Differential diagnosis and management of a mural mass in the aortic arch

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Although mural masses in the thoracic aorta are rare, early diagnosis is important because these result in life-threatening distal arterial embolisms, such as cerebral infarction. Differential diagnoses include mural thrombosis^{1,2} or tumors such as angiosarcoma and leiomyosarcoma,³ but accurate diagnosis before treatment is difficult. Several therapeutic options are available, such as systemic anticoagulation, surgical resection, and exclusion with an endovascular stent graft. However, there is a lack of consensus regarding the management of these conditions, and this management is different from their diagnosis. We report 3 patients with intraluminal masses in the thoracic aorta, particularly in the aortic arch, and discuss the therapeutic management of this condition.

CLINICAL SUMMARY

The patients' details are shown in [Table 1](#).

Patient 1

A 58-year-old man presented with abdominal pain. Computed tomography (CT) showed gastrointestinal perforation caused by sigmoid colon cancer, as well as a mural mass in the aortic arch ([Figure 1, A](#)). Emergency right hemicolectomy and Hartmann's operation were performed. The mural mass was diagnosed as a mural thrombus and treated conservatively with anticoagulants for 4 weeks. CT scans performed 4 weeks after initiating warfarin revealed that the mural mass had completely resolved, and there were no visible systemic emboli; therefore, we continued the conservative therapy ([Figure 1, B](#)).

Patient 2

A 73-year-old man was referred to our hospital for vertigo. Magnetic resonance imaging (MRI) revealed acute phase cerebral infarction. During the workup for embolic infarction, a stringy mural mass was detected in the aortic arch by transesophageal echocardiography. He was treated conservatively

Mural masses are rare but important embolic sources for distal arteries.

Central Message

A mural mass in the aortic arch leads to potentially life-threatening embolic complications, and surgical treatment is favorable for this rare condition.

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with anticoagulants for 4 weeks. The mass did not completely resolve after anticoagulant therapy, so a secondary surgical procedure, which was mass resection without graft replacement, was pursued. Intraoperatively, the 20-mm long stringy mass was seen attached to an atheroma on the lesser curvature of the arch. It was finally diagnosed as a thrombus by histopathologic examination.

Patient 3

Our third patient, a 53-year-old man, presented with dysarthria and was diagnosed with multiple cerebral infarctions. During the examination for the cause of infarctions, CT scans revealed an irregularly shaped mural mass in the distal aortic arch, which was primarily considered as a thrombus ([Figure 1, C](#)). Despite a 4-week course of anticoagulant therapy, the mass persisted ([Figure 1, D](#)). We performed secondary mass resection under cardiopulmonary bypass with selective cerebral perfusion. Intraoperative findings revealed a jelly-like tumor that extended from the ascending aorta to the distal aortic arch. The tumor could not be completely excluded by performing total aortic arch replacement; therefore, we performed tumor resection as much as possible without graft replacement. The postoperative pathologic diagnosis was leiomyosarcoma. The patient died of metastatic leiomyosarcoma 1 year after the surgical procedure.

TABLE 1. Patient summary

Case	Age (y)	Sex	Reason of detection	Localization of mass	Therapy	Final diagnosis	Underlying diseases	Follow-up (y)	Result
1	58	Male	Incidental (CT)	Aortic arch	Warfarin, aspirin	Thrombosis	Colon cancer	1.8	No recurrence
2	73	Male	Embolicisms (cerebral infarction)	Aortic arch	Warfarin and aspirin, resection	Thrombosis	None	6.5	No recurrence
3	53	Male	Embolicisms (cerebral infarction and renal infarction)	Aortic arch	Warfarin and aspirin, resection	Leiomyosarcoma	Leiomyosarcoma	1	Died of metastasis

CT, Computed tomography.

DISCUSSION

An intraluminal mass in the thoracic aorta is a relatively uncommon condition, but it is an important source of emboli and is associated with a high complication rate. The most common differential diagnosis is mural thrombus,¹ and the other rare diagnosis includes intraluminal tumor such as aortic sarcoma.⁴ It has been reported that positron emission tomography/CT is useful in differentiating these conditions,⁵ and that this imaging modality might be helpful in selecting the appropriate treatment strategy for patients with intraluminal aortic masses. If the mass

were a mural thrombus, as is the most common diagnosis, some researchers favor conservative management with anticoagulation therapy, which usually leads to complete resolution without additional embolic events.⁶ However, previous reports suggest that primary anticoagulation therapy is associated with a higher risk of recurrence of thrombosis and complications compared with primary surgical management.² Therefore, the optimal management of these patients is still controversial. In addition, these mural masses are commonly located in the descending or abdominal aorta (54%-89%),¹⁻³ and their common sites of

FIGURE 1. CT scans (A) before and (B) after conservative anticoagulation therapy in patient 1. The mural mass (arrowheads) in the aortic arch has completely resolved, indicating that it was a mural thrombus. CT in patient 3 shows (C) a mural mass (arrowheads) in the aortic arch (D), which persisted after 4 weeks of anticoagulation therapy. This mass was finally diagnosed as a leiomyosarcoma.

embolism were located mainly in the renal and lower-extremity arteries. However, in patients in whom a mass is located within the aortic arch, as in our case series, potentially life-threatening cerebrovascular embolic complications could occur. In addition, mobile mural masses in the aortic arch may be a cause of recurrent cerebral embolization.⁷ Therefore, the therapeutic strategy for mural masses in the aortic arch should be considered more carefully, and surgical options may be more favorable.

Recent reports describe favorable early outcomes of endovascular repair for patients with mural thrombi or tumors.⁸ However, its long-term outcome has not been fully established, and its usefulness in the management of mural masses remains controversial. In addition, endovascular repair may be suitable for the treatment of patients with mural masses in the descending thoracic aorta. Masses in the aortic arch, as those in the present study, or masses in the visceral segment of the aorta may exclude this treatment option.

CONCLUSIONS

A mural mass in the aortic arch is rare, but early diagnosis and treatment are important to prevent life-threatening

embolic complications. Differential diagnoses include mural tumor and thrombosis. We suggest that a primary surgical procedure is necessary in such cases.

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