

Scientific letters

Stent Implantation in the Anastomosis After Correction of a Total Anomalous Pulmonary Venous Connection**Implante de un stent en la anastomosis del colector a la aurícula izquierda tras cirugía correctora de drenaje venoso pulmonar anómalo total****To the Editor,**

Total anomalous pulmonary venous connection accounts for 1.5% of all congenital heart defects.¹ Although the total postoperative mortality for total anomalous pulmonary venous connection has dropped to 10%, mortality can rise to 40% to 60% in patients with postoperative venous obstruction.^{1,2} This type of obstruction can occur in the anastomosis or in the pulmonary vein ostium.

This condition has been treated by balloon dilation or stent implantation in the pulmonary vein ostium,^{3,4} although sutureless surgery is now considered the treatment of choice.⁵

We describe a 4-year-old boy diagnosed at age 1 month with nonobstructive supradiaphragmatic total anomalous pulmonary venous connection, in which the pulmonary veins converged into a common chamber that drained into the innominate vein. Surgical repair was performed 2 months later, and the chamber was anastomosed to the left atrium roof. The postoperative period was unremarkable. After 2 years, echocardiography revealed a possible stenosis in the anastomosis (Figure 1A), which was later confirmed by magnetic resonance imaging (Figure 1B).

The patient underwent cardiac catheterization via a femoral vein approach and radiofrequency perforation of the interatrial septum. The pulmonary pressure was 27/15 (25) mmHg; aortic pressure, 63/40 (50) mmHg; pulmonary wedge pressure, 18 mmHg; and chamber-to-left atrium gradient, 7 mmHg. Angiography revealed dilatation of the pulmonary veins and chamber, with a diameter of 6.1 mm in the anastomosis with the left atrium (Figure 1C). Angioplasty with a 15 × 25-mm Cristal Balloon catheter was unsuccessful and, therefore, a decision was made to implant a stent in the anastomosis. A 0.035-inch Amplatzer

Super-Stiff™ guidewire and a Mullins 9 Fr sheath were used to advance a 16-mm IntraStent® LD Mega™ fitted to a 14 × 35-mm BIB® (balloon-in-balloon) catheter, which was implanted in the anastomosis (Figure 2A). The gradient between the chamber and the left atrium dropped to 2 mmHg. There were no complications, and acetylsalicylic acid and clopidogrel therapy was initiated.

During follow-up, echocardiography showed persistent dilatation of the pulmonary veins, with a slightly higher velocity, but the biphasic flow pattern of the pulmonary veins was maintained. Two years after the procedure, follow-up computed tomography angiography showed a possible stenosis at the stent angle with the right pulmonary veins (Figures 2B and C) and, therefore, cardiac catheterization was repeated. The mean pulmonary pressure was 15 mmHg; the mean aortic pressure, 54 mmHg; and the pulmonary wedge pressure, 11 mmHg, equal to the left ventricular end-diastolic pressure. Transesophageal echocardiography showed laminar flow through the stent and stent cells, but no endothelial proliferation. Because no stenosis was observed, it was decided to take a wait-and-see approach and maintain long-term dual antiplatelet therapy to avoid the risk of thromboembolism.

Postoperative venous obstruction following surgical repair of total anomalous pulmonary venous connection is a severe complication, particularly when it presents early, is bilateral, and affects the ostium of the pulmonary veins.^{1,2} In these cases, endothelial proliferation narrows the pulmonary vein lumen and usually recurs after stent implantation or classic surgical repair.^{2–4} In the case of our patient, the prognosis is good because the postoperative venous obstruction developed 2 years after the surgery and only affected the anastomosis. Hence, we believed that the implantation of a large stent at some distance from the pulmonary vein ostium would not favor endothelial proliferation. The stent lumen and lateral cells have remained patent during the patient's clinical course, which supports our hypothesis.

To our knowledge, this is the first case of the successful implantation of a stent to resolve postoperative venous obstruction in the anastomosis. The follow-up period is short, and in-stent stenosis could develop in the future. However, the possibility of dilation up to 22 mm provides ample margin for surgery, and if

