

CASE REPORT

ADVANCED

CLINICAL CASE

Mass Lesions That Almost Fill the Ascending Aorta



When to Operate?

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ABSTRACT

Although anticoagulation can be an option for the resolution of thrombus, surgical removal is a definite treatment for removing mass lesions, especially in patients with unknown pathology. The present case report demonstrates the surgical removal of a sarcoma of the ascending aorta after the failure of anticoagulation. (**Level of Difficulty: Advanced.**) (J Am Coll Cardiol Case Rep 2021;3:1535–1540) © 2021 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

HISTORY OF PRESENTATION

A 73-year-old man presented to the outpatient clinic with left knee pain for a week. On admission, his oxygen saturation was 98%, blood pressure was 124/68 mm Hg, heart rate was 58 beats/min, and there was no abnormal finding on the physical examination. Because the patient was diagnosed with a mass lesion of the left proximal tibia, he was admitted for an excisional biopsy for the lesion. Before the excisional

biopsy, he had a preoperative evaluation, including transthoracic echocardiography. The transthoracic echocardiography showed normal morphology and function of the left ventricle with normal valvular function. However, there was a mass lesion that almost filled the ascending aorta on the suprasternal notch view (**Figure 1, Video 1**).

PAST MEDICAL HISTORY

His past medical history included previous subtotal gastrectomy for early gastric cancer (more than 10 years before this admission), hypertension, and diabetes mellitus for 5 years.

DIFFERENTIAL DIAGNOSIS

For incidental aortic masses, we thought about the possibility of thrombi or true mass lesion, including angiosarcoma.

LEARNING OBJECTIVES

- To be able to make a differential diagnosis in a patient with an incidental aortic mass by multimodality imaging and change of size with anticoagulation.
- To determine the time of operation in a patient with an aortic mass lesion according to the response to anticoagulation.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

Manuscript received July 19, 2021; revised manuscript received August 3, 2021, accepted August 16, 2021.

ABBREVIATIONS AND ACRONYMS

CECT = contrast-enhanced computerized tomography

¹⁸F-FDG PET/CT = ¹⁸F-fluorodeoxyglucose positron emission tomography/computerized tomography

INVESTIGATIONS

To evaluate the lesion, we performed transesophageal echocardiography. The transesophageal echocardiography revealed a 33 × 15-mm highly mobile mass lesion attached on the ascending aortic wall with a mass lesion having irregular surfaces (**Figure 2, Video 2**).

The contrast-enhanced computerized tomography (CECT) demonstrated a huge mass lesion with irregular surfaces in the ascending aorta and aortic arch without contrast enhancement (**Figure 3**).

MANAGEMENT

The patient underwent excisional biopsy for the left proximal tibia and was diagnosed with sarcoma. Because there was a possibility of a thrombus or a tumor almost filling the ascending aorta, we initiated anticoagulation therapy with subcutaneous low-molecular-weight heparin (Fraxiparine [Sanofi India], 4,750 U per 12 hours) to evaluate the possibility of a thrombus associated with increased thrombogenicity. We observed the size of the mass with trans-thoracic echocardiography every 2 days. However, the mass lesion did not respond to anticoagulant therapy for 7 days. An ¹⁸F-fluorodeoxyglucose positron emission tomography/computerized tomography (¹⁸F-FDG PET/CT) scan showed uneven glucose uptake in the ascending aorta, suggesting inflammatory plaque or malignant lesion (**Figure 4**), and a

hypermetabolic mass lesion in the right adrenal gland, suggesting metastasis. Based on the lack of response to anticoagulation and the findings of the PET/CT scans, the possibility of thrombus was excluded, and the patient was treated with a mass excision and replacement of the ascending aorta and aortic arch with 28-mm/8-mm/8-mm/8-mm-sized collagen-impregnated woven double velour polyester grafts (Hemashield Platinum [Maquet]). The mass did not invade the aortic wall and was limited in the aortic lumen. The excised ascending aorta and aortic arch were filled with tumor (**Figures 5A and 5B, Video 3**), and undifferentiated pleomorphic sarcoma was confirmed (**Figures 5C and 5D**).

