



## Rare Case Report

### Ectopic Thyroid Mass Separately Present in Mediastinum with Multinodular Goiter

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#### ABSTRACT

Masses located in the superior mediastinum primarily consist of retrosternal goiters, characterized by their classic presentation of compressive symptoms such as difficulty breathing (dyspnea), swallowing (dysphagia), altered voice, or obstructive sleep apnea. The standard approach to managing these goiters involves total thyroidectomy with the removal of any intrathoracic thyroid tissue. However, in some rare instances, these masses may not be a direct extension of the thyroid in the neck and may necessitate a sternotomy—a surgical procedure involving an incision in the sternum—for complete excision of the mediastinal gland. We encountered an intriguing case that initially appeared to be a retrosternal extension of the thyroid gland based on clinical evaluation. However, during the surgical procedure, it was discovered to be a separate and encapsulated mass, requiring a sternotomy for its excision. This unexpected finding underscores the importance of thorough intraoperative assessment and adaptability in surgical management. Retrosternal goiters represent a unique challenge due to their location and potential complications related to compression of nearby structures. While total thyroidectomy is often sufficient for management, instances like the one described in our case report highlight the variability and complexity that surgeons may encounter. Awareness of such variations is crucial for ensuring optimal patient outcomes and minimizing the risk of incomplete excision or damage to adjacent structures.

#### Introduction

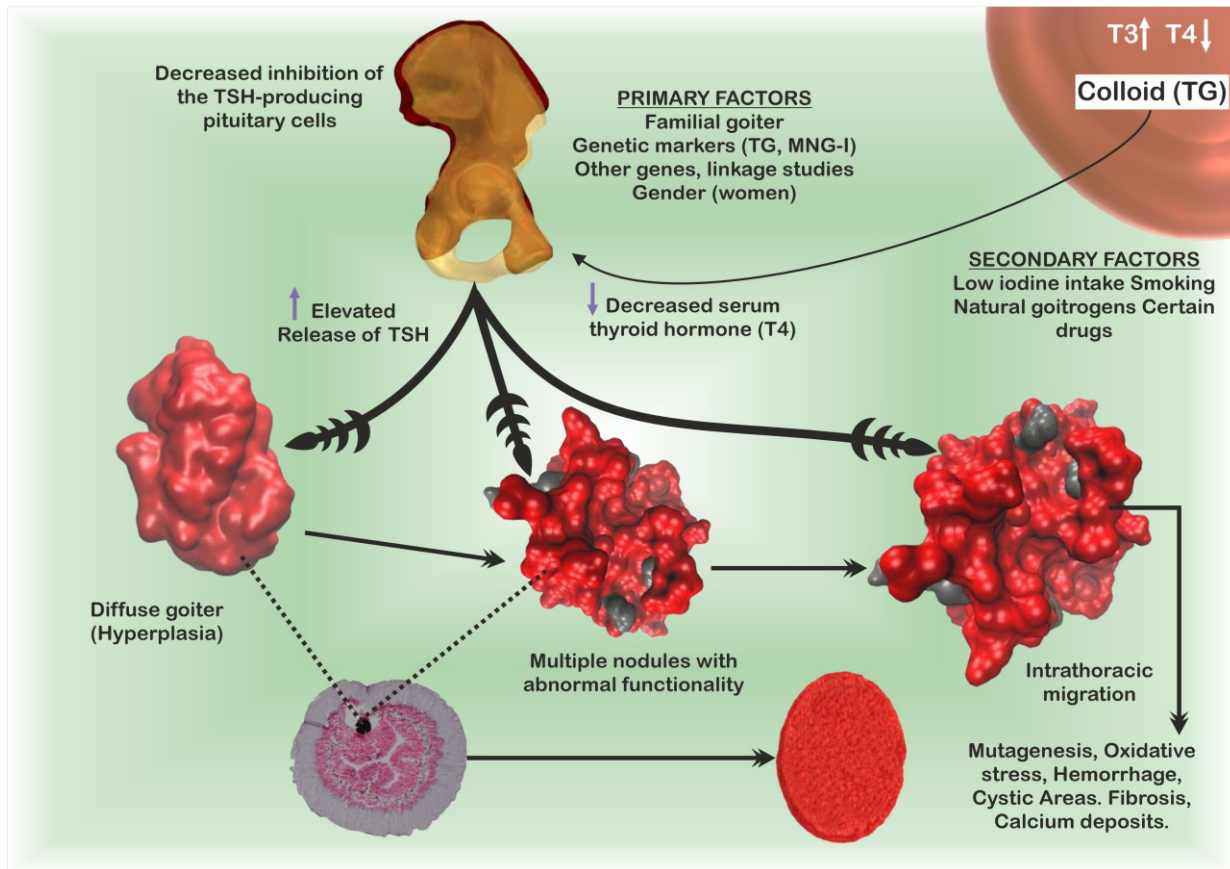
Masses located in the superior mediastinum are primarily retrosternal goiters, a condition where the thyroid gland extends below the thoracic inlet. When a thyroid mass has 50% or more of its volume below this anatomical landmark, it is termed a substernal goiter [1]. Despite attempts to classify retrosternal goiters, such as through Huin's and Randolph's classifications, there remains ambiguity in defining their types. These goiters typically manifest with compressive symptoms such as dysphagia, dyspnea, obstructive sleep apnea, and voice alterations. In rare instances, they may lead to superior vena ca-

