 DOI: https://doi.org/10.4038/gmj.v29i2.8111

Detection of a large thrombus in abdominal aorta extending to bilateral common iliac arteries in a smoker

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Submitted on 09.12.2021 and accepted for publication on 22.11.2023

Introduction

Mural thrombi in the non-aneurysmal AA are extremely rare and exact incidence is not known (1). The likely pathophysiological mechanism includes Virchow's triad for thrombogenesis, which are hypercoagulability, stasis of blood flow, and endothelial injury (2). Malignancy, aortitis, structural abnormalities of the aorta such as aneurysms, chemotherapy, trauma, thrombocytosis, and certain medications have all been identified as potential triggers in documented cases of aortic thrombosis (3). The clinical sequelae of aortic thrombosis can vary widely, from being asymptomatic to symptomatic with severe complications. The investigation of choice for detection of aortic thrombus is contrast-enhanced computed tomography (CT) due to its ability to clearly identify the presence of a thrombus, its size, and location, as well as any underlying aortic abnormalities (1).

Case presentation

A 44-year-old male patient with hypertension presented with worsening exertional dyspnoea, orthopnoea, paroxysmal nocturnal dyspnoea, and bilateral lower limb oedema over two days. Clinical examination revealed dyspnoea at rest, fine end-inspiratory crepitations in lung bases, and blood pressure of 200/120 mmHg. He had an O_2 saturation of 94% on room air and the chest X-ray showed pulmonary oedema without cardiomegaly. ECG indicated sinus tachycardia and left ventricular strain pattern. Transthoracic echocardiogram demonstrated concentric left ventricular hypertrophy with severe diastolic dysfunction and a normal ejection fraction. The patient was diagnosed with acute pulmonary oedema and successfully treated with continuous positive pressure ventilation, intravenous glyceryl trinitrate (GTN) infusion, and intravenous furosemide.

The patient had a history of hypertension, disabling intermittent claudication, a 10 pack-year smoking history, and previous heroin addiction, which he ceased two years prior. Examination revealed weak lower limb pulses. An ultrasound of the abdomen showed chronic renal parenchymal changes with reduced kidney sizes. Bilateral renal artery Doppler study indicated renal artery stenosis, and a CT renal angiogram confirmed complete thrombosis in the infrarenal abdominal aorta and common iliac arteries, with collateral reconstruction of the external iliac vessels (Figure 1).

Contrast tomography of the aorta and major branches revealed no stenosed, thickened segments, atherosclerosis, or aneurysms. Malignancy or thrombophilia screening was negative. This patient came from a prison background and possible smoking and substance abuse was thought to be a possible aetiology.

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The patient was started on anticoagulation with warfarin and a statin. Due to the chronicity of the thrombus, presence of collaterals, and target organ injury, acute surgery was not planned. He was discharged after achieving a target international normalized ratio (INR) in prothrombin time and normalizing blood pressure, with advice to avoid smoking and heroin abuse. Follow-up was at a medical clinic. Although renal angioplasty and aorto-femoral bypass were considered if medical therapy failed, the patient was lost to follow-up after a few months.

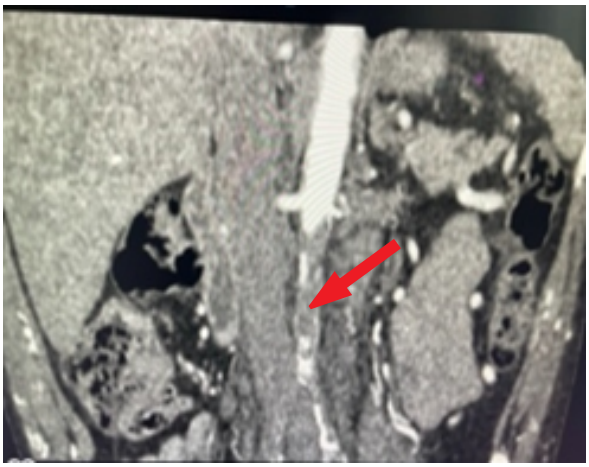

Figure 1: CT aortogram and renal angiogram showing the large thrombus in infrarenal aorta (Red arrow) extending to bilateral common iliac arteries.

