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Case Report (Open Access)

A CASE REPORT OF EXTENSIVE AORTIC DISSECTION

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ABSTRACT
Aortic dissection is an acute aortic emergency having a high mortality rate requiring timely surgical intervention. The clinical presentations can vary depending on the extent and site of involvement leading to misdiagnosis. Imaging plays an important role in the diagnosis of suspected cases of aortic dissection as well as in surgical planning for further management. In this case report, we discuss a case of extensive Stanford Type A aortic dissection in a 38-year-old male with chronic hypertension and chronic renal disease.

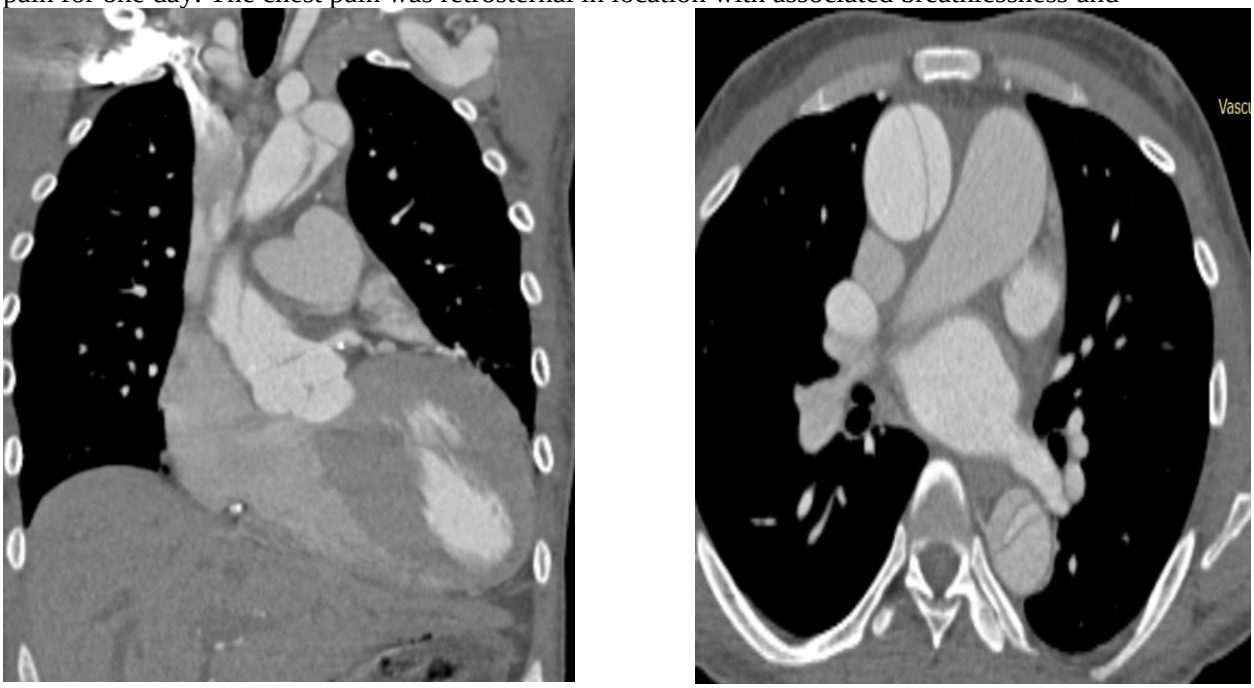
Keywords: *Aortic Dissection, Chronic Hypertension, Chronic Kidney Disease*

INTRODUCTION

Standford type A aortic dissection is a life-threatening condition requiring timely diagnosis and management. Chronic hypertension is the most common risk factor for the condition (Lee *et al.,* 2013). Imaging plays a crucial role in the timely diagnosis of suspected cases as in planning further surgical management.

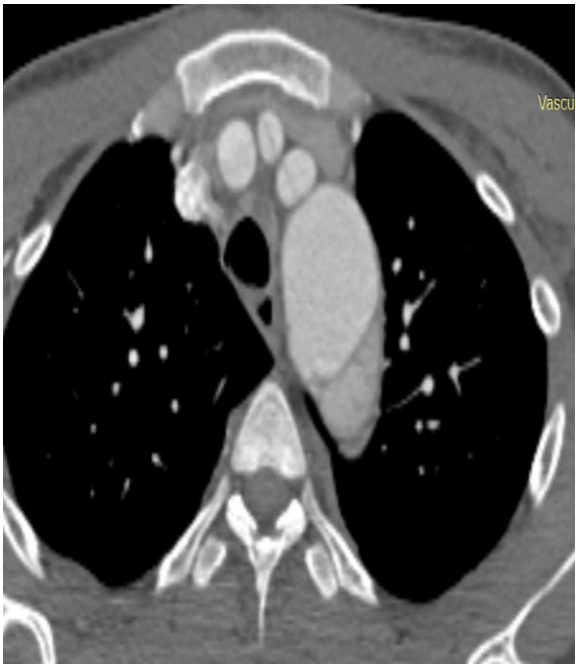
CASE

A 38-year-old male patient presented to the emergency department with sudden onset of progressive chest pain for one day. The chest pain was retrosternal in location with associated breathlessness and



