Case Report

THORACIC AORTIC ANEURYSM AND ITS DISSECTION

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Introduction

Aneurysms are localized dilatation of the vessel wall, where the diameter of an artery exceeds 1.5 times the normal diameter. Most of the cases with thoracic aortic aneurysm are asymptomatic and aneurysm is detected as an incidental finding on chest radiograph or computed tomography (CT)[1]. Patient may present with symptoms, due to mass effects of aneurysm to adjacent structures; compression to oesophagus (dysphagia), air way compression (dyspnoea), recurrent laryngeal nerve compression (hoarseness), sometimes with fever and pain in case of mycotic cause or pulmonary infection and may present with distal thrombo-embolic manifestation or the event of aneurysm rupture. The risk of rupture is increased in larger aneurysm diameter, advanced age, smoking etc. Aneurysm rupture is most likely when diameter exceeds 5-cm and most ruptured aneurysm diameter reported greater than 6-cm. Aortic dissection is the most common acute emergency affecting the aorta. Untreated dissection often is fatal and advances in surgical as well as medical therapy are improving the survival[2]. Thoracic aneurysms grow faster than the abdominal aortic aneurysms[3].

Case History

63 yrs old Acharya female presented in medical OPD with the history of - fever, cough and chest pain for one week. She had back pain for years and was more for two days. She had feeling of loss of body weight in three months. She was a known case of hypertension on medication but medication was not regular. She was nonsmoker, nonalcoholic. She had cataract surgery – 3 month ago, postoperative period was uneventful.

On Examination: General condition was fair, and she was not uncomfortable. Temp was 101^0 F and pulse rate 100/min and regular. Respiration- well. Blood pressure was 150/96 mmHg. Chest auscultation: B/L basal crepitations, more in the left side. Chest radiography was done with the provisional diagnosis of pulmonary infection. Laboratory investigations showed :Total WBC count 27,500/ cumm with high neutrophil count. Hb 11.9 Gm% , Blood glucose, urea, creatinine- normal. VDRL non-reactive.

Chest radiographs P/A and left lateral view

Widening of mediastinal shadow and aortic contour is

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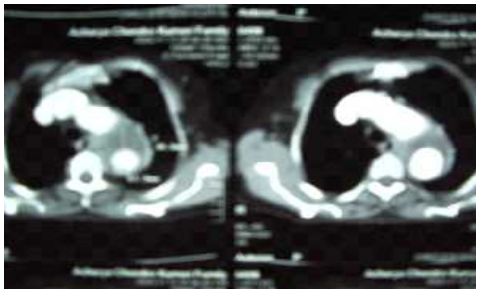
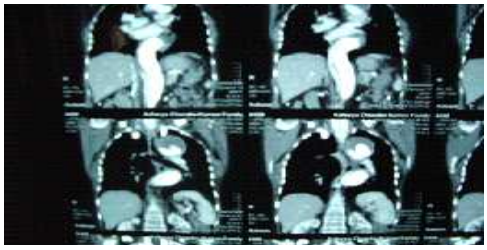
obliterated. Area of consolidation in left lower zone. On lateral view large aortic shadow (Picture-1).



Axial and coronal CT images of chest with contrast *Arch, descending aorta show contrast in true lumen and hypodense haematoma anterior and laterally. Intimal flap between true and false lumen (Picture-2 and 3).*



Reconstructed CT image showing dilated arch, proximal, and mid thoracic aorta (picture- 4).

Radiological Diagnosis

Aortic aneurysm with dissection

Discussion

Aneurysmal dilatation of the aorta is usually localized, but some aneurysms may extend over long segments[1]. Thoracic aortic aneurysm is the most common vascular cause of mediastinal mass[4]. Average diameter of the thoracic aorta is 3.5-cm at ascending part, 3.5-cm at arch, 2.6 am at proximal and 2.4 cm at distal descending thoracic aorta[5]. So the aortic diameter more than 3.6 cm at distal thoracic aorta and 5.25 am at ascending aorta are considered the abnormally dilated.

