Ectopic Mediastinal Thyroid Mass with a Normally Located and Functioning Thyroid Gland

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Abstract

Ectopic thyroid tissue is a rare and often asymptomatic cause of a mediastinal mass. It is usually an incidental finding on imaging. Symptoms may include cough, chest pain or discomfort, dysphagia, and dyspnea. We herein describe the case of a 58-year-old Caucasian gentleman, who presented to us with a history of persistent, non-productive cough. His chest X-ray showed a large, para-cardiac opacity within the right hemithorax, consistent with an anterior mediastinal mass. Computed tomography (CT) scan showed a lesion with mixed texture, containing areas of low attenuation and multiple foci of calcification. This study was supplemented by a positron emission tomography (PET) scan, which demonstrated a mildly fluorodeoxyglucose (FDG)-avid, well-circumscribed and heterogenous mass, within the anterior mediastinum. A large, globular, encapsulated mass was surgically resected via a posterolateral thoracotomy, measuring approximately 16.5 cm x 12.0 cm x 10.0 cm, and weighing 745 grams. Histopathology confirmed the diagnosis of a benign nodular goitre with no evidence of malignancy. At five months, a follow-up CT scan demonstrated no evidence of disease recurrence.

Keywords: ectopic thyroid tissue, anterior mediastinal mass, ectopic thyroid mass, nodular goitre, thyroid pathology, right posterolateral thoracotomy

Introduction

Ectopic thyroid tissue (ETT) is a rare pathology; in >90% of cases, it is located at the base of the tongue, and termed a lingual thyroid. Comparatively, in <1% of cases, ETT is found within the mediastinum. Interestingly, in such cases, an orthotopic or cervical thyroid was present and thyroid function test (TFT) showed an euthyroid picture.[1] Hence, mediastinal ETT are often asymptomatic and diagnosed incidentally on imaging performed to investigate an unrelated disease.[2,3] Rarely, it may exert pressure, producing symptoms such as cough, chest discomfort, and dyspnea.[1] It has a bimodal age distribution; early peak between 10-19 years of age, and a second peak at 45-55 years. It is thought that during these ages, the body had an increased metabolic requirement with a surge in circulating thyroid stimulating hormone (TSH), which also stimulates growth of the ETT.[1,4]

The aetiology and natural disease progression of ETT is unclear. It is said to occur due to abnormal migration of the thyroid diverticulum from its origin, at the base of the tongue.[1,2,5] We describe a case of a 58-year-old Caucasian gentleman, who presented with a five-week history of persistent, non-productive cough, and was incidentally found to have an ectopic thyroid goitre within the right anterior mediastinum.

Case Report

A 58-year-old Caucasian gentleman presented with a five-week history of persistent, non-productive cough. He denied any associated chest discomfort or dyspnea. He had a medical history of hypertension and asbestos exposure. He was an ex-smoker with a 30-pack-year history. He had no family history of lung cancer or pulmonary disease. At the time of presentation, he was afebrile, and his vital signs were within normal limits. On examination, he had normal vesicular breathing with equal and bilateral air entry. Laboratory investigations were unremarkable with normal C-reactive protein (1 mg/L) and white-cell count (7.3 x10^9/L). Electrocardiogram showed sinus rhythm with first-degree atrioventricular block. Plain chest X-ray showed a large, para-cardiac opacity within the right hemithorax, consistent with a mediastinal mass [Figure 1]. The left lung field appeared clear.

