

An unusual cause of chest pain: the importance of acute aortic syndromes

Introduction

Chest pain is a common clinical presentation to emergency and acute medicine. Underlying this presentation a comprehensive history, examination and appropriate investigations should be focussed on delineating the correct diagnosis.

Acute aortic syndromes are uncommon but potentially life threatening, and require timely imaging and intervention.

Discussion

Acute aortic syndromes encompass a range of pathologies including aortic dissection, intramural haematoma, penetrating atherosclerotic ulcer, traumatic aortic injury, pseudoaneurysm, rupture, atherosclerosis, and genetic and congenital aortic diseases (Erbel et al, 2014).

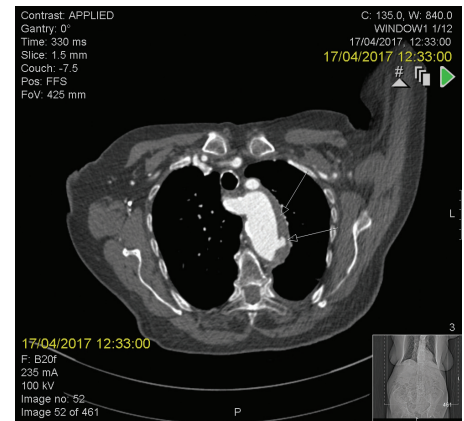
Acute aortic syndromes may present with catastrophic symptoms including severe relentless chest or back pain, pulse deficit, neurological compromise, shock or even cardiac arrest. Beyond prompt assessment and recognition, the attendant clinician needs to perform timely cardiovascular imaging, which may include computed tomography, magnetic resonance imaging or transoesophageal echocardiography. The most commonly used modality is computed tomography aortography which needs to

be performed immediately because of the associated mortality risk of 1% per hour in delay in diagnosis (Goldstein et al, 2015).

There is no specific biomarker for acute aortic syndromes. A serum D-dimer level may be useful. A positive D-dimer may reflect the presence of acute aortic syndromes, as it reflects exposure of the aortic intimal layers to the circulation (Ranasinghe and Bonser, 2010; Erbel et al, 2014).

Conventionally, the management of acute aortic syndromes is divided into medical or surgical. If the patient is a candidate for surgical intervention, then a rapid discussion with and facilitated transfer to the tertiary cardiothoracic or vascular service should ensue. Surgical management includes conventional open repair or novel endovascular techniques. Medical management focuses on strict blood pressure control and appropriate monitoring of the patient for end organ complications (Erbel et al, 2014).

Figure 1. Sagittal view of the thoracic aorta on computed tomography. The superior arrow demonstrates intramural haematoma (the denser material surrounding the aorta) and the inferior arrow demonstrates the penetrating atherosclerotic ulcer.



Penetrating arteriosclerotic ulcers are a distinct type of acute aortic syndrome. They

CASE REPORT

An 88-year-old woman presented with acute sudden onset tearing chest pain which occurred while she was carrying fully laden shopping bags and walking to the bus. This was persistent, pleuritic pain that radiated around the left scapula. The woman had a previous background of hypertension, a previous cerebrovascular event and hypothyroidism.

Owing to the initial diagnostic uncertainty a full haematological and biochemical screen was performed. A mildly elevated troponin I level of 0.16 ng/ml (normal range <0.04 ng/ml) and a D-dimer level of 1.49 ng/ml (normal range 0–0.5 ng/ml) were found. On the basis of the raised D-dimer level the woman underwent an emergency computed tomography pulmonary angiogram which did not show a pulmonary embolus.

Following admission and further review she was found to have ongoing chest pain, a wavering left radial pulse and 30 mmHg discrepancy in blood pressure between the two arms.

Having ruled out pulmonary embolus and acute coronary syndrome, her most likely diagnosis was acute aortic syndrome.

Urgent transthoracic echocardiography excluded a pericardial effusion and revealed no obvious dissection flap. A computed tomography aortogram was performed (Figure 1). Following expert review by a cardiac radiologist and the tertiary cardiothoracic centre, she was found to have an arteriosclerotic penetrating ulcer in the ascending aorta with intramural haematoma. A thrombus was also noted within the left brachial artery. Active aortitis was excluded via a positron emission-computed tomography scan and vasculitic screen. Following multidisciplinary team discussion, a conservative management strategy was chosen and agreed with the patient and her relatives. Blood pressure was strictly controlled with a combination of losartan and bisoprolol. Owing to the ongoing issue of a wavering left radial pulse a Doppler ultrasound study was performed which documented an axillary artery thrombosis. Following further speciality discussion the patient was discharged on apixaban 2.5 mg twice daily.

The patient remains well 6 months following discharge.

