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Case Report
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Large Aortic Thrombus in a Nonaneurysmal Ascending Aorta

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Abstract

Aortic mural thrombus is a rare clinical finding in the absence of aneurysmal changes but represents an important source of noncardiogenic emboli. It is associated with diagnostic challenges and a high complication rate, including significant mortality

Keywords: Nonaneurysmal; Anticoagulation therapy; Aortic surgery

Introduction

Aortic mural thrombus is a rare clinical finding in the absence of aneurysmal changes [1], but represents an important source of noncardiogenic emboli. It is associated with diagnostic challenges and a high complication rate, including significant mortality [2,3]. Both anticoagulation therapy and aortic surgery are commonly used as primary treatments; however, no consensus or clinical guidelines currently exist to define the optimal management strategy for this uncommon condition.

Case Presentation

A 68-year-old man presented to the Emergency Department with acute abdominal pain, nausea, revealed a large, near-occlusive aortic mass (24 mm × 50 mm) in the ascending aorta, extending into the aortic arch, along with intimal thickening of the arterial wall extending to the distal arch, and an Ulcer-Like Projection (ULP) (Figure 1).

A part from a history of hypertension, previous cerebral infarction, and cigarette smoking, no other risk factors for thrombosis were identified. A thrombophilia screen showed slightly reduced levels of protein C (54%) and protein S (62%), while thrombin antithrombin III complex (TAT) (27.0 ng/mL), thrombin, and α2 plasmin inhibitor-plasmin complex (4.5 μg/mL) levels were elevated. Although the association with thrombosis was unclear, blood cultures at admission grew Pseudomonas, Bacillus, and Bacteroides).

Following bacterial identification, effective antibiotic therapy with meropenem hydrate (3.0g/day) was initiated. Inflammatory markers decreased promptly after treatment. Given the life-threatening risk of embolisms, surgical intervention was planned.

The procedure was performed under cardiopulmonary bypass and deep hypothermia. The mass had an irregular surface and was firmly attached to the opposite side of the brachiocephalic artery (Figure 2A). The aortic wall was partially thickened and a ULP was present in the distal aortic arch (Figure 2B). Total arch replacement was necessary because of the thickened aortic wall and ULP extending into the distal arch. A frozen elephant trunk (FROZENIX 31 mm; Japan Lifeline Co., Ltd) was deployed in the distal arch, and the ascending and arch were replaced with a four branched Dacron graft (J Graft 24 mm; Japan Lifeline Co Ltd).

Histological examination showed thrombus formation attached to the intima, with areas of fibrous thickening. The intimal surface beneath the thrombus exhibited erosive changes. Most of the thrombus was fresh, although organized thrombus was present in some regions. Focal accumulations of foam cells were also observed (Figure 3).

The patient received six weeks of antibiotic therapy for preoperative bacteremia, with no further oral antibiotics required. Postoperatively, cilostazol was administered as anticoagulant therapy for six months; however, as the patient developed a transient ischemic stroke, prompting a switch to aspirin. No further complications occurred following the change in anticoagulation therapy. Follow-up Computed Tomography (CT) performed one year after surgery showed no recurrence

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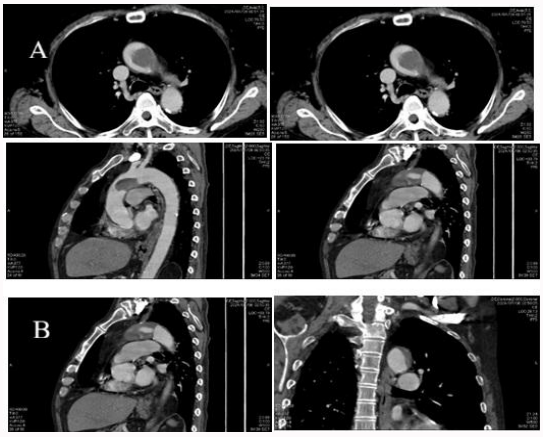

Figure 1: Contrast-enhanced computed tomography at admission.
(A). A giant, near-occlusive aortic mass (24 × 50 mm) in the ascending aorta, extending into the aortic arch.
(B). An Ulcer- Like Projection (ULP) and a thickened intimal layer extending to the distal arch.

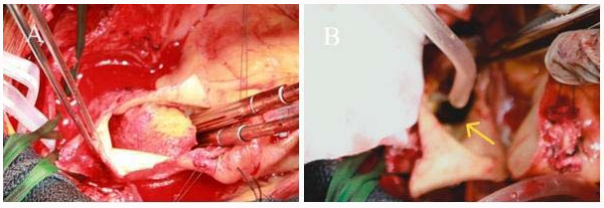

Figure 2: Intraoperative photographs.
(A). The mass filling the aorta had an irregular surface and was firmly attached to the opposite side of the brachiocephalic artery.
(B). The aortic wall was partially thickened and an ulcer-like-projection (ULP) was found in the distal aortic arch.

