

Case Summary

A 66 year old female presented to the emergency department with shortness of breath and chest pain radiating to her back. She had previously been treated with antibiotics by her GP for a presumed lower respiratory tract infection. Her past medical history included hypertension.

On examination she was tachypnoeic and hypertensive (BP170/90mmHg) with no BP disparity between arms. CXR revealed a left sided pleural effusion (Fig 1). Initial impression was that of a left sided basal pneumonia with parapneumonic effusion for which intravenous antibiotics were prescribed. Failure to improve prompted a CTPA which showed a large distal thoracic penetrating aortic ulcer at T11-12 with associated intramural haematoma and left sided pleural effusion. The patient was urgently transferred to a regional tertiary vascular centre for further management.



Fig 1. Left pleural effusion seen on the CT planning scan of the patient (white asterisk)

What is Acute Aortic Syndrome (AAS)?

“AAS is the term used to collectivise three life-threatening pathologies that include penetrating aortic ulcer (PAU), intramural haematoma (IMH) and aortic dissection”¹

1. Penetrating aortic ulcer

- PAU (penetration of an aortic atherosclerotic plaque into the aortic tunica media¹) Fig 2-B

2. Intramural haematoma

- Rupture of vaso vasorum leading to bleeding into the outer half of the aortic tunica media¹ Fig 2-A

3. Aortic dissection

- Tearing of the intimal layer allowing high pressure blood to separate the media from the aortic intima, creating a false lumen²) Fig 3-C

“PAU, IMH or aortic dissection may all present with ‘aortic pain’, which is acute and severe ripping, tearing or pulsating chest pain which radiates to the back”¹

- Extreme hypertension is a common finding in the patient was AAS³.
- Others symptoms depend on the anatomical site of the PAU, IMH or dissection; e.g. may mimic myocardial infarction or stroke.

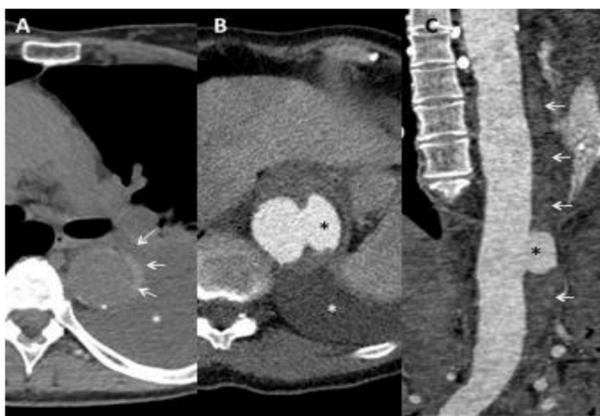


Fig 2. Axial CT at different levels of the thoracic aorta before (A) and after (B) contrast administration. IMH is seen as a crescent of high attenuation within the wall of the aorta (A). A large PAU is seen in the distal descending thoracic aorta (B and C, black asterisk).

Risk factors

- *****Hypertension*****
- Age
- Pregnancy
- Aortic instrumentation
- Congenital: connective tissue disorders

Investigations

“The role of imaging in AAS is not only to diagnose but also to characterise lesions and identify any complications”

- ☐ **★ CT angiography (CTA) ★**
 - ❤ Gold-standard investigation in AAS.
 - ❤ Allows for a rapid diagnosis.
 - ❤ Risk of contrast-induced nephropathy
- ☐ **Magnetic resonance angiography**
 - ❤ Similar sensitivity to CTA
 - ❤ Useful for younger patients and those with poor renal function.
 - ❌ Longer scanning times
- ☐ **Ultrasound**
 - ❌ Infrequently used due to user variability & reduced sensitivity.

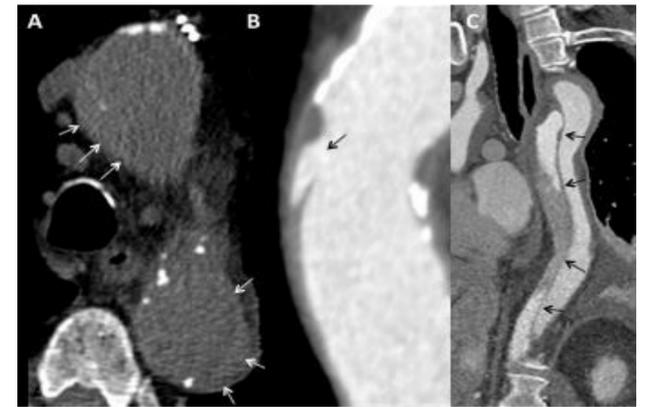


Fig 3. Further examples of IMH (A), PAU (B) and dissection (C). The intimal flap separating the true and false lumen in the dissection is identified in C (black arrows)

Management

“Prompt reduction of blood pressure in a critical care unit setting is crucial in the hypertensive patient with AAS”²

Medical management

- Aggressive BP reduction (target SBP 100-120mmHg)
- Analgesia.

Interventional/surgical management

- Surgery indicated for ascending thoracic aorta pathology.
- Transthoracic endovascular aortic repair (TEVAR) indicated for complicated Stanford Type B aortic dissection, PAU with persistent pain despite medical management or large diameter PAU.

Imaging surveillance

- Recommended at 1,3,6,9 and 12 months post discharge.

Lifestyle modification

- Healthy lifestyle, avoid lifting heavy weights.

Patient Outcome

“The patient underwent a successful TEVAR operation and drainage of her pleural effusion. She is undergoing regular surveillance imaging to assess for complications”

References

1. Lansman S, Saunders PC, Malekan R, Spielvogel D (2010). Acute aortic syndrome. *The Journal of Thoracic and Cardiovascular Surgery*. 140 (6), 92-97.
2. Tsai T. Acute Aortic Syndromes. *Circulation*. 2005; 112(24):3802-3813.
3. Golledge J, Eagle K. Acute aortic dissection. *The Lancet*. 2008;372(9632):55-66.