DISCUSSION

In this case, we successfully removed undifferentiated pleomorphic sarcoma of the ascending aorta and replaced the aortic arch successfully after checking the possibility of thrombus with anticoagulation therapy and other imaging modalities.

Although thrombus in the ascending aorta is rare because of high flow velocity, there are several reported cases with free-floating thrombus in the ascending aorta (1-3). Because there was a low echogenic mass in the ascending aorta, and this lesion was not enhanced by the contrast on the CECT, we thought of the possibility of thrombus in the ascending aorta. Thus, we tried to use anticoagulation first to test the likelihood of thrombus.

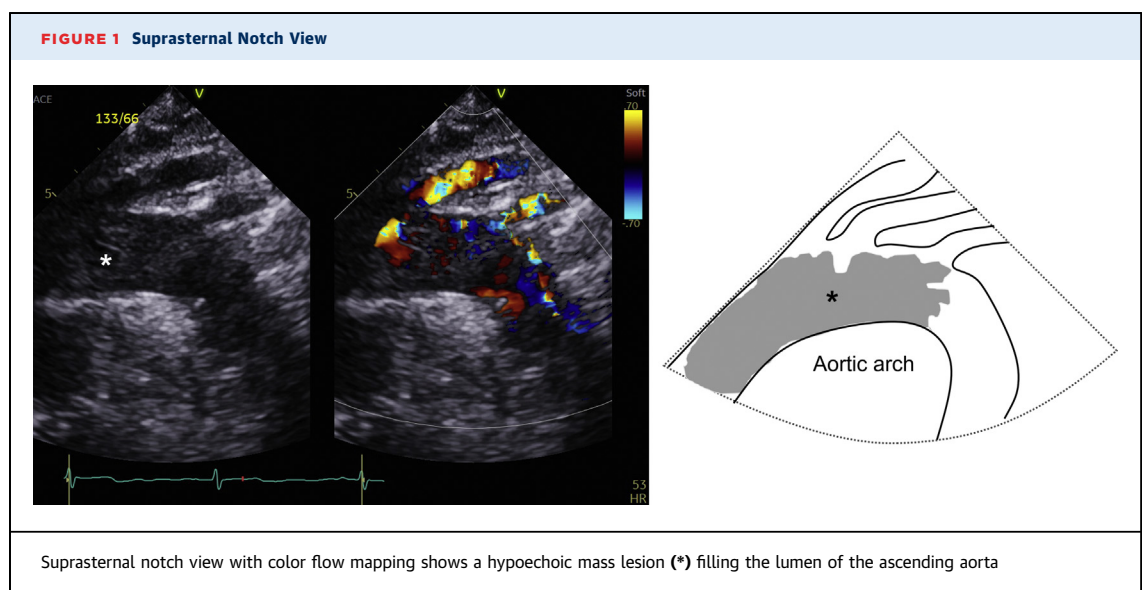
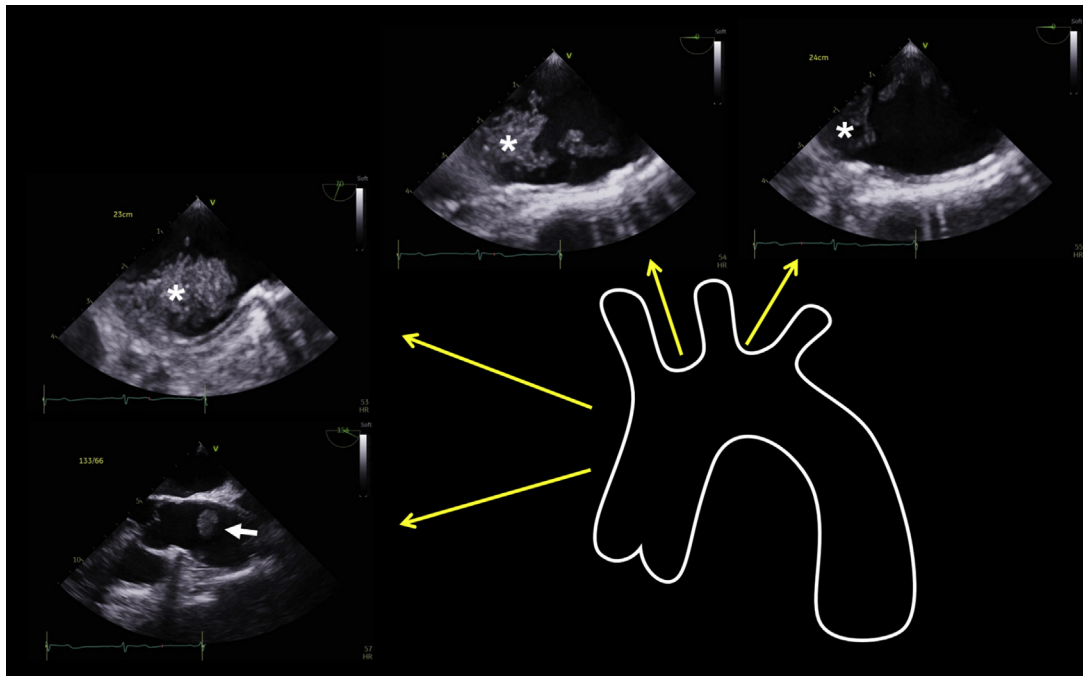


