Aortic Sinus of Valsalva Thrombosis Presenting as Limb Ischemia: A Case Report

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INTRODUCTION

Native aortic valve thrombosis is an uncommon condition with scarce data limited to case reports in the medical literature. In this case we describe a 52-year-old man who presented with acute limb ischemia secondary to sinus of Valsalva thrombus. Transesophageal echocardiography (TEE) revealed an echogenic structure in the right sinus of Valsalva, which was not detected by transthoracic echocardiography. The patient underwent surgical aortic valve exploration with aspiration of the thrombus, and he recovered without complications. The aim of this case report is to (1) emphasize the value of clinical history in patients with cardiovascular source of embolism, (2) highlight the diagnostic and imaging challenges in cardiac source of embolism, and (3) provide characteristic three-dimensional echocardiography illustrations of sinus of Valsalva thrombus.

CASE PRESENTATION

A 52-year-old male patient presented for pain and cold sensation in his right foot. He described 1 week of numbness and worsening pain in his right foot. Physical examination revealed a regular tachycardic rhythm at 100 beats per minute. His blood pressure was 151/101 mm Hg. The right foot was dusky in appearance, cold to touch with intact sensation, and tender to palpation with decreased range of motion. He had no palpable popliteal, dorsalis pedis, or posterior tibial pulses on his right leg. The patient’s history was significant for paroxysmal atrial fibrillation, peripheral embolism to his right ring finger in 2011 treated with Coumadin, which was subsequently replaced by apixaban to avoid blood tests, left common femoral artery thrombosis, and Buerger’s disease. The patient’s history was significant for noncompliance, hypertension, hyperlipidemia, and tobacco smoking.

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Keywords: Three-dimensional echocardiography, Aortic valve, Embolism

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Spontaneous native aortic valve thrombus is an uncommon source of embolism, and when suspected the differential diagnoses include papillary fibroelastoma and endocarditis. When aortic root thrombus is diagnosed, the underlying etiologies include hypercoagulable states, sinus of Valsalva aneurysm, aortic root atheroma, or aortic inflammatory diseases such as systemic lupus erythematosus and HLA B27-associated aortitis. Echocardiography is usually the initial recommended diagnostic modality for suspected cardiac source of embolism, and in some patients, multimodality cardiovascular imaging is necessary. This case presents an illustrative example of how echocardiography can be used to diagnose and manage this rare clinical entity.

DISCUSSION

The patient’s symptoms, physical examination findings, and laboratory results were consistent with aortic root embolization. The diagnosis was confirmed by transesophageal echocardiography, which revealed an echogenic structure in the right sinus of Valsalva. The decision to proceed with surgical intervention was based on the size and location of the thrombus, as well as the patient’s clinical presentation.

At open-heart surgery, intraoperative TEE before cardiopulmonary bypass redemonstrated the right sinus of Valsalva thrombus. Upon aortic root exploration, suctioning of aortic cusps was performed to evacuate the retained blood. Cusp inspection revealed no abnormalities; therefore, the thrombus was most likely attached to the right sinus of Valsalva rather than the right coronary cusp itself, and the thrombus was thought to be aspirated. Immediate postoperative TEE revealed the resolution of the aortic valve thrombus. Blood cultures had no growth, and workup was negative for lupus anticoagulant, anticardiolipin antibodies, prothrombin gene mutation, protein C and S, antithrombin III, and JAK mutation. We think that secondary polycythemia from smoking is the most probable cause of the thrombus. The anti-Xa activity was not measured during this hospitalization as the patient was not taking apixaban for a few months prior to this current event. The patient recovered well postoperatively without complications and was discharged on Coumadin and smoking cessation. The choice of Coumadin was favored for international normalized ratio monitoring to ensure effective anticoagulation during follow-up. The plan of follow-up was made to pursue clinical signs and symptoms of recurrent embolism and repeat TEE imaging if embolic events are suspected.
imaging can be useful. In addition, imaging offers some insight into the embolic risk; thrombi and vegetations on valves are usually of high embolic risk. Vegetations are characterized as amorphous and highly mobile compared with well-rounded masses that move in coherence with adjacent structures such as fibroelastoma. Thrombi can have predilection for several locations and can assume variable shapes but are avascular compared with tumors; therefore, lack of contrast uptake is a key imaging characteristic of thrombi. During echocardiography, ultrasound enhancing agent use with the flash-echocardiography technique is helpful during thrombus evaluation. However, this technique is not widely available on echocardiography machines, and potential limitations include small size and highly mobile irregular thrombi that can be tough to evaluate for contrast uptake. In case of intracardiac masses with complex three-dimensional geometry, multiplanar echocardiography may characterize the shape more accurately than two-dimensional echocardiography. Compared with CT and CMR, echocardiography has superior temporal resolution and offers the detection of relatively small, highly mobile intracardiac masses with higher sensitivity, whereas CT and CMR offer superior spatial resolution and are particularly useful for tissue and vascularity characterization when feasible. The utility of multimodality imaging is limited in most cases of native aortic valve thrombosis, unless concomitant aortitis is suspected. Positron emission imaging can be useful. In addition, imaging offers some insight into the embolic risk; thrombi and vegetations on valves are usually of high embolic risk. Vegetations are characterized as amorphous and highly mobile compared with well-rounded masses that move in coherence with adjacent structures such as fibroelastoma. 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tomography–CT and CMR can be useful for the diagnosis of aortitis. Thus, sources of embolism can be challenging to image and often require the incorporation of multiple imaging techniques. The clinical context is always essential for identifying the source etiology, and occasionally surgical or pathologic diagnosis is needed.

In this patient, the source of embolism was small, irregular, highly mobile, and located in the right sinus of Valsalva. We think that the relatively lower temporal resolution of CMR compared with TEE, thrombus size, mobility, and location decreased the sensitivity of CMR for thrombus detection, limiting its role for tissue characterization. Therefore, TEE remains essential for appropriate diagnosis in such cases. However, CMR was useful for excluding concomitant aortitis. Flash-contrast echocardiography was technically not feasible. Therefore, based on the clinical context of limb ischemia due to a thrombus, no surgical findings to suggest de novo thrombosis during vascular surgery, and the echocardiography findings, the most likely etiology was a thrombus. Furthermore, we think that the thrombus was not seen during surgery because it was probably loosely attached and friable and that during application of the suction catheter to evacuate the retained blood within the sinuses of Valsalva prior to aortic valve inspection the thrombus was aspirated. Postoperatively there was no evidence of stroke or peripheral embolism. The literature has limited case reports about native aortic valve thrombosis with few cases suggesting poor outcomes and thrombus persistence with anticoagulation, therefore we followed a multidisciplinary approach, and the consensus was to proceed with surgical exploration and removal of thrombus. The thrombus was aspirated successfully; the patient did well and was discharged on coumadin without complications.

CONCLUSION

Appropriate cardiovascular imaging use in addition to the clinical scenario is critical in patients with a cardiac source of embolism. The current knowledge about native aortic valve thrombosis presentations and outcomes is limited in the literature. A systematic review can help provide more insight into this uncommon condition.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found at https://doi.org/10.1016/j.case.2021.01.003.
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