

A lady with an abnormal aorta

A Kitcher & R Gomez

Abbie Kitcher

IMT 3 Respiratory Medicine
Email: abbiekitcher@yahoo.co.uk

Ryan Gomez

Registrar
North Manchester General
Hospital
Email: ryanstanleygomez@outlook.com

Abstract

In the following case report we describe a lady with chest pain due to a pulmonary embolism. Her CT pulmonary angiogram and CT abdomen revealed an aortic abnormality.

A 64-year-old lady presented to hospital with sudden right sided chest pain and abdominal pain of 12 hours duration. She described it as sharp, pleuritic and constant. The pain improved with intravenous paracetamol administered by the paramedics at home. She also mentioned that she was a bit more breathless than before. She denied any cough, phlegm, wheeze or haemoptysis. She had no palpitations or dizziness. She was a smoker with smoking history of 48 pack years. She was a retired office worker and lived alone. She managed well and her exercise tolerance was around a quarter of a mile on the flat. She had a past medical history of lung nodules under CT surveillance and was waiting for pulmonary function tests. She was on salbutamol inhaler on a prn basis and sertraline 50mg for anxiety.

On examination she had no oedema or calf tenderness. There was no clubbing. Her heart sounds were normal without any audible murmurs. There were no neck bruits. She was in sinus rhythm with a heart rate of 98 beats per minute. She had clear lung fields. She had a d dimer of 1626. She had a chest x-ray and a CT pulmonary angiogram (CTPA).

Mural thrombi are thrombi that are attached to the wall of a blood vessel or cardiac chamber. When attached to a large vessel such as aorta, it can restrict the blood flow. In the aorta, they are most commonly seen in the descending aorta and less commonly in the aortic arch or the abdominal aorta. The pathogenesis of thrombus formation was described by Virchow, a renowned physician from Berlin in 1856.¹ His work involved extensive study of venous thrombosis and pulmonary embolism. His triad described three factors that contribute to the development of thrombosis. These are

1. A hypercoagulable state
2. Venous stasis, and
3. Endothelial injury

Mural thrombus can be symptomatic or diagnosed as an incidental finding. Symptoms depend on the location of the thrombus.

Mural thrombus of the aorta are rare in the absence of aneurysm or atherosclerosis. They are an important source of noncardiogenic emboli with a high rate of complications including a high mortality. They are diagnosed more often now due to an increased use of high-resolution imaging available now.²

In their systematic review, Fayad et al³ conducted an extensive literature search comparing the outcomes of medical management with anticoagulation with aortic surgery. They found 200 patients from 98 articles and 112 of these patients received anticoagulation and 88 underwent aortic surgery as primary treatment. They concluded that aortic thrombus persisted or recurred in 26.4% of the anticoagulation group and in 9.1% of patients treated with surgery. Mortality rates were similar in both the groups. Complications were a bit higher in the anticoagulation group 27% as compared to 17% in the surgery group. Major limb amputation rate was 9% in those treated with anticoagulation and 2% in those who had surgical treatment. Anticoagulation is associated with a higher incidence of complications, recurrence and limb loss. However, the authors also concluded that because of the rarity of the condition, it is difficult to conduct prospective randomised studies.

Primary aortic mural thrombus (PAMT) is defined as thrombus attached to the aortic wall in the absence of any atherosclerotic disease or aneurysmal disease in the aorta.

In their retrospective analysis of 88 patients who presented with acute occlusion of the extremities (upper or lower) or visceral arteries, Verma et al⁴ found that PAMT was present in 19 patients and was more common in young women. In their cohort only 1 patient was a smoker and none of the others