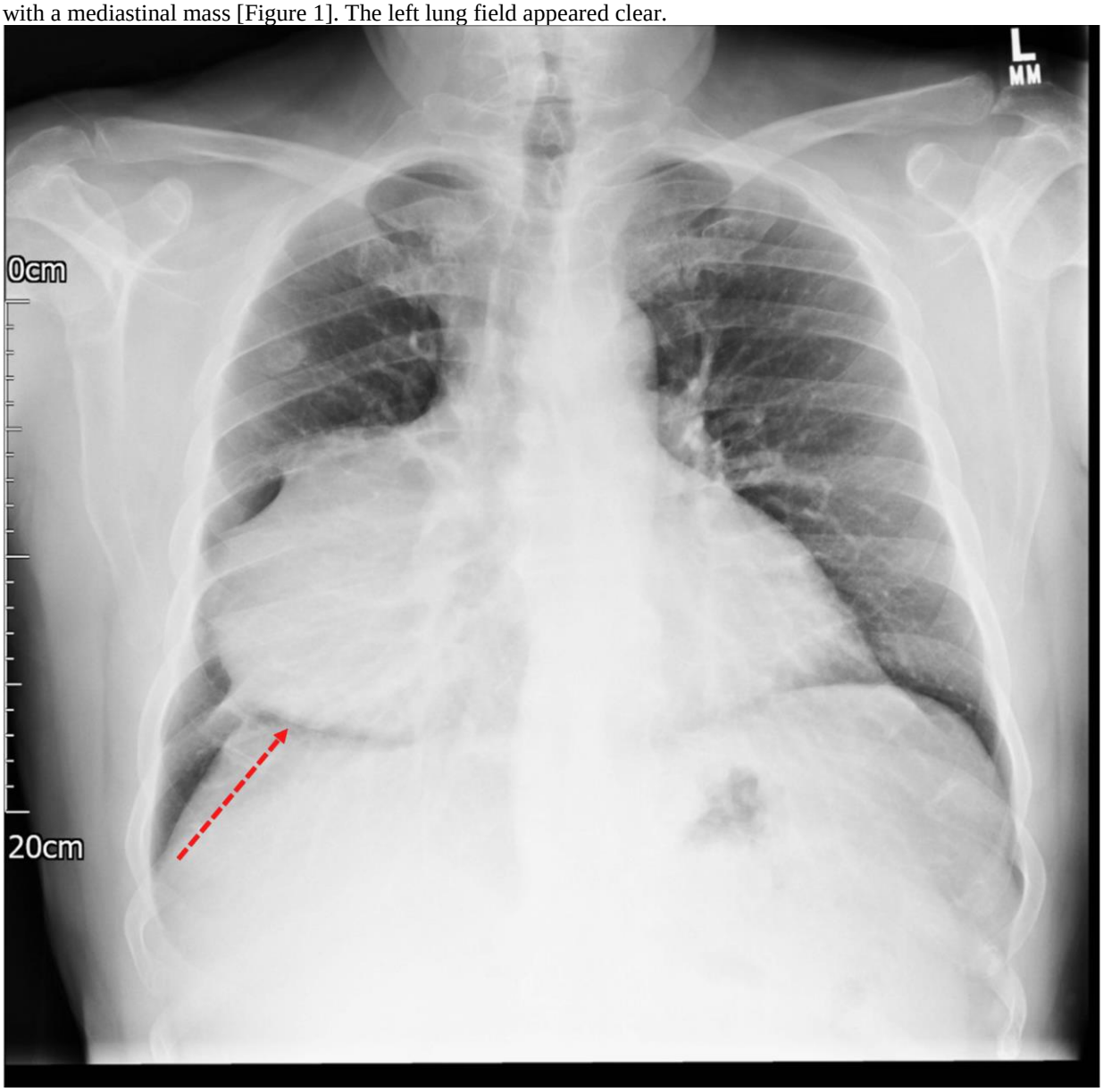

Figure 1: Chest X-ray showing a large, para-cardiac opacity within the right hemithorax.

Chest CT scan showed a large, anterior mediastinal lesion of mixed texture, containing areas of low attenuation and multiple foci of calcification [Figure 2]. It occupied a significant portion of the right hemithorax, exerting pressure

on adjacent structures, namely the right cardiac chambers and the right middle lung lobe. There was no evidence of supraclavicular or axillary lymphadenopathy. The appearance of the mediastinal lesion on CT imaging was suggestive of a teratoma, although differential diagnoses included lymphoma or thymoma. Notably, the thyroid gland appeared morphologically normal on the CT.

