CASE REPORT

Mature teratoma of the thymus

James Murray,¹ Faisal Amin,² Samir Shah,³ Samantha Cooper⁴¹Department of Respiratory, King George Hospital, London, UK²Department of Respiratory, Colchester Hospital, Colchester, Essex, UK³Department of Cardiothoracic Surgery, Basildon and Thurrock University Hospital, Basildon, Essex, UK⁴Department of Respiratory, Colchester University Hospital, Colchester, Essex, UK

Correspondence to

Dr James Murray,
jamesmurray@doctors.org.uk

SUMMARY

A 55-year-old man presented with a 7-month history of an intermittent dry cough after returning from Turkey. A chest radiograph revealed a large mass-like opacity in the right lung field and CT demonstrated a 13 cm round, cystic lesion in the anterior mediastinum. The patient was referred to the cardiothoracic surgical team for rigid bronchoscopy, thoracotomy and resection. Surgery was uncomplicated with a rapid uneventful recovery. Histology concluded a diagnosis of a mature teratoma of the thymus.

BACKGROUND

Mature teratomas of the thymus are a rare phenomenon. Although they are the commonest germ cell tumours (GCTs) found in the mediastinum they form only 8% of all tumours in this area and are more commonly found in the gonads, retroperitoneum or sacrococcygeal region.

There are a number of pathologies to consider when evaluating an anterior mediastinal mass. We presented this interesting case as an opportunity to review the differential diagnoses and to discuss in brief the aetiology, presentation, investigation and management of this disease.

CASE PRESENTATION

A 55-year-old man presented to the respiratory outpatient clinic with a 7-month history of a dry cough, which had been intermittent since a trip to Turkey. He denied weight loss or fevers. He described non-drenching night sweats. He was an ex-smoker with a 32-pack-year history. He denied any medical history and was not taking any medications. He reported travel to Gambia, Morocco and Egypt over the previous few years. A clinical examination was unremarkable. Spirometry demonstrated a restrictive picture with a forced expiratory volume in 1 s (FEV1) measuring 50% of predicted and a forced vital capacity measuring 48% of predicted.

INVESTIGATIONS

A chest radiograph organised by his general practitioner is shown (figure 1).

Blood testing revealed a C reactive protein of 226 and a white cell count of 13.1. Other tests were unremarkable, including thyroid function.

A CT scan of the chest and abdomen was arranged (figure 2). It revealed a 13 cm round, cystic lesion in the right hemithorax, abutting the anterior chest wall, right heart border and right hemidiaphragm. The lesion was compressing the superior vena cava (SVC) and right atrium, while displacing the bronchus intermedius posteriorly. There was no lymphadenopathy.

Figure 1 Chest radiograph.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis considered at lung multi-disciplinary team (MDT) was of dermoid cyst, bronchogenic cyst, hydatid cyst or (less likely) pericardial cyst.

TREATMENT

Referral was made to the cardiothoracic surgical team for resection and he was started on metronidazole 400 mg three times daily for 7 days in case this was hydatid disease. The patient underwent rigid bronchoscopy, right thoracotomy and resection of the mass (figure 3).

OUTCOME AND FOLLOW-UP

A 12 cm in diameter cyst was resected weighing 150 g (figure 4). Macroscopically, the cyst's inner layer was heterogeneous and irregular, containing a yellow polypoid mass with hair shafts (figure 5) and a cut section showed fat tissue covered by a thin white layer (figure 5).

Figure 2 CT scan of the thorax.

To cite: Murray J, Amin F, Shah S, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-010127

Figure 3 Appearance at operation.

The microscopic findings of the polypoid mass showed it was covered with a keratising squamous epithelium with adnexal structures (sebaceous, apocrine and eccrine glands as well as hair follicles) imbedded in adipose tissue. The cyst wall was fibrous with hyalinised areas. Outside the cyst, thymic remnants and small fragments of normal lung were identified. The histological conclusion was that of a mature teratoma of the thymus.

DISCUSSION

Mature teratomas are well-differentiated and benign congenital tumours arising from pluripotent embryonic germ cells. They are the commonest histological type of primary GCTs and are usually found in the gonads, retroperitoneum or sacrococcygeal region.¹ Rarely, they can occur in extragonadal locations that are usually in or near the anatomical midline with the mediastinum being the most common of such sites. They are thought to result from the aberrant migration of primordial germ cells during early embryological development.² Primary GCTs of the mediastinum are rare representing 1–3% of all germ cell neoplasms.³

There are a number of pathologies to consider when evaluating an anterior mediastinal mass. The location and composition of the mass can help to differentiate between the possible diagnoses. Common differentials include thymoma, teratoma, thyroid disease, lymphoma, cystic lesions as well as neurogenic tumours (table 1).² Thymic neoplasms are a common cause and primary GCTs frequently arise within the thymus.³

Figure 4 Histology (specimen A).

Figure 5 Histology (specimen B).

