

CASE REPORT

Perioperative Transesophageal Echocardiographic Diagnosis of Membranous Interventricular Septal Aneurysm in Two Patients

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ABSTRACT

Aneurysms of interventricular septum are a rare anomaly usually seen as an incidental finding on echocardiography. Rarely, they can cause right ventricular outflow tract obstruction. They can present in patients having other cardiac lesions. Diagnosis of interventricular septal aneurysm is not straightforward. They can be confused with sinus of valsalva aneurysm or ventricular septal defect on transthoracic echocardiography. Transesophageal echocardiography (TEE) provides a better alternative to delineate the interventricular septal aneurysm. We describe the TEE diagnosis of membranous interventricular septal aneurysm in two dissimilar patients who presented for cardiac surgery at our cardiac center.

Keywords: Interventricular septum, Septal aneurysm, Transesophageal echocardiography.

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INTRODUCTION

Ventricular septum aneurysms have been described to occur in membranous and muscular part of interventricular septum. Aneurysm of membranous part is a congenital anomaly, whereas most of the aneurysms of the muscular septum are seen after myocardial infarction.¹ Angiography was the only method of diagnosis before the introduction of echocardiography.² Two-dimensional (2D) echocardiography can detect the aneurysms of ventricular septum with a sensitivity of 70%.³ We report

the transesophageal echocardiography (TEE) findings of membranous interventricular septal aneurysm seen in two dissimilar patients.

CASE REPORTS

Case 1

A 23-year-old male patient was admitted with a history of dyspnea on exertion. Chest X-ray showed cardiomegaly. On auscultation, there was a 3/6 holodiastolic murmur in the third left intercostal space. Diagnosis of bicuspid aortic valve with severe aortic regurgitation with sinus of valsalva aneurysm was made on transthoracic echocardiography (TTE). The patient was posted for aortic valve replacement with repair of sinus of valsalva aneurysm. Transesophageal echocardiography was done after induction of anesthesia. Aortic valve short-axis view showed a bicuspid aortic valve and a membranous structure prolapsing into right ventricle (RV) during systole (Fig. 1A). Color Doppler interrogation showed no communication between RV and membranous structure (Fig. 1B). Midesophageal long-axis view showed communication between left ventricular outflow tract (LVOT) and aneurysm (Fig. 2). The aneurysm was not communicating with RV, and there was no dilatation of sinus of valsalva. Thus a diagnosis of aneurysm of interventricular septum was made. The patient underwent aortic valve replacement and resection of aneurysm with primary closure of defect. The patient had uneventful postoperative course.

Case 2

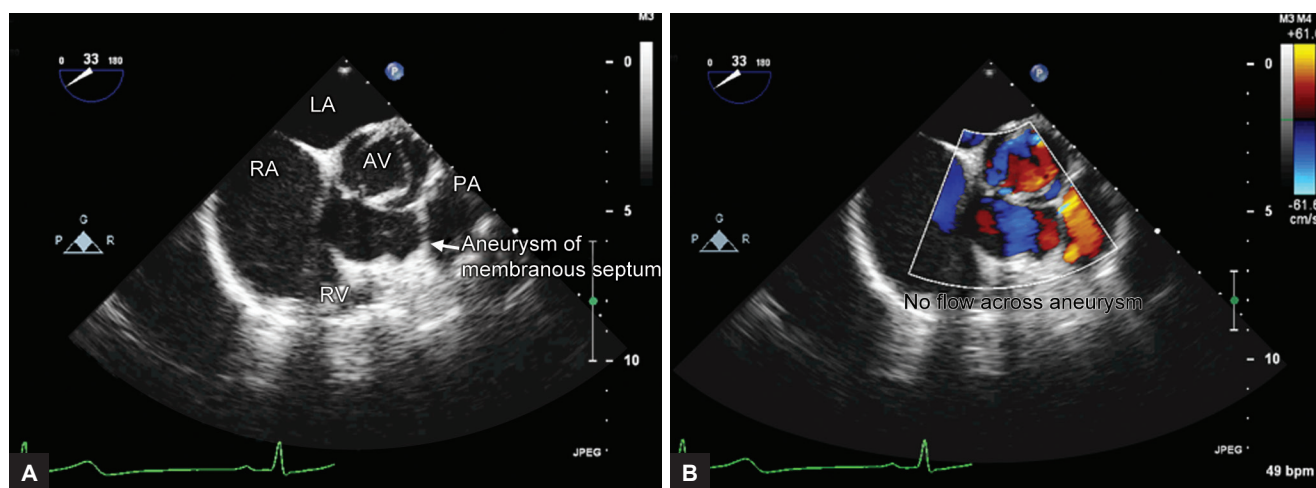
A 2-year-old male child was admitted with history of recurrent chest infections. Chest X-ray was normal. On auscultation, there was a 3/6 systolic ejection murmur in second left intercostal space with widely split S2. Transthoracic echocardiography showed 4 mm perimembranous ventricular septal defect (VSD) with valvular pulmonary stenosis. Mean gradient across pulmonary valve was 43 mm Hg. After induction of anesthesia TEE was done. Midesophageal five-chamber view showed a defect in interventricular septum and a membranous structure bulging into RV during systole (Fig. 3A). Midesophageal RV inflow outflow view showed aneurysm of interventricular septum bulging