FIGURE 2 Images of the Transesophageal Echocardiography



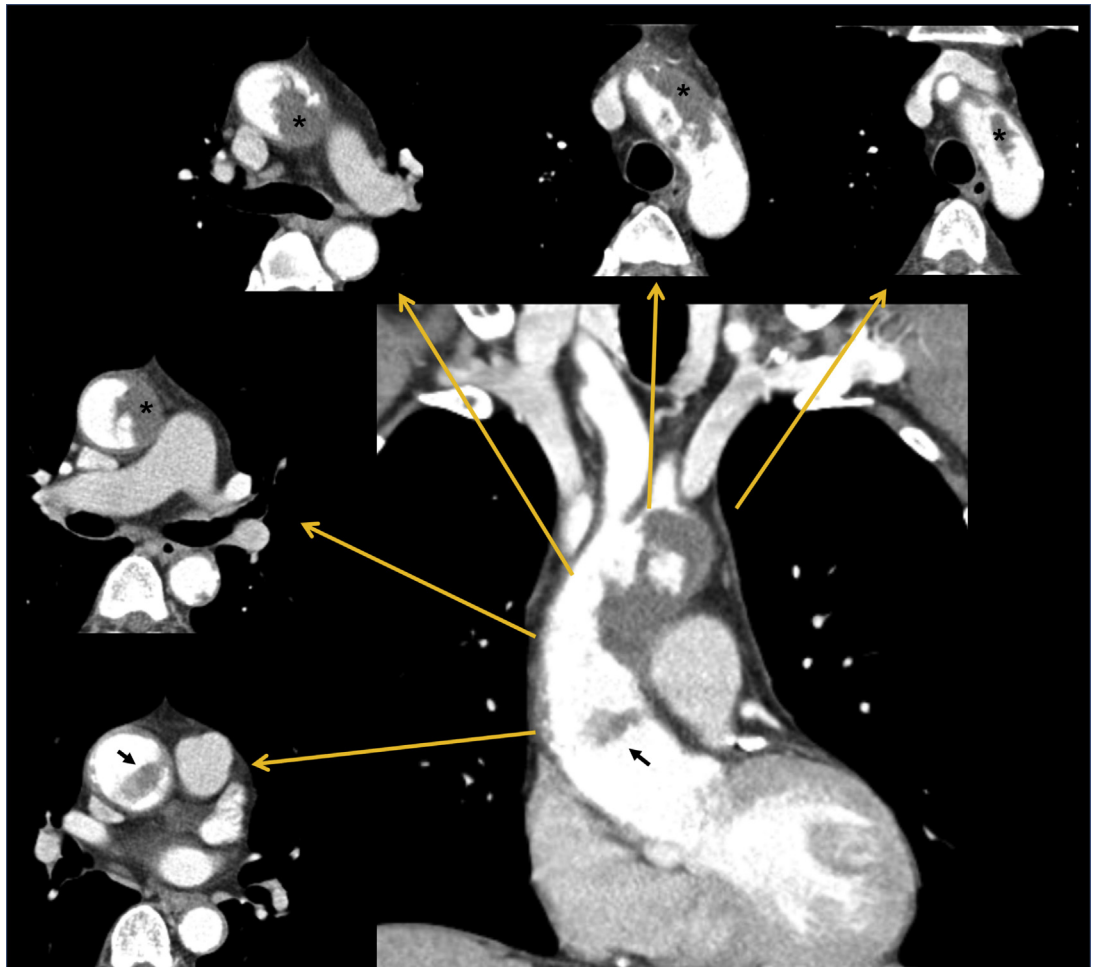
There is a protruding mass lesion in the ascending aorta (**white arrow**), and a mass lesion (*) with irregular surfaces fills the lumen of the ascending aorta with irregular surfaces.

