



Massive sinus of Valsalva aneurysm with an associated bicuspid aortic valve: A rare clinical image

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Abstract

A sinus of Valsalva aneurysm is a rare cardiac anomaly characterized by an abnormal dilatation of the aortic root. This occurs due to a weakened elastic lamina at the junction of the aortic media and the annulus fibrosus. The aneurysm can be congenital or acquired and comprises up to 3.5% of all congenital cardiac defects. Due to the aneurysm's physiologic function and location, it can present significant clinical consequences in both the ruptured and unruptured state. We present the case of a middle-aged male with no significant medical history who was found to have a massive unruptured sinus of Valsalva aneurysm. He was treated surgically with no postoperative complications.

Keywords

Sinus of Valsalva aneurysm, Echocardiography, Bicuspid aortic valve, Cardiac magnetic resonance imaging, Cardiac computed tomography

A 52-year-old male with no significant medical history presented to the emergency department with a two-week onset of dry cough, rhinorrhea, and worsening dyspnea on exertion. An electrocardiogram on admission revealed left ventricular hypertrophy with repolarization abnormalities. Due to concerns for new-onset heart failure, a complete two-dimensional transthoracic echocardiogram (TTE) was performed, which revealed a circular fine structure within the left atrium, suggestive of an aneurysm (Figure 1a). To further investigate the findings on TTE, a transesophageal echocardiogram (TEE) was subsequently done, revealing a sinus of Valsalva aneurysm with an associated bicuspid aortic valve (Figure 1b). The patient underwent surgical repair of the unruptured aneurysm using a patch cut from a Valsalva aortic prosthesis Gelweave Valsalva™ graft (Terumo Vascutek). The postoperative course was uncomplicated, and the patient completely recovered after three months.

Sinus of Valsalva aneurysm, or SOVA, is a cardiac defect that is congenital or acquired with an estimated incidence of approximately 0.09 % in the general population.¹ It is commonly associated with other congenital heart anomalies such as ventricular septal defects, bicuspid aortic valve, and pulmonary stenosis.^{1,2} They originate from the right coronary sinus in 70 to 90 percent of cases, followed by the noncoronary sinus (10%-25%) and the left sinus (<5%).³ Clinical presentation may be asymptomatic or may include acute rupture that clinically manifests with chest pain, dyspnea, palpitations, and cardiac murmurs.¹⁻³ Cardiac computed tomography or magnetic resonance imaging may be used to aid in the diagnosis.³ However, TEE is preferred for anatomical delineation of aneurysmal

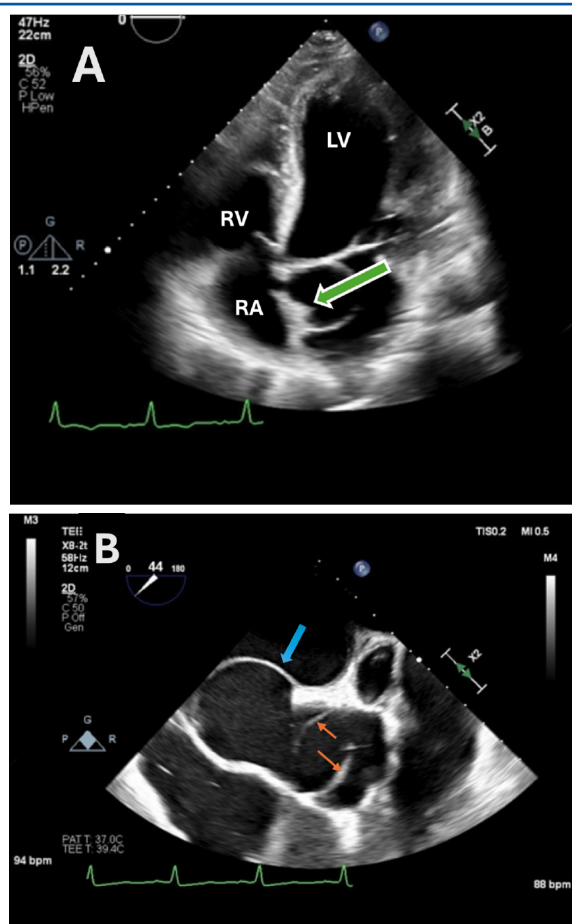


Figure 1 - (A) Apical four chamber view transthoracic echocardiography showing a circular fine structure within the left atrium (arrow). LV, left ventricle; RV, right ventricle; RA, right atrium. (B) Mid-esophageal short axis TEE showing bicuspid aortic valve (orange arrows) and the sinus of Valsalva aneurysm (blue arrow).

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origination, which will appear on two-dimensional imaging as a thin-walled mobile structure that is circular in the short axis.^{2,3} Surgical repair remains the preferred method of treatment.^{3,4} In patients with a ruptured SOVA, transcatheter closure devices are an acceptable alternative in those with suitable anatomy and high risk for cardiac surgery.^{2,5}

Ethics approval and consent to participate

Not applicable, as this is an anonymous clinical image.

Consent for publication

Not applicable, as this is an anonymous clinical image.

Declaration of conflict of interests

The author declared no potential conflicts of interest with respect to the publication of this article.

REFERENCES

1. Weinreich M, Yu PJ, Trost B. Sinus of valsalva aneurysms: review of the literature and an update on management. *Clin Cardiol* 2015 Mar; 38(3):185-9.
2. Sarhan HHT, Shawky AH, Anilkumar S, Elmaghraby A, Sivadasan PC, Omar AS, Al-Mulla AW. Association of ruptured sinus of Valsalva aneurysm and congenital ventricular septal defect: a case series. *Eur Heart J Case Rep* 2021 Jul 7; 5(7):ytab233.
3. Hanna MF, Malguria N, Saboo SS, Jordan KG, Landay M, Ghoshhajra BB, Abbata S. Cross-sectional imaging of sinus of Valsalva aneurysms: lessons learned. *Diagn Interv Radiol* 2017 Sep-Oct; 23(5):339-46.

Funding

This article received no specific grant or support from any public or private agencies.

Acknowledgements

I would like to sincerely thank Dr. Assaf Tzur (Division of Cardiovascular Disease and Clinical Cardiac Electrophysiology, Jackson Memorial Hospital, Miami, FL, USA) for his assistance with interpretation of the images.

4. Jaswal V, Kumar V, Thingnam SKS, Puri GD. Surgical repair of ruptured sinus of Valsalva aneurysm: 13-year single center experience. *J Card Surg* 2021 Apr; 36(4):1264-9.

5. Wingo M, de Angelis P, Worku BM, Leonard JR, Khan FM, Hameed I, Lau C, Gaudino M, Girardi LN. Sinus of Valsalva aneurysm repairs: Operative technique and lessons learned. *J Card Surg* 2019 Jun; 34(6):400-3.