

Aortic Arch Thrombus Detected by Inter-Arm Blood Pressure and Pulse Discrepancy in a 77-Year-Old Man Presenting with Urinary Retention

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ABSTRACT

Aortic mural thrombus occurring in a non-aneurysmal, non-dissected aorta is a relatively rare entity. The presentation is variable, and aortic mural thrombus may be asymptomatic or present with emboli or ischemia. We present a case of a 77-year-old man admitted with urinary retention, who was found on examination to have a significant inter-arm blood pressure difference and a reduced right radial pulse. Computed tomography angiography (CTA) was performed and identified the presence of an aortic arch mural thrombus extending into the brachiocephalic trunk, left common carotid artery, and left subclavian artery. No dissection or aneurysm was detected. As there was no evidence of emboli, distal embolization, or ischemia, the patient was treated with anticoagulants. Three months later, the patient remains well with resolution of the radial pulse and inter-arm blood pressure difference; however, repeat CTA was refused, and resolution of the thrombus could not be confirmed. This case highlights the importance of careful general examination in patients presenting with non-vascular complaints and suggests conservative anticoagulation as a treatment modality for aortic mural thrombus in the absence of emboli or ischemia.

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Introduction

In general, thrombosis of the aorta is a rare but life-threatening phenomenon linked to atherosclerosis, aneurysms, and hypercoagulable states (1, 2). Yet, it is still uncommon and inadequately diagnosed in the absence of any structural abnormality or other predisposing factors (3). As a result of the non-specific presentation, with many of the affected patients developing complications, most commonly emboli to the distal arteries, resulting in cerebrovascular accidents, organ failure, or limb ischemia, it can be difficult to diagnose (4).

The role of advanced imaging modalities in the detection of aortic thrombosis is well recognized; however, there are currently no clinical guidelines in the management of idiopathic aortic thrombosis (5). Anticoagulation and surgical intervention are the more widely used modalities; clinicians are unsure as to the best course of action, especially in asymptomatic patients (6).

We present an unusual case of aortic thrombosis identified incidentally on physical examination of a 77-year-old man who had no prior medical history or any previously identified predisposing risk factors. This man was being investigated for urinary retention. However, the triage nurse who was taking his general medical history detected a significant blood pressure discrepancy between the upper limbs.

This case report demonstrates the value of a thorough clinical examination in identifying silent vascular pathologies and highlights the need to maintain attentiveness despite seemingly benign presenting complaints. This case further contributes to the limited literature concerning the presentation, etiology, and treatment of aortic thrombosis.

Materials and Methods

A retrospective case report of a single patient was conducted at Labbafinejad Hospital, Tehran, Iran. Data were collected from the patient's medical records, which included documented clinical findings, vital signs, laboratory results, and imaging reports. The patient initially came in for the workup of urinary retention.

As a difference in blood pressure and pulse between the upper limbs was recorded, a vascular abnormality was suspected, and

subsequent imaging was undertaken. Contrast-enhanced computed tomography angiography (CTA) of the aorta and its main branches was employed to define vascular anatomy and find any pathology.

There were no experimental interventions. Management was dictated by the patient's clinical condition and standard clinical practice. The patient was given clinical follow-up following treatment. Follow-up imaging was not obtained as the patient refused repeat CT angiography.

Case Presentation

A 77-year-old male was transferred from a nursing home to the emergency department at Labbafinejad Hospital, presenting with urinary retention. Following the insertion of a urinary catheter, he was examined for hypotension on triage. He was conscious, alert, and oriented, answering questions appropriately. He denied dizziness, headache, nausea, chest pain, dyspnea, or any other cardiovascular or respiratory symptoms.

