



Ectopic Thyroid Tissue in the Lung

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Abstract:

The result of dismigration during organogenesis, thyroid gland can rarely present outside their usual anatomical localization, especially midline cervical, thoracic and abdominal cavity. The lung is a rare localization for ectopic thyroid tissue. Most patients are asymptomatic. However, they can be noticeable as a solitary pulmonary nodule, during tests conducted for other purposes, or during autopsy. A 47-year-old female patient presented with chest pain for 3 months. She had a past history of subtotal thyroidectomy for nodular goitre 31 years ago. Computed tomography showed anterobasal segment nodule in right lower lobe of lung. After thoracotomy, dirty yellow, solid nodular lesion, 1 cm in diameter, was observed in lung wedge resection material. Histological examination showed the lesion was separated with a sharp boundaries from the lung parenchyma, had non-teratogenic components, and thyroid tissue was found with a colloid-containing follicular structures. Immunohistochemical staining showed TTF-1 and thyroglobulin expression in this area. With these findings the patient was diagnosed as ectopic thyroid tissue. We want to emphasize that although it is rare, ectopic thyroid tissue can be localized intrapulmonary, and this should be considered in the differential diagnosis of pulmonary nodules.

Key words: Solitary Pulmonary Nodule, Thyroglobulin, Thyroid Dysgenesis, Thyroidectomy, Tomography.

Introduction

Heterotopic thyroid tissue is the presence of thyroid tissue at any sites along its embryologic path other than the usual thyroid position in the neck. It is a rare developmental anomaly [1,2]. Although ectopic thyroid tissue is rare, with a reported incidence of 1 in 300,000, it is most frequently reported between the foramen caecum and the normal position of the thyroid gland, often in the base of the tongue, as a lingual thyroid [1,3]. The other common sites for

an ectopic thyroid gland are thyroglossal duct, the coupling between the foramen cecum and thyroid gland, and laryngotracheal region [1]. It is rare, but there have been reports of ectopic tissue in the lung, submandibular region, the trachea, the mediastinum, the heart, the duodenum, the adrenal gland, the parotid gland and the gall bladder [3]. Intrapulmonary heterotopic thyroid is a rare form of ectopic thyroid tissue with only eight cases reported

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so far [4-11]. As in our case, the nodules were always single [4-10]. Only two case of bilateral intrapulmonary ectopic thyroid has been reported [9,11] [Table 1].

Case Report

A 47 year old female presented to the hospital with a history of chest pain for last 3 months. She had a past history of subtotal thyroidectomy for nodular goiter 31 years ago and was subsequently followed by medical treatment. In the computed tomography, captured there, solitary nodule was detected in the segment of the right lower lobe in anterobasal, and patient was referred to our hospital [Fig.1]. The patient, underwent thoracotomy and pulmonary wedge resection was carried out.

In macroscopic evaluation of wedge resected specimen of lung, 5.5 cm, dirty yellow specimen with 1 cm in diameter, solid, nodular lesion was observed. On microscopic examination of the lesion, thyroid tissue that had colloid content and follicular structures lined with monomorphic cells was seen [Fig.2]. It was well-defined, had non-teratogenic components and separated by sharp boundaries from the usual lung parenchyma. Around the lesion there was mild chronic inflammation in a restricted area. The lung parenchyma outside this area was normally observed. The lesion was stained positive with the immunohistochemical TTF-1 and thyroglobulin [Fig.3]. With all these findings the patient was diagnosed as intrapulmonary ectopic thyroid tissue.

Table 1: Profiles of cases.

Cases	Age	Gender	Evidence of malignancy or teratomatous elements	Localization in lung	Type of case	Primary thyroid gland disease or tumor	History of different tumor
<i>M Simon (1989)</i>	26	Male	Absent	Lung single nodule	Autopsy	Occult papillary carcinoma	Absent
<i>T Bando (1993)</i>	83	Female	Absent	Right lower lobe single nodule	Live (Excision)	Absent	Absent
<i>LP Weng (2000)</i>	86	Female	Absent	Right lobe single nodule	Autopsy	Nodular goiter	Colon adenocarcinoma
<i>Y Ito (2008)</i>	59	Female	Absent	Right lobe single nodule	Live (Excision)	Nodular goiter	Absent
<i>N Di Mari (2010)</i>	77	Male	Absent	Left upper lobe single nodule	Autopsy	Absent	Gastric carcinoma
<i>HS Ryu (2012)</i>	50	Female	Absent	Multiple pulmonary nodule	Live (Excision)	Absent	Endometrioid adenocarcinoma
<i>HH Ko (2013)</i>	64	Female	Absent	Left lower lobe single nodule	Live (Excision)	Thyroid carcinoma	Absent
<i>H Cheng (2015)</i>	37	Female	Absent	Multiple pulmonary nodule	Live (Excision)	Multinodular colloid goiter	Absent
<i>Present case</i>	47	Female	Absent	Right lower lobe single nodule	Live (Excision)	Nodular goiter	Absent

