Percutaneous Closure of Ventricular Septal Defect Secondary to Aortic Valve Replacement

Cierre percutáneo de comunicación interventricular secundario a cirugía de recambio valvular aórtico

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Ventricular septal defect (VSD) after aortic valve replacement (AVR) is a rare complication. It is usually a high-risk surgery with significant technical difficulty; therefore, percutaneous closure is a highly successful option with very few complications in expert hands. (1-3)

These images correspond to a 57-year-old woman with aortic valve disease who was implanted a 21 mechanical prosthesis in 1996. Prosthetic dysfunction with severe aortic regurgitation was targeted, and a new cardiac surgery with implantation of bioprosthesis 21 was decided. After the procedure, a 7 x 7 mm VSD was targeted below the juncture of the right coronary sinus and the non-coronary sinus with QP/QS of 2, deciding her referral for percutaneous closure of the defect. A cardiac CT scan was performed (Figure 1). The electrocardiogram showed right bundle branch block (RBBB).

The procedure was performed with double (arterial and venous) femoral approach under echocardiographic monitoring (Figure 2). A guidewire was passed from the left ventricle (LV) through the VSD and advanced to the pulmonary artery; it was captured with a gooseneck loop and externalized in the right femoral vein to form an arteriovenous circuit. From the femoral vein through the externalized guidewire, a carrier catheter was advanced through the VSD to the LV and an Amplatzer Muscular VSD Occluder 10 was successfully implanted without interfering with the aortic valve prosthesis or the tricuspid valve. On the second day after surgery, the patient had complete atrioventricular block (AVB) and required permanent DDD pacemaker implantation. Control echocardiography showed minimal residual shunt with no hemolysis and no clinical data for heart failure.

A VSD following AVR is an uncommon complication that is manifested as left ventricular overload with symptoms of heart failure. Shunts with QP/QS below 1.5 are usually well tolerated, but larger shunts should be repaired. Closing the septal defect reduces the incidence of endocarditis, pulmonary hypertension, arrhythmias, or left ventricular systolic dysfunction. Classically, surgery has been considered the gold standard for treating VSD, but today, with the development of percutaneous closure techniques, these have become an important and very reliable option. The percutaneous closure technique can be ante-

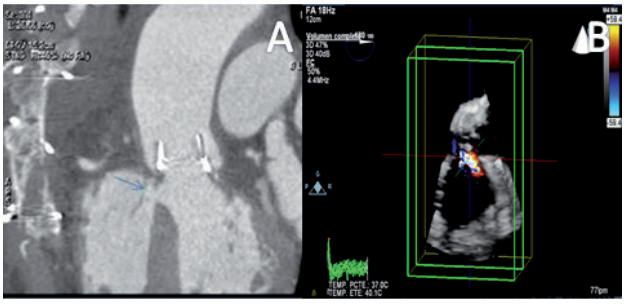

Fig. 1. Computer tomography scan and 3D echocardiography images of the defect.

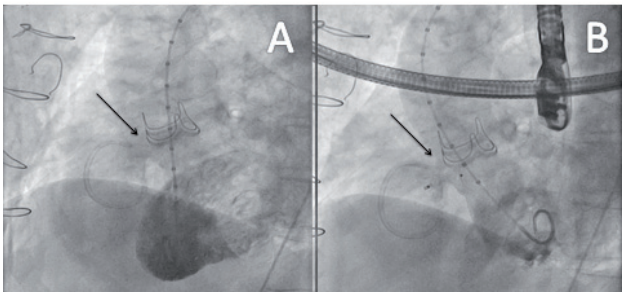

Fig. 2. Angiography before and after percutaneous closure with Amplatzer Muscular VSD Occluder 10.

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grade (transseptal puncture) or retrograde (from the aorta). (4) In the case of mechanical prostheses, only the antegrade approach is possible, but in the case of bioprostheses, a retrograde approach is a simpler treatment of choice.

The usual treatment for perimembranous VSD is surgical, but given the recent aortic valve replacement in our patient, percutaneous closure is a good option. Proximity of the left His bundle branch should be taken into account, since it is associated with high risk of AV block, which is greater if the device is oversized, and in patients with preexisting RBBB. (5) Today, a device called Nit Occluder® (PF Medical) is available, with lower incidence of AVB but higher incidence of hemolysis.

Conflicts of interest

None declared (See authors' conflicts of interest forms on the website/ Supplementary Material).

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See additional video in:

https://youtu.be/T3j3M3xiT94