-va compression and Horner's syndrome [2]. The standard treatment for retrosternal goiters involves total thyroidectomy with the removal of intrathoracic thyroid tissue, usually performed via a cervical incision. However, in some cases, a partial or complete median sternotomy may be necessary. In this report, we present an intriguing case where a patient initially diagnosed with retrosternal extension of the thyroid gland was found to have a separate, encapsulated mass intraoperatively, requiring sternotomy for excision [3-5].

The superior mediastinum, nestled between the thoracic inlet and the thoracic plane, is a common location for retrosternal goiters. These goiters, which extend into the thoracic cavity from the neck, are often

challenging to classify precisely due to variations in their anatomical presentation. While attempts have been made to categorize them using classification systems like Huin's and

Randolph's, the diverse nature of retrosternal goiters complicates their clear delineation[6-8].



**Figure 1: Factors responsible for multinodular goiter**

Clinical manifestations of retrosternal goiters primarily arise from their compressive effects on surrounding structures. The proximity of these masses to vital structures in the neck and chest can lead to symptoms such as difficulty swallowing (dysphagia), breathing difficulties (dyspnea), episodes of obstructive sleep apnea, and alterations in voice quality. Additionally, in rare instances, the mass may exert pressure on the superior vena cava, resulting in superior vena cava syndrome characterized by facial and upper extremity swelling. Moreover, compression of sympathetic nerves in the neck may cause Horner's syndrome, characterized by a combination of ptosis (drooping eyelid), miosis (constricted pupil), anhidrosis (lack of sweating), and enophthalmos (sunken appearance of the eye)[9-13].

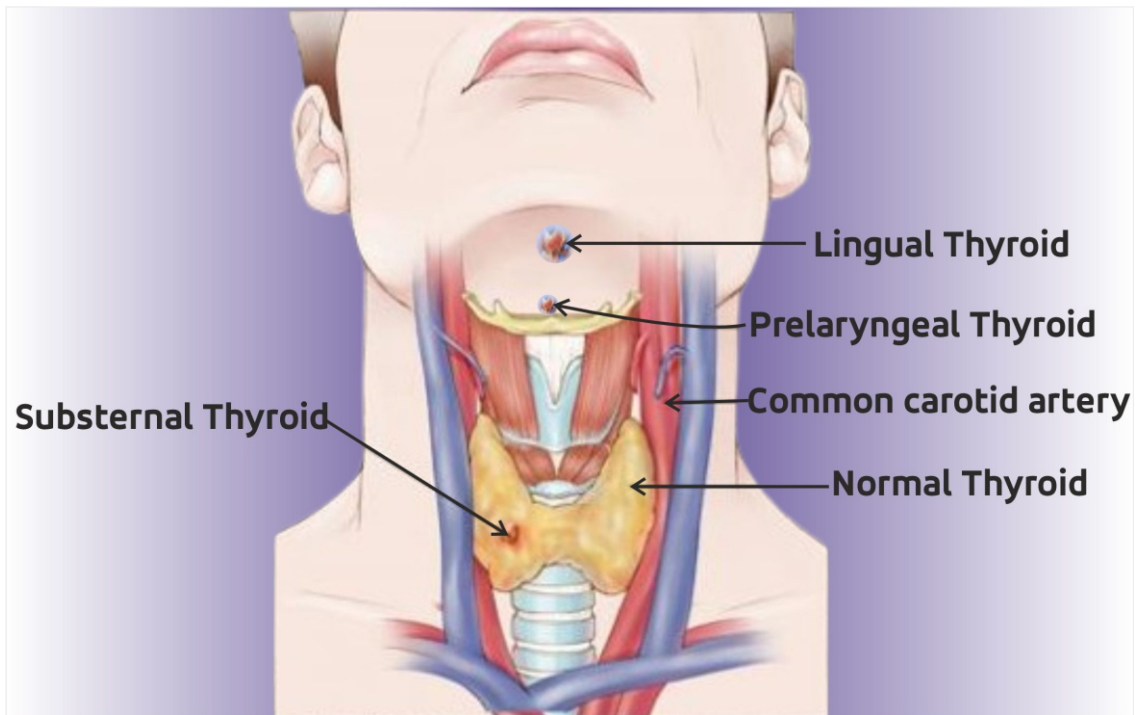
The cornerstone of treatment for retrosternal goiters is surgical intervention, typically in the form of total thyroidectomy. This procedure involves the complete removal of the thyroid gland, including any intrathoracic extension of thyroid tissue. While most cases can be managed through a cervical incision, providing direct access to the thyroid gland, certain situations necessitate more extensive surgical approaches. In such instances, a partial or

complete median sternotomy, where the sternum is partially or fully divided, may be required to adequately visualize and excise the retrosternal component of the goiter[14-17].

