

Heterotropic Pulmonary Thyroid in the Presence of a Normally Located Multinodular Goitre

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Abstract

We report the case of a 75-year-old female with an intrapulmonary smooth, round 2-cm nodule that contained heterotropic thyroid tissue with no malignant or teratomatous features. She also had a normally located multinodular goiter. Ultrasound examinations of the thyroid and CT-scans of the pulmonary nodule done 7 years apart showed no significant change. Thyroid/whole body scans using TC-99m done 7 years apart also provided similar findings. The lack of change in the thyroid and pulmonary nodules makes a thyroid malignancy highly unlikely.

Intrapulmonary heterotropic thyroid tissue is a very rare entity, with only 2 reported cases in the literature. Our case is different from the other 2 in that they did not have a co-existing goiter.

This case report draws attention to the occurrence of intrapulmonary heterotropic thyroid tissue. Although rare, it needs to be considered in the differential diagnoses of a pulmonary nodule.

Introduction

Heterotropic thyroid tissue is a rare developmental anomaly. It is defined as the presence of thyroid tissue at sites other than the usual thyroid position in the neck.

We report a case of an intrapulmonary heterotropic thyroid, a very rare form of heterotropic thyroid, in the presence of a normally located multinodular goiter.

There are only two cases of intrapulmonary heterotropic thyroid previously reported by Bando et al. [1] and Di Mari et al. [2]. They were diagnosed after surgical resection of a lung nodule and at autopsy respectively. Unlike our patient, both did not have a goiter.

Case Report

A 75-year-old woman of Sri Lankan descent gave a history of a goiter for about 40 years. She had two previous subtotal thyroidectomies in Sri Lanka. The pathology reports were not available to us but the patient and her family informed us that the resected thyroid was not cancerous.

In 2004, in preparation for coronary artery bypass surgery in Ottawa, Canada, the patient had a chest x-ray which showed a well circumscribed 1.2 cm mass in the right lower lobe of the lung. A subsequent CT-scan of the chest revealed a smooth round lesion in the right lower lobe measuring 2.0 cm in diameter and no mediastinal lymphadenopathy (Figure 1).

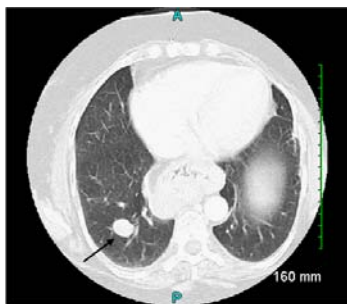


Figure 1: CT- chest showing a smooth round lesion in the right lower lobe measuring 2.0 cm in diameter (black arrow).

A core biopsy of the lesion was performed under fluoroscopic guidance. The specimen contained thyroid follicles with no malignant changes together with a small amount of lung parenchyma. No other tissues were noted as part of the biopsy (Figure 2). Immunohistochemical staining for thyroglobulin of the follicular cells was positive, confirming them as thyroid cells (Figure 3).

An ultrasound of the thyroid done soon after the lung biopsy revealed multiple nodules throughout the thyroid gland. The largest nodule was relatively hyper echoic in the mid to lower pole of the right thyroid lobe, measuring 25 x 17 x 16 mm. No lymphadenopathy was observed. A thyroid/whole body scan and uptake using TC-99m and 10 MicroCi I¹³¹ respectively showed focal areas of hypo activity in the mid portion of the left lobe and the mid portion of the right lobe and a focal area of increased tracer uptake in the lower portion of the right lobe. Twenty four-hour radioactive iodine uptake was 9% at the neck which is slightly low (reference range 10-20%). Her serum Thyroid Stimulating Hormone (TSH) was 1.3 mU/L (reference range 0.3-5.6), free thyroxine (fT4) 12.6 pmol/l (reference range 9-24) and free triiodothyronine (fT3) 3.6 pmol/l (reference range 2.5-5.3). No detectable uptake was demonstrated in the area of the right sided pulmonary nodule (Figure 4). No active intervention was recommended for her lung nodule. No biopsy of the thyroid was done.

