Pseudoaneurysm of the Mitral-Aortic Intervalvular Fibrosa: A Case Series with Literature Review

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INTRODUCTION

Pseudoaneurysm of the mitral-aortic intervalvular fibrosa (P-MAIVF) was traditionally considered a rare, life-threatening sequela of endocarditis or valve surgery.

Pseudoaneurysm is an outpouching where the aortic and mitral valves meet and forms between the aorta and the left atrium with superior and posterior extension. It is contiguous with the left ventricular outflow tract, which differentiates it from an abscess.[1,2] In this article we present three consecutive cases and one highly suspicious case of P-MAIVF diagnosed at our institution using transesophageal echocardiography and discusses the causes, presentation, diagnosis, and management of that entity.

CASE 1 PRESENTATION

A 56-year-old white man presented with fevers and blood cultures positive for β-hemolytic *Streptococcus* group B.

Ten months prior, he was diagnosed with aortic valve endocarditis and an aortic root abscess, due to *Streptococcus agalactiae* infection. He was managed with aortic valve replacement with a 19-mm St. Jude mechanical prosthesis and patch reconstruction of the aortic root abscess. Transthoracic echocardiography upon discharge demonstrated a well-seated mechanical valve and a normal aortic root.

On his current presentation, initial transthoracic echocardiography showed mild aortic prosthesis regurgitation with no vegetation or evidence of perivalvular infection. Subsequently, transesophageal echocardiography revealed the presence of P-MAIVF, approximately 1.2 cm at its largest dimension (Figure 1). The pseudoaneurysm extended superiorly and posteriorly between the aorta, the left atrium, and the pulmonary artery and exhibited systolic expansion and diastolic collapse (Videos 1 and 2). There was no communication with the left atrium or the aorta and no signs of prosthetic valve dysfunction. Because of hemodynamic and electrical stability, the patient was treated with penicillin G and gentamycin for 1 month and subsequently underwent repair of the pseudoaneurysm with a bovine patch and received a new 19-mm mechanical aortic valve. He had an uneventful recovery and was discharged home 1 week later.

CASE 2 PRESENTATION

An 84-year-old Caucasian man with diabetes and chronic stage IV kidney disease was referred for transesophageal echocardiography for evaluation of endocarditis.

Eighteen months previously, he had undergone single vessel (left internal mammary artery to left anterior descending coronary artery) coronary artery bypass graft surgery combined with aortic valve replacement with a 23-mm Magna bovine pericardial valve for severe aortic stenosis. Results of postoperative transthoracic echocardiography were unremarkable.

One month before his current presentation, he developed fevers and malaise. He was found to have transient staphylococcal bacteremia and was treated with 2 weeks of antibiotics. The fevers resolved, but the patient developed dyspnea on exertion and lower extremity edema. He was then referred for transesophageal echocardiography, which showed a well-seated aortic bioprosthesis with markedly thickened cusps, no vegetation, and mild transvalvular regurgitation. The images were highly suggestive of P-MAIVF without fistula formation or compression of adjacent structures (Figures 2 and 3, Videos 3–6). After discussion of the risks and benefits of complex surgical intervention in an elderly patient, he and his family opted against it. He was managed with chronic suppressive intravenous antibiotics with close clinical and imaging follow-up. He was alive 15 months after the diagnosis.

CASE 3 PRESENTATION

A 67-year-old Caucasian man was referred for evaluation of dyspnea on exertion and weight gain of 1 week's duration. He had a history of two-vessel bypass surgery in 2007.

Five months before the current presentation, he was admitted with fevers and disorientation. His blood cultures grew β-hemolytic *Streptococcus* group G. Transesophageal echocardiography at that time revealed a large vegetation on the noncoronary cusp of the aortic valve (1.7 $\times$ 0.2 cm) and an aortic root abscess. He underwent aortic valve replacement with a 23-mm bovine pericardial valve and patch repair of the aortic abscess. He was discharged 1 week later and completed a 2-week course of intravenous ceftriaxone.

On his current presentation, transesophageal echocardiography revealed P-MAIVF with characteristic systolic expansion and diastolic collapse, which measured 3.5 cm at its largest dimension. The pseudoaneurysm demonstrated a fistula to the left atrium (Figures 4–6, Videos 7–11). Multiple blood cultures at that time were negative, and the patient had no fevers, but he was restarted prophylactically

