

## Endovascular Management of Idiopathic Proximal Descending Aortic Thrombus after Attempted Medical Management

Yang A\*, Murphy B and Holden C

Mount Carmel Health Systems, Columbus, Ohio, USA

### Abstract

Idiopathic aortic mural thrombi are a rare cause of embolic disease. There is no consensus in treatment of aortic mural thrombi. Our case is to add to the body of literature regarding the management of this rare condition.

Our patient is a 41-year-old Caucasian female with a known aortic mural thrombus presents with an ischemic left lower extremity. Initial diagnosis was made via cross sectional imaging and patient was followed by the diagnosing internist. Patient was lost to follow up and subsequently developed an embolic complication. She was treated with an embolectomy and interval endovascular stent graft placement with successful exclusion of the thrombus.

Our case demonstrates that early intervention is important to prevent embolic events. Both medical management and endovascular stent graft placement have been demonstrated as a viable first line of treatments of thoracic aortic thrombi. This patient demonstrated that complications may still arise with patients managed with anticoagulation, especially in patients with a history of poor medical compliance. Thus, patient compliance should be considered in medical decision making and strong consideration be given to early thrombus exclusion.

**Keywords:** Aorta; Thrombus; Endovascular; Stent; Mural thrombus; Idiopathic

### Introduction

Thoracic aortic mural thrombus (TAMT) is a rare cause of peripheral arterial embolism that is often associated with aneurysmal disease, dissection, atherosclerotic disease or previous trauma. TAMT accounts for approximately 0.9% of peripheral artery embolisms [1].

Idiopathic cases of TAMT are even more infrequent and its rarity is reflected by the paucity of literature. Several case reports and small case series comprise the bulk of the published research regarding TAMT. Treatments include anticoagulation therapy, thrombolytic therapy, open aortic surgery, and endovascular stent grafting [2]. There are no widely accepted guidelines for treatment. In the spectrum of therapies, some authors would argue to start with anticoagulation and reserve more invasive therapies for recurrences or aortic thrombi that do not resolve after anticoagulation [3]. Other authors would argue a more aggressive approach with open aortic surgery [2].

We will recount the medical management and surgical treatment of a patient who presented with idiopathic thoracic aortic mural thrombus that underwent endovascular exclusion of the thrombus. The patient has consented for publication of this case.

### Case Report

Our patient is a 41-year-old Caucasian female with a history chronic obstructive pulmonary disease and major depressive disorder who presented to the emergency department with acute onset of left lower extremity pain. She had been admitted one month prior for community acquired pneumonia. A CT-angiogram of the chest at that time showed a 50 mm x 10 mm x 10 mm thrombus in the descending thoracic aorta (Figures 1 and 2). She received low molecular weight heparin while inpatient, but was lost to follow up after discharge. She was not on any anticoagulation or antiplatelet agents at the time of the Vascular Surgery team's assessment one month later.

The patient presented with pain in the left foot and loss of sensation in a stocking distribution extending just proximal to the left ankle. She

is an active smoker with no reported history of vascular disease. She denied any additional medical history, however, did report that she had not been following with a physician in several years.

Physical exam revealed a cold left foot and ankle with loss of pin-prick sensation. Dorsalis pedis and posterior tibial pulses were absent on the left. A Doppler signal was obtained in the left popliteal artery. The right lower extremity vascular exam was unremarkable. A CT-



**Figure 1:** CT-Angiography axial image demonstrating thrombus in a non-aneurysmal thoracic aorta.

\*Corresponding author: Yang A, Mount Carmel Health Systems, 793 W. State St, Columbus, OH 43222, USA, Tel: 240-620-1594; E-mail: [Andrew.yang@mchs.com](mailto:Andrew.yang@mchs.com)

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**Figure 2:** Coronal reconstruction demonstrating thrombus extending distally in thoracic aorta.



**Figure 3:** Coronal reconstruction after stent graft placement showing exclusion of thoracic aortic mural thrombus.

angiogram of the left lower extremity confirmed an occlusion of the distal popliteal artery with reconstitution distally. Transit time from initial encounter with the Vascular Surgery team to the operating room for embolectomy was approximately one hour (Figure 3).

