implantation for high-grade atrioventricular block. Prior to dual-chamber pacemaker implantation, the following contrast venograms are obtained. How do you proceed?

Contrast venography demonstrated occlusion of the left subclavian vein with extensive formation of collateral veins. Contrast venography of the right subclavian vein showed a similar obstruction (fig. 1). There were no clues in the patient's history as to the cause of the venous obstructions: no trauma, radiation, or intravascular procedures were reported. Computed tomography angiography of the chest (fig. 2) confirmed hypoplastic, filiform subclavian veins, which represents an uncommon vascular phenomenon [1]. In patients in whom the traditional transvenous route is not available, different techniques may be used to overcome this difficulty: (1) epicardial placement of electrodes via surgical approach; (2) "inside-out" access: by obtaining femoral access various tools

such as stiff angioplasty wires, laser extraction tools or even a trans-septal kit have been described to allow penetration of the proximal edge of the occluded segment of the subclavian vein towards the distal edge of occlusion; (3) implantation of a leadless pacemaker using right femoral access [2]. We chose the last option because of its simplicity and safety profile and the

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availability of AV-synchronous pacing with the latest device (MICRA AV, Medtronic, Minneapolis, MN) [3]. The ECG at discharge (fig. 3) confirmed VDD pacing (by detection of atrial contraction by the accelerometer). In the new 2021 European Society of Cardiology (ESC) guidelines for cardiac pacing and cardiac resynchronization therapy [4], DDD should be preferred over single

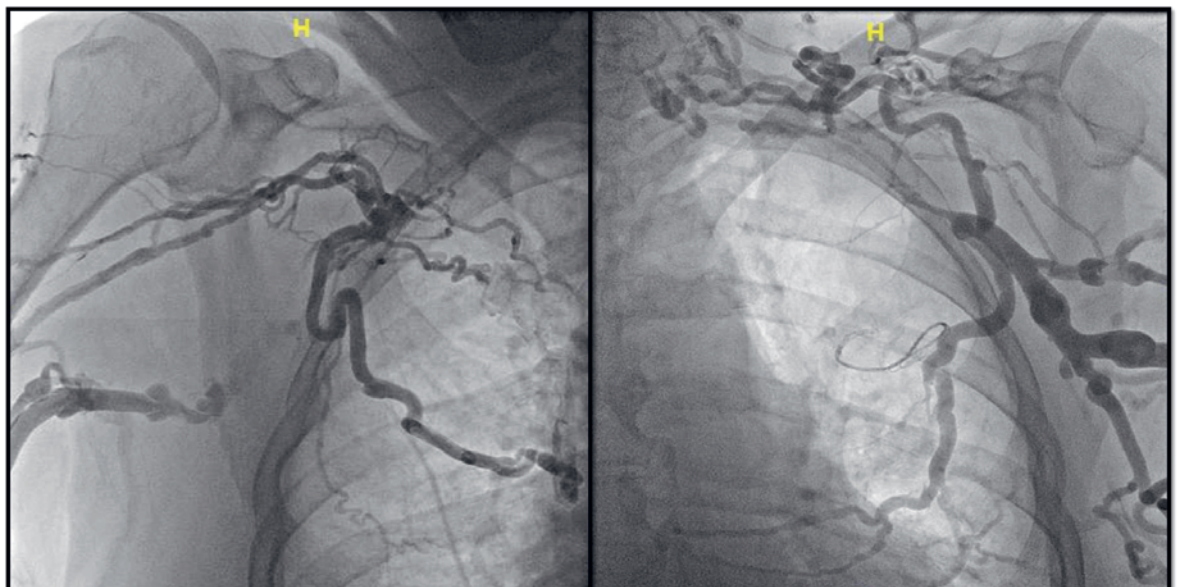


Figure 1: Contrast venography demonstrating bilateral subclavian vein stenosis.

