

Intrathoracic Goiter and Thyroid Nodule: Case Report

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ABSTRACT

Introduction: There is a strong correlation between the incidents. of substernal goiter and cervical goiter and endemic in some regions. The incidence of substernal goiter is difficult to evaluate, but between 3 and 21% of these patients undergo thyroidectomy, as was our case. This variation reflects the lack of a definitive definition of substernal goiter. **Clinical Case:** A 57-year-old female from the outpatient clinic was referred from another hospital center with a history of total thyroidectomy due to goiter and compressive symptoms in 2009, post-surgical hypothyroidism with subsequent management with levothyroxine 100 mcg per day. His current condition began in 2021 with myalgia, low back pain, dyspnea with medium effort and a sensation of retrosternal oppression, so he went to a doctor, where a chest x-ray was performed, finding an intrathoracic tumor, so a fine-needle-guided biopsy was performed. with a report of ectopic thyroid tissue (upper mediastinum) benign category II, for which she was referred to this unit. She persists with low back pain, which increases with physical activity. She denies dysphagia or other additional symptoms. **Discussion:** Primary intrathoracic goiter is a rare congenital entity that arises from accessory and/or ectopic thyroid tissue originating from an orthotopic thyroid gland and can cause complications such as respiratory obstruction and malignancy. These entities are generally managed surgically due to an increased risk of respiratory complications or malignancy. In contrast, secondary thyroid goiter is a more common entity arising from orthotopic thyroid tissue and its differential diagnosis should be considered when mediastinal masses are incidentally found.

Keywords: Ectopic thyroid, large intrathoracic goiter, Tc-99m pertechnetate, intrathoracic goiter, substernal/surgery.

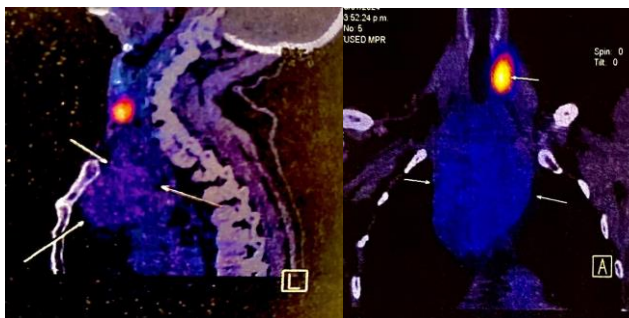
INTRODUCTION

There is a strong correlation between the incidents. of substernal goiter and cervical goiter and endemic in some regions. The incidence of substernal goiter is difficult to evaluate, but between 3 and 21% of these patients undergo thyroidectomy, as was our case. This variation reflects the lack of a definitive definition of substernal goiter. About 85-95% of substernal goiters are benign and they represent up to 7% of mediastinal tumors. Other mediastinal lesions include thymomas, lymphomas, dermoid cysts, pleuropericardial and neurogenic cysts. These tumors must be considered in the differential diagnosis. Although between 5 and 50% of patients are asymptomatic, symptoms such as dyspnea, stridor, and dysphagia are common and result from substernal goiter causing compression of the trachea or esophagus. Superior Vena Cava Syndrome and progressive hoarseness are less common symptoms [1]. It is essential to accurately locate the toxic region in patients with hyperthyroidism before making the decision to operate. Serim et al, reported the removal of an intrathoracic toxic thyroid nodule causing hyperthyroidism with a multinodular normal functional cervical thyroid gland [2]. On the other hand, substernal goiter is commonly known as an extension of the thyroid tissue into the mediastinum. The incidence of substernal goiter varies from 5 to 16% in patients with thyroid disease and is more commonly found in women than in men with a ratio of 4:1. Cervical goiter and substernal goiter are etiologically similar as they both obtain their blood supply from the neck region, especially the inferior thyroid artery. The descent of the cervical goiter through the thoracic inlet by more than 50% is a commonly accepted definition of substernal goiter. The inferior extension of the goiter is due to anatomical limitations of the gland, which are demonstrated by limitation of the gland in all directions except the inferior [3].