An arteriotomy was made at the distal popliteal artery, and an embolectomy was performed. Several firm rubbery emboli were removed proximal and distal to our arteriotomy, palpable pulses in the dorsalis pedis and posterior tibial were obtained. As we were able to revascularize the limb in less than four hours of symptom onset, a four-compartment fasciotomy was not performed. Post-operative course was uncomplicated. She remained on a continuous heparin infusion as arrangements were made for endovascular stent-graft placement to exclude the aortic thrombus.

She underwent endovascular exclusion using the right femoral artery as access; a thoracic endoprosthesis 28mm x 15cm stent was deployed. A completion angiogram was negative for any distal embolus. Post-operatively, the patient was started on Aspirin and Clopidogrel. Her heparin drip was discontinued and she was discharged on post-operative day one. Two weeks after surgery, the patient reported chest pain, but a follow-up CT angiogram showed the thrombus was still adequately excluded (Figure 3). An additional CT angiogram was obtained 6 months after placement and demonstrated a stable aortic

stent with no evidence of intraluminal thrombus. Patient has had no additional complications related to her aortic thrombus.

## Discussion

Acute limb ischemia from a distal arterial embolism is a relatively common problem with high morbidity and mortality. The amputation rate has been estimated to be 13-14% with a mortality of 9-12% [4]. Most commonly, these emboli are cardiac in nature with underlying pathologies such as atrial fibrillation, myocardial infarct, or replaced heart valves. Non-cardiac etiologies are far less common. Here we have presented a case of idiopathic thoracic descending aortic thrombus.

The incidence of aortic mural thrombus, reported by Machleder et al. [5] was found to be approximately 0.9% (95 cases out of 10,671 autopsies). Only 17 percent of these patients were found to have evidence of peripheral embolism. The prevalence of idiopathic thoracic descending aortic thrombus in an otherwise aneurismal free vessel is low.

Several case series have demonstrated that medical therapy including anticoagulation is a viable option in patients with an aortic mural thrombus [1,6,7]. Choukroun et al. [8] recommends a treatment period of 15 days with intravenous heparin to a target activated clotting time between two and threefold that of physiologic. With this approach, they reported resolution of the aortic thrombus in 4 of the 9 patients [8-13]. Boufi et al. [13] reports a similar response rate to intravenous heparin in a separate case series. However, there is no consensus on the most appropriate medical treatment for TAMT, whether it be Coumadin or another derivative (9), nor evidence-based recommendation for duration of therapy [9].

There are also proponents of surgical intervention as the primary treatment for TAMT. A meta-analysis of 200 patients by Fayad et al. demonstrated a recurrence rate of peripheral emboli of 25.7% for patients treated with anticoagulation versus 9.1% in the surgical group. Complications were reported as 27% and 17% for medical and surgical management, respectively. Mortality rates were 6.2% for anticoagulation and 5.7% for surgery [2].

Alternatively, elective stent-graft deployment has been demonstrated as an effective and safe option in the management of embolizing arterial lesions in general [10] and thoracic aortic mural specifically [11]. Criado et al. [12] first described the use of stent grafts for endovascular exclusion of thoracic aortic mural thrombi. Boufi et al. had seven patients successfully undergo endovascular stent graft exclusion of aortic thrombus with no complications or deaths at 30 days [13].

One of the main concerns with this therapeutic option is the risk of thrombus dislodgement causing an acute distal embolism. We took several precautions to help mitigate this risk. Heparin was administered as an IV bolus prior to endovascular manipulation. Additionally, we minimized the manipulation of any wires and catheters in the aorta. Finally, as previous authors have suggested, we performed a completion angiography at the end of the procedure to detect any distal emboli that may have been dislodged during the procedure [14].