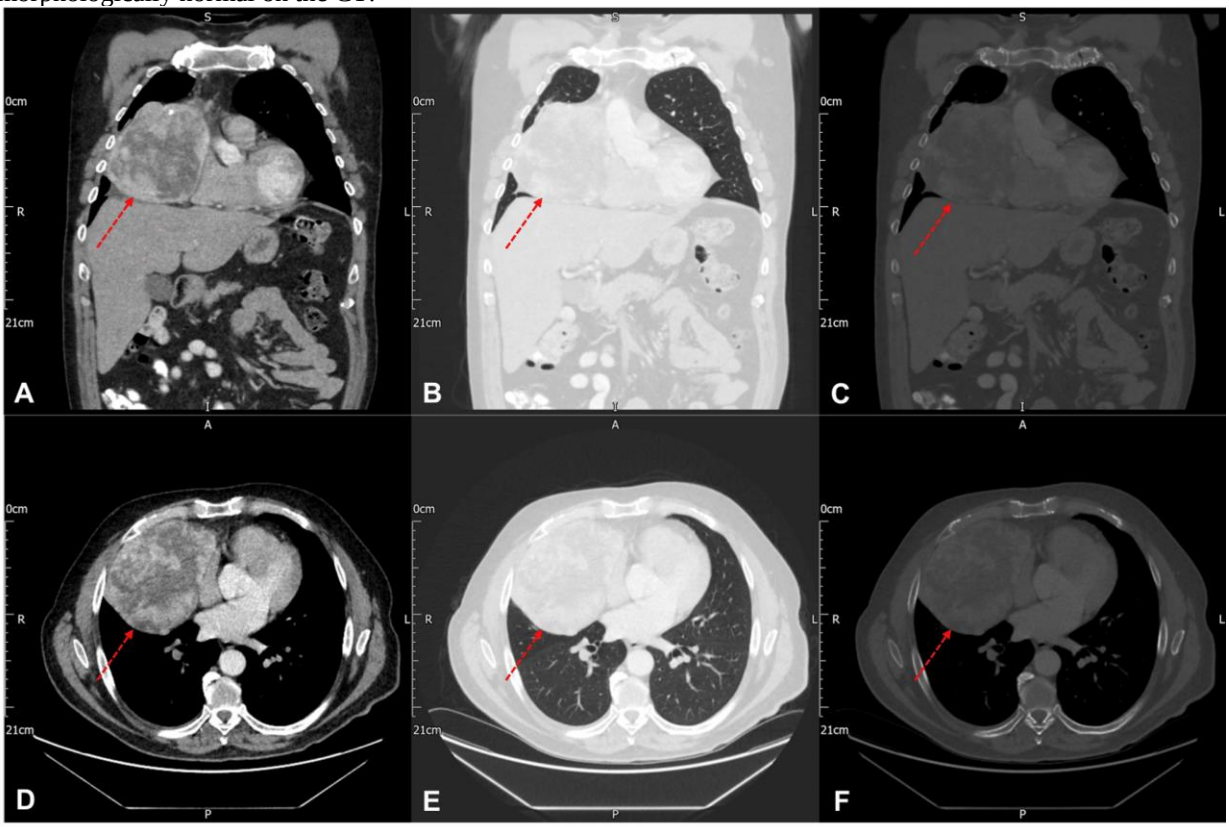

Figure 2: A contrast-enhanced computed tomography (CT) scan showing a large, globular, and heterogenous mass within the right hemithorax (red arrow). Panel A/D shows the mediastinal window, demonstrating the chest wall and pleura. Panel B/E shows the lung window, demonstrating the lung parenchyma in detail, including the pulmonary vasculature. Panel C/F shows the bone window.

This study was supplemented by a whole-body fluorodeoxyglucose (FDG) PET scan. It showed a heterogenous mass, measuring approximately 25 x 15 cm, within the right hemithorax [Figure 3]. Importantly, it was mildly FDG-avid with a maximum standardised uptake value of 2.5. Importantly, there were no FDG-avid lymph nodes. The appearance of the mediastinal lesion on the PET scan was consistent with a benign mass, likely a fibrous tumour or sequestration.