Because there is no prospective study regarding thrombus resolution in patients with aortic mural thrombus to our knowledge, we did not know the optimal duration of anticoagulation. There is a case report showing complete resolution of a huge aortic thrombus with a 2-week duration of anticoagulation (4). Also, there is a case report showing failure of anticoagulation in a patient with aortic mural thrombus with a 10-day duration of anticoagulation (5). Thus, we observed the change of the aortic mass with transthoracic echocardiography every 2 days. However, there was no response after 7 days of anticoagulation. We performed a PET/CT scan and found weak uptake of the aorta, suggesting inflammatory plaque or malignant lesion. Because the aortic lesion was different from the findings of atherosclerotic plaques, we thought of the possibility of a tumor originating from the ascending aorta.

Primary aortic tumors are rare diseases with poor prognosis; the median overall survival from diagnosis is approximately 8 months (6). Aortic sarcomas have 2 varieties: mural and intimal. The intimal form often develops into intraluminal polyps or extensive longitudinal forms. Thus, intimal varieties can make

distal embolization or aortic obstruction (7). The mural types originate from the media or adventitia and usually grow outward to invade periaortic tissue (8). Our case shows an intimal form involving the ascending aorta and aortic arch with multiple floating portions. However, there was no distal embolization in our case.

Although CECT and cardiac magnetic resonance are useful for diagnosis, cardiac magnetic resonance is preferred by some authors because of its superior soft tissue characterization and better differentiation between tumors and thrombi (9). ¹⁸F-FDG PET/CT can be used for detecting subsequent local and distant metastasis (10). In this patient, there was an uneven glucose uptake in the ascending aorta, suggesting inflammatory plaque or malignant lesion. We diagnosed the hypoechoic tumor by transthoracic echocardiography. Although we tried anticoagulation therapy first, an aortic tumor should be considered, especially if the mass is located inside the aorta with a broad base, as in our case. Combination of surgical removal and chemotherapy had the greatest survival benefit in patients with aortic sarcomas, with a median survival rate of 12 months (6).

FIGURE 3 Images of the Contrast-Enhanced Computerized Tomography

There is a protruding mass lesion (**black arrows**) in the ascending aorta, and a mass lesion (*) fills the lumen of the ascending aorta with irregular surfaces.

FOLLOW-UP

The patient was discharged to another hospital in his hometown without any complications after the surgery. At the hospital, he received doxorubicin-based chemotherapy and radiotherapy to the left knee joint. However, he died of sepsis 1 month later.

CONCLUSIONS

This case highlights the role of the challenge of anticoagulation in a patient with incidental aortic masses. The failure of anticoagulation for a short duration can

aid in the decision to surgically remove the mass lesions.

FUNDING SUPPORT AND AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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FIGURE 4 ¹⁸F-Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography Scans Demonstrate Uneven Glucose Uptake in the Ascending Aorta, Suggesting Inflammatory Plaque or Malignant Lesion

