

Clinical History:

A 75-year-old man complained of abdominal pain for one month. Barium enema and colonoscopy revealed a malignant tumour in the colon. A pre-operative chest radiograph was performed (Figure 1), followed by computed tomography (CT) (Figure 2) to further investigate the incidental radiographic finding.

Figure 1: Frontal chest radiograph

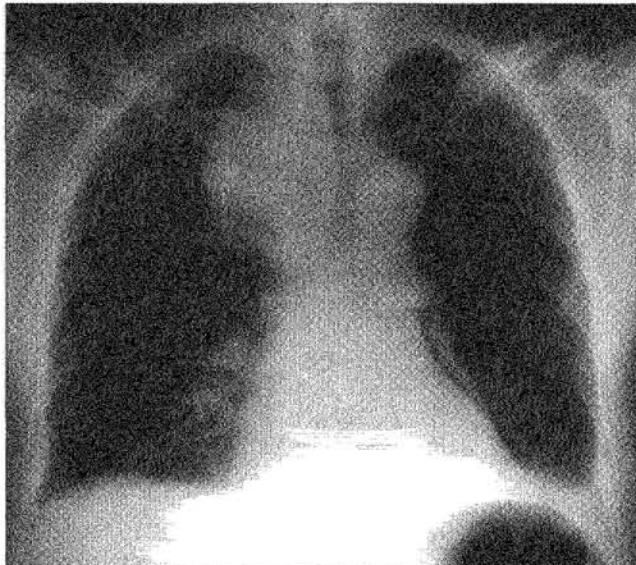


Figure 2: Unenhanced CT of the thorax (level of aortic arch)



**Answer
on
page 150**

What is the diagnosis?

- a) Aortic arch aneurysm
- b) Pulmonary metastasis
- c) Mediastinal lymphadenopathy
- d) Lateral thoracic meningocoele
- e) Bronchogenic cyst

This radiology case was prepared by: **Dr. W.C. Wong,**
Senior Medical Officer.
Professor W.C.G. Peh,
Department of Diagnostic Radiology,
The University of Hong Kong,
Queen Mary Hospital.

RADIOLOGICAL CONFERENCE

Answer:

e) Bronchogenic cyst

Radiological findings

The chest radiograph (Figure 3) shows a large oval-shaped soft tissue opacity in the right mediastinum. Its lateral border is smooth and well-defined, while parts of its medial border are inseparable from the adjacent mediastinal soft tissue structures. The trachea is compressed and displaced to the left side by this mass. No obvious calcification or cavitation is detected within this lesion. There is no apparent bony erosion, abnormal splaying of ribs or destruction of vertebral pedicles.

Figure 3: Same radiograph as Figure 1 with the addition of arrows. Convex lateral border of the right mediastinal mass is arrowed. Part of its medial border compresses the trachea (arrowheads). Adjacent bony structures have a normal appearance

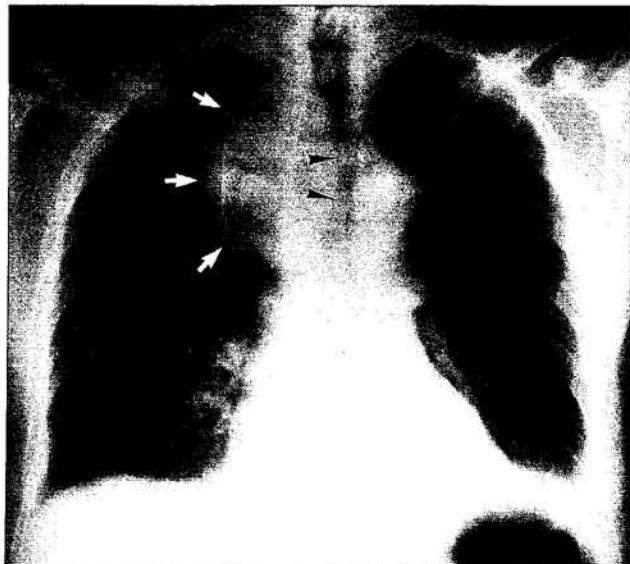


Figure 4: Same CT section as Figure 2 with the addition of arrows. This unenhanced image shows a well-defined smooth mass (arrows) with low-density homogeneous contents. Its relationship to surrounding structures, such as the trachea (T), oesophagus (O) and vertebral body (V), are precisely demarcated