CLINICAL CASE

A 57-year-old female from the outpatient clinic was referred from another hospital center with a history of total thyroidectomy due to goiter and compressive symptoms in 2009, post-surgical hypothyroidism with subsequent management with levothyroxine 100 mcg per day. His current condition began in 2021 with myalgia, low back pain, dyspnea with medium effort and a sensation of retrosternal oppression, so he went to a doctor, where a chest x-ray was performed, finding an intrathoracic tumor, so a fine-needle-guided biopsy was performed. with a report of ectopic thyroid tissue (upper mediastinum) benign category II, for which she was referred to this unit. She persists with low back pain, which increases with physical activity. She denies dysphagia or other additional symptoms. On physical examination, oriented and cooperative, with adequate coloration of the integuments, neck with the presence of a previous surgical scar, bilateral jugular engorgement, an enlarged thyroid gland was palpated, which continued towards the suprasternal notch. Chest without presence of tumors or lymphadenopathy, rhythmic heart sounds of adequate frequency and intensity, normal respiratory sounds, abdomen without alterations, intact extremities with fine distal tremor in both arms, eutrophic, without edema. Rest without alterations. Laboratory: Bun 13 mg/dl, Gluc 88 mg/dl, Creat 0.81 mg/dl, ALT 24 U/L, AST 22 U/L, Alb 4 g/dl, FA 90 u/L, Cholesterol 247 mg/dl, Triglycerides 118 mg/dl, Na 141 meq/L, K 4.1 meq/L, Cl 106 meq/L, Total Bilirubin 0.59 mg/dl, Ca 9.7 mg/dl, mg 2.07mg/dl, P 3.7 mg/dl, Hba1c 5.2%, Leuc 4.5,000/mm³, Hb 15.5 g/dl, Hct 44.4%, Pla_q 184,000/mm³, LDL185.3 Mg/Dl, HDL 60 mg/dl. Thyroid function tests: TSH.

0.022 mIU/L, T4t 12.5 µg/dl, T4l 1.58 ng/dl, T3t 163 ng/dl, T3l 3.95 pg/ml, Thyroglobulin 164 ng/ml. A thyroid scan with 3 mci of technetium-99 was requested.



Figures. 1, 2. thyroid gammagram in the planar study, concentration is seen in the left lobe of 29 mm longitudinally. There is a retrosternal tumor mass, with complex content, measuring 113 mm x 83 mm (transverse) x 68 mm (ap), which surrounds the trachea and compresses the esophagus, until it reaches the aortic arch and the pulmonary artery. Findings; residual left thyroid lobe and retrosternal thyroid tumor mass.



Figures. 3-6. A retrosternal tumor mass is observed that surrounds the trachea and compresses the esophagus, until it reaches the aortic arch. A biopsy was performed that reported thyroid tissue without atypia. Therefore, after evaluation by the endocrinology service, an intrathoracic thyroidectomy plus partial sternotomy was performed. With transsurgical biopsy with thyroid tissue with hyperplasia without signs of cellular atypia. Findings were a thyroid measuring 10x12 cm with firm adhesions to mediastinal vessels, carotid artery and innominate vein, with incidental carotid injury repaired without complications.



Figure 7. Partial sternotomy. Figure 8. intrathoracic goiter exposure. Fig. 9. intrathoracic thyroid Patient with adequate post-surgical evolution without complications is discharged home due to clinical improvement.