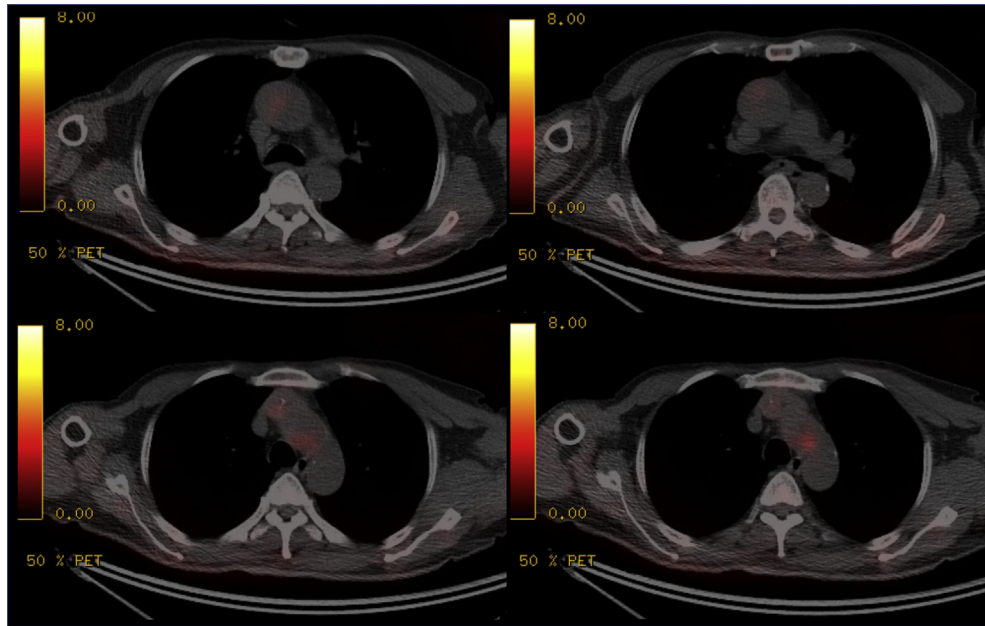
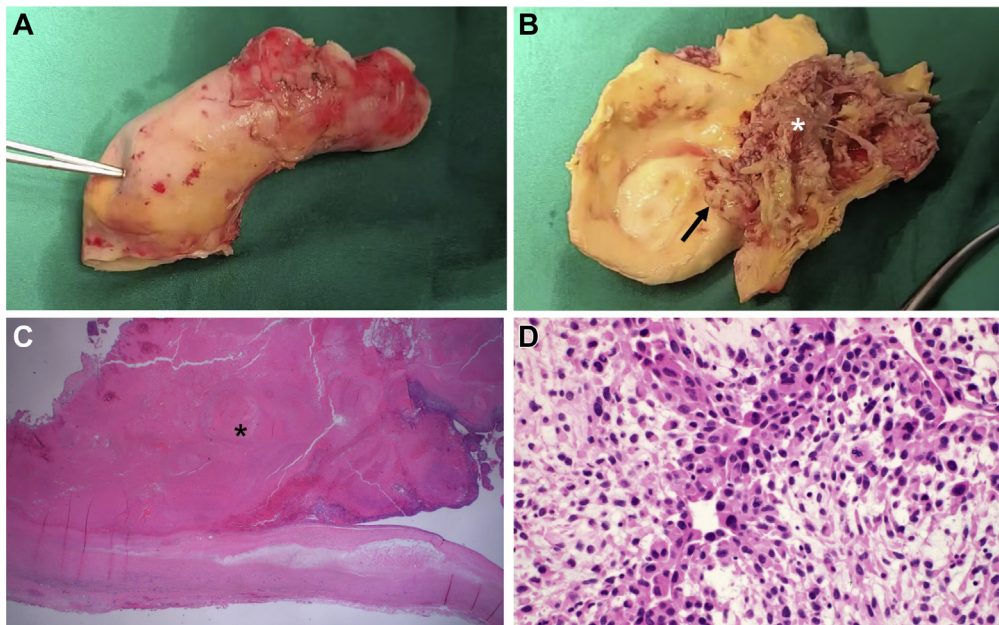


FIGURE 5 Resected Mass With Pathologic Finding




(A) The approximately 11.5-cm-sized excised ascending aorta and aortic arch and (B) the opened aortic lesion. There was a fungating mass sized approximately 8.5 × 4.5 × 3.0 cm (*) with a protruding portion (black arrow). Pathologic findings show (C) a mass lesion (*) attached on the aortic wall (original magnification: ×12.5) and (D) high mitotic activity (31/10 high-power fields) and necrosis, suggesting sarcoma (original magnification: ×400). There was no positive immunohistochemical stain with CD31, CD34, s-SMA, Desmin, and S-100, suggesting undifferentiated sarcoma.

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KEY WORDS anticoagulation, ascending aorta, sarcoma

 **APPENDIX** For supplemental videos, please see the online version of this paper.