

Case Report

Membranous Interventricular Septal Aneurysm: A Case Report

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ABSTRACT

Aneurysmal formation in the membranous part of the interventricular septum is a very rare heart defect. The interventricular membranous septal (IVMS) aneurysm is mainly found in conjunction with ventricular septal defects or other congenital cardiac anomalies. It has often been found as an asymptomatic phenomenon, so that it is diagnosed incidentally during imaging evaluations of heart structures. Thereby, its presence without other congenital cardiac anomalies is a very uncommon entity. Herein, we describe a 77-year-old man with the chief complaints of chest pain and dyspnea on exertion. The physical examination was normal except for the presence of ejection-type systolic murmurs along the left sternal border in the aortic area on auscultation. The patient's preoperative transthoracic echocardiography revealed severe aortic valve stenosis, and his transesophageal echocardiography during aortic valve replacement revealed an incidental IVMS aneurysm. The aneurysm was resected concomitantly with aortic valve replacement surgery, and he was asymptomatic and stable in the follow-up period. (*Iranian Heart Journal 2021; 22(3): 115-118*)

KEYWORDS: Interventricular septal aneurysm, Echocardiography, Congenital heart anomaly, Surgery

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The membranous portion of the interventricular septum is a very compact fibrous segment that is associated with the origin of the cardiac great vessels. Since there is no myocardial tissue in this region, high-pressure gradients could play an important role in the formation of the interventricular membranous septal (IVMS) aneurysm.¹ As this type of aneurysm is a very uncommon cardiac disorder, its accurate incidence is not determined yet.¹⁻³ The IVMS aneurysm is accompanied by ventricular septal defects in about 19% of cases, while other congenital heart diseases (CHDs) are associated with the IVMS

aneurysm in approximately 0.3% of cases.⁴ The IVMS aneurysm is often asymptomatic; it is, therefore, diagnosed incidentally during angiography, transthoracic or transesophageal echocardiography (TTE or TEE), cardiac magnetic resonance imaging (CMR), or cardiac computed tomography (CT).^{3, 5} In addition, it could be detected during cardiac surgery⁴ or autopsy.³

Case Presentation

A 77-year-old man was admitted to our hospital with the chief complaints of chest pain and dyspnea on exertion. The patient had undergone percutaneous coronary

intervention 7 years previously, but his exertional intolerance had resumed. His physical examination was normal except for the presence of ejection-type systolic murmurs along the left sternal border and in the aortic area on auscultation. TTE revealed an ejection fraction of 55%, mild mitral regurgitation, mild tricuspid regurgitation, mild pulmonary insufficiency, and calcified aortic valve with severe aortic stenosis. Angiography confirmed the presence of aortic stenosis and showed no significant stenosis in the coronary arteries. The patient was scheduled for aortic valve replacement. During the operation, after the induction of anesthesia, pre-pump intraoperative TEE confirmed the preoperative information and the presence of an aneurysm in the IVMS with no ventricular septal defect flow (Fig. 1). Through a median sternotomy on the cardiopulmonary bypass machine with

cardioplegic arrest, aortotomy was done. After the removal of the severely calcified aortic valve, the IVMS aneurysm presented itself in a better view. It was located under the commissure between the non-coronary cusp and the right coronary cusp (diameter $\approx 3-4$ cm). The aneurysm was closed by plication with a 5/0 pledgeted Prolene suture. The degenerated aortic valve was replaced with a number 25 Magna bioprosthesis Edwards' aortic valve. Intraoperative TEE after cardiopulmonary bypass showed the bioprosthesis aortic valve with normal leaflet motion and no obvious transvalvular regurgitation. The operation was finished uneventfully. The patient was discharged from the hospital in a good condition, and there was no recurrent aneurysmal formation or cardiac arrhythmias during the follow-up period.

