Aneurysm of Ascending Aorta and Arch of Aorta

By Madan Mohan Gupta [2], N.U. Bahri, MD [3], H.P. Parekh, MD [4], S.L. Chudasama, MD [5], and Tabassum Belim, DMRD [6]

Case History: 58-year-old patient with dyspnoea for eight months. No history of fever. Lab exam and history were unremarkable.

Case History: A 58-year-old patient presented with complaint of dyspnoea for eight months. No history of fever and laboratory examination, and individual and family history were unremarkable. On chest X-ray (frontal and lateral view), a large well-defined, smooth marginated homogenous opacity was seen in posterior mediastinum with obliteration of right ascending aorta border (Figure 1). Further chest CT was performed, which showed two large saccular aneurysms arising from ascending aorta and arch of aorta with mural thrombus and peripheral calcification (Figure 2). Aneurysmal segment of aorta causes mass effect in form of compression of adjacent vascular structures and compression over trachea and oesophagus and causing posterior displacement of them (Figure 3). There was no evidence of contrast leakage or impending rupture of aorta. Diffuse changes of atherosclerosis were also noted in visible aorta.

Figure 1: Chest radiograph (A, frontal view and B, lateral view) shows a large, well-defined, smooth marginated homogenous opacity in posterior mediastinum with obliteration of right ascending aorta border. The lesion is forming an obtuse angle with right lung parenchyma.
Figure 2: Contrast CT angiography shows two large saccular aneurysms (large and small arrows) arising from ascending aorta and arch of aorta with mural thrombus and peripheral calcification in its wall. There is no evidence of contrast leakage or impending rupture of aorta. Diffuse changes of atherosclerosis in visible aorta.

Figure 3: Contrast CT angiography shows aneurysmal segment of aorta causes mass effect in form of compression of adjacent vascular structures (large arrow) and compression over trachea (small
arrow) and oesophagus and causing posterior displacement of them. There is no evidence of contrast leakage or impending rupture of aorta. Diffuse changes of atherosclerosis in visible aorta.

**Diagnosis:** Aneurysm of ascending aorta and arch of aorta

**Discussion:** Aneurysms in thoracic aorta are relatively uncommon compared to their counterparts below the diaphragm. Majority of thoracic aortic aneurysms are atherosclerotic. Symptomatic presentation may be due to mass effect on airway of oesophagus. Alternatively, they may present due to a complication, including rupture, aorto-bronchial or aorto-oesophageal fistulae. Thoracic aortic aneurysms can be divided pathologically according to their relationship to the aortic wall: o True aneurysm-atherosclerotic aneurysms (most common), inflammatory/aortitis • Rheumatoid arthritis (RA), ankylosing spondylitis, takayasu arteritis, giant cell arteritis (GCA), syphilis • Structural: cystic medial necrosis, Marfan disease, Ehlers-Danlos syndrome, false aneurysms • Traumas • Mycotic aneurysms

Radiographic features: The location and shape of thoracic aortic aneurysms is variable. Aneurysms elsewhere can be described as saccular or fusiform. In the case of fusiform dilatation, the term aneurysm should be applied when the diameter is greater than 4 cm.¹

Plain film: The thoracic aorta can usually be seen on both frontal and lateral chest radiographs, and aneurysms are often obvious. Additionally, mediastinal masses may mimic aortic aneurysms. Mural calcification is seen both in atherosclerotic disease as well as various causes of aortitis.

CT: Typically aneurysms appear as dilatations of the lumen. The walls may be thin or thickened by presence of mural thrombus (circumferential or more frequently eccentric). Calcified atherosclerotic disease is often identified not only in the wall of the aneurysm but in adjacent arteries. If rupture or leak has occurred haematoma/fluid may be seen adjacent to the aorta. MRI has the advantage of not requiring ionizing radiation or large volumes of iodinated contrast.² This is particularly advantageous in young patients with connective tissue disorders.

Digital subtraction angiography (DSA): Although angiography has long been considered the gold standard for vascular imaging, it has largely been superseded by CTA and MRA, which are able to obtain 3D volumetric data, and able to assess the extra luminal soft tissues. Angiography is however used during endovascular repair.

Complications

• Rupture
• Distal embolization
• Fistula formation
• Aorto-oesophageal fistula
• Aorto-bronchial fistula

Differential diagnoses

• Aortic dissection
• Penetrating atherosclerotic ulcer
• Intramural aortic haematoma
• Kommerell diverticulum

References

1. Collins J, Stern EJ. Chest radiology, the essentials. Lippincott Williams & Wilkins. 2007.