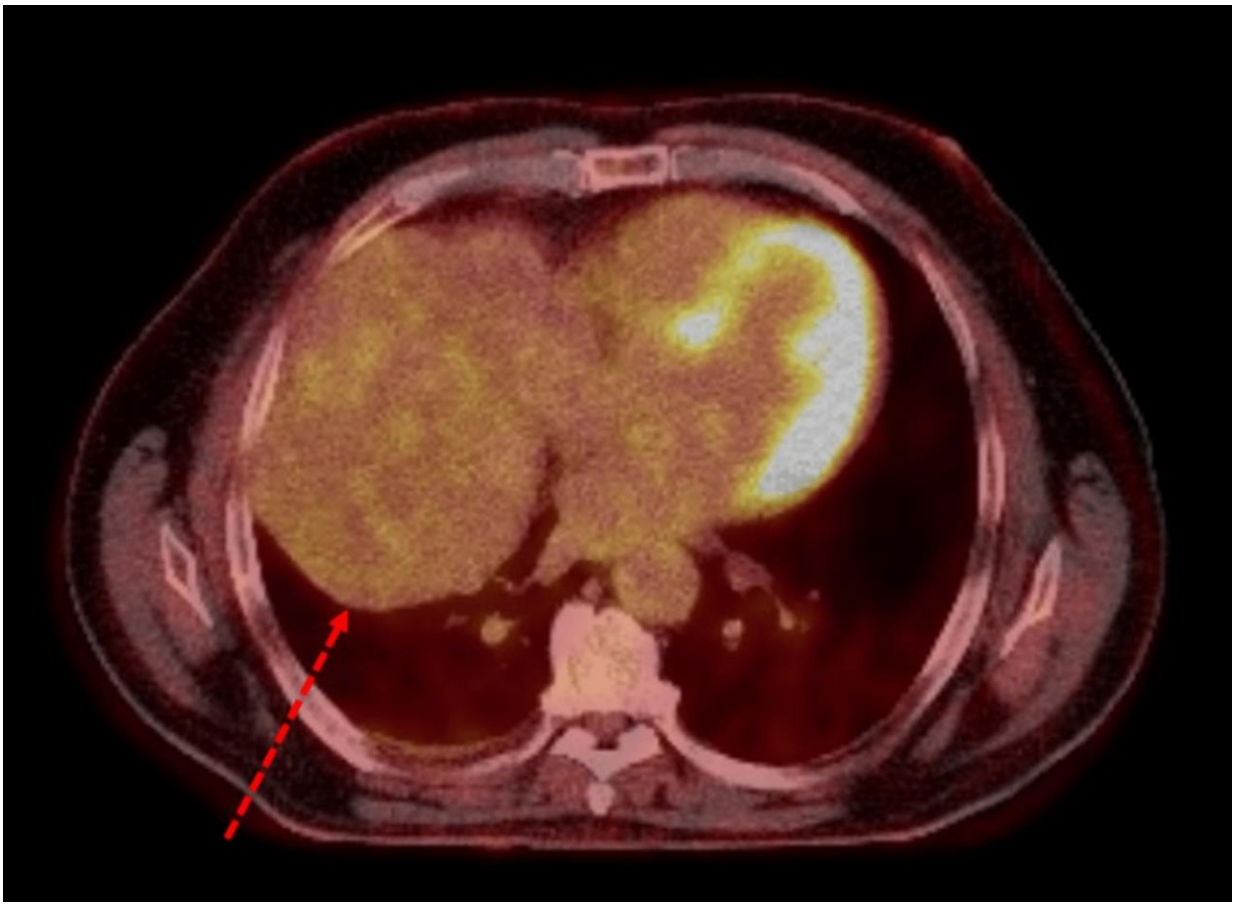

Figure 3: Positron-emission tomography (PET) images demonstrating a large mass, measuring approximately 25 cm x 15 cm, occupying the entire right hemithorax (black arrow). The maximum standardised uptake value (SUV max) was 2.5, similar to the rest of the mediastinal uptake. No fluorodeoxyglucose (FDG)-avid mediastinal or hilar lymph nodes were present. Panel A shows a coronal view.

