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Images in Clinical Medicine

Thoracic aortic aneurysm

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Aortic diseases contribute to the high overall cardiovascular mortality rate. The Global Burden Disease 2010 project demonstrated that the overall global death rate from aortic aneurysm and aortic dissection has increased in the past decade. Guidelines on the diagnosis and treatment of aortic diseases emphasize rapid and efficacious diagnostic strategies. In this paper, we review the imaging of a man with a thoracic aortic aneurysm diagnosed in an outpatient clinic.

An 81-year-old man presented with recurring sweating, dizziness, and syncope. He had hypertension since he was 60 years old, which was well controlled. Two years previously, he had episodes of presyncope, fainting, sweating, and blood pressure fluctuations, ranging from 160–170/100 mmHg to 80/40 mmHg. No intracranial lesions were noted in brain computed tomography. Myocardial perfusion scintigraphy for myocardial ischemia was negative and an echocardiogram showed no abnormalities in the left ventricular ejection fraction or wall motion.

Magnetic resonance imaging of the neck revealed a huge dilation of the aortic arch with a peripheral thrombus (Fig. 1, arrows). A series of plain chest radiographs revealed a high aortic arch (Fig. 2) with progressive elongation (Fig. 3). Altogether, the results indicated a diagnosis of a thoracic aortic aneurysm (TAA). The patient underwent a thoracic endovascular aortic repair. Postoperatively, he had an embolic stroke and pulmonary infection. He was discharged after 3 months of hospitalization and followed up in an outpatient clinic.

Thoracic aortic diseases encompass a broad range of degenerative, structural, acquired, genetically based, and traumatic disease states and presentations. Atherosclerosis is the major cause of TAA. Most TAAs are clinically silent until dissection. Acute aortic syndrome (severe tearing chest pain, back pain, or syncope) is often the first sign of the disease. A rapid diagnosis is needed to reduce the extremely poor prognosis.

Most silent TAAs are detected on plain chest radiographs performed for other reasons. On a plain radiograph, a TAA is usually recognized as a prominent or tortuous ascending aorta (Fig. 2). But they may be impossible to distinguish from the tortuous ascending aorta frequently seen in healthy elderly people (Fig. 4). Moreover, a normal aortic silhouette is not sufficient to rule out an aneurysm of the ascending aorta.

Magnetic resonance imaging is helpful in diagnosing aortic diseases and assessing the maximal aortic diameter, shape, and extent of the aorta, involvement of the aortic branches in aneurysmal dilation or dissection, relationship to adjacent structures, and presence of mural thrombi. Computed tomography also plays an invaluable role in evaluating TAAs, providing measurements as a key parameter for assessing risk factors associated with rupture.

Fig. 1. Neck magnetic resonance image reveals a 7 cm fusiform-saccular aneurysm of aortic arch with peripheral thrombus aneurysm (arrows).

Conflict of interest: none.

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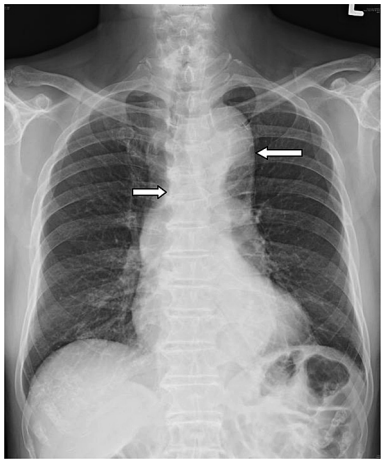

Fig. 2. PA film, taken in 2010, shows apparent tortuous aorta; the aortic arch highly located and slightly widened (arrows). Emphysematous lung with fibrotic scars.

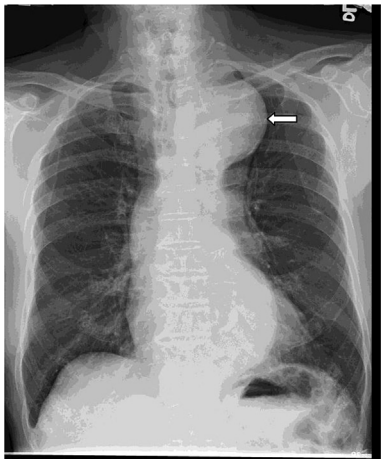

Fig. 3. PA film, taken in 2014 before operation, shows an enlarged aortic arch (arrow). At surgery was a 7-cm fusiform arteriosclerotic aneurysm, with no evidence of dissection.

Transthoracic echocardiographic imaging can assess the aortic root and aortic arch, but the distal ascending aorta and the descending aorta are often not well seen.

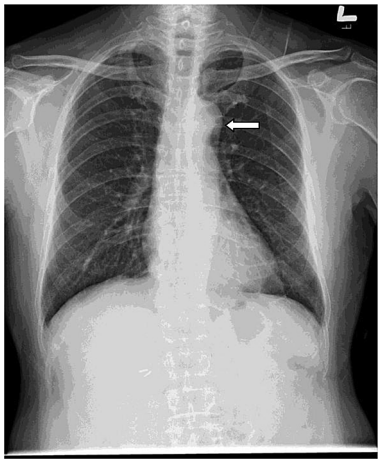

Fig. 4. PA film of an aged 75 man as comparison aorta arch located at 3rd rib (arrow).

When imaging the aorta, it is recommended that measurements of the aortic diameter should be taken at reproducible anatomical landmarks, perpendicular to the axis of blood flow, and reported in a clear and consist format. Repetitive imaging of the aorta should be done over time, with the same imaging modality with the lowest iatrogenic risk. Standardized measurements are needed to assess changes in diameter, and abnormalities in each aortic segment.

Further reading

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