Discussion

The presence of thyroid tissue anywhere along its embryologic path other than the usual thyroid position in the neck is defined as heterotopic thyroid tissue [1,2]. It is a rare developmental anomaly. The prevalence of thyroid ectopia is higher in females than in males [12]. The lung is a quite rare localization for ectopic thyroid tissue and location of heterotopic thyroid tissue in the lung parenchyma is difficult to explain on basis of embryology. One possibility 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 [10]. Most cases of ectopic intrapulmonary thyroid are asymptomatic and it is incidentally detected as a solitary pulmonary nodule or noticeable during autopsy [5]. Sometimes it can cause symptoms with mass effect such as dysphagia, dysphonia, stidor, dyspnea, hemorrhage, and hoarseness [12]. Ectopic thyroid may become goitrogen and may also be associated with clinically evident thyroid dysfunction, which could be either hypofunction or hyperfunction. Rarely, benign or malignant neoplastic changes can occur. Thyroiditis occurring in ectopic thyroid tissue has also been reported. Hyperthyroidism arising from ectopic thyroid tissue is less common than hypothyroidism. However, an ectopic thyroid gland with histological features of Graves' disease has been found in different locations like the base of the tongue, mediastinum, submandibular region, lateral neck and the mesentery of the small intestine [13]. Thyroid tissue was sharply separated from the lung parenchyma as histologically and thin, connectival septa incompletely separated it into distinct lobular units. Follicles had a normal, benign appearance

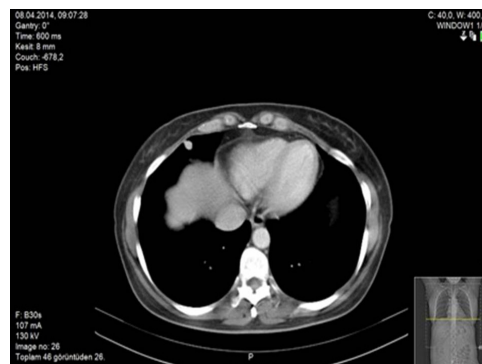


Fig.1: In CT, solitary nodule in the segment of the right lower lobe.

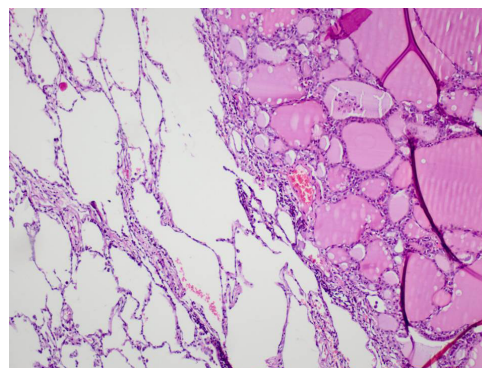


Fig.2: Microscopically, thyroid tissue that had colloid content and follicular structures lined with monomorphic cells besides the lung tissue (x100, HE).

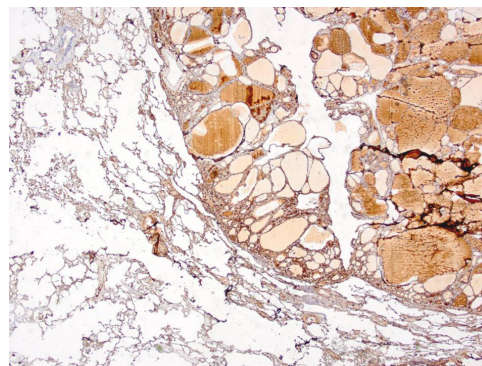


Fig.3: The lesion immunohistochemically positive for thyroglobulin.

with a cuboidal epithelium and abundant fluid colloid. It doesn't contain teratomatous components and it has a positive immunohistochemical staining seen with thyroglobulin [8].

A differential diagnosis of ectopic intrapulmonary thyroid includes thyroid cancer metastasis, thymoma, neuroma, germ cell tumor and all kinds of metastatic tumors. Ectopic thyroid may progress to malignant papillary thyroid carcinoma. Prior to ectopic intrapulmonary thyroid treatment, the patient's age, presence of orthotropic thyroid, symptoms due to nodules and their severity, thyroid hormone level and malignancy potential need to be considered to perform surgical or medical treatment. Depending on the position of the tissue, sternotomy or thoracotomy can be performed for surgical treatment. Also, thoracoscopic treatment can also be considered.

In conclusion, ectopic thyroid tissue is rare and elusive diagnosis that is usually asymptomatic, but can be symptomatic depending on its location, size, and risk of malignancy. Surgical treatment can be performed considering the presence of symptoms or malignancy [10]. One must maintain a high degree of suspicion in any patient presenting with intrapulmonary nodules.

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