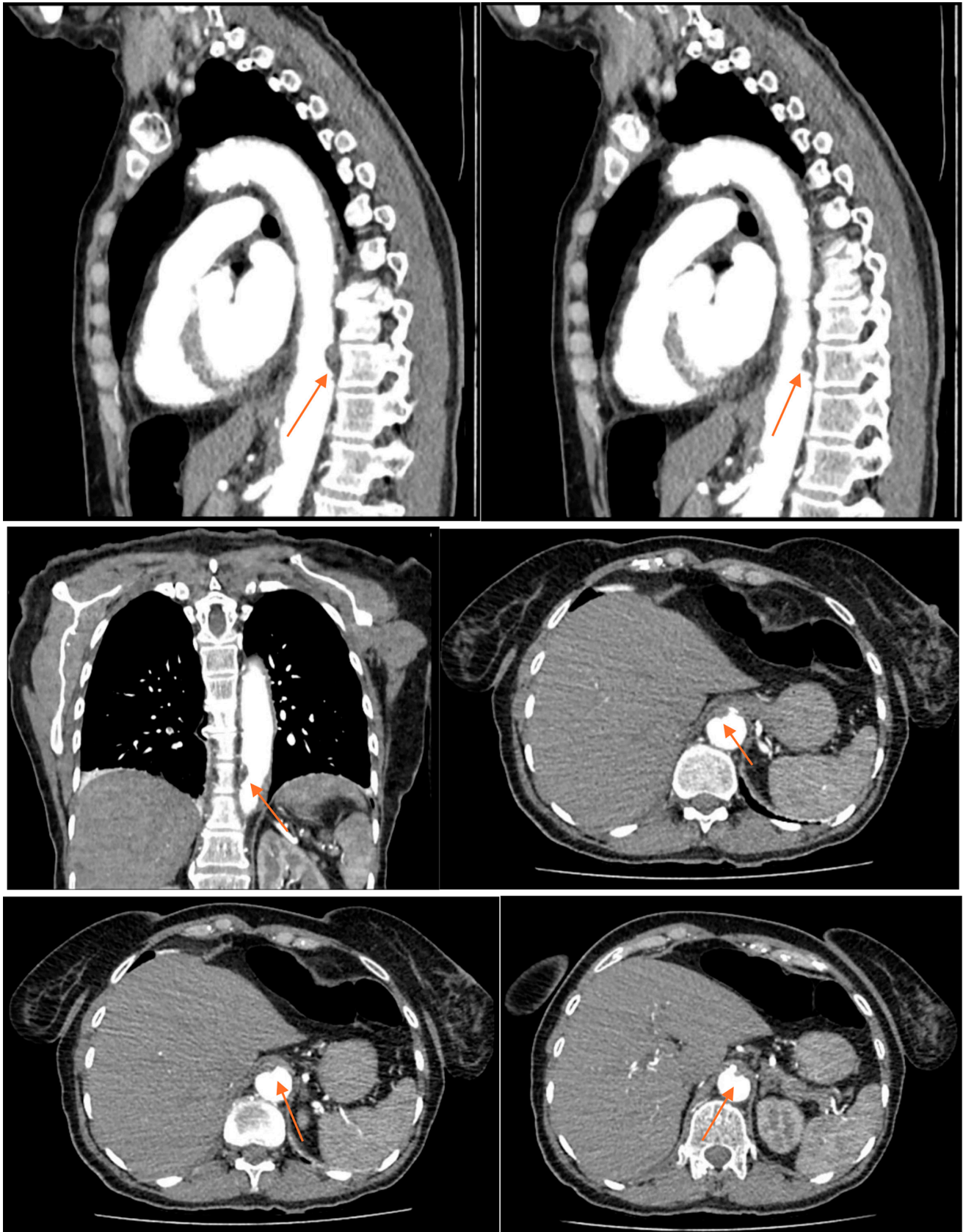
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Figure 1. Figure 2. Figure 3. Figure 4. Figure 5. Figure 6. A Mural wall thrombus noted in the upper abdominal aorta and a Mural wall thrombus is noted at the lower part of the descending thoracic aorta. Visualised as a low-density area attached to the vessel wall with irregular borders.

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Location of thrombus	Distal vessel which gets embolised
Type 1: Mural thrombus (MT) in ascending aorta & arch of aorta	Left brachial artery
Type 2: MT in descending thoracic aorta (distal to left subclavian artery up to coeliac artery)	Common femoral artery Superficial femoral artery Popliteal artery Coeliac trunk Splenic artery Hepatic artery
Type 3: MT in aortic segment between coeliac artery and lowest renal artery)	Renal artery Superior mesenteric artery Splenic and hepatic artery
Type 4: MT between lowest renal artery to aortic bifurcation.	Popliteal artery (both) Superficial femoral artery

had risk factors for atherosclerosis (hypertension, smoking, diabetes mellitus and dyslipidaemia). All their patients underwent an echocardiogram initially to exclude cardiac mural thrombus and a CT aortogram / MRA if the echocardiogram excluded a cardiac mural thrombus. They defined PAMT as thrombus attached to the aortic wall in the

absence of any atherosclerotic or aneurysmal disease in the aorta and a cardiac source of embolus. They identified that out of 88 patients, 19 had PAMT. None of these patients had signs of atherosclerotic change in the aorta or any aneurysmal dilatation. Of the 19 patients 10 had PAMT in the thoracic aorta while 3 patients had the thrombus in the perivisceral aorta and 6 had the thrombus in the infrarenal aorta. PAMT can be classified according to its location. The location also determines the location where the embolus can travel. They managed these 19 patients with a combination of medical treatment for sessile, small thrombus and endovascular stenting or stent grafting for large or non-visceral aortic thrombus and open surgical thrombectomy for visceral thoracoabdominal thrombus.

Conclusion

Symptomatic PAMT is uncommon but an important source of non-cardiogenic embolus. It is more common in women and can affect the limbs or a viscera depending on its location in the aorta. Patients may need surgical treatment depending on its location and effect.

Declaration of competing interests

Nothing to declare

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