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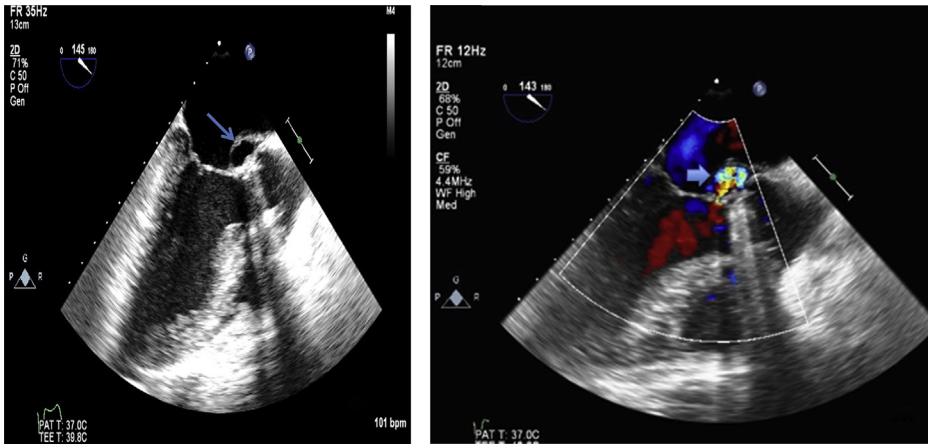

Figure 1 Transesophageal echocardiogram, midesophageal long-axis views without color (*left*) and with color (*right*), demonstrating P-MAIVF. Both images were obtained during systole and show the characteristic systolic expansion of the pseudoaneurysm (*arrows*). The color Doppler image demonstrates the pseudoaneurysm's communication with the left ventricular outflow tract (*thick arrow*). A mechanical prosthesis in the aortic position is present.

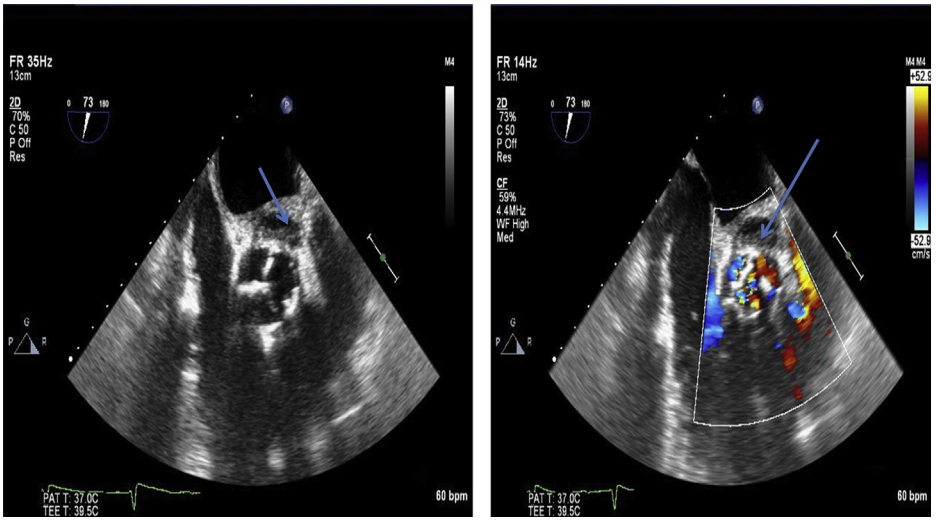

Figure 2 Transesophageal echocardiogram, midesophageal short-axis views showing the pseudoaneurysm (*arrows*) at the level of the aortic valve without color (*left*) and with color (*right*).

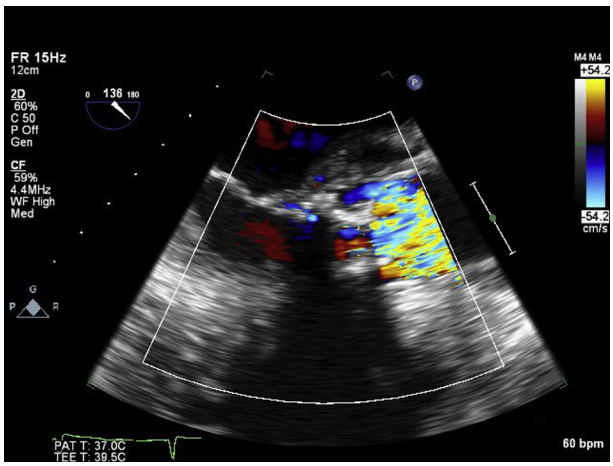

Figure 3 Image was obtained at the end of systole and demonstrates a thickened bioprosthesis in the aortic position with a possible pseudoaneurysm between the left atrium, the aorta, and the pulmonary artery.

on ceftriaxone. He underwent a third cardiac surgical procedure at an outside institution per the family's wishes, which by report involved repeat aortic valve replacement with a tissue valve and repair of the pseudoaneurysm with an unremarkable postoperative course. After discharge, the patient had alleviation of his heart failure symptoms and was enrolled in cardiac rehabilitation. A follow-up transesophageal study 4 months later showed persistent P-MAIVF. Because of his disease complexity and multiple prior sternotomies, he was deemed at very high risk for a repeat intervention. He was managed with close clinical and echocardiographic follow-up. He has remained symptom free to date.

CASE 4 PRESENTATION

A 43-year-old African American woman presented with right upper extremity pain and was found to have a thrombus in the right axillary/brachial artery, for which she underwent thrombectomy. The patient had a history significant for end-stage renal disease requiring hemodialysis three times per week through an arteriovenous fistula