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EC EMERGENCY MEDICINE AND CRITICAL CARE
Case Report

A Presentation of Aortic Dissection in the Emergency Department

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Abstract

Thoracic Aortic Dissection is a serious condition requiring early diagnosis and intervention. We describe a 61 year old gentleman who presented to A&E with chest pain. Initial observations, ECG and blood tests including troponin were normal. Physical examination revealed a new heart murmur initiating further investigations. A Raised Dimer led ED doctors to suspect aortic dissection as differential diagnosis. A CT confirmed the diagnosis of acute aortic dissection, steps were taken to stabilise the patient for transfer to a specialist centre for surgical intervention.

Keywords: *Thoracic Aortic Dissection; Emergency Department; Troponin*

Introduction

Thoracic Aortic Dissection is a serious condition requiring early diagnosis and intervention. The pathophysiology of the disease includes a tear in the intimal layer of the aorta causing the flow of blood between the intima and medial layers of the aorta. A false lumen for blood to penetrate is thus created. Classically the patient will describe a ripping or tearing chest pain which radiates to the flank or back. Sweating, nausea, shortness of breath and syncope have also been reported. This case report focuses on a typical clinical presentation of aortic dissection in the ED which poses a diagnostic dilemma and requires a high level of suspicion and prompt investigation to aid diagnosis [1,2].

Case Presentation

A 61 year old man self-presented to the A+E department, after triage he was deemed stable to await medical review in the waiting room. His observations on arrival were a respiratory rate of 14, Oxygen Saturations of 100%, blood pressure of 146/74 with a pulse rate of 63 and a temperature of 35.2. His primary complaint was of sharp sudden onset chest pain radiating from the lower chest to the neck, the severity of which was initially 10/10. The chest pain remained in a band around the chest. Patient reported hyperawareness of heartbeat and skin blotching to left leg with a sensation of pins and needles in the left hand. His past medical history included hypertension, gallstones and renal colic.

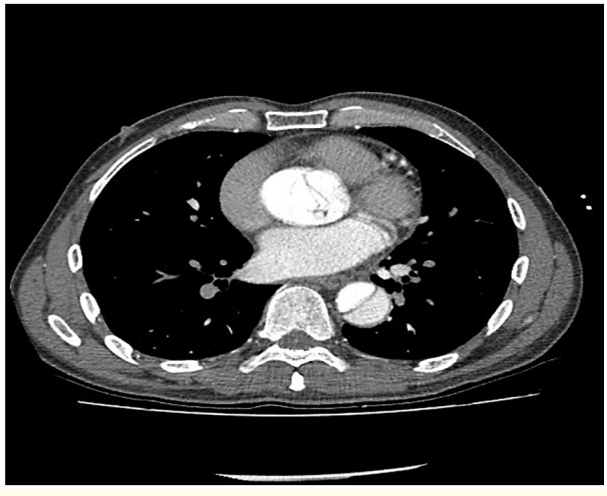
On examination, findings of note included upon auscultation a new diastolic murmur. There was also a wide blood pressure variation between right and left arm. Blood pressure of the Left arm was 116/65 and on the Right was 140/67. On the basis of chest pain associated with murmur and differing cuff pressures, Aortic Dissection was suspected.

Blood results were initially unremarkable. Troponin was negative. A D-dimer was requested on reflection of clinical examination. This was elevated to a value of 10080. ECG was normal. Chest X-ray showed nil of note.

A bedside cardiac echo was performed showing severe Aortic Regurgitation visually as Doppler was not available at time of imaging. The ascending aorta measured 4.5 cm with suspicion of an intimal flap over the right coronary aorta. The left ventricle did not appear dilated and no pericardial effusion was seen.

A definitive diagnosis was made via CT aortogram, which showed dissection involving the entire thoracic and abdominal aorta extending to the left iliac artery.

There was widening of the ascending aorta measuring 4.8cm and descending aorta 3.5 cm in diameter (Figure 1 and 2). The intimal flap arose from the aortic root and extends to the ascending aorta, aortic arch, descending aorta abdominal aorta (Figure 3 and 4) and left common iliac artery (Figure 5 and 6).