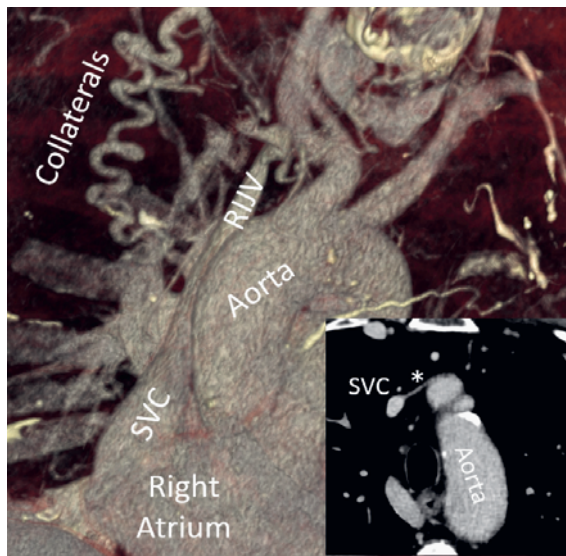


Figure 2: Multiplanar 3D reconstruction of extensive collaterals, right internal jugular vein draining into SVC. Inlay with * showing axial computed tomography slice of filiform bridging vein. SVC = superior vena cava; RIJVV = right internal jugular vein

chamber ventricular pacing in the case of atrioventricular block and underlying sinus rhythm (recommendation class IIa, level A). Leadless pacemaker placement has now a class IIb recommendation (level B) for indications such as obstruction of the venous route, pocket

issues or increased infection risk. In certain circumstances assessment of atrial function by clinical parameters, echocardiographic markers or sinus rate variability at rest to predict a high percentage of atrioventricular-synchronous pacing may help in patient selection for leadless VDD pacing.

In summary, percutaneous, leadless pacemaker placement may be considered in cases with bilateral total vein occlusion.

Disclosure statement

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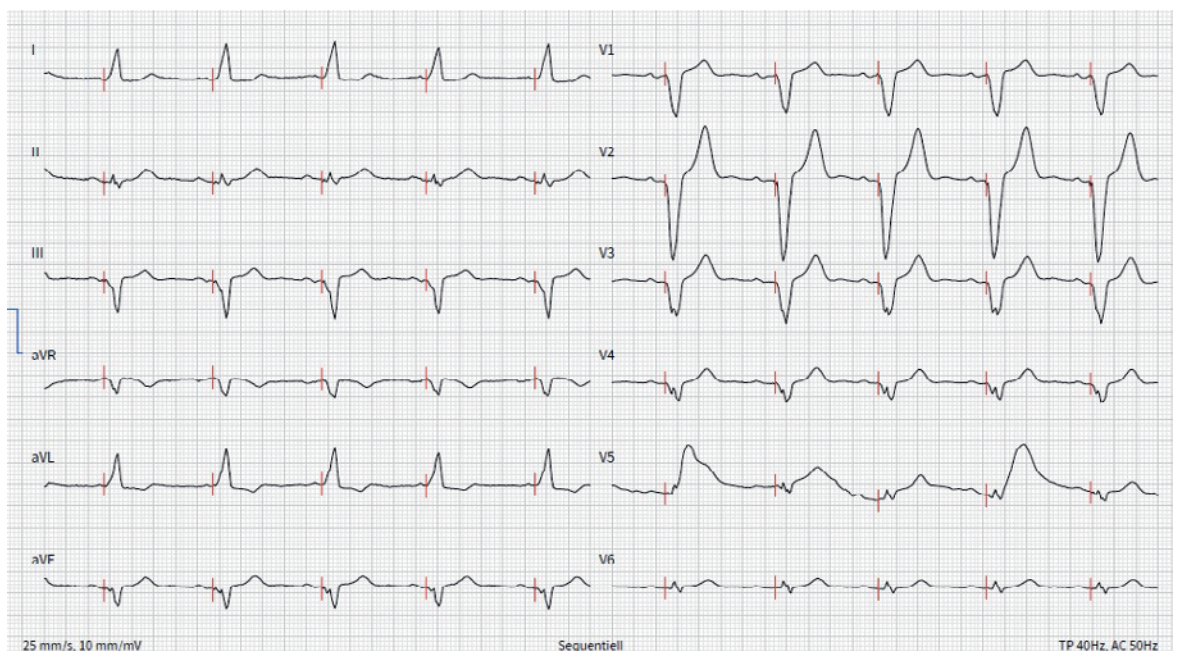


Figure 3: ECG at discharge confirmed atrioventricular-synchronous pacing by detection of atrial contraction by the accelerometer.

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