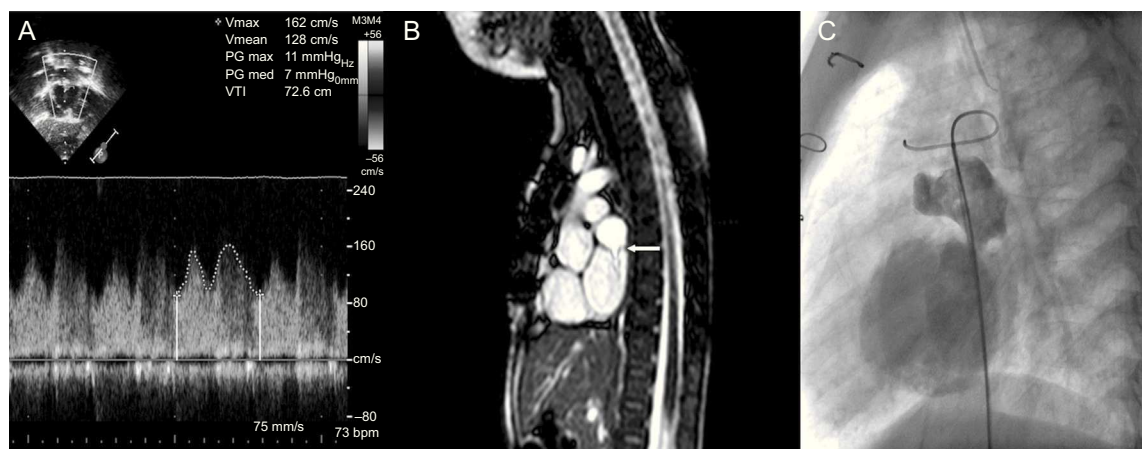


Figure 1. A: Echocardiography with pulsed Doppler in anastomosis, with loss of the biphasic pattern in pulmonary venous flow and a mean gradient of 7 mmHg. B: Sagittal plane on cardiac magnetic resonance imaging; stenosis in the anastomosis, with a 6-mm diameter (arrow). C: Angiography (lateral view); dilated chamber connected to the left atrium roof through a stenosed orifice. Bpm, beats per minute; PG, pressure gradient; Vmax, maximum velocity; Vmean, mean velocity; VTI, velocity-time integral.

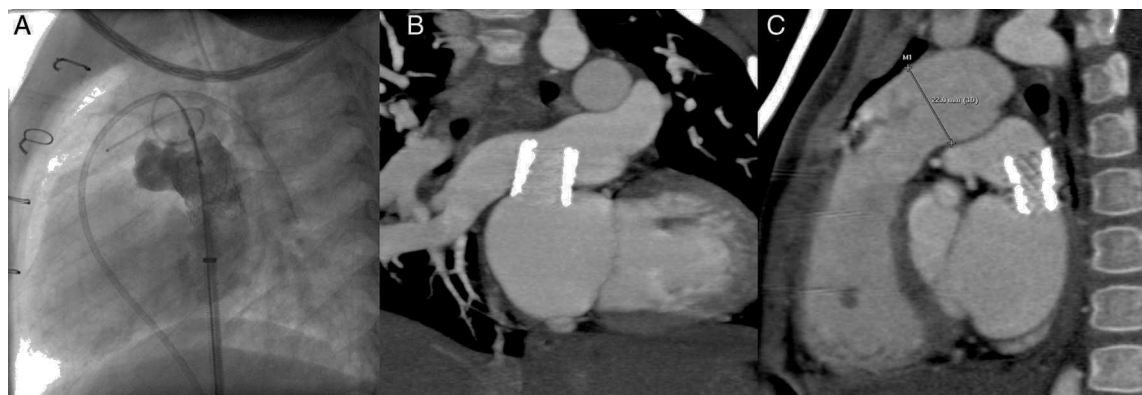


Figure 2. A: Angiography (lateral view) following stent implantation in the anastomosis. B and C: Computed tomography angiography (coronal and sagittal planes); patent and well-positioned stent at a 90° angle compared with the right pulmonary veins.

surgery is deemed necessary, stent removal should pose no difficulties.

In conclusion, we believe that stent implantation may prevent repeat surgery in postoperative anastomotic venous obstructions after total anomalous pulmonary venous connection surgery, at least in the short- and medium-term.

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Percutaneous Closure of VSD and TAVI With Left Atrial Appendage Exclusion in a Single Procedure: Potential Benefits of a Combined Structural Interventional Procedure



Cierre percutáneo de CIV y TAVI transfemoral asociado a la exclusión de la orejuela: potenciales beneficios del intervencionismo estructural combinado

To the Editor,

Percutaneous closure of the left atrial appendage (LAA) is an accepted procedure for stroke prevention in patients with atrial fibrillation. In patients with heart diseases eligible for percutaneous intervention, LAA obliteration during the same procedure may be particularly beneficial, in view of the clinical profile and high comorbidity of these patients. Transcatheter treatment of concomitant cardiac conditions is emerging as a possible strategy to improve the clinical outcomes of the procedure.

We describe the case of a patient with permanent atrial fibrillation and ventricular septal defect (VSD) following surgery for aortic valve replacement who underwent simultaneous transcatheter closure of the VSD and LAA, as well as the case of a patient with chronic atrial fibrillation and severe symptomatic

aortic stenosis who was successfully treated by transfemoral aortic valve implantation (TAVI) and percutaneous LAA closure during the same procedure.

The first patient was a 77-year-old woman with hypertension, dyslipidemia, chronic renal failure, and repeated transient ischemic attacks who had chronic atrial fibrillation plus several episodes of gastrointestinal bleeding; she was also receiving acenocoumarol therapy. The patient had undergone aortic valve replacement 12 years earlier. Due to progressive degeneration of the mechanical prosthesis, she required a new operation for aortic valve replacement. A decision was made to implant a 19-mm Carpentier-Edwards PERIMOUNT Magna Ease (Edwards Lifesciences Corporation, Irvine, California, United States) bioprosthesis, with discontinuation of anticoagulant therapy to be considered during follow-up. After the surgery, she experienced complete atrioventricular block that required implantation of a single-chamber permanent pacemaker. Before discharge, a VSD with a diameter of 6 mm was visualized in the perimembranous area; the peak interventricular gradient was 85 mmHg and clinical tolerance was initially good; therefore, we decided to adopt a conservative approach. One month later, the patient was readmitted for heart failure.

The case was discussed in a medical-surgical session, and a decision was made to perform percutaneous closure of the VSD and LAA in the same procedure.