We performed a CT-guided biopsy; histopathology showed micro-and macro-follicular hyperplasia, haemorrhage, and inflammatory changes, consistent with an ectopic thyroid goitre.

The patient was referred to cardiothoracic surgeons for resection of the ETT. Surgery was performed under general anaesthesia with the use of a double-lumen endotracheal tube. Access was obtained via a right posterolateral thoracotomy, through the fifth intercostal space. Upon entering the pleural cavity, a large, well-encapsulated, globular mass was visualised. It was adherent to the hilum. The adhesions were dense, and attempted dissection led to considerable ooze. However, once the mass was mobilised, the vascular bundle supplying the mass was identified, stapled, and cut using a 45-mm vascular stapler. Macroscopically, the mass measured approximately 16.5 cm x 12.0 cm x 10.0 cm and weighed 745 grams.

The patient made an uneventful recovery postoperatively. He was dismissed from the hospital on the third postoperative day. Chest X-ray, prior to dismissal, showed clear lung fields bilaterally with no visible masses, nodules, consolidation, or collapse [Figure 4]. However, the right hemidiaphragm was elevated, suggestive of iatrogenic phrenic nerve injury. Clinically, the patient remained asymptomatic and denied dyspnea.

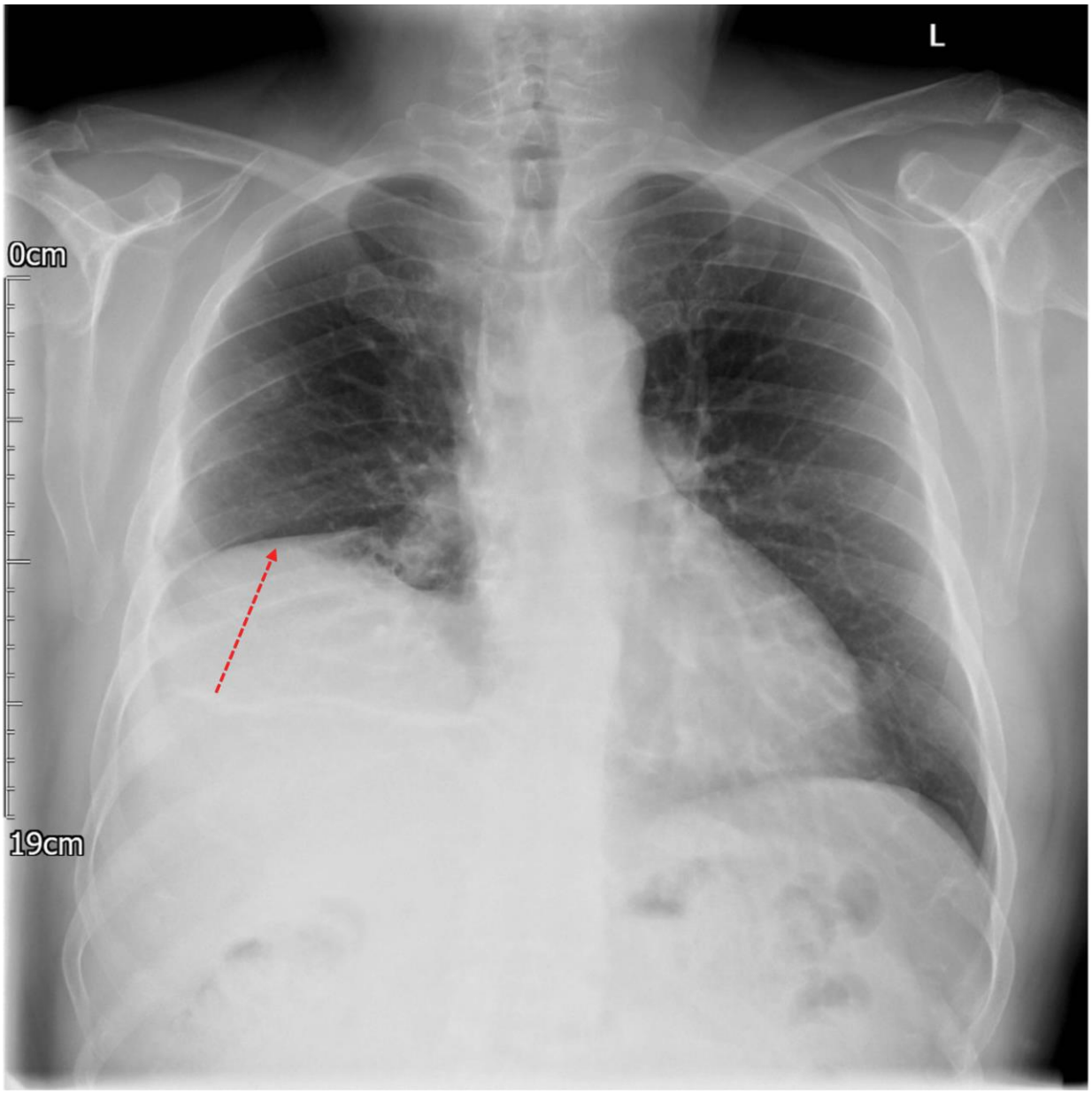

Figure 4: Chest X-ray performed on the third postoperative day showing clear lung field bilaterally. No obvious masses, nodules, consolidation or collapse visible. The right hemidiaphragm was elevated (red arrow).

Histopathology of the resected specimen confirmed the diagnosis of an ETT; there was no evidence of malignancy. At five months, the follow-up CT scan demonstrated no evidence of disease recurrence.

Discussion

The prevalence of ETT is reportedly around 1 in 100,000 - 300,000; however, given that most ETT are asymptomatic, the true prevalence is unknown.[6] It occurs due to aberrancies in the embryonic development or migration of the thyroid.[1,5] The thyroid gland originates from the first and second pharyngeal pouches, near the base of the tongue. It migrates caudally along the midline, crossing anterior to the hyoid bone and the larynx, before reaching its destination in the anterior neck. Mal-descent can occur, and an ectopic thyroid gland may be found anywhere along this path.[2,3,6] However, mediastinal ETT is thought to occur during an earlier stage of embryological development, when cardiac looping pulls thyroid tissue caudally into the mediastinum.[7]