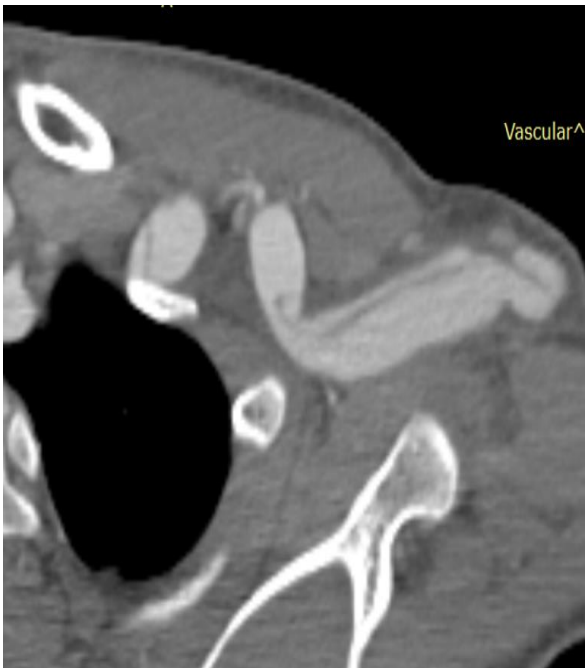
1a **1b**

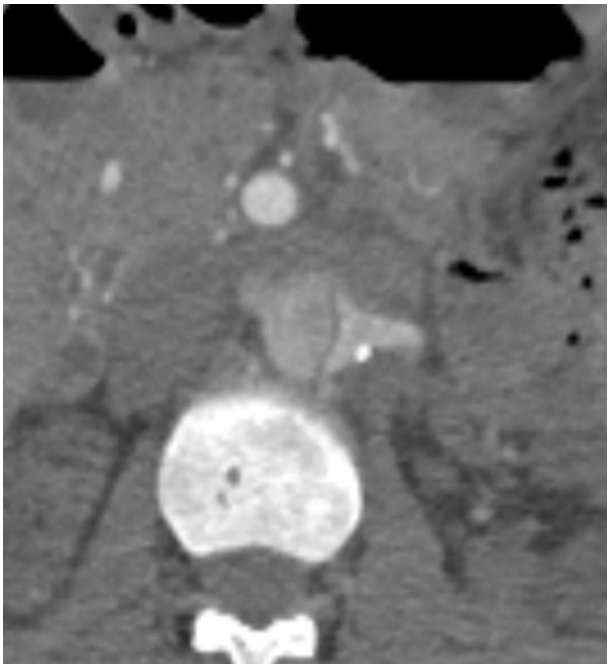
Figure 1: CT angiography images show aortic dissection at the level of aortic root (1a) and at the level of ascending and descending aorta (1b).



2a **2b**

Figure 2: CT angiography images show extension of dissection into the aortic arch branches (2a) and celiac trunk and SMA (2b).





3a **3b**

Figure 3: CT angiography images show dissection into the left subclavian artery (3a). Figure 3b shows left renal artery arising from the true lumen and right renal artery from the false lumen.

orthopnea. The patient was a known case of hypertension with chronic kidney disease on haemodialysis.
On examination, he had an elevated blood pressure of 240/180 mm Hg and a pulse rate of 90 bmp. Peripheral pulses of both his lower limbs were absent, however, his upper limbs pulses were well felt.
Laboratory tests revealed a haemoglobin of 8.3 gm/dl. The patient's renal function tests were deranged with serum creatinine of 4.78 mg/dl and serum blood urea of 45 mg/dl. Serum electrolytes and cardiac enzymes were within normal limits.
An initial chest x-ray was performed which showed mild cardiomegaly with widening of the mediastinum and prominence of the aortic knuckle and descending aorta. The lung fields were normal.
On subsequently performed CT angiography, Aortic dissection with double lumen and intimal flap was noted involving the ascending aorta, arch and descending thoracic and abdominal aorta till the level of its bifurcation. The dissection flap was seen to further extend into the aortic arch branches (left common carotid and left subclavian artery), celiac trunk, splenic artery, proximal common hepatic artery as well as origin of superior mesenteric artery. The right renal artery was seen arising from the false lumen of the dissection and left renal artery from the true lumen. There was non-opacification of the aorta at its bifurcation, bilateral common iliac arteries and proximal portions of bilateral external and internal iliac arteries suggestive of thrombosis. The distal portions of both the external iliac arteries also showed presence of suspicious dissection flaps.