His pulse rate was 75 bpm, respiratory rate 12/min, and oxygen saturation 95% on room air. Blood pressure was initially measured using the standard automated blood pressure monitor available in the hospital, with an appropriately sized cuff. Because of the marked inter-arm difference, bilateral upper-extremity blood pressure measurements were repeated and confirmed using a mercury sphygmomanometer. The systolic blood pressure was 150 mmHg in the left arm and 60 mmHg in the right arm. Examination of the left radial pulse showed that it was strong and palpable, but the right was reduced. All other peripheral pulses were felt to be symmetrical and palpable.

On auscultation of the heart, a murmur was best auscultated over the aortic valve. The patient showed no neurological deficits and no clinical evidence of acute limb ischemia, such as pallor, cyanosis, significantly raised temperature asymmetry, or sensory or motor impairment. Abdominal examination was unremarkable, with a soft, non-tender abdomen and no palpable pulsatile mass. There was no clinical evidence of acute end-organ hypoperfusion.

Given the significant inter-arm blood pressure difference, reduced right radial pulse, and aortic murmur, the differentials

included aortic dissection and other large aortic or atherosclerotic vessel abnormality. Aortic CTA was undertaken.

Results

Initial laboratory investigations were unremarkable, including a full blood count, clotting profile, renal and liver function tests, and inflammatory markers as shown in Table 1.

The patient reported no history of regular medication use, smoking, use of illicit drugs, recent surgery, trauma, prolonged immobilization, or infection. He also had no history of cancer, autoimmune or inflammatory disease, or a family history of thrombosis. He also reported no history of known atherosclerotic risk factors such as hypertension, diabetes mellitus, or dyslipidemia.

The electrocardiogram showed a normal sinus rhythm with no significant ST or T wave abnormality. Transthoracic echocardiogram revealed normal LV systolic function (LVEF being around 55%). There was no intracardiac thrombus or significant valvular abnormality, and the visualized parts of the aorta were unremarkable; however, there was mild mitral regurgitation.

CT angiography of the aorta showed a mural thrombus of the aortic arch extending into the brachiocephalic trunk, left common carotid artery and the left subclavian artery. No evidence of aortic dissection or aneurysm was seen, and there was no feature suggestive of aortitis on the scan. There was also evidence of left subclavian artery stenosis, approximately 50% stenosis at the

origin of the celiac trunk and approximately 70% stenosis at the origin of the superior mesenteric artery.

Vascular surgery and cardiology consultations were obtained. Due to the patient's clinical stability and lack of documented acute limb or visceral ischemia or other evidence of distal embolization, a shared decision was made for conservative management with therapeutic anticoagulation. The patient was placed on IV unfractionated heparin and subsequently oral warfarin. Heparin was titrated based on aPTT (range 60–80 sec), and warfarin titrated based on INR (range 2.0–3.0). Heparin was continued for at least 5 days and until the INR reached the therapeutic range before discontinuation. No antiplatelet or statin therapy was prescribed.

No operative or endovascular procedures were performed. At 3-month follow-up, the patient was clinically well, and there was no thromboembolic or bleeding complication. The right radial pulse was much stronger than on presentation. Blood pressure measurement showed 135/75mmHg on the left arm and 125/70mmHg on the right arm, showing a significantly reduced inter-arm blood pressure difference. Warfarin treatment continued with INR monitoring. Repeat CTA was advised to confirm resolution of the thrombus; however, the patient refused consent for repeat imaging. Resolution or persistence of thrombus could therefore not be confirmed radiologically.

The clinical course from presentation through diagnostic evaluation, treatment, and follow-up is summarized in Figure 1.

Table 1. Laboratory results.