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are defined by ulceration of an atheromatous plaque that interferes with the internal elastic lamina and permits intramural haematoma within the media. Within the ascending aorta, there is a tendency to develop saccular or fusiform aneurysms. Penetrating atherosclerotic ulcers have an elevated risk of aortic rupture compared to aortic dissection (Goldstein et al, 2015). Computed tomography with contrast is the investigation of choice for a penetrating atherosclerotic ulcer. Similar to this patient, the penetrating defect in the lamina will be visualized. **BJHM**

Erbel R, Aboyans V, Boileau C et al; ESC Committee

for Practice Guidelines. 2014 ESC Guidelines on the diagnosis and treatment of aortic diseases: Document covering acute and chronic aortic diseases of the thoracic and abdominal aorta of the adult. The Task Force for the Diagnosis and Treatment of Aortic Diseases of the European Society of Cardiology (ESC). *Eur Heart J*. 2014 Nov 1;35(41):2873-926. <https://doi.org/10.1093/eurheartj/ehu281>

Goldstein SA, Evangelista A, Abbara S et al. Multimodality imaging of diseases of the thoracic aorta in adults: From the American Society of Echocardiography and the European Association of Cardiovascular Imaging. *J Am Soc Echocardiogr*. 2015 Feb;28(2):119-182. <https://doi.org/10.1016/j.echo.2014.11.015>

Ranasinghe AM, Bonser RS. Biomarkers in acute aortic dissection and other aortic syndromes. *J Am Coll Cardiol*. 2010 Nov;56(19):1535-1541. <https://doi.org/10.1016/j.jacc.2010.01.076>

LEARNING POINTS

- Chest pain is a common presentation to the emergency department and acute medicine.
- Acute aortic syndromes are rare but may be lethal.
- Acute aortic syndromes may be associated with elevated levels of D-dimers.
- The consideration of an acute aortic syndrome requires timely imaging of the aorta.

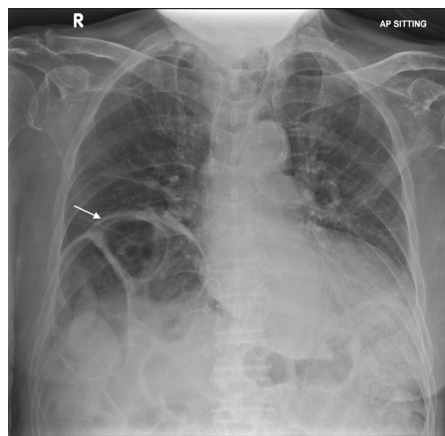
Chilaiditi syndrome: an uncommon cause of dyspnoea

A 78-year-old man presented with acute chest discomfort and dyspnoea. Clinical examination revealed reduced right-sided breath sounds and abdominal distension. Chest radiograph (*Figure 1*) and abdominal computed tomography (*Figure 2*) revealed the Chilaiditi sign, confirming the diagnosis of Chilaiditi syndrome (when symptomatic) (Moaven and Hodin, 2012).

Although Chilaiditi syndrome is benign and usually managed conservatively, it has a broad differential diagnosis including conditions which require urgent surgical intervention such as volvulus and bowel obstruction or ischaemia. The Chilaiditi sign may be mistaken for free subdiaphragmatic gas caused by perforated viscus. However, identification of interposed colonic haustrations on chest radiograph distinguishes the Chilaiditi sign from

pneumoperitoneum. When in doubt, computed tomography of the abdomen or left lateral decubitus abdominal radiograph may be performed, where change in air location would exclude the Chilaiditi sign (Keles et al, 2006).

Figure 1. Chest radiograph demonstrating the Chilaiditi sign: elevated right hemidiaphragm, hepatodiaphragmatic interposition of an air-distended large bowel loop, and inferior displacement of the superior margin of the right hepatic lobe below the level of the left hemidiaphragm (white arrow). Atelectasis is also present in the bilateral lung lower zones, worse in the right lung base, because of superior displacement by the right hemidiaphragm.



This patient's dyspnoea was contributed to by reduced intrathoracic volume and right lung ventilation as a result of superior displacement by the right hemidiaphragm, which resolved with bowel decompression. **BJHM**

Keles S, Artac H, Reisli I, Alp H, Koc O. Chilaiditi syndrome as a cause of respiratory distress. *Eur J Pediatr*. 2006 Jun;165(6):367-369. <https://doi.org/10.1007/s00431-005-0077-9>

Moaven O, Hodin RA. Chilaiditi syndrome: a rare entity with important differential diagnoses. *Gastroenterol Hepatol (N Y)*. 2012 Apr;8(4):276-278.

Figure 2. Computed tomography scan of the abdomen (coronal section) demonstrating the Chilaiditi sign (white arrow).



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