CASE REPORT

Benign cystic mediastinal teratoma presenting as a massive pleural effusion in a 17-year-old boy

Annalisa Montebello,¹ Adrian Mizzi,² Paul John Cassar,¹ Karen Cassar¹

¹Department of Medicine, Mater Dei Hospital, Msida, Malta

²Department of Radiology, Mater Dei Hospital, Msida, Malta

Correspondence to

Dr Annalisa Montebello, annalisamontebello@gmail.com

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SUMMARY

Mediastinal teratomas are a rare, albeit an important differential diagnosis of anterior/middle mediastinal masses in young adults and various atypical presentations have been reported. The authors report a case of a 17-year-old boy who presented with a 2-month history of worsening shortness of breath and pleuritic chest pain. A massive left-sided pleural fluid collection was seen on a chest radiograph (CXR). The pleural fluid was drained and a CT Thorax confirmed the presence of a cystic mass. Following re-accumulation of the fluid, thoracotomy was performed and a benign mediastinal teratoma excised. The patient remained well with no evidence of recurrence on follow-up CXRs a year post operatively.

BACKGROUND

This case highlights the importance of the differential diagnosis of anterior/middle mediastinal masses that includes lymphomas, thyroid masses, thymomas and teratomas. Mediastinal teratomas are the least common among these aetiologies and presentation with a pleural effusion is unusual.

CASE PRESENTATION

A 17-year-old boy presented to the emergency department with 2-month history of left-sided pleuritic chest pain and shortness of breath on exertion. The pain worsened in the 3 days prior to presentation. He denied any fever, cough, chills or rigors, haemoptysis or recent travel.

On examination, he had tachycardia of 124 bpm and was tachypnoeic at 24 breaths/min with saturations of 96% on air. On chest examination, there were decreased breath sounds on the left side with stony dull percussion note. Cardiovascular, abdominal, thyroid, lymph node and testicular examination were normal.

A chest radiograph (CXR) showed massive left-sided pleural effusion with midline shift to the right (figure 1). A chest drain was inserted and 3.2 L of straw-coloured pleural fluid were tapped. The pleural aspirate pH was 7.5. Pleural fluid analysis confirmed a transudate by Light's criteria (fluid protein 10 and serum protein of 67.9 and ratio of 0.147). Fluid cultures and cytology were negative.

Complete blood count, renal function and liver function tests were normal. ESR was mildly raised at 34 mm/hour, while C-reactive protein was elevated at 134 mg/L (0–10). An ANA, ENA and coeliac screen were negative. Ca19.9 was raised at 187 U/mL (0–33 U/mL).

Figure 1 The initial chest radiograph (CXR) showing complete white out of the left lung with cardiomeastinal shift to the right.

CT pulmonary angiogram showed an 8 cm×5 cm left-sided chest mass amidst a left pleural effusion. The mass contained multicystic areas, a focus of fat and a focus of contrast enhancement but no calcifications (figures 2 and 3).

The chest drain was kept in situ for 10 days post insertion, following which a repeat CT thorax confirmed the presence of an anterior mediastinal cystic mass. Fluid re-accumulation was confirmed on CXR performed 10 days after the removal of the chest drain, necessitating re-admission to hospital; this time for a left thoracotomy.

At surgery, a large mediastinal cyst was found, pushing the lung laterally. The cyst was incised and removed. Histology showed a benign mature cystic teratoma consisting of different types of mature tissue. The largest component was pancreatic parenchyma, containing endocrine nests and exocrine acini together with duct structures (figure 4). The pancreatic tissue was organised in lobules with fibrosis and sclerosis in some areas. Adjacent to it smooth muscle, adipose tissue, apocrine gland, vessels, cartilage (figure 5) and skeletal muscle fibres were identified. There were also cystic structures, lined by respiratory (figure 6) or intestinal mucinous-type epithelium and squamous epithelium. A focus of thymic parenchyma was also identified.

Post operatively the patient suffered a pneumothorax that needed chest drain insertion with suctioning. He was discharged home with chest drain

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Figure 2 Multiloculated anterior mediastinal mass, abutting left heart border surrounded by a pleural effusion (marked with red arrow).

and Heimlich valve but was subsequently readmitted with worsening shortness of breath due to a recurrent pneumothorax. The Heimlich valve was removed and suctioning reapplied successfully. The drain was finally removed with successful lung re-inflation (figure 7).

INVESTIGATIONS

- ▶ CXR: massive left-sided pleural effusion with contralateral mediastinal shift.
- ▶ CT PA: left-sided 8 cm×5 cm chest mass amidst a pleural effusion. The mass contained multicystic areas and a focus of fat and a focus of contrast enhancement but no calcifications.
- ▶ CT thorax: confirmation of the mass described above and a residual multiloculated paramediastinal left pleural effusion.

DIFFERENTIAL DIAGNOSIS

- ▶ Thymomas: unilateral, well-margined masses with smooth or lobulated contours on CT scan and may contain fat (thymolipoma).
- ▶ Thyroid masses: mass is continuous with thyroid tissue in neck and may show calcification.
- ▶ Lymphomas: diffuse mass encasing mediastinal vessels on CT scan; calcification is rare.

TREATMENT

Surgical excision.

Figure 3 Multiloculated anterior mediastinal mass. A focus of fat density is seen marked with a white arrow while contrast enhancement is marked with the black arrow.

Figure 4 Intermediate power view showing exocrine (star) and endocrine (arrow) pancreatic glands found in the mediastinal teratoma.

OUTCOME AND FOLLOW-UP

The patient was followed up regularly at outpatients. He remains clinically well.

DISCUSSION

Teratomas are germ cell tumours. They consist of any cell type from one or more of the three germ layers (ectoderm, mesoderm and endoderm).¹ Cells can thus consist of any type of body tissue.

Teratomas usually arise in the gonads but may be extra gonadal. Extragonadal teratomas are classified as seminomas, non-seminomatous germ cell tumours, and mature and immature teratomas.² Extragonadal teratomas may occur in the anterior mediastinum, retroperitoneum, pineal and suprasellar regions.² The commonest location for extra gonadal germ cell tumours is the anterior mediastinum.³

Benign teratomas of the mediastinum are rare, representing 3–12% of mediastinal tumours.⁴ The majority of these teratomas are found in the anterior mediastinum with only 5% in the posterior mediastinum.⁴ Teratomas usually occur in young adults.¹ 60% of patients are asymptomatic and are diagnosed on routine CXR. Symptoms may occur due to compression of mediastinal structures.⁵ Rarely the patient may have trichoptysis; this is pathognomonic.⁵

The differential diagnosis of anterior/middle mediastinal masses lymphomas, thyroid masses, thymomas and teratomas.

Figure 5 Intermediate power view showing mature cartilage (arrow).

Figure 6 High power view showing the respiratory epithelium (arrow) lining.

Figure 7 Final CXR showing postoperative changes on the left side with an elevated left haemidiaphragm.

CT is the investigation of choice where teratomas appear as anterior mediastinal masses with areas of soft-tissue, fluid, fat or calcium attenuation. A fat-fluid level may be observed. This is specific for mature mediastinal teratoma but uncommon.^{6 7}

Mediastinal teratomas can secrete tumour markers into the bloodstream. In our case, Ca19.9 was the most prevalent tumour marker. Ca19.9 has previously been reported to be produced by mature benign cystic teratomas of the mediastinum. It is possibly secreted from the apical cytoplasm of the epithelial lining of the cyst wall.^{8 9}

A literature review with the keywords 'benign mature cystic mediastinal teratoma' on PubMed revealed 20 cases of mediastinal teratomas, some of which resulted in complications such as pleural effusions, empyemas, cardiac tamponade and

perforation into the lungs. Ruptured teratomas causing pleural effusions similar to ours were reported in only five cases. The majority were young patients including a 7-month-old child.

Complications of benign mediastinal teratomas may include respiratory distress, haemorrhage, pneumothorax, fistulation with bronchial tree and rupture of the teratoma with resultant pleural effusion.^{10 11} Surgical removal is the treatment of choice and patients have a very good prognosis.

Learning points

- ▶ Teratomas are an important differential diagnosis of anterior/middle mediastinal masses.
- ▶ Rarely, mediastinal teratomas can be a cause of a recurrent pleural effusion.
- ▶ Treatment requires surgical excision of the mass.

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Contributors AM involved in planning and drafting the case report. AM reviewed the report, selected and reported radiological images. PJC and KC reviewed the case report.

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