

## An unusual mediastinal mass

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**ABSTRACT** We report a case of a mediastinal mass indenting the left lateral tracheal wall of a 35-year-old male who presented with weight loss, cough and breathlessness. Flow volume loop and thyroid function tests were normal and thyroid peroxidase antibodies were negative. Technetium scintigraphy and positron emission tomography both showed no uptake. Endobronchial ultrasound-guided fine needle aspiration confirmed ectopic mediastinal thyroid tissue.

Mediastinal ectopic thyroid tissue is very rare. Most patients are asymptomatic and euthyroid with positive signals on scintigraphy. False negative technetium scintigraphy can occur in areas of necrosis, carcinoma and from substernal tissue. Ectopic thyroid tissue is a rare but important differential diagnosis when investigating mediastinal lesions and should be considered even if scintigraphy is negative in the right clinical context. Endobronchial ultrasound-guided fine needle aspiration can be used when scintigraphy is not diagnostic.

**KEYWORDS** ectopic mediastinal thyroid, endobronchial ultrasound-guided fine needle aspiration, mediastinal mass, mediastinum, positron emission tomography

**DECLARATION OF INTERESTS** No conflict of interest declared

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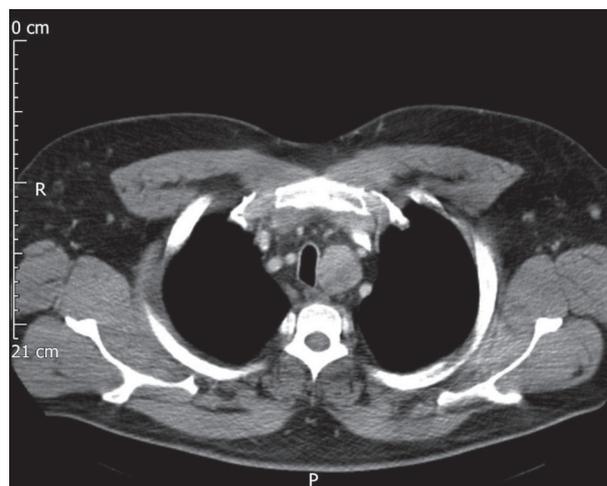
### CASE HISTORY

A 35-year-old male clerical worker presented to the fast track lung service with a 4-month history of cough, breathlessness and 6.4 kg weight loss. Past medical history included asthma and obstructive sleep apnoea with non-contributory physical examination. Chest X-ray suggested possible pleural thickening prompting computerised tomography of the chest which showed an incidental 3.4 cm x 3 cm mass indenting the left lateral tracheal wall (Figure 1) and no pleural thickening. The left lobe of thyroid was noted to be enlarged but separate.

Flow volume loop, thyroid function tests and thyroid peroxidase antibodies were unremarkable. Ultrasound-guided fine needle aspiration of the left thyroid lobe showed no malignant cells, with flat sheets of uniform thyroid epithelial cells on a colloid background (categorised as Thy2 – i.e. benign cells). Technetium (Tc99-m Sestamibi) scintigraphy revealed uptake in the thyroid gland, but not in the mass (Figure 2). The mass did not show avid uptake of <sup>18</sup>F-fluorodeoxyglucose on positron emission tomography (<sup>18</sup>F-FDG-PET). Endobronchial ultrasound-guided fine needle aspiration (EBUS-TBNA) of the mass confirmed ectopic mediastinal thyroid tissue with thyroid follicles (Figure 3).

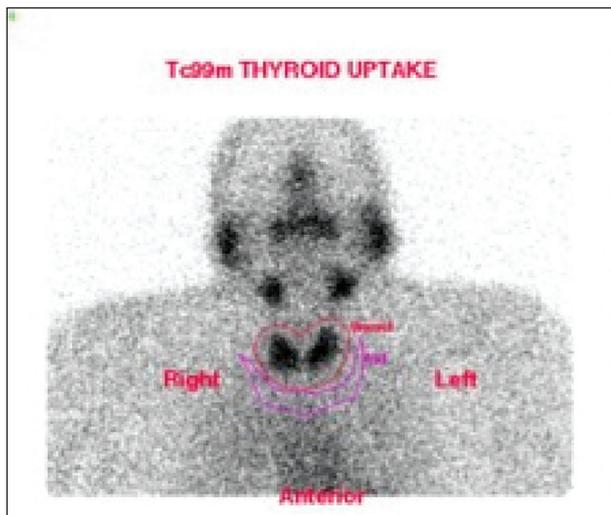
### DISCUSSION

Ectopic thyroid tissue occurs due to the abnormal descent of the thyroid gland along the thyroglossal duct to its final location anterior to the trachea. In 90% of