In adults, 10–15% of anterior mediastinal masses are primary GCTs.⁴ Histologically they can be divided into benign teratomas, seminomas and embryonal tumours, which tend to be malignant (also known malignant teratomas or non-seminomatous GCTs).²

Mature teratomas are the most common type of mediastinal GCTs and the vast majority are histologically well defined and benign. They account for 8–13% of all mediastinal tumours.¹ They are typically seen in the anterior mediastinum and contain at least two of the three primitive germ layers found in embryonic cells. They are predominantly composed of ectodermal tissues such as skin, hair, sweat glands and tooth-like structures although mesodermal and endodermal tissues may also be present.² Immature teratomas tend to contain fetal and neuroendocrine tissue and are usually malignant in nature. Malignant GCTs are much more rare, accounting for <1% of all mediastinal tumours.⁵ A small proportion of mature teratomas (<1%) have the potential to undergo malignant transformation.^{2, 5}

Mature mediastinal teratomas are slow growing tumours that occur in adolescence or early adulthood, usually between the second and fourth decade of life. The mean age at diagnosis is 27 years with equal gender prevalence unlike malignant GCTs, which are seen predominantly in men.⁵ They are asymptomatic in up to 53% of cases and are often an incidental finding on a routine chest radiograph.⁶ Symptoms are related to proximity of the tumour to structures within the mediastinum with chest pain being the most common presenting discomfort. Individuals may also present with dyspnoea, cough, back or shoulder pain, fever, bulging of the anterior chest wall or SVC

Table 1 Differential diagnosis of a mediastinal mass by anatomic location

Anterior	Middle	Posterior
Thymoma	Lymphoma	Neurogenic tumour
Teratoma, seminoma	Pericardial cyst	Bronchogenic cyst
Lymphoma	Bronchogenic cyst	Enteric cyst
Carcinoma	Metastatic cyst	Xanthogranuloma
Parathyroid adenoma	Systemic granuloma	Diaphragmatic hernia
Intrathoracic goitre		Meningocele
Lipoma		Paravertebral abscess
Lymphangioma		
Aortic aneurysm		

obstruction.⁵ Rarely the teratoma may rupture or invade surrounding tissues leading to pleural and pericardial effusions, lipoid pneumonias and the expectoration of sebum or hair (trichoptysis), which is pathognomonic.^{3 7} In addition to these, systemic symptoms may result from the release of excess hormones, antibodies or cytokines.²

The routine chest radiograph is an important diagnostic aid. Mature teratomas typically appear as well-defined, lobulated masses usually protruding to one side to occupy either the left or right hemithorax. Calcification is present in 26% of cases and in exceptional cases, bone or teeth-like structures may be seen.² A fat-fluid level that is considered to be specific to teratomas is an infrequent finding.³ CT remains the radiographic modality of choice to evaluate the true extent of a mature mediastinal teratoma. It provides a three-dimensional estimation, helping to identify the involvement of surrounding structures and to assess suitability for surgical resection. It can also reveal the composition of the mediastinal mass; a combination of fluid, soft tissue, calcium and fat attenuation is highly specific and allows a reliable diagnosis of mature teratoma.⁸ Where the diagnosis remains unclear, MRI or a bronchoscopic examination aiming to obtain a tissue sample may be performed. Hair-like material may be visualised on the bronchoscopy where the teratoma has ruptured or invaded the bronchial tree.⁶

Complete surgical resection is the recommended treatment for all mature teratomas. This not only helps to confirm the diagnosis but also helps to prevent future complications from the tumour. The benign nature of mature mediastinal teratomas means they rarely invade local structures and therefore can be excised with good results. Survival rates have been reported to approach 100% at 5 years.⁷ In cases where there is local invasion, subtotal resection can provide symptomatic relief.²

Learning points

- ▶ Mature teratomas remain a rare phenomenon but should be considered in the differential diagnoses for any mediastinal mass, particularly with anterior lesions.
- ▶ Common differential diagnoses for an anterior mediastinal mass include: thymoma, lymphoma, carcinoma, thyroid disease and aortic aneurysm.
- ▶ The routine chest radiograph is an important diagnostic aid. CT allows assessment of suitability for surgical resection.
- ▶ Complete surgical resection is recommended in all mature teratomas with favourable survival rates.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Argarwal G, Kar DK. Teratoma of the anterior mediastinum presenting with a cystic neck mass: a case report. *J Med Case Rep* 2008;2:23.
- 2 Duwe BV, Sterman DH, Musani AI. Tumors of the mediastinum. *Chest* 2005;128:2893–909.
- 3 Shameem M, Qaseem SMD, Siddiqui MA, *et al.* Mature mediastinal teratoma in adult. *Respir Med CME* 2010;3:116–17.
- 4 Takeda S, Miyoshi S, Ohta M, *et al.* Primary germ cell tumours in the mediastinum—a 50-year experience at a single Japanese institute. *Cancer* 2003;97:367–76.
- 5 Stella F, Davoli F. Giant mediastinal mature teratoma with increased exocrine pancreatic activity presenting in a young woman: a case report. *J Med Case Rep* 2011;5:238.
- 6 Chen RFC, Chang TH, Chang CC, *et al.* Mediastinal teratoma with pulmonary involvement presenting as massive haemoptysis in 2 patients. *Respir Care* 2010;55:1094–6.
- 7 Bachh AA, Haq I, Gupta R, *et al.* Benign mediastinal teratoma with intrapulmonary extension presenting with trichoptysis. *Respir Med CME* 2010;3:189–91.
- 8 De Hoyos A, Sundaresa RS. Resection of mediastinal teratoma. *Oper Tech Thorac Cardiovasc Surg* 2001;6:209–20.

Copyright 2013 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow