Case 12846

Mediastinal mature cystic teratoma with rapid growth and rupture
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Section: Chest imaging
Area of Interest: Thorax
Procedure: Education
Imaging Technique: Digital radiography
Imaging Technique: CT
Special Focus: Pathology Case Type: Clinical Cases
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Patient: 50 years, male

Clinical History:

50-year-old male patient presented with acute onset lower anterior thoracic pain associated with vomiting and fevers. He had no relevant past medical history. There were no associated respiratory symptoms. He was initially evaluated with a chest radiograph followed by a CT scan of the chest and abdomen which showed the following.

Imaging Findings:

The frontal chest radiograph (Fig. 1a) on admission demonstrated a well-defined elongated opacity overlying the right cardiac border (with the latter not being clearly delineated). This favoured the location of the abnormality to be in the anterior mediastinum. A radiograph performed two years before was normal (Fig. 1b).

Subsequent CT images (Fig. 2a-c) confirmed a rounded 9 cm well-defined anterior mediastinal mass abutting the right heart border corresponding to the radiographic abnormality. There were fluid as well as fat attenuating components within it with a small focus of hyper-attenuation (likely representing a calcific component). These imaging features favoured a mediastinal teratoma.

Additionally, there was ill-defined fluid with stranding (Fig. 3a-b) extending deeply within the anterior sulcus of the anterior mediastinum beneath the costochondral articulations in keeping with a rupture (leading to the acute presentation). Moderate bi-basal posterior pleural effusions were seen but there was no pericardial fluid.

Discussion:

A mature cystic teratoma (dermoid cyst) is a germ-cell derived tumour composed of at least two of the three well-differentiated germ cell layers (ectoderm, mesoderm, and endoderm) [1]. The anterior mediastinum is the commonest extragonadal site for these [2]. Benign teratomas could represent around 3-12% of all mediastinal tumours. They most commonly present in the second to fourth decades of life [3]. Some articles quote an equal gender distribution while others quote a female preponderance [4, 5]. Patients are usually asymptomatic with most lesions diagnosed incidentally on chest radiographs or CT scans performed for an unrelated reason. Some may present acutely with cough, dyspnoea or chest pain if there is bronchial tree/SVC compression or mediastinal or wider thoracic rupture [3, 4].

Clinical perspective
The rapid growth observed in this case is unusual for a mature cystic teratoma but has been occasionally reported
Being an adult male is also unusual considering the typical age-gender distribution of benign teratomas. Our patient presented with acute lower-anterior thoracic pain due to a rupture into the anterior mediastinal space with extension of ruptured content deeper into the anterior sulcus.

Imaging perspective
CT appearances can be variable with combinations of well-defined fat, fluid, soft tissue components and calcification. Fat-fluid levels or focal fat collections, though uncommon, are considered highly specific for a mediastinal mature teratoma [9]. Lesions are often large at presentation and may occupy a large part or all of the hemithorax [3, 4]. A rupture could render inhomogeneity of internal components and result in pleural or pericardial effusions [10]. Haemorrhage and/or infection may lead to rapid increase in size although this was not present in our case [3]. The final diagnosis was made by histological evaluation of the surgical specimen.

In our case, the pathological biopsy specimen showed a cystic mass with a 5 mm thick wall containing brown to greenish fluid and a solid nodular area with a partly fatty cut surface and no other intra-cystic proliferation. Focal haemorrhage and fibrinous exudate within the cyst wall extending to the overlying surface was seen consistent with perforation [11] with no major intra-lesional haemorrhage. On microscopy, it contained cutaneous and respiratory epithelium, pancreatic parenchyma, smooth muscle and abundant adipose tissue consistent with a teratoma with no immature components or malignancy [11].

Outcome
Our patient then underwent a complete surgical resection (the preferred modality of treatment for mature cystic teratoma) with an uneventful recovery [12].

Differential Diagnosis List: Anterior mediastinal mature cystic teratoma with rapid growth and rupture, Cystic thymoma with rupture, Mediastinal mature cystic teratoma - with malignant transformation

Final Diagnosis: Anterior mediastinal mature cystic teratoma with rapid growth and rupture

References:
tumors. AJR Am J Roentgenol Sep;171(3):591-4 (PMID: 9725279)
Figure 1

Description: Frontal chest radiograph on admission demonstrates a well-defined elongated mass-like area of opacification overlying the right cardiac border. A distinct right cardiac contour is difficult to delineate. Origin: Royal Perth Hospital, WA
Description: A prior radiograph from two years ago of the same patient shows normal findings. Origin: Royal Perth Hospital
Description: Selected axial CT image shows an irregular but reasonably well-defined rounded right anterior mediastinal mass with fluid and fat attenuating components corresponding to the position of the radiographic abnormality. Origin: Royal Perth Hospital
Description: Selected coronal CT image further delineates the anterior mediastinal mass which again comprises fluid and fat attenuating components. A small adjacent high attenuating component may represent an early focus of calcification. Origin: Royal Perth Hospital
Description: Selected sagittal CT image shows the extent of the anterior mediastinal mass and its relationship with the anterior thoraco-abdominal wall. Origin: Royal Perth Hospital
Description: Selected axial CT image more inferiorly shows ill-defined fluid with stranding tracking along the anterior mediastinal space extending deeply in the anterior sulcus of the anterior mediastinum.

Origin: Royal Perth Hospital
Description: Selected axial CT image more superior to the previous slice shows moderate posterior bi-basal pleural effusions but without any direct communication with the mediastinal mass. There is no pericardial fluid. Origin: Royal Perth Hospital