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Case Report

Paravalvular leak closure with two large size devices

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ABSTRACT

Paravalvular leaks (PVL) after valve replacement surgeries are not uncommon. A significant number of these patients need some form of intervention as they commonly present with heart failure or severe hemolysis. Surgical correction is associated with high mortality and morbidity. Device closure of PVLs has been found to have good results. Since there are no devices designed specifically for PVL closure, large PVL closure is difficult. Occasional larger PVLs have been closed with a combination of a device and smaller coils. We present here a case of very large sized mitral PVL, in a patient with high risk for surgery, which was closed with two large size devices.

1. Introduction

Mitral paravalvular leak (PVL) subsequent to valve replacement surgery is not an uncommon occurrence having been reported in upto 4.5% of cases.[1,2] Most of these cases are asymptomatic but a significant number need some form of intervention. Surgery is the standard treatment for such cases but is associated with high morbidity and mortality. Mortality rates are as high as 13, 15, and 37% after the first, second, and third procedures, respectively.[3] Percutaneous device closure of PVLs is an acceptable mode of intervention for such patients and has shown good survival benefit.[4] The long-term result correlates with the degree of residual mitral regurgitation (MR). We report a case which presented with severe MR, causing symptoms of heart failure, due to a large mitral valve PVL and needed two large devices for percutaneous device closure of the PVL.

2. Case history

A 25-year-old male patient presented to us with NYHA class III dyspnea with history of having needed 2–3 hospital admissions for acute pulmonary edema in the last 6 months. He has had mitral valve replacement done 8 years back with a Starr Edward valve and had chronic persistent atrial fibrillation.

Echocardiography done showed a very large PVL at the 9 O'clock position in the parasternal short axis view measuring

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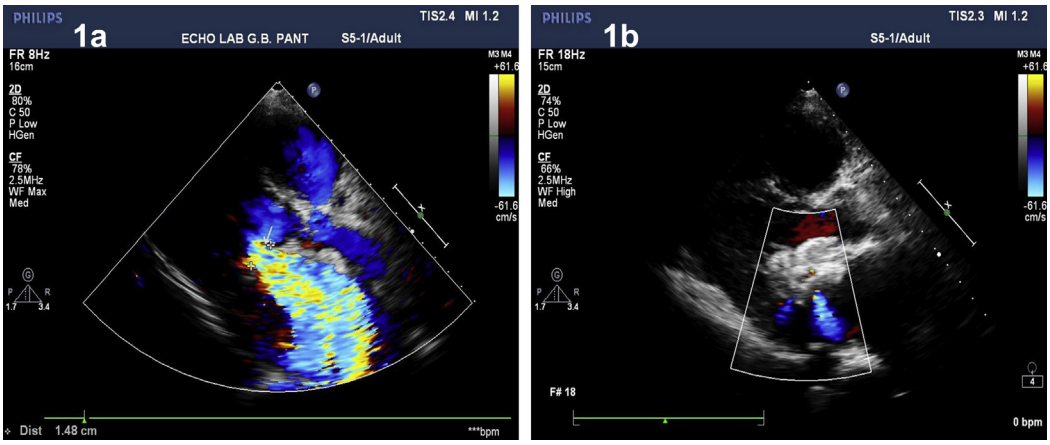

Fig. 1 – a – Shows preprocedure severe mitral regurgitation through a large PVL, b – Shows post procedure mild residual mitral regurgitation.

15–17 mm. The associated mitral regurgitation was severe (Fig. 1a) with dilated left atria (measuring 68 mm in parasternal long axis view) and left ventricle with mild left ventricular (LV) systolic dysfunction (LV ejection fraction of 45%). The patient, after being explained different management options, refused surgery and was hence taken up for a device closure after obtaining an informed written consent.

The procedure was carried out under local anesthesia with transthoracic echocardiography guidance. While a transesophageal approach may give better guidance and visibility, we opted for transthoracic guidance to avoid a prolonged general anesthesia and also for the fact that the patient had a Starr Edward valve which has a good profile under fluoroscopy. An antegrade approach for device closure was planned. A routine transseptal puncture was done and a 14F Mullins sheath (Cook Inc, Bloomington, IN) was lodged in the left atrium (LA). Since the left atrium was significantly dilated and the PVL was located relatively medially, we made a conscious decision not to make a high septal puncture which is advisable for laterally located PVLs. The PVL was crossed with a 180 cm, 0.035 inch, curve tipped Glide wire (Terumo Medical Corp., Somerset, New Jersey) taken with a 5F Judkins Right (JR) catheter through this sheath. The JR catheter was taken across the PVL after confirming that the wire was not across the valve in orthogonal fluoroscopic views. Once inside the LV, the wire was exchanged for a 300 cm, 0.032 inch Amplatz ExtraStiff wire (Cook Medical, Bloomington, Indiana). This wire was taken across the aortic valve and positioned in the right subclavian artery. Another 0.032 Amplatz ExtraStiff wire was similarly taken across the PVL and positioned alongside the first wire. The 14F sheath could now be taken across the PVL, over these two wires, without any resistance (Fig. 2). Once in the LV, one of the wires was removed and a 16/18 mm Amplatzer duct occluder like device (Cardio-O-Fix PDA occluder, Starway Medical Technology Inc., Beijing, China) was deployed across the PVL. Echocardiography done showed a significant persistent regurgitation. It was hence decided to deploy another device across the PVL. To ensure more stability, an Amplatzer muscular VSD closure device (AGA Medical Corp., Plymouth, Minnesota) was selected as the second device. A 12 mm device easily fell across the PVL with the first device in place. It was hence decided to use an 18 mm device. The first device was resheathed and the 14F sheath was lodged across the PVL in the LV with both the devices (Fig. 3). The distal one third of both the devices were exteriorized out of the sheath on the LV side and the whole assembly was pulled back to the level of the valve ensuring that the two distal rims were aligned side by side and not affecting the movement of the ball within the valve. The sheath was now gradually pulled back exteriorizing the proximal ends of the two devices. Echocardiogram showed minimal residual MR. Both the devices were released. A stable position was confirmed by both echocardiogram and fluoroscopy.

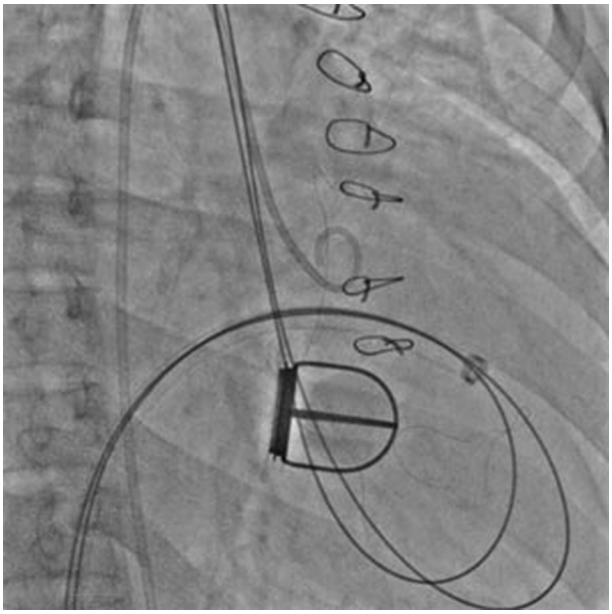

Fig. 2 – Two 032 wires have been taken through the PVL and then across the aortic valve and parked in the subclavian artery (not seen in figure). The sheath can be seen having been tracked over the wires through the PVL into the LV.