Aortic aneurysms are classified as true and false or pseudo aneurysm. Arterial wall are composed of inner intima, middle media and outer adventitial layers. In true aneurysm, all the three layers are intact but stretched; where as in pseudo aneurysm, a hole in the arterial wall permits the escape of blood which is localized within surrounding tissue[1]. Weakness of the vessel wall causes either gradual distension (fusiform type) or gradual localized bulging causes saccular variety of aneurysm. Vessel wall weakness may be congenital (potential weakness due to deficiency of media and elastic lamina or gap in vessel wall) or acquired[1]. Various acquired predisposing factors of aortic aneurysms are: atherosclerosis, hypertension, bicuspid aortic valve, coactation, severe scoliosis, blunt chest trauma, mycotic dissection, Marfan's syndrome (congenital weakening), tertiary syphilis and aortitis[4,7]. Pregnancy is now not considered as risk factor unless hypertension or connective tissue disease is present[8]. Arteriosclerosis are the most common causes and are responsible for fusiform, saccular or

occasionally dissecting aneurysms. Medial degeneration causes dissecting aneurysms. Complications of aneurysms may be local pressure effects on adjacent structures like oesophagus, heart, lung, nerve, vertebral or sternal erosion, thrombosis with embolism and fatal haemorrhage[6].

The dissection is defined as a separation of the layers of the vessel wall initiated by a tear in the weakened intima or by rupture of a vasa vasorum with haemorrhage into a diseased aortic media. This is also called dissecting aortic haematoma. The condition occurs when blood enters the media of an vessel through a intimal tear and then dissects along the length of the artery. Arterial dissection requires two processes; one is the weakening of the media of vessel and the development of a tear in the intima through which blood inters into media[1]. Tear is transverse in weakened intima in 95-97% of the cases[5]. Most common predisposing condition of aortic dissection is hypertension and this is present in up to 90% of patients[9].
Aortic dissection begins mostly in the chest and extends into abdomen. Common site is just below the origin of left subclavian artery. This condition occurs when blood enters the media of the vessel through a tear in the intima and then dissects along the length of the artery. Aortic dissection is common in male (M:F ratio 3:1) between 30- 85 years age and highest incidence is during 60 years[10].

Aortic dissection is classified into two system[4].

DeBakey classification-

DeBakey type I: involving ascending aorta, arch and portion of the descending aorta (treatment is surgical).
DeBakey type II: limited to ascending aorta (worse prognosis and treatment is surgical).
DeBakey type III: originates near to origin of left subclavian artery (best prognosis and treatment is medical or surgical).

Stanford classification

Type A: involves the ascending aorta with variable involvement of arch and descending aorta.

Type B: limited to arch of aorta and descending aorta (DeBakey type III).
Classification of aortic dissection has both prognostic and therapeutic implications. Patients with type A dissection require emergency surgery because of high risk of rupture into pericardiac sac with development of pericardial temponade, coronary artery occlusion. Medical management alone of type A dissection is associated with high mortality of 20% at 24 hours and that increases up to 50% at one month follow up. Patients with non-ruptured type B dissections are usually managed medically with control of elevated systolic blood pressure[8].

Chest radiography findings are highly suggestive of an aortic aneurysm. Mediastinal widening (80%) and double aortic knob sign (40%) seen in chest radiograph. Inward displacement of aortic knob calcification, displacement of trachea to right, cardiomegaly may be seen. Chest radiographic findings are nonspecific and chest radiograph does not determine the dissection. Chest radiograph does not exclude the diagnosis and in 12% of the cases chest radiographs are reported normal[2,11].

CT (or MRI) is the best modality and it shows aortic dilatation. In case of dissection it shows contrast enhanced blood in true

lumen and low attenuated mural thrombus within false lumen. CT demonstrates the intimal flap between true and false lumen. Extent of the dissection can be classified on CT findings[2,4,11]. CT gives diagnosis with 100% accuracy[12]. This modality also demonstrates other causes of mediastinal widening. As with CT, MRI demonstrates signs of aortic aneurysm and dissection. True and false lumen identification with intimal flap demonstrated by MRI as CT[2].

Ultrasound can evaluate the ascending aortic aneurysm but it is limited to evaluate the arch and descending aorta. Evaluation of thoracic aorta by trans-oesophagial ultrasound is possible. Abdominal aortic aneurysm is evaluated well by abdominal ultrasonography. Aortography is an accurate technique in the detection and evaluation of aortic dissection with a historic diagnostic accuracy of greater than 95%[2]. Now it is almost replaced by noninvasive modalities.

Finally, aortic aneurysm and dissection is a serious clinical problem mostly seen in elderly. Most of the cases are asymptomatic at presentation. Chest radiograph is highly suggestive of diagnosis with mediastinal widening but nonspecific and CT (or MRI) is confirmatory modality for the diagnosis and further follow up the case. Role of USG is important for abdominal aortic aneurysm.

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