DISCUSSION

Aortic dissection is the most common form of acute aortic syndrome which is characterised by an intimal tear leading to formation of false and true lumen in the aorta.
Hypertension is the leading risk factor for aortic dissection, especially in the elderly age group. Other predisposing factors include atherosclerosis, connective tissue disease (like Marfan's syndrome and Ehlers-Danlos syndrome), structural aortic abnormalities (like bicuspid valve and aortic coarctation), Turners syndrome and pregnancy. Prior interventions like cardiac and aortic surgeries are also associated with a risk of dissection (Macura *et al.*, 2003).
The clinical presentation of aortic dissection is often non-specific making diagnosis challenging. Acute onset of chest pain is the most common presenting symptom. It is described as a tearing or sharp type of pain which may radiate to the shoulder, back or abdomen. Other symptoms include syncope, limb ischemia, neurological deficits or abdominal pain depending on the extent and site of involvement (Macura *et al.*, 2003; and Hagan *et al*., 2000).
The two commonly described classification systems are Stanford and DeBakey classifications. These classification systems help to decide further management of the patient. Another new classification system used in dissection is DISSECT (duration, intimal tear, size of the dissected aorta, segmental extent of involvement, clinical complication, thrombosis of the false lumen) (Dake *et al*., 2013)
The chest x-ray findings of aortic dissection include, double aortic contour, widening of the mediastinum at the level of aortic knob (DeLacey *et al.* 2008; and Lai *et al.*, 2012), irregular aortic contour and inward displacement of the atherosclerotic wall calcification (DeLacey *et al.* 2008; Gartland *et al*., 2007). Signs of mediastinal hematoma on plain x-ray are opacification of aortopulmonary window, obscuration of the aortic knob, deviation of oesophagus to right side, trachea to right side, left main bronchus inferiorly, apical thickening and increased thickness of the left or right paratracheal stripes.
CT aortogram remains the investigation of choice in the evaluation of aortic dissection. Inclusion of neck and abdominal vessels in imaging is essential, as these vessels are often involved in extensive cases of aortic dissection. Findings on unenhanced CT are presence of hematoma and displacement of the atherosclerotic intimal wall calcifications. ECG gated CT angiography is performed in cases of aortic root dissection. Findings on contrast enhanced imaging are intimal flap, dilatation of the aorta, double lumen, aortic intramural hematoma, Mercedes Benz sign in case of triple barrelled dissection and windsock sign (Sebastia *et al*., 1999, Lepage *et al*., 2001. Macura *et al.*, 2003). Assessment of the true and false lumen is very essential, as the placement of the endoluminal stent graft in the false lumen can lead to dreaded complications.

The high pressure in the false lumen causes compression of the true lumen, making the latter appear smaller. The true lumen can also be identified by presence of the intimal calcifications along its outer wall. The true lumen is contiguous with the root of aorta and usually gives origin to the celiac trunk, superior mesenteric artery and right renal artery. The false lumen is larger and shows delayed opacification which accounts for lower density lumen. It surrounds the true lumen in Stanford type A. Presence of beak sign, cobweb sign and thrombosis are seen in the false lumen. The left renal artery usually arises from the false lumen **(**Lepage *et al*., 2001).

Digital subtraction angiography has become the gold standard investigation in aortic dissection. It gives better delineation of the poorly opacifying false lumen, intramural hematoma and end organ ischemia and is also used in endoluminal repair.

Some of the imaging differential diagnosis of aortic dissection are pseudo dissection-due to artefacts, intramural hematoma, penetrating atherosclerotic ulcer and minimal aortic injury (Macura *et al.*,2003).

The treatment of aortic dissection includes controlling blood pressure and heart rate with medical management. This helps in reduction of the extra-pressure on the aortic wall. Surgical repair is done in cases of Type A dissection or complicated type B dissection.

CONCLUSION

Aortic dissection is an acute emergency having a high mortality for which timely clinical suspicion and diagnosis is required to help prevent fatality. The clinical presentations may often be atypical and non-specific making a clinical diagnosis deficient, thus radiological imaging plays an important role in the diagnosis and management of these cases.

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