DISCUSSION

Goiter with an intrathoracic component is relatively common. However, it is less common to see extension outside the mediastinum whether anterior or posterior. When the goiter extends

further into the chest, the path of least resistance is to the right. Thyroid masses found after thyroidectomies are not common and most often result from incomplete removal of a descending goiter or, more rarely, isolated congenital mediastinal thyroid tissue disconnected from the cervical portion that becomes hypertrophic after removal of the functional cervical thyroid [4]. Furthermore, intrathoracic goiters are benign tumors that present within the mediastinum or thoracic cavity as a large intrathoracic goiter. Due to their mass effects, they can cause life-threatening complications if they compress cardiorespiratory structures, such as the tracheobronchial airway, main pulmonary artery, atrium, and superior vena cava. A combination of tumor-related tracheal stenosis and unilateral phrenic nerve palsy, obesity, and sleep can lead to life-threatening hypoventilation, even if there is no apparent obstruction [5]. Primary intrathoracic goiter is a rare congenital entity that arises from accessory and/or ectopic thyroid tissue originating from an orthotopic thyroid gland and can cause complications such as respiratory obstruction and malignancy. These entities are generally managed surgically due to an increased risk of respiratory complications or malignancy. In contrast, secondary thyroid goiter is a more common entity arising from orthotopic thyroid tissue and its differential diagnosis should be considered when mediastinal masses are incidentally found [6]. In addition, extracervical ectopic thyroid tissue is rare, and may also be present in various locations in the chest, abdomen, and pelvis. These foci are asymptomatic and can be detected incidentally on images. It is important for radiologists to not only be aware of these rare imaging locations and features, but also the functions of various imaging modalities. Contrast-enhanced and unenhanced CT show increased attenuation and marked contrast enhancement, respectively, while iodine scintigraphy with single-photon emission computed tomography provides functional and anatomical characterization [7]. Regarding the surgical treatment of substernal goiter, it is a challenge for surgeons. The best surgical approach should be determined based on the evaluation of the CT scan. The complete capsule and the clear boundary between the retrosternal goiter and the surrounding tissue are the most important factors for surgery. The incidence of perioperative complications, such as recurrent laryngeal nerve injury, nerve palsy, hypoparathyroidism, hypocalcemia, and infection, are not significantly different from that seen with traditional thyroid surgery. With careful planning and execution before surgery and meticulous operation during surgery, most substernal goiters can be safely removed through the cervical approach [8]. Approximately 8% of thyroid tumors may present with mediastinal lesions. Aberrant mediastinal goiter can be resected with video-assisted thoracoscopic surgery (VATS), but some substernal goiters require manipulation in both the cervical and thoracic regions. In patients with ectopic goiter, it is often controversial whether there is fibrous continuity when the primary tumor and the mediastinal lesion appear separate on imaging [9]. Recent advances in thyroid surgery have allowed vascular sealing systems to be used instead of traditional knots. Since the vast majority of substernal goiter can be safely removed transcervically, the implication of cardiothoracic support should be evaluated preoperatively. LigaSure Small Jaw uses a combination of energy and pressure application for the vessel and tissue fusion procedure and permanently seals vessels and tissue bundles up to seven mm in diameter without the need for dissection. The seals can withstand up to three times the normal systolic pressure. The average sealing cycle is 2-4 seconds and the feedback-controlled response system automatically deactivates as the sealing cycle ends, without requiring any relevant assumptions and coagulation occurs when collagen and elastin have been denatured. to form a seal [10]. The robotic approach facilitates precise dissection around vascular and nervous structures due to its three-dimensionality, high vision, and multidirectional articulation. These characteristics allow surgery a precise resection surgery

when performed in narrow anatomical spaces, such as at the apex of the thoracic cavity [11]. Radiofrequency ablation (RFA) offers a promising alternative for patients with ITG. RFA is a well-established, effective and minimally invasive technique and is a treatment for patients with benign thyroid nodules. RFA can result in a significant volume reduction with good cosmetic effects and symptomatic improvement, and presents a low recurrence rate. The advantages of RFA include a minimally invasive technique, procedure under local anesthesia, outpatient surgery, and lower complication rate compared to surgery. It should be noted that complications may include voice changes, nerve injury, tumor rupture, hematoma, skin burns, and hypothyroidism. However, RFA provides an alternative treatment to surgical modality in patients with ITG who refuse surgery, or cannot undergo a surgical procedure [12].

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