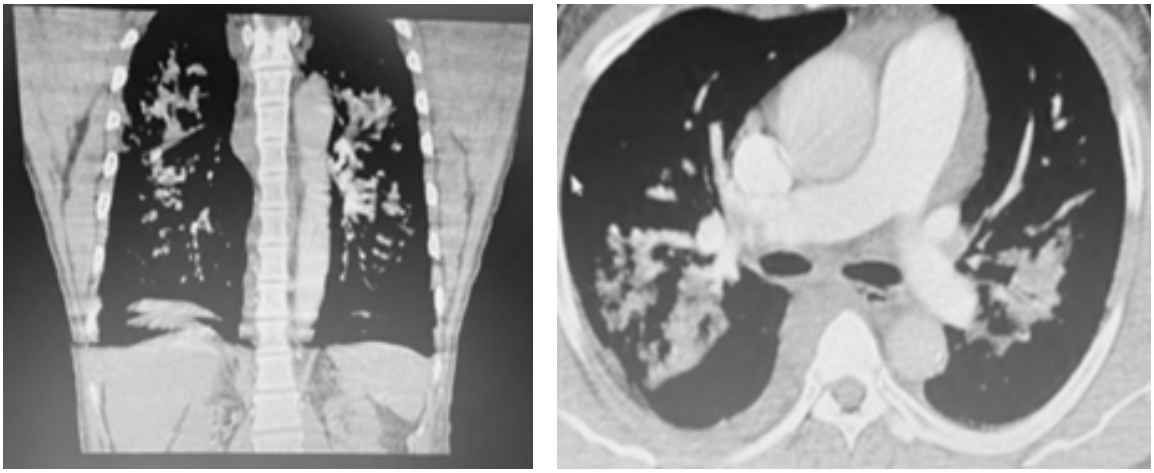

Figure 2: Normal appearance of the rest of the aorta and the branches

Discussion

Aortic thrombosis typically involves the abdominal aorta and can result from local thrombus formation, particularly in severe atherosclerosis. Acute aortic occlusion is often caused by an embolism from a cardiac thrombus (4).

The pathogenesis involves Virchow's triad: venous stasis, vascular wall damage, and hyper-coagulability (2). Vessel wall abnormalities such as aneurysms, atherosclerosis, and aortitis, along with hypercoagulable conditions like coagulation disorders and malignancies, are significant risk factors (3). However, stasis is less significant in the aorta due to its fast blood flow.

Smoking and recreational drug use, particularly cocaine, increase the risk of aortic thrombosis by inducing hypercoagulation and endothelial dysfunction, leading to vascular inflammation and a prothrombotic state (5). Both cocaine and smoking can precipitate thrombosis by increasing plasma viscosity through elevated fibrinogen levels and reducing nitric oxide production (6).

CT aortogram is the preferred diagnostic tool for detecting aortic thrombus, offering rapid image acquisition, comprehensive 3D visualization of the aorta, and widespread availability.(7).

Treatment approaches depend on the patient's health status, thrombus size, location, and clinical impact. (8). Medical management typically includes antiplatelet agents, statins, anticoagulants, and hypertension control. Surgical options include endovascular stent implantation, thrombectomy, or aortotomy on cardiopulmonary bypass (8).

The prognosis of the aortic thrombosis depends on the acuteness of the condition, and underling comorbidities. One study done in Sweden has found in acute aortic thrombosis overall 30 days mortality was 19.9%. (9). Chronic or asymptomatic aortic thrombosis is lacking it increases long term mortality and morbidly by causing distal organ ischemia and thromboembolism.

Our patient had a non-aneurysmal non atherosclerotic aortic thrombus which was secondary to smoking and recreational drug abuse. This remained undetected for a long period, resulting in consequences such as renovascular hypertension, chronic kidney disease, and peripheral vascular disease. Early diagnosis and intervention would have prevented the complications and improve the quality of life of the patient.

Conclusions

Aortic thrombus is rare but life-threatening condition. Smoking and recreational substances can cause aortic thrombus by inducing hypercoagulation and promoting vessel wall inflammation. CT aortogram is useful in the diagnosis of aortic thrombus. Medical treatment, as well as endovascular stents and bypass procedures, are implicated in treatment of aortic thrombus.

Written informed consent has been obtained from the patient to publish this case report with figures.

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