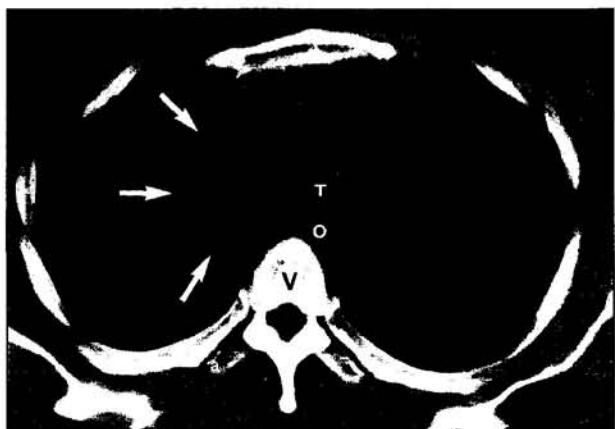
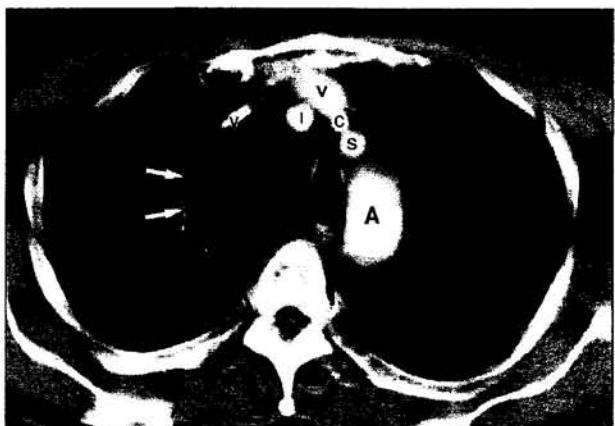


Figure 5: Same CT section as Figures 2 & 4, taken after intravenous contrast administration. There is intense opacification of the major vessels such as the aorta (A), the left subclavian (S), left common carotid (C) and innominate (I) arteries, and the innominate veins (V). The bronchogenic cyst does not show any enhancement, except of its very thin walls (small arrows)



RADIOLOGICAL CONFERENCE

The radiographic findings are more precisely delineated on CT (**Figures 4 and 5**). In particular, there is no evidence of calcification, cavitation or invasion of the surrounding mediastinal structures and vertebrae. Measurement of the CT attenuation number confirms the mass to be wholly fluid-filled, without any contrast enhancement. No lung parenchymal lesion is detected using the lung window settings. Appearances are typical of those of a bronchogenic cyst.

Discussion

Aortic arch aneurysm

Aortic aneurysm usually presents as either a round or oval mediastinal mass, or widening of mediastinum on the chest radiograph of an elderly patient. The presence of a peripheral rim of calcification is characteristic and is a useful diagnostic sign. On contrast-enhanced CT images, the lumen of the aneurysm demonstrates intense opacification which is similar to that of the adjacent arteries. In the investigation of aortic aneurysms, CT scans can

- (1) confirm the diagnosis by showing its direct origination from and communication with the aortic lumen,
- (2) delineate extent of involvement, and
- (3) detect complications such as thrombosis, dissection or leakage.

The findings of fluid density of the lesion and complete lack of contrast enhancement in our patient exclude the diagnosis of aortic aneurysm.