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Figs 1A and B: (A) Aortic valve short-axis view showing bicuspid aortic valve and membranous septal aneurysm; (B) no flow across the aneurysm

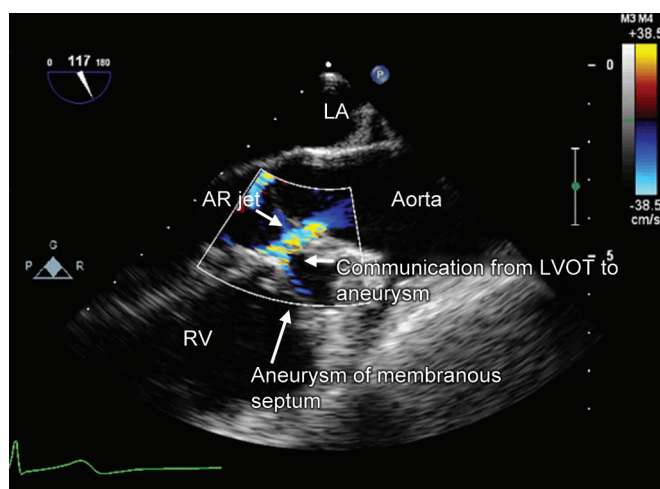
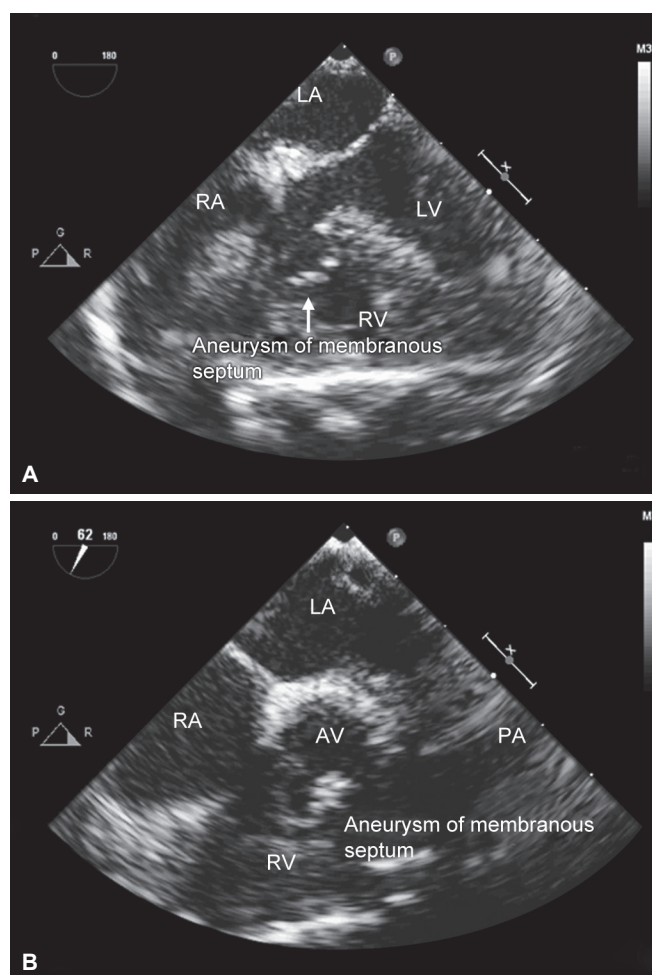


Fig. 2: Midesophageal long-axis view showing communication between left ventricular outflow tract and membranous septal aneurysm with normal sinus of valsalva

into RV during systole (Fig. 3B). Transesophageal echocardiography also revealed an ostium secundum atrial septal defect (ASD) with left-to-right shunt and left main coronary arising from the noncoronary cusp (Fig. 4). Aneurysm resection, VSD closure (created after aneurysm resection), ASD closure, and pulmonary valvotomy were done. The patient was discharged from the hospital uneventfully.

DISCUSSION

Aneurysm of the membranous interventricular septum is a rare anomaly and is usually benign. It can potentiate tricuspid regurgitation, aortic valve prolapse, and right ventricular outflow tract (RVOT) obstruction.⁴ The natural history of aneurysm of membranous ventricular septum is not well understood. Spontaneous closure of perimembranous VSD can result in aneurysm formation with or without residual defect.⁵ In the first



Figs 3A and B: (A) Midesophageal five-chamber view showing membranous septal aneurysm; (B) Midesophageal right ventricular inflow–outflow view showing membranous septal aneurysm

case, the aneurysm was confused with sinus of valsalva aneurysm, but it had no hemodynamic consequence. The aortic regurgitation was because of coaptation defect and not because of prolapse of cusp. The second case had valvular pulmonary stenosis, and aneurysm of

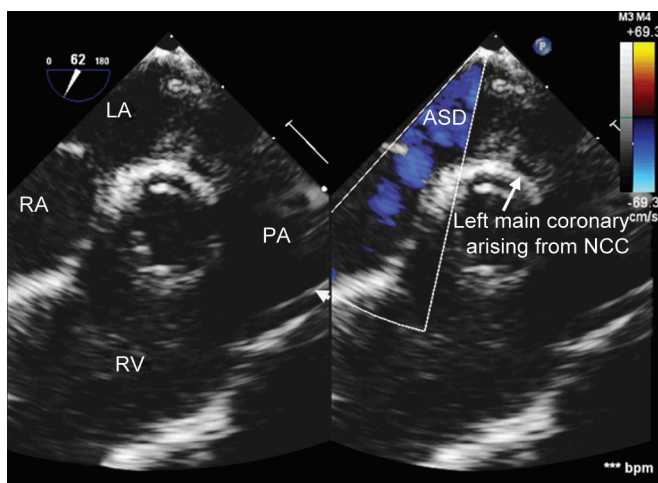


Fig. 4: Small atrial septal defect and left main coronary artery originating from noncoronary cusp

membranous ventricular septum was not causing any RVOT obstruction.

The membranous interventricular septum aneurysms can be diagnosed with cardiac catheterization.² In the present age of echocardiography, cardiac catheterization is rarely necessary as a primary diagnostic modality for congenital heart disease. Echocardiography can diagnose these aneurysms, but it has a low sensitivity.³ Cardiac computed tomography and cardiac magnetic resonance imaging are other modalities that can be used for diagnosing the aneurysms of membranous interventricular septum.^{6,7}

Transesophageal echocardiography is routinely done in patients undergoing cardiac surgery. Transesophageal echocardiography can accurately diagnose aneurysms of membranous ventricular septum.^{7,8} Various views should be used to confirm the diagnosis. Midesophageal five-chamber view usually shows the aneurysm. Midesophageal RV inflow–outflow view will show the aneurysm coming into RV cavity or RVOT during systole. Midesophageal long-axis view will

show a communication between the left ventricle and the aneurysm and thus confirm the diagnosis. In all patients having an aneurysm of membranous interventricular septum, we should get Doppler of RVOT from transgastric view to rule out any RVOT obstruction. All aneurysms of the membranous interventricular septum should be excised so as to prevent complications.⁴ To conclude, aneurysms of membranous interventricular septum are rare, usually asymptomatic, and may occur with other cardiac lesions. They can be accurately diagnosed with TEE.

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