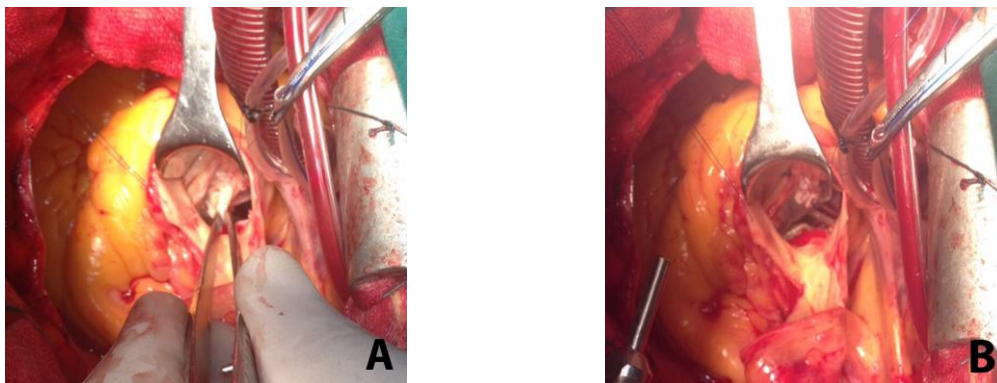


Figure 1. Intraoperative images show the interventricular membranous septal aneurysm before (A) and after (B) resection.

DISCUSSION

The membranous portion of the interventricular septum is a compact fibrous segment that is associated with the origin of the cardiac great vessels. Since there is no myocardial tissue in this region, high-

pressure gradients could play an important role in the formation of the IVMS aneurysm.¹ This type of aneurysm is a very uncommon cardiac disorder, and its accurate incidence has yet to be determined.¹⁻³ Because this phenomenon is often asymptomatic, it is

diagnosed incidentally during the use of invasive or noninvasive diagnostic modalities.^{3,5}

Traumas and infections are involved in the IVMS aneurysmal formation as etiologic factors; however, post-surgical and idiopathic causes are also considered.^{3,4}

Nowadays, the use of cardiac catheterization is not the first option to detect CHDs. Instead, echocardiography is the modality of choice. The sensitivity of TTE to detect the IVMS aneurysm is approximately 70%.⁶

Although TEE is usually used in patients scheduled for cardiac surgery with good accuracy in detecting the IVMS aneurysm, multiple views should be used to confirm the presence of this phenomenon.^{7,8} The

presented case in our report was examined with TEE after the induction of anesthesia, and the IVMS aneurysm was identified without concomitant ventricular septal defects or any other CHDs. Cardiac CT and CMR are frequently used cardiac imaging modalities, which can be implemented for diagnosing the IVMS aneurysm.^{1,5} Similar to our case, Yavuz et al⁴ described a 22-year-old man with a calcified bicuspid aortic valve who was incidentally diagnosed with an IVMS aneurysm during elective surgery. We think that due attention to this potential lesion and the identification of its association with CHDs could be helpful for surgical planning. This also demonstrates the role of surgical repair in patients with an asymptomatic IVMS aneurysm.

Although aortic valve replacement was the intended surgical intervention, the discovery of the aneurysmal IVMS raised the dilemma of performing concomitant aneurysm repair. Some physicians do not recommend the implementation of surgical treatment in cases without other cardiac comorbidities or uncomplicated aneurysms in order to prevent postoperative cardiac arrhythmias.^{3,4}

In contrast, some authors believe that all

IVMS aneurysms should be repaired to preclude life-threatening complications.⁹ In the present case, we repaired the IVMS aneurysm along with aortic valve repair for aortic stenosis. The patient's postoperative follow-up was uneventful without any arrhythmias or any other complications.

Despite the rarity of the IVMS aneurysm, a comprehensive differential diagnosis of a congenital heart murmur presenting in adolescence could include an IVMS aneurysm. A previous study suggested that a late systolic murmur heard primarily along the left sternal border could signify the existence of an IVMS aneurysm.¹⁰

Although patients are typically asymptomatic, an isolated IVMS aneurysm might be associated with potential risks, including rupture, bacterial endocarditis, right ventricular outflow tract obstruction, intracardiac shunting, thromboembolism, and arrhythmias.^{3,5,9} Therefore, it appears that in asymptomatic cases, it might be useful to follow up patients regarding the development of complications and the need for surgical repair.

In conclusion, the IVMS aneurysm, as a rare phenomenon, could be detected incidentally without accompanied CHDs. This pathology might benefit from surgical repair and require close follow-ups to prevent any life-threatening complications.

Conflict of Interest

The authors have none to declare.

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