**FIGURE 1** CT (soft tissue/mediastinal window settings) showing left paratracheal mass

reported cases, ectopic thyroid tissue is found at the base of the tongue (lingual thyroid) as the gland fails completely to descend. Mediastinal ectopic thyroid tissue is very rare, with only eight cases reported in the literature.<sup>2</sup> Most patients with ectopic mediastinal thyroid tissue are asymptomatic and euthyroid as orthotopic tissue usually co-exists. Symptoms may develop due to tissue size and location. Primary thyroid cancers very rarely arise in ectopic thyroid tissue; when they do, most are papillary, mixed follicular and papillary carcinomas or Hurthle cell tumours.<sup>3</sup> Ectopic thyroid tissue frequently has low avidity on <sup>18</sup>F-FDG-PET scan (in contrast to thyroid carcinoma, thyroiditis and multi-



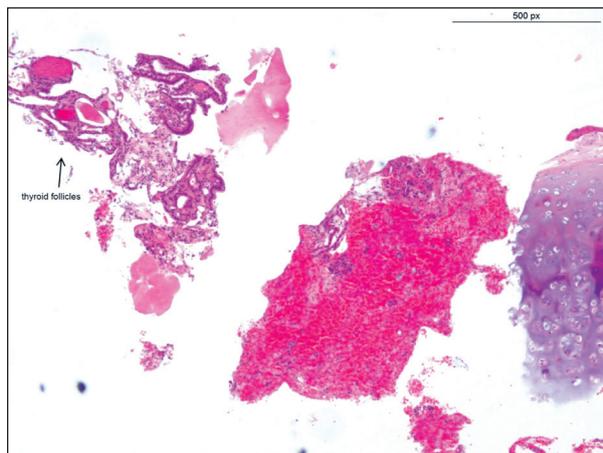
**FIGURE 2** Technetium scintigram (Tc99-m) showing no radioisotope uptake in nodule

nodular goitre), as normal thyroid tissue uses free fatty acids as its main energy substrate.

Tc99-m scintigraphy can confirm ectopic thyroid tissue and differentiate it from other causes of mediastinal masses. If surgery is considered, Tc99-m is also used to determine the presence of orthotopic thyroid tissue. In this case the mass had no uptake on Tc99-m. False negative Tc99-m results can occur due to lack of concentration by the ectopic thyroid tissue, necrosis, carcinoma or a substernal location (due to a high level of background activity in the heart and great vessels). Iodine-123 is trapped more efficiently by the thyroid tissue and is the preferred agent in imaging intrathoracic thyroid tissue.<sup>4</sup> In this case, iodine-123 was not locally available so only Tc99-m could be used.

Minimally invasive sampling is readily achieved via EBUS-TBNA to confirm ectopic thyroid tissue and exclude malignancy or other benign pathologies.<sup>5</sup> EBUS-TBNA has a high sensitivity and negative predictive value for malignancy in the mediastinal lymph nodes, with quoted sensitivities of between 93–97% and negative predictive values of between 89–97% in recent publications.<sup>1,5,6</sup> There is a paucity of published data relating to EBUS-TBNA in thyroid lesions, but one case series of 12 patients demonstrated EBUS-TBNA correctly detected three malignant cases and was correctly negative in the remaining nine benign cases confirmed on follow-up or further biopsy.<sup>7</sup> In euthyroid, asymptomatic patients, regular follow-up is advised given the risk (albeit low) of malignant transformation. Larger, symptomatic masses are managed surgically.

In the case we present here, the symptoms of cough and breathlessness were attributed to the patient's known asthma and obstructive sleep apnoea. The weight loss stabilised after resolution of a domestic issue which had



**FIGURE 3** EBUS-TBNA biopsy confirming ectopic thyroid tissue

been causing the patient anxiety and subsequently normalised on follow-up. Given the normal flow-volume loop, size and location of the mass, and the patient's comorbidities, the mass was not thought to be contributing to the symptoms reported. Given the high negative predictive value of EBUS-TBNA mentioned above,<sup>1,5,6</sup> the clinical stability of the patient and the stability of serial neck ultrasound on the patient over a 12-month period, we were confident the mass was not malignant. The patient continues under rigorous clinical follow-up with serial neck ultrasound.

In conclusion, this case highlights ectopic thyroid tissue as a rare and important differential for mediastinal masses and illustrates the value but also the limitations of technetium scintigraphy when suspecting this diagnosis and complementary utility of EBUS-TBNA when scintigraphy is non-avid. Correct early diagnosis may avoid unnecessary patient anxiety, further invasive tests and consequent morbidity.

## LEARNING POINTS FOR CLINICIANS

Ectopic normal thyroid tissue in the mediastinum may not be highlighted by positron emission tomography. This can normally be confirmed using technetium scintigraphy to avoid biopsy. However, false negative results on technetium scintigraphy can occur with mediastinal ectopic thyroid tissue in areas of necrosis, carcinoma and in the substernal position, in which case EBUS-TBNA is recommended as a minimally invasive tool to confirm diagnosis. Regular follow-up is advisable even for asymptomatic euthyroid patients given the risk of malignant transformation.

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