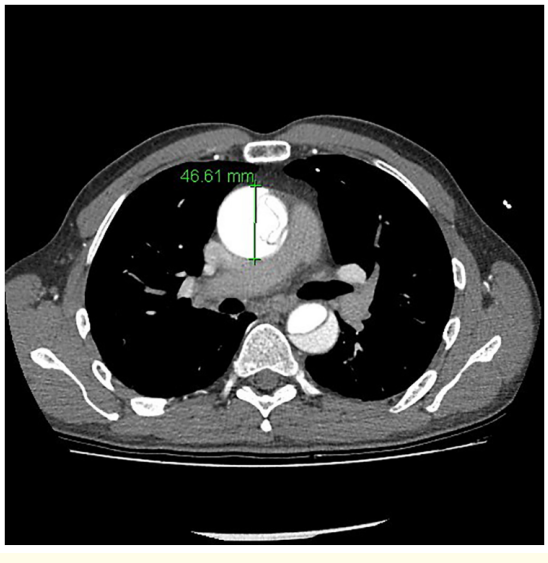


Figure 1 and 2: *Extension of dissection in the abdominal aorta.*

Figure 3 and 4: *Extension of dissection in the abdominal aorta.*

Figure 5 and 6: *Extension to left iliac artery.*

From CT imaging, this was confirmed to be a type A dissection. A type A dissection can involve the area of the aortic root to arch. A Type B dissection has no involvement at the ascending aorta.

The management was escalated to resus, where the main focus of care centred on pain control and maintaining blood pressure at a target of 120 mmHg with IV beta blocker. The European heart journal recommends a target of systolic blood pressure between 100 - 120 mg with intravenous beta blocker. As per the guidelines from the American College of Cardiology, Society of Vascular Surgery and American Heart Association that recommend repair for all symptomatic TAA, the patient was referred to the nearest specialist centre for cardiothoracic surgery. The same day the patient received a successful aortic valve repair, aortic arch and ascending aortic replacement with interposition graft and hemi arch.

Post-surgery, the patient was transferred to ICU in a stable condition. However, 11 days after the procedure, the patient developed a tongue deviation to the left, difficulty swallowing and aggressive delirium. An MRI showed two small anterior white matter infarcts on the left and equivocal small subacute focus on the right. The patient received rehabilitation, progressed well with the therapy and was discharged. He was commenced on life-long Clopidogrel, Bisoprolol and Simvastatin for secondary prevention.

Discussion and Conclusion

Aortic dissection may present with typical or atypical features, hence could pose an initial diagnostic challenge to clinicians in an acute setting. Although asymmetric blood pressure in both arms (typically > 20 mmHg) has been documented in literature [4], this is not always present. It should however rouse the suspicion of acute aortic dissection when present; as with this patient.

The routine blood tests including troponin remained normal. No specific blood tests currently exist to confirm aortic dissection, but D-dimer has been used as a tool to guide clinical suspicion of dissection. Our patient had a D-dimer of 10080 ng/ml. In a meta-analysis by Cui., *et al.* found, they suggested D-dimer levels are useful to eliminate diagnosis of dissection in low risk patients. Suzuki., *et al.* further suggested that in a setting of a high level of suspicion for dissection, D-dimer can be used to rule in or rule out the diagnosis of dissection if its levels are high (typically > 1600 ng/mL) or low (< 500 ng/ml) respectively [4,5]. We ruled in the diagnosis of dissection in this case and a CT angiogram confirmed the diagnosis.

Learning points

When assessing patients with chest pain:

- Consider aortic dissection as differential diagnosis for acute presentations of chest pain.
- Aortic dissection is a serious condition, requiring early action from clinician to stabilise patient and involve specialist input.
- D-dimer is an important test to aid diagnosis of aortic dissection.
- Simple observation techniques such as simultaneous blood pressure measurement in both arms should be used when assessing patient with chest pain.

Relevant differential diagnosis

Differential diagnosis of chest pain:

1. Cardiac causes:
    a. Ischaemic cause: Angina, Myocardial infarction, Aortic stenosis, Hypertrophic cardiomyopathy, coronary vasospasm.
    b. Non ischemic cause: Aortic dissection, pericarditis.
2. Non cardiac causes:
    a. Gastroesophageal: Gastritis, peptic ulcer disease, esophagitis, oesophageal spasm, oesophageal rupture.

b. Pulmonary: Pneumothorax, Pulmonary embolism, pleuritic, neoplasm

c. Musculoskeletal: Costochondritis, rib fracture [3].

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