In the case of our patient, she was initially managed by the medical team but was lost to follow up after discharge. Unfortunately, her next healthcare encounter was in the setting of an acute ischemic event. Endovascular approaches have been utilized with increasing frequency for many vascular therapies, including the treatment of thoracic aortic thrombi. Our case echoes several other case reports that

endovascular exclusion of an idiopathic thoracic aortic thrombus in an otherwise non-aneurismal non-atherosclerotic aorta is effective and safe. Additionally, this patient unfortunately did suffer a complication related to non-operative management due to non-compliance. While the literature discussed above does support the use of anticoagulants as the primary treatment of TAMT [1,6-8,13], the efficacy of these treatments are based on an assumption of a reliable patient who will adhere to the treatment regimen. Thus, we would recommend early endovascular intervention if there are concerns regarding patient compliance to medical therapy.

## Conclusion

Idiopathic thoracic descending aortic thrombi are a rare problem with significant consequences. There is currently no consensus for treatment of this rare problem. Management with anticoagulation, endovascular exclusion with stent graft, and surgical interventions has all been reported. Our case supports recent case reports and series that endovascular stent graft placement for aortic thrombus exclusion is an effective and safe treatment for idiopathic thoracic descending aortic thrombi. Additionally, from our experience with this case, we also recommend early treatment to mitigate the risk of embolic sequel especially if there are concerns that the patient may be lost to follow up.

## References

1. Abissegue Y, Lyazidi Y, Chtata H (2015) Acute Systemic Embolism Due to an Idiopathic Floating Thrombus of the Thoracic Aorta: Success of Medical Management: A Case Report. *BMC Research Notes*.
2. Fayad ZY, Semaan E, Fahoum B, Briggs M, Tortolani A, et al. (2013) Aortic mural thrombus in the normal or minimally atherosclerotic aorta. *Ann Vasc Surg* 27: 282-290.
3. Turley RS, Unger J, Cox MW, Lawson J, McCann RL, et al. (2014) Atypical aortic thrombus: should nonoperative management be first line? *Ann Vasc Surg* 28: 1610-1617.
4. Eliason J, Wainess R, Proctor M (2003) A National and Single Institutional Experience in the Contemporary Treatment of Acute Lower Extremity Ischemia. *Annals of Surgery* 238: 382-390.
5. Machleder H, Takiff H, Lois JF, Holburt E (1986) Aortic mural thrombus: an occult source of arterial thromboembolism. *J Vasc Surg* 4: 473-478.
6. Bowdish ME, Weaver FA, Liebman HA, Rowe VL, Hood DB (2002) Anticoagulation is an effective treatment for aortic mural thrombi. *J Vasc Surg* 36: 713-719.
7. Iyer AP, Sadasivan D, Kamal U, Sharma S (2009) Resolution of large intra-aortic thrombus following anticoagulation therapy. *Heart Lung Circ* 18: 49-50.
8. Choukroun EM, Labrousse LM, Madonna FP, Deville C (2002) Mobile thrombus of the thoracic aorta: diagnosis and treatment in 9 cases. *Ann Vasc Surg* 16: 714-722.
9. Zhang WW, Abou-Zamzam AM, Hashisho M, Killeen JD, Bianchi C, et al. (2008) Staged endovascular stent grafts for concurrent mobile/ulcerated thrombi of thoracic and abdominal aorta causing recurrent spontaneous distal embolization. *J Vasc Surg* 47: 193-196.
10. Shames ML, Rubin BG, Sanchez LA, Thompson RW, Sicard GA (2002) Treatment of embolizing arterial lesions with endoluminally placed stent grafts. *Ann Vasc Surg* 16: 608-612.
11. Luebke T, Aleksic M, Brunkwall J (2008) Endovascular therapy of a symptomatic mobile thrombus of the thoracic aorta. *Eur J Vasc Endovasc Surg* 36: 550-552.
12. Criado E, Wall P, Lucas P, Gasparis A, Proffit T, et al. (2004) Transesophageal echo-guided endovascular exclusion of thoracic aortic mobile thrombi. *J Vasc Surg* 39: 238-242.
13. Boufi M, Mameli A, Compes P, Hartung O, Alimi YS (2014) Elective stent-graft treatment for the management of thoracic aorta mural thrombus. *Eur J Vasc Endovasc Surg* 47: 335-341.
14. Fueglistaler P, Wolff T, Guerke L, Stierli P, Eugster T (2005) Endovascular stent graft for symptomatic mobile thrombus of the thoracic aorta. *J Vasc Surg* 42: 781-783.