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Case Report

Percutaneous closure of complex paravalvular aortic root pseudoaneurysm and aorta-cavitary fistulas



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ABSTRACT

Native aortic valve or its prosthetic valve endocarditis can extend to the adjacent periannular areas and erode into nearby cardiac chambers, leading to pseudoaneurysm and aorta-cavitary fistulas respectively. The later usually leads to acute cardiac failure and hemodynamic instability requiring an urgent surgical intervention. However rarely this might pass unnoticed and the patient might present later with cardiac murmur. Percutaneous device closure of aortic pseudoaneurysm, ruptured sinus of Valsalva aneurysm, aorta-pulmonary window, paravalvular leaks, and aorta-cavitary fistula have been reported. We present a 59-year-old female who developed a large aortic root pseudoaneurysm with biventricular communication aorta-cavitary fistulas presenting late following aortic prosthetic valve endocarditis. She underwent successful percutaneous device closure of her pseudoaneurysm and aorta-cavitary fistulas using two Amplatzer Duct Occluders. This case illustrates a challenging combination of aortic root pseudoaneurysm and biventricular aorta-cavitary fistulas that was successfully treated with percutaneous procedure.

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1. Introduction

Native aortic valve or its prosthetic valve endocarditis can invade the periannular tissue causing tissue destruction and abscess formation.^{1,2} This might lead to aortic pseudoaneurysm (PA) formation and more rarely erode into adjacent cardiac chambers, leading to an aorta-cavitary fistula (ACF).^{1,2} In

a large study of infective endocarditis, cavitary fistula occurred in 2.2% of all endocarditis and 3.5% of prosthetic valve endocarditis.² These PA and ACF are generally treated surgically.^{3,4} Of late, cases of percutaneous device closure of both ascending aortic and aortic root PA is reported.^{5,6} In addition, percutaneous device closure of ruptured sinus of Valsalva aneurysm, aorta-pulmonary window, paravalvar

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leaks, and ACF have been reported.^{7–11} We present a challenging case of aortic prosthetic valve endocarditis with a large aortic root PA with biventricular communication which underwent successful percutaneous device closure.

2. Case report

A 59-year-old female, hypertensive, non-diabetic with history of prosthetic aortic valve replacement (21 Carbomedic mechanical valve) implanted 12 years earlier for severe aortic stenosis, presented to a regional hospital with fever. Prior to this presentation she was doing well on daily warfarin therapy and a target INR of 2.5 with an annual echocardiogram showing normally functioning prosthetic valve with good left ventricular (LV) systolic function. She presented with persistent fever of 38 °C and all the three blood cultures taken grew Beta Hemolytic Streptococci. Clinically she was not in heart failure and there were no signs of infective endocarditis. Her ECG showed sinus rhythm with normal intervals. She underwent transthoracic and a transesophageal echocardiogram (TTE/TEE) at the regional hospital which reported normally functioning prosthetic valve and a suspicious tricuspid valve vegetation. She was treated with 2 weeks of gentamycin and 4 weeks of ceftriaxone with fever subsiding over 2–3 weeks period and was discharged. After 4 weeks of discharge she was seen in cardiology clinic at our institute and she was doing well with no symptoms. However, clinical auscultation revealed a precordial grade 3/6 continuous murmur. Prosthetic valve clicks were well heard. There were no signs of heart failure.

A TTE/TEE done in our institute demonstrated non dilated chambers with prosthetic aortic valve-in-situ with peak and mean gradient of 39 and 20 mmHg, respectively. There was no significant valvar leak. There was a large paravalvar PA adjacent to the right coronary cusp measuring 2.8 × 1.0 cm communicating with right ventricle (RV) and LV (Fig. 1A, B and C, arrowheads). There was no clear-cut ventricular septal defect noted. She underwent CT angiogram of aorta which

confirmed TEE findings with demonstration of a large aortic root PA involving anterior sinus extending from just next to aortic prosthesis at the level of annulus with a tract communicating this PA to the RV and LV (Fig. 2 A, B and C, arrowheads). She was offered percutaneous device closure or high risk surgery, but the patient and family needed time for discussion and finally elected an attempt of percutaneous device closure. Hence she underwent percutaneous device closure 4 months after index event.

The procedure was done under general anesthesia along with fluoroscopy and TEE guidance. 6000 IU of unfractionated heparin was given intravenously. The right femoral artery and vein (7F) and left femoral artery (6F) accesses were obtained. Ascending aortic angiogram was performed with a pigtail catheter (5F) from the left femoral artery access, which demonstrated a large PA with a narrow neck from aorta along with a 10 mm LV (Fig. 3A, arrowheads) and a 5 mm RV fistulous communications (Fig. 3B, arrowheads). The prosthetic valve ring was forming the superior medial wall of the PA and the roof of the PA-LV communication. The LV fistula connection was crossed with right Judkins catheter to the LV through the PA. Then a coronary wire was placed and the catheter was removed. A 12 × 40 mm Tyshak II balloon (NuMED, Hopkinton, New York) was used to confirm the size of the PA-LV connection (Fig. 3C). The right Judkins catheter and a 260 cm 0.035" Terumo wire (Terumo Medial Corp., Somerset, NJ) were used to cross the PA to the RV fistula and subsequently advanced to the left pulmonary artery. A 5F Swan–Ganz catheter was advanced from the venous access to the left pulmonary artery. This was advanced through the tricuspid valve while its balloon was inflated. The Swan–Ganz catheter was replaced with 6F Multipurpose catheter (Cordis Corp., Miami Lakes, FL). The Terumo wire was snared out of right femoral vein to establish a stable "arteriovenous loop" using 15 mm PFM snare through the Multipurpose catheter.

Venous introducer was removed and a 7F Amplatzer Duct Occluder I (ADO I) delivery sheath (AGA medical corporation, Golden Valley, MN) was then passed over the guide wire from the right femoral vein into the RV and into the PA. The dilator

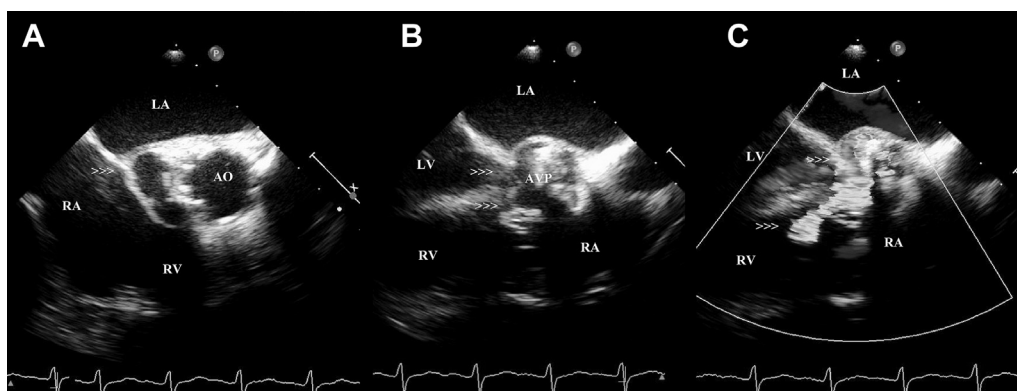


Fig. 1 – Transesophageal echocardiogram (TEE) showing a large aortic root pseudoaneurysm involving right coronary cusp extending from aortic valve prosthesis in a patient with aortic valve prosthetic endocarditis (A, arrowheads). Note pseudoaneurysm to biventricular fistulous connection (B, arrowheads) with color Doppler flow across these fistulous tracts (C, arrowheads). LA, Left atrium; RA, Right atrium; LV, Left ventricle; RV, Right ventricle; AO, Aorta; AVP, Aortic valve prosthesis.

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