






Uncommon Sinus Valsalva Aneurysm Dissecting into the Interventricular Septum Linked to Infective Endocarditis: Insights from Echocardiography and CT Scans

Said Abdirahman Ahmed¹, Mohamed Omar Hassan¹, Ishak Ahmed Abdi¹,
Mohamed Abdullahi Mohamud¹, Mohamud Mire Waberi¹, Ahmed Elmi Abdi¹,
Abdullahi Mohamed Hassan Fujejra², Abdijalil Abdullahi Ali³, Mohamed Sheikh Hassan⁴

¹Department of Cardiology at Mogadishu Somali-Turkish Training and Research Hospital, Mogadishu, Somalia; ²Dean College of Medicine and Health Science at Abrar University, Mogadishu, Somalia; ³Cardiovascular Surgery Department at Mogadishu Somali-Turkish Training and Research Hospital, Mogadishu, Somalia; ⁴Neurology Department at Mogadishu Somali-Turkish Training and Research Hospital, Mogadishu, Somalia

Correspondence: Said Abdirahman Ahmed, Mogadishu Somalia Turkish Training and Research Hospital, Digfer Road, Mogadishu, Somalia, Tel +252615583381, Email Saciidcabdi114@gmail.com

Abstract: The sinuses of Valsalva are three pouch-like dilations at the root of the aorta, just above the aortic valve. Aneurysms of the sinuses of Valsalva can be congenital or acquired secondary to infective endocarditis. Here, we describe the case of a 41-year-old male patient who presented to the cardiology department of our hospital with fatigue and dyspnea on exertion for long periods. He had a history of infective endocarditis, smoking and substance abuse, like khat. Cardiovascular examination showed a murmur consistent with aortic regurgitation. Other systemic examinations, including those of the neurological, respiratory and abdominal, were unremarkable. Laboratory investigations were normal. Cardiac imaging, like transthoracic, trans-esophageal and cardiac computed tomography showed an aneurysm of the sinus Valsalva dissecting into the interventricular septum. The patient was managed with metoprolol 25 mg, perindopril 10 mg and furosemide 20 mg and recommended for surgery but unfortunately it is not available in our country.

Keywords: sinus of valsalva aneurysm, Av valve, cardiac CT, infective endocarditis

Introduction

The sinuses of Valsalva (SOV) are three pouch-like dilations at the root of the aorta, just above the aortic valve. These sinuses play a crucial role in the proper functioning of the heart and the aortic valve.¹ Aneurysms are weaknesses in the walls of the sinuses that can lead to the development of aneurysms. Aneurysms of the sinuses of Valsalva can be congenital or acquired, and they may be associated with conditions such as connective tissue disorders. It can potentially lead to complications such as aortic regurgitation or compression of nearby structures.^{2,3} These patients are usually asymptomatic if the aneurysm is intact. Those with ruptured or dissected aneurysms develop symptoms like chest pains or shortness of breath (SOB)⁴ and surgical repair is usually mandatory in cases where aneurysms are encroaching on nearby structures and causing myocardial ischemia. Ruptured SOV aneurysms (RSOV) are rare, and their dissecting into the interventricular septum (DAIS) is scarcely reported.⁵ Here we present a 40-year-old male with a sinus Valsalva aneurysm dissecting into the interventricular septum as a complication of infective endocarditis.

Case Presentation

A 41-year-old male with a history of infective endocarditis and social history of heavy smoking and khat chewing presented to a cardiology outpatient with fatigue and dyspnea on exertion.