In our patient, CT scan showed an orthotopic thyroid gland in addition to the mediastinal ETT; clinically, he was euthyroid and laboratory investigations showed a normal serum TSH level. Patients with mediastinal ETT are often asymptomatic, and ETT is usually an incidental finding on imaging.[2,3] However, our patient was symptomatic with persistent, non-productive cough; possibly due to increased intrathoracic pressure and compression of the heart and lung parenchyma. It is not uncommon for symptoms to occur late in the disease, as the tumor grows and compresses on surrounding structures.[1] Although our patient was clinically and biochemically euthyroid, patients with ETT may present in a hypo-or hyperthyroid state. It has been suggested that during periods of increased metabolic demand or physiological stress, the anterior pituitary secretes increased levels of TSH, which stimulates the ETT and results in a thyrotoxicosis-like state.[1,4]

Surgery is recommended, especially if the ETT is compressing on surrounding structures or the patient is symptomatic. In this case, the ETT, measuring 16.5 cm x 12.0 cm x 10.0 cm, was excised through a right posterolateral thoracotomy; this was an appropriate approach given the size, location, and vascular supply of the tumor. In patients with secondary mediastinal ETT, a cervical approach may be required, often with concomitant resection of the orthotopic thyroid, given that the blood supply is from thyroid vessels.[7] Follow-up with imaging and TFT is recommended to ensure resolution of mass effect and to monitor for disease recurrence.

Conclusion

Mediastinal ETT are rare and often incidental findings; however, it is an important differential to consider in patients presenting with an anterior mediastinal mass. Just as in our case, patients are usually euthyroid, and symptoms may be due to mass effect on surrounding structures.

Acknowledgements

Younus Qamar and Amna Qamar contributed equally to the work and should be considered co-first authors. We are grateful to the patient for his consent to the publication of this case report. Written informed consent was obtained from the patient for the publication of this case report and accompanying images.

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