Pulmonary metastasis

Metastases usually disseminate to the lungs by haematogenous spread. They have a predilection for

the peripheral subpleural zones of the lungs. However, up to 25% of pulmonary metastases are solitary. Being intra-pulmonary lesions, pulmonary metastases are completely surrounded by air. This accounts for their well-defined borders on chest radiographs, in contrast to mediastinal lesions which always have indistinctness of part of their medial border. The "incomplete" border appearance, typical of a mediastinal lesion, is a helpful sign in determining the relative location of an intrathoracic lesion to adjacent structures (Silhouette sign). On CT, pulmonary metastases are most frequently of soft-tissue density and usually demonstrate some degree of enhancement. The mediastinal location, CT characteristics of the lesion and absence of pulmonary lesions in our patient are features against the diagnosis of pulmonary metastasis.

Mediastinal lymphadenopathy

On radiographs, mediastinal lymphadenopathy are usually seen as masses with smoothly lobulated contours. They may arise in a variety of diseases, including underlying neoplasm, infection and sarcoidosis. Mediastinal lymphadenopathy may be the first presentation of malignancy such as small cell carcinoma of lung. In lymphoma, lymphadenopathy is usually bilateral in distribution. Primary infection by tuberculosis leads to enlarged hilar and/or mediastinal lymph nodes which together with the primary pulmonary focus, constitute the Ghon complex. On CT, lymph nodes are soft tissue in density and display mild degrees of enhancement. This diagnosis is unlikely based on the non-enhancing cystic appearance of the mediastinal lesion.

Lateral thoracic meningocoele

A lateral thoracic meningocoele is an extraspinal cerebrospinal fluid (CSF) - filled protrusion of dura and arachnoid mater. It extends laterally through an

enlarged neural foramen and then anteriorly through the adjacent intercostal space into the extrapleural aspect of the thoracic gutter. Neurofibromatosis is a frequent association, being present in about 85% of affected patients. Expansion of the spinal canal and intervertebral foramen, and associated spinal scoliosis, are frequent findings. Radiographs and CT show the paravertebral lesion and demonstrate any underlying bony changes. On CT, the lesion is typically of CSF (or fluid) density. Continuity of the lesion with the intra-spinal arachnoid space and skeletal changes are optimally displayed on CT. None of these findings were present in our patient.

Bronchogenic cyst

Bronchogenic cysts are uncommon, usually isolated, lesions representing a branching abnormality of the tracheobronchial tree during its embryogenic development. Most of these lesions arise in the mediastinum or hilar region while a small number occur within the lung parenchyma. Clinical features are variable. In infants, these lesions may be discovered when the patient presents as a result of pressure effects on the tracheobronchial airway and oesophagus. Many older children and adults are however asymptomatic with the lesion being incidentally detected on routine

chest radiographs, usually before the 4th decade of life. On CT, a sharply-outlined thin-walled cyst is seen. While the cyst contents are usually of homogeneous fluid density, the CT attenuation number may be higher if the cyst is complicated by haemorrhage or infection. On rare occasions, a bronchogenic cyst may undergo rapid increase in size as result of haemorrhage, infection or distension with air. These cysts are usually found in close proximity to the major airways, with the most frequent sites being immediately adjacent to the lower trachea and the proximal main bronchus. The diagnosis of bronchogenic cyst can be confirmed non-operatively by needle aspiration of its fluid contents, which should be examined to exclude malignant cells. The diagnosis of bronchogenic cyst in the appropriate clinical circumstances obviates the need for surgical removal. ■

References

1. Felson B, Felson H: Localisation of intrathoracic lesions by means of the postero-anterior roentgenogram: the silhouette sign. *Radiology* 1950;55: 363-374.
2. Barkovich AJ. *Paediatric Neuroimaging*. 2nd edition. New York, Raven Press. 1995;pp477-540.
3. Armstrong P. The mediastinum. In: Grainger RG, Allison DJ. *Diagnostic Radiology*. 2nd edition. Edinburgh, Churchill Livingstone, 1992;pp185-211.
4. Dee P. Congenital disorders of the lungs and airways. In: Armstrong P, Wilson AG, Dee P, Hansell DM. *Imaging of diseases of the chest*. 2nd edition. St. Louis, Mosby, 1995;pp609-640.