The patient was seen by us for the first time in 2011. She had not received any follow-up assessment of her lung nodule since 2004. Physical examination revealed the presence of a 60 gram multinodular goiter. She was clinically euthyroid. Her serum TSH was 1.20 mU/L (reference range 0.3-5.6). An ultrasound of the thyroid and a CT-scan

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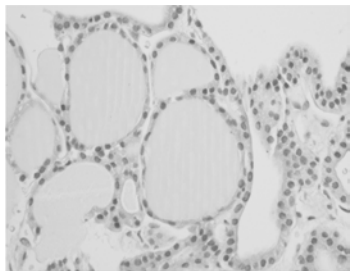


Figure 2: Small and medium-sized colloid-filled follicles, with flattened follicular cells (Hematoxylin and Eosin staining).

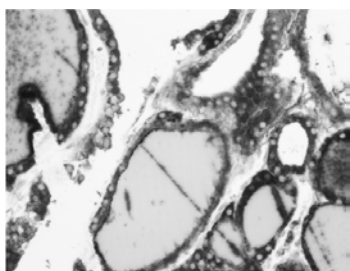


Figure 3: Positive immunohistochemical staining for thyroglobulin of the thyroid tissue in the lung.

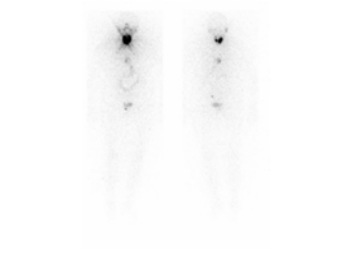


Figure 4: Whole Body RAI Scan and Uptake: a large MNG with cold nodules at the neck. No detectable uptake was demonstrated in the area of the right sided pulmonary nodule.

of the chest showed no significant change compared to findings in 2004. A whole body scans and uptake using TC-99m and 10 MicroCi I¹³¹ respectively again showed similar findings in the neck with no detectable uptake in the area of the right sided pulmonary nodule.

Discussion

We report a case of intrapulmonary heterotopic thyroid tissue. There are only two such published cases in the literature. Bando, et al. [1] reported an 83-year-old woman who underwent resection of a pulmonary tumor which turned out to contain benign thyroid follicles. Di Mari, et al. [2] reported a 77-year old male who was found to have thyroid tissue within the lung at autopsy. Saleh HA, et al. [3] reported a case of heterotopic thyroid tissue in the lateral chest wall but there was no extension of the heterotopic thyroid tissue into the lungs.

While intrapulmonary heterotopic thyroid tissue is rare, cervical, mediastinal and intra-abdominal heterotopic thyroid lesions are more common [4]. Other very rare locations for heterotopic thyroid include the pituitary [5] and the iris [6].

An embryologic explanation for midline heterotopic thyroid tissue is plausible since the thyroid is derived from the thyroid diverticulum which is located in a midline position. It is more difficult to explain the location of heterotopic thyroid tissue in the lung parenchyma based on embryology. Nonetheless, one could speculate on two possibilities. One is that during early embryologic life, there may be abnormal contact of the thyroid and the respiratory diverticulae, both of which originate from the primitive foregut endoderm and are anatomically close to each other. This may result in implantation of thyroid cells in the respiratory diverticulum and eventually in the lungs. The second possibility is metaplasia of lung cells into thyroid cells given that both organs share a common embryologic origin from the foregut endoderm. In this context, it is interesting to note that in animal models, a sonic hedgehog deletion (a gene crucial to foregut development) has been associated with thyrocyte differentiation in aberrant locations such as the trachea and primitive respiratory epithelium [7].

The possibility of metastasis from a thyroid cancer is highly unlikely in our case since the biopsy specimen did not have features of malignancy at all and both the pulmonary lesion and her multinodular goiter did not show any clinical and radiological progression over 7 years from the initial detection of the pulmonary nodule. The lung nodule is also unlikely to be a teratoma since no other tissues were noted in the biopsy. However, a teratomatous origin of the heterotopic thyroid tissue cannot be totally ruled out since some teratomas can be composed of only one type of tissue.

An interesting feature in our case is the presence of a eutopic MNG. In thinking about a possible link between her MNG and her heterotopic thyroid, one has to recognize that the other two cases of heterotopic pulmonary thyroid reported in the literature did not have a goiter. However, a causal relationship, while unclear, cannot be excluded. The absence of radioactive iodine uptake by the heterotopic thyroid nodule is probably the result of autonomy of one or more of her eutopic thyroid nodules. Unfortunately, a thyroid/whole body scan was not done in the other two reported cases of intrapulmonary heterotopic thyroid.

This case report draws attention to the occurrence of intrapulmonary heterotopic thyroid tissue. Although rare, it needs to be considered in the differential diagnoses of a pulmonary nodule.

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