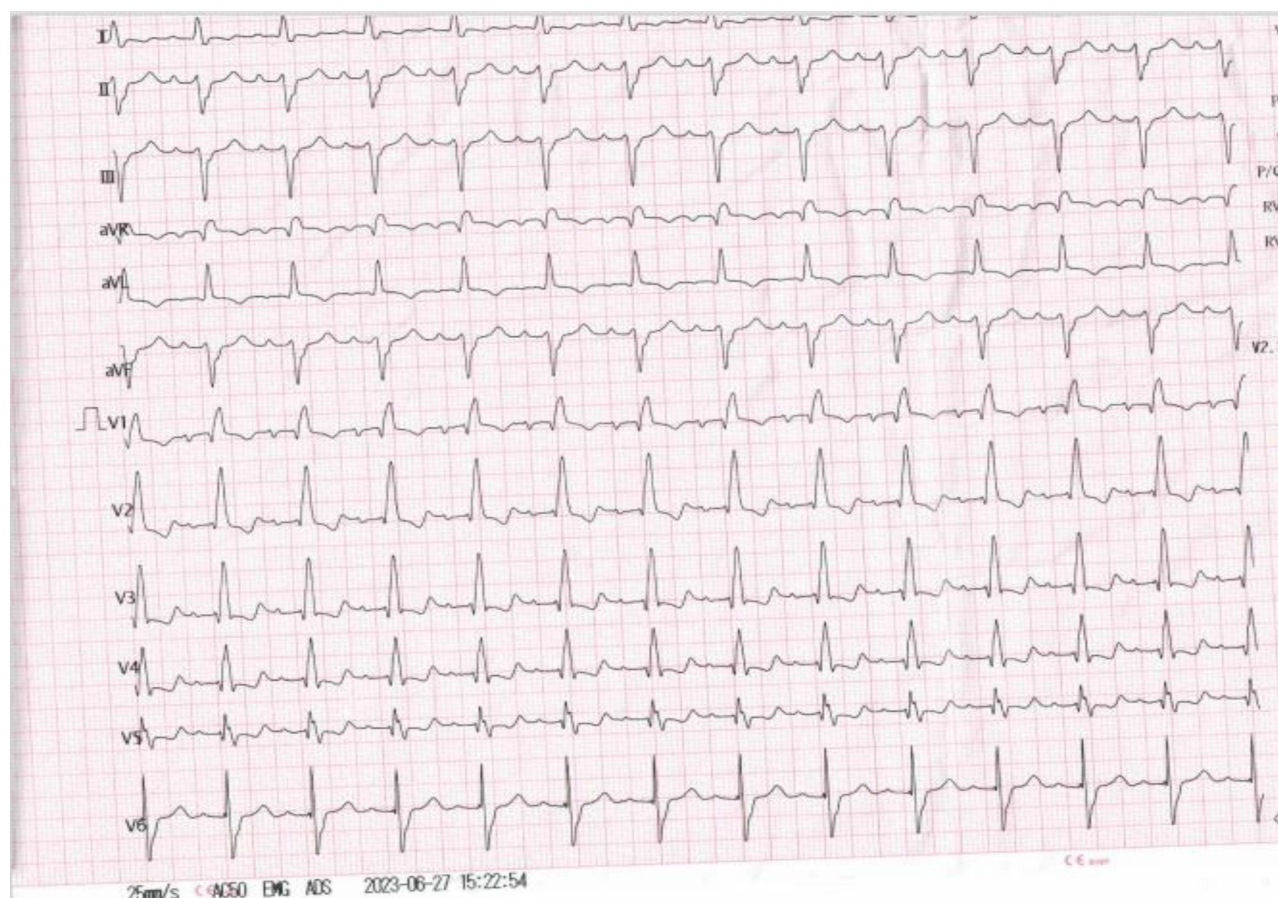


Figure 1 Electrocardiography showing bi-fascicular block.

Vital signs at presentation were in the normal range, except for a heart rate of 110 bpm and mild grade fever (36.9 °C). Systemic review of neurology, respiratory, and abdominal were unremarkable. On cardiac examination, he had a diastolic murmur at the level of the aorta, consistent with aortic regurgitation. The laboratory tests of thyroid function, full blood count, renal function, and liver function were in the normal range. Complete right bundle branch block (RBBB) with left axis deviation (ALD) consistent with a bi-fascicular block was seen on electrocardiography (Figure 1).

Echocardiography demonstrated a right sinus Valsalva aneurysm with multiple interventricular septum abscess like vegetation (Figure 2A and B). Further cardiac CT assessment showed a larger sinus Valsalva aneurysm and marginal calcification with suspicious communications into the interventricular septum. (Figure 3A and B).

The case was managed with metoprolol 25 mg, ramipril 2.5 mg 2×1, and furosemide 20 mg and recommended cardiac surgery but unfortunately it is not available in our country. Though he was advised to go where cardiothoracic surgery is available, the patient did not go due to financial constraints, and he is now on cardiology outpatient for his follow up.