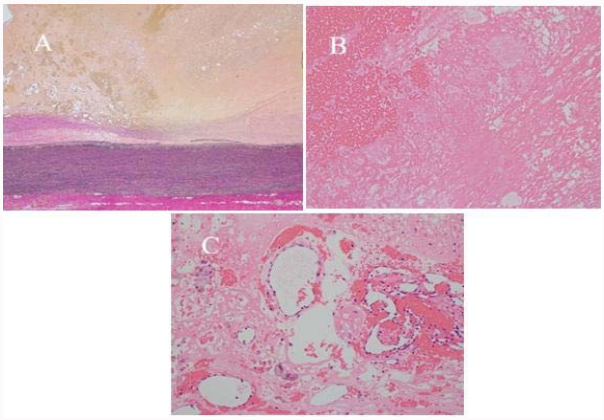

Figure 3: A lumpy thrombus adherent to the intima protruding into the vascular lumen (A: EVG × 20). Histologically, the thrombus was mostly fresh, although organized thrombus was also present (B: HE × 200) The intima showed fibrous thickening and focal accumulation of foam cells were observed within the thrombus (C: HE × 200).

of thrombus.

Discussion

In many cases, aortic thrombi remain asymptomatic until significant embolic events occur, making early diagnosis of a floating aortic thrombus is challenging. With the increasing use of high-resolution imaging modalities such as echocardiography, CT, Magnetic Resonance Imaging (MRI), and angiography, asymptomatic mural thrombi are now being detected more frequently.

Aortic mural thrombus is associated with multiple risk factors, but the exact pathophysiological mechanisms are not fully understood. Endothelial injury is considered the most common substrate for thrombosis. In cases involving mild atherosclerosis, microscopically damaged plaques in the aortic wall often serve as sites for the attachment of a floating thrombi due to the accumulation of adherent debris.

The optimal treatment strategy for floating aortic thrombi remains controversial [4]. Although thrombolysis has been proposed, a floating thrombus in the thoracic aorta carries a significant risk of embolization. Historically, anticoagulation has been the first-line treatment for aortic mural thrombus, while surgical thrombectomy is preferred for hypermobile thrombi. However, no standardized treatment guidelines currently exist. A prior meta-analysis showed similar mortality rates among patients treated with systemic anticoagulation and those treated surgically, but significantly higher rates of recurrent peripheral arterial embolization occurred in patients receiving anticoagulation alone [5].

When considering surgical options, simple thrombectomy often fails to address underlying aortic wall abnormalities. In such cases, the use of covered stent graft to fully exclude the diseased area can be effective. Recent reports suggest that endovascular coverage of aortic thrombi, when feasible, is a safe and effective treatment with low recurrence and re-embolization rates [6]. However, this approach is typically reserved for patients who are poor surgical candidates, for those with descending aortic involvement, or antithrombotic therapy is contraindicated.

In the ascending aorta, open surgery is often considered a last resort, particularly when less invasive approaches fail or when diagnostic uncertainty remains for example, when concomitant surgical pathology cannot be excluded. Various surgical approach has been described, including simple resection and replacement with a synthetic graft. Because treatment strategies vary, the choice of therapy should be individualized based on the thrombus's location, size, mobility, and underlying pathology.

Postoperative management plays a critical role in determining long-term outcomes. Anticoagulation therapy should be continued after surgery [7]. However, there is insufficient evidence to guide the selection of a specific anticoagulant. Some retrospective studies [8,9] have shown an association between low-dose aspirin and reduced ischemic events, whereas other studies [10,11] have reported no benefit. Further research is needed to establish evidence-based recommendations for anticoagulant therapy and long-term follow-up of aortic thrombosis.

Comprehensive postoperative care, including tailored medical therapy and consistent imaging surveillance, is essential for preventing recurrence and future embolic events. Prioritizing these steps may significantly improve patient outcomes and quality of life.

Conclusion

The management and treatment of mural thrombus in a non-aneurysmal aorta remain challenging due to the lack of established guidelines and should be individualized for each patient. A comprehensive therapeutic approach should address three key aspects; underlying disease, anticoagulation therapy, and surgical or

endovascular intervention to eliminate embolic risk. Additional case studies are necessary to determine the optimal combination of these strategies.

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