Laboratory parameter	Result	Unit
WBC	6.8	$\times 10^3/\mu\text{L}$
Hemoglobin	13.8	g/dL
Platelet count	238	$\times 10^3/\mu\text{L}$
PT	12.4	sec
INR	1.02	—
aPTT	31	sec
Creatinine	0.9	mg/dL
BUN	18	mg/dL
AST	22	U/L
ALT	19	U/L
ALP	92	U/L
Total bilirubin	0.7	mg/dL
ESR	12	mm/h
CRP	<0.5	mg/dL

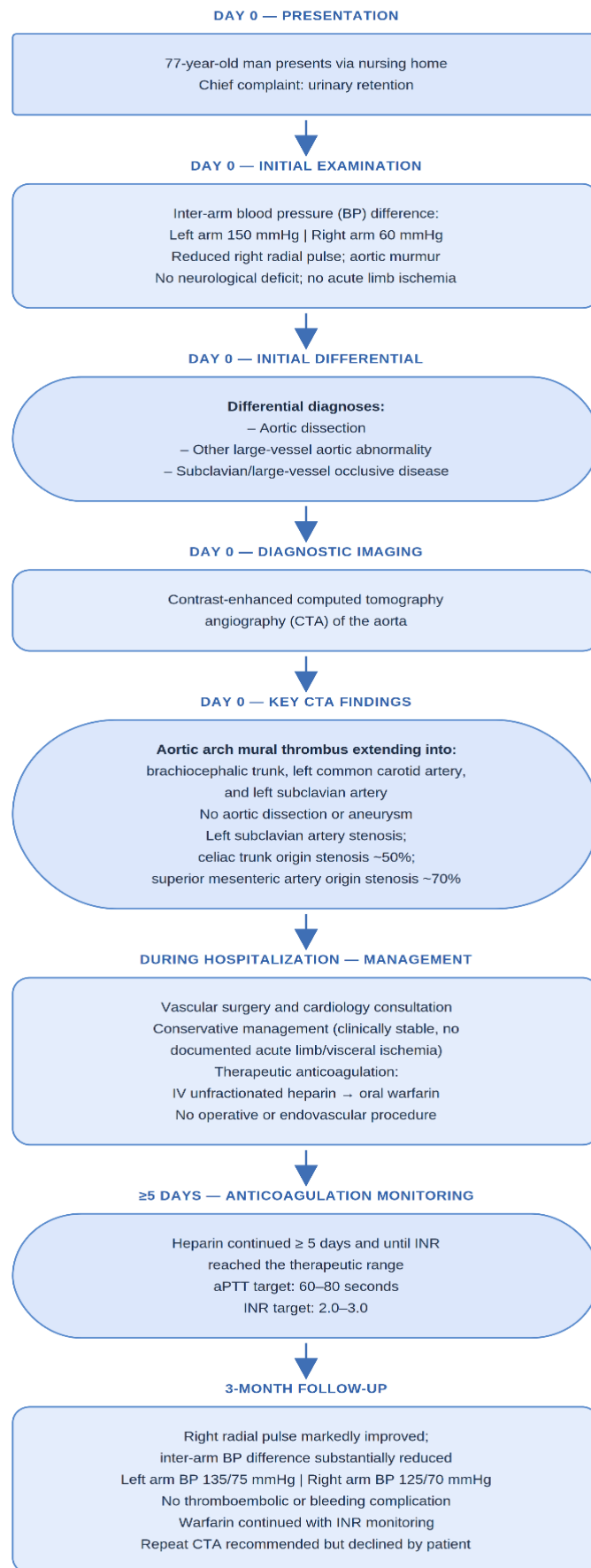


Figure 1: CARE-compliant clinical timeline of presentation, diagnostic evaluation, treatment, and follow-up.

Discussion

Aortic mural thrombosis on a non-aneurysmal, non-dissected aortic wall is rare and usually detected following distal embolization (2, 7). Our patient is unusual in that he did not have visible symptoms suggestive of embolism, and the thrombus was only discovered after examination for urinary retention revealed a large inter-arm blood pressure discrepancy and a reduced right radial pulse. This is similar to some other reported cases where a thrombus in the arch or ascending aorta was discovered incidentally (8), highlighting the importance of a careful vascular exam even when the presenting complaint is remote from the pathology discovered.

Known associations with this type of thrombus include hypercoagulable states, e.g., inherited thrombophilia or antiphospholipid antibodies, malignancy, or inflammatory/autoimmune vasculitis with a specific prothrombotic abnormality often identified when investigated specifically for them (7, 9). Our patient did not have a history suggesting any of these, and initial investigations were normal, but formal assessment for thrombophilia, antiphospholipid antibodies or malignancy was not performed. Thus, the lack of a known risk factor cannot be taken to imply the etiological work-up was negative, and a prothrombotic disorder cannot be entirely ruled out. The etiology of the thrombus in this patient should then be classified as undetermined rather than idiopathic.

The significant inter-arm difference in blood pressure and asymmetric radial pulse suggested aortic dissection was unlikely, and we should therefore consider alternative causes of asymmetric upper-limb perfusion, including subclavian artery occlusive disease or stenosis (10). CTA was negative for dissection, displaying the lack of an intimal flap or false lumen, although a mural thrombus was visualized from the arch, overlying the great vessels, with subclavian artery stenosis.

As there was no evidence of limb or visceral ischemia and the patient was hemodynamically stable, therapeutic anticoagulation was decided on instead of surgical or endovascular intervention. Anticoagulation has been reported as a

conservative management modality in certain instances of non-embolizing aortic thrombus, with some reports of successful resolution (9, 11). Surgery or endovascular removal of thrombus can be chosen in situations of large or unstable thrombus, recurrent embolization, or failure or intolerance to anticoagulation (7, 9). Given the lack of documented embolic or ischemic phenomena, a conservative strategy was utilized in this case.

Three months after presentation, improvement in inter-arm blood pressure difference and right radial pulse was suggestive of a good clinical response. However, radiological resolution of thrombus could not be confirmed, as the patient refused repeat CT angiography. Therefore, clinical improvement should not be equated with radiological resolution and persistent or recurrent thrombosis cannot be excluded.

The report is limited by its single-case design, incomplete etiological evaluation, which does not exclude an underlying prothrombotic or inflammatory process, and the lack of follow-up imaging. These factors limit the ability to draw robust conclusions regarding the etiology, natural history, and durability of response in this case. It does, however, underscore the value of a thorough vascular assessment and awareness of a significant inter-arm blood pressure difference even among patients presenting with an unrelated or nonspecific complaint.

Overall, this case further demonstrates the ongoing importance of comprehensive bedside clinical examination in patients with seemingly unrelated or nonspecific complaints. Bedside examination is not solely used to rule out a diagnosis that had been suspected; it also plays a role in discovering unexpected physical findings that alarm physicians about clinically important disease and redirect the diagnostic evaluation. Failure to identify and evaluate physical examination findings was associated with a missed or delayed diagnosis and other adverse outcomes (12, 13). While advanced diagnostic technology is readily available, the continued importance of the physical exam in achieving diagnostic accuracy has been emphasized (14, 15). In this case, the vascular findings identified during evaluation for urinary retention were not related to the

patient's presenting complaint but resulted in the detection of an otherwise asymptomatic aortic arch thrombus.

Conclusion

An aortic mural thrombus may be found in a non-aneurysmal, non-dissected aorta without obvious embolic or ischemic symptoms and identified as incidental findings noted on examination. In this case, the presence of vascular findings (i.e., discrepancy in BP between the upper limbs and abnormal peripheral pulses) emphasizes the importance of a thorough examination, including vascular assessment, as part of the assessment of patients presenting with a non-vascular complaint. In the absence of documented ischemia or embolization, anticoagulation may be considered as a conservative management strategy in this setting. However, close clinical and radiological follow-up is important, and further assessment for an underlying prothrombotic state would be indicated as appropriate.

Ethics Statement

Written informed consent was obtained from the patient for the publication of any potentially identifiable images or data included in this article.

Conflicts of Interest

None.

Funding

None.

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