Discussion

A rare case of a right sinus Valsalva aneurysm dissecting into the interventricular septum due to infective endocarditis is a complex and unusual condition. This case involves the rupture of the sinus of Valsalva aneurysm, leading to complications such as interventricular septal dissection and infective endocarditis. The literature indicates that such cases are extremely rare and often associated with high mortality rates.⁶ The sinus of Valsalva aneurysm is a congenital cardiac anomaly, but it can also be secondary to chest trauma, infection, aortic root involvement, syphilis, Behçet disease, atherosclerosis, and Marfan syndrome.⁷ The rupture of the sinus of Valsalva aneurysm can lead to various complications,

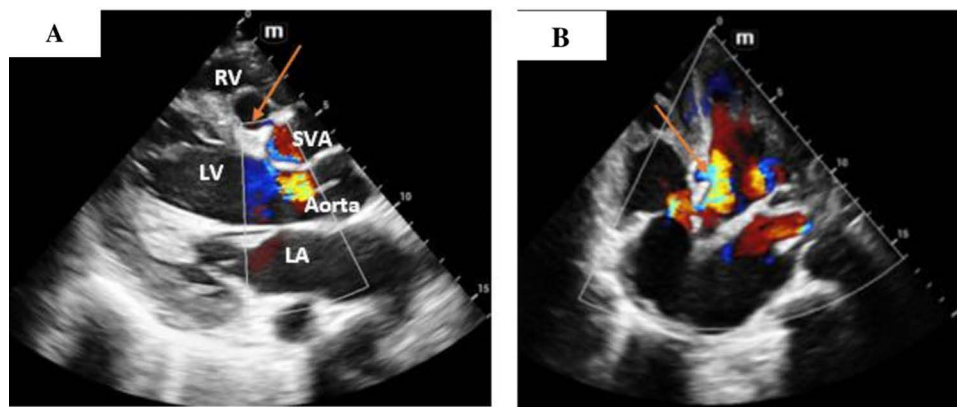


Figure 2 (A) Parasternal short axis view sinus Valsalva aneurysm dissecting in to interventricular septum (red arrow), (B) Apical 4 chamber view interventricular aneurysm (red arrow).

Abbreviations: LA, left atrium; LV, left ventricular; SVA, sinus Valsalva aneurysm; RV, right ventricular.

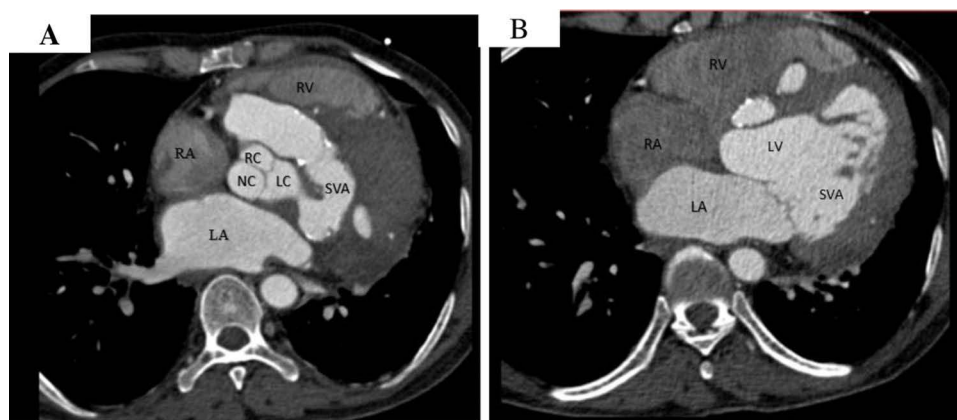


Figure 3 Cardiac CT in axial view (A and B) Showing left sinus of Valsalva aneurysm with suspicious communication in to interventricular septum.

Abbreviations: CT, computed tomography; RV, right ventricle; RA, right atrium; LA, left atrium; RC, right coronary sinus; LC, left coronary sinus; NC, non-coronary sinus; SVA, sinus valsalva aneurysm; LV, left ventricle.

including right ventricular outflow tract obstruction, myocardial infarction due to coronary artery compression, conduction disturbances, and endocarditis.⁸

Echocardiography and CT findings play a crucial role in diagnosing and understanding the extent of the sinus of Valsalva aneurysm and its complications. Three-dimensional echocardiography has been particularly useful in delineating the anatomy of ruptured sinus of Valsalva aneurysms, especially in cases of infective endocarditis.⁹ Additionally, transesophageal echocardiography has been instrumental in the surgical management of pseudoaneurysms of the mitral-aortic intervalvular fibrosa with aneurysms of the right sinus of Valsalva and the left main coronary artery.¹⁰

Comparing this case to other reported cases, it is evident that the involvement of the interventricular septum due to the dissecting right sinus Valsalva aneurysm is a rare and unique occurrence. While most reported cases focus on the rupture of the sinus of Valsalva aneurysm into the right atrium or ventricle, the involvement of the interventricular septum presents distinct challenges and considerations for surgical management and treatment. The rarity of this presentation underscores the importance of comprehensive imaging and diagnostic modalities to accurately assess the extent of the aneurysm and its complications.¹¹

Conclusion

The case of a sinus Valsalva aneurysm dissecting into the interventricular septum due to infective endocarditis is a rare and complex condition that requires multidisciplinary management involving cardiology, cardiac surgery, and imaging

specialists. The unique nature of this case highlights the need for further research and comprehensive reporting of similar cases to enhance our understanding and management of this rare cardiac anomaly.

Consent

Written informed consent was obtained from the patient's family to have the case details and any accompanying images published.

Funding

There is no funding to report.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Xu B, Kocyigit D, Betancor J, et al. Sinus of valsalva aneurysms: a state-of-the-art imaging review. *J Am Soc Echocardiography*. 2020;33(3):295–312. doi:10.1016/j.echo.2019.11.008
2. Nguyen Q, Vervoort D, Phan K, et al. Surgical management for unruptured sinus of valsalva aneurysms: a narrative review of the literature. *J Thoracic Dis*. 2021;13(3):1833–1850. doi:10.21037/jtd-20-2682
3. Nunes SV, Arruda AD, Rodrigues YL, et al. Giant ruptured sinus of valsalva aneurysm. In: *Cardiovascular Surgery: A Clinical Casebook*. Springer;2019:37–45.
4. Wu P, Yu S, Zeng J, et al. Aortic sinus aneurysm invading ventricular septum and dissection caused by Behcet's disease: a case report and literature review. *BMC Cardiovasc Disord*. 2023;23(1):429. doi:10.1186/s12872-023-03420-7
5. Ghosh S, Bootla D, Barward P, et al. Multilobulated sinus of valsalva aneurysm Dissecting into the Interventricular Septum (DAIS) and rupturing into left ventricle: a case report. *Eur Heart J Case Rep*. 2022;6(2):ytac019. doi:10.1093/ehjcr/ytac019
6. Abetti A, Gandet T, Amri A, et al. Ruptured right valsalva sinus into the right atrium due to infective endocarditis: a case report. *Pan Afr Med J*. 2020;37. doi:10.11604/pamj.2020.37.65.21491
7. Barroso F, Takakura I, Reis R, et al. Ruptured aneurysm of the sinus of valsalva causing pulmonary embolism: a rare association. *Aorta*. 2020;08(04):107–110. doi:10.1055/s-0040-1722099
8. Chandra S, Vijay S, Dwivedi S, Saran R. Delineation of anatomy of the ruptured sinus of valsalva with three-dimensional echocardiography: the advantage of the added dimension. *Echocardiography*. 2012;29(6):E148–E151. doi:10.1111/j.1540-8175.2011.01652.x
9. Güler N, Eryonucu B, Tuncer M, Aşker M. Aneurysm of sinus of valsalva dissecting into interventricular septum: a late complication of aortic valve replacement. *Echocardiography*. 2004;21(7):645–648. doi:10.1111/j.0742-2822.2004.03128.x
10. Haque H, Afroz F, Afroze S, et al. Ruptured sinus of valsalva aneurysm complicating infective endocarditis: a case report. *Birdem Med J*. 2016;52–55. doi:10.3329/birdem.v5i3.28540
11. Joshi S, Jagadeesh A, Furtado A, Bhat S. Transesophageal echocardiography in surgical management of pseudoaneurysm of mitral-aortic intervalvular fibrosa with aneurysms of right sinus of valsalva and left main coronary artery. *Ann Card Anaesth*. 2013;16(1):40. doi:10.4103/0971-9784.105368

Research Reports in Clinical Cardiology

Dovepress

Publish your work in this journal

Research Reports in Clinical Cardiology is an international, peer-reviewed, open access journal publishing original research, reports, editorials, reviews and commentaries on all areas of cardiology in the clinic and laboratory. The manuscript management system is completely online and includes a very quick and fair peer-review system. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/research-reports-in-clinical-cardiology-journal>