Now, turning our attention to the case report at hand, we encountered a patient who was initially diagnosed with a retrosternal extension of the thyroid gland based on clinical and imaging findings. However, intraoperative exploration revealed a distinct entity—a separate, encapsulated mass—that warranted a different surgical approach. In this unique scenario, sternotomy became imperative for complete excision of the mass, highlighting the importance of careful preoperative assessment and adaptability during surgical interventions for complex cases of retrosternal goiters[20].

### CASE PRESENTATION

A 27-year-old woman, without any known underlying health conditions, presented to our medical facility after an incidental discovery of a swelling during a routine master health checkup. Remarkably, she displayed no symptoms associated with the swelling and did not report any sensations of compression. Upon examination, we observed an enlarge-



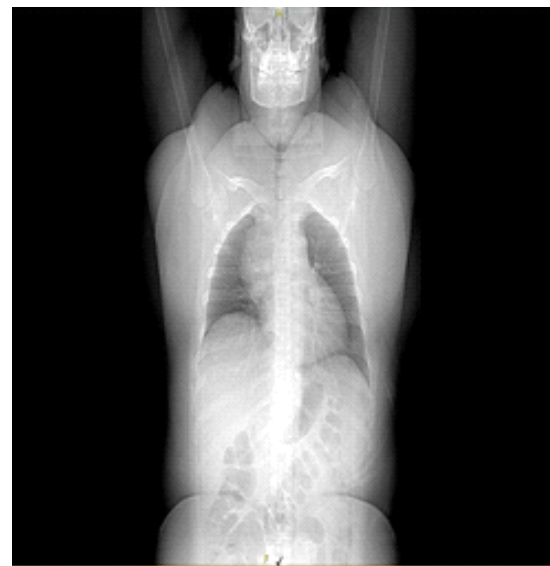
**Figure 2: Ectopic thyroid (Image Courtesy: S Bhimji MD) [18, 19]**

-d, nodular thyroid affecting both lobes, with a predominant enlargement noted in the right lobe. The texture of the gland felt firm and nodular, with the lower border of the right lobe showing some clinical indistinctness.

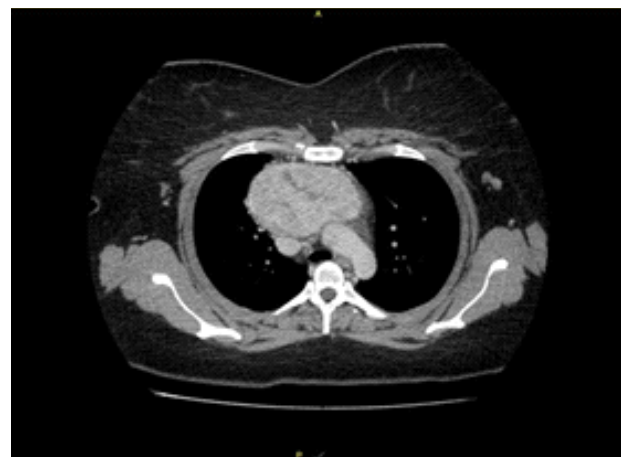
To investigate the possibility of retrosternal extension, a contrast-enhanced computed tomography (CECT) scan of the neck and thorax was conducted. The imaging revealed an enlarged thyroid gland with extension into the retrosternal region, reaching up to the anterior mediastinum near the superior pulmonary vein. The remainder of her physical examination did not reveal any abnormalities. Subsequently, she underwent a fine needle aspiration biopsy, which indicated a benign thyroïdal swelling.

As part of her treatment plan, she was admitted electively for a total thyroidectomy, along with excision of the mediastinal component. The surgical approach involved initial mobilization of the thyroid through a cervical skin crease incision. Following this, a sternotomy was performed to access the retrosternal component, which was found to be in close proximity to the innominate vein and thymus. Intraoperative observations revealed an enlarged right lobe of the thyroid measuring approximately 8x4 cm, and a left lobe measuring about 7x3 cm. Initially appearing as a contiguous mass from the neck to the mediastinum, further exploration revealed that it was encapsulated separately, measuring 9x8 cm.

Following the procedure, the patient experienced two episodes of hypocalcemia, which were promptly corrected with intravenous calcium gluconate. Oral medications were initiated on the first day post-operation and gradually increased. She was discharged on the seventh day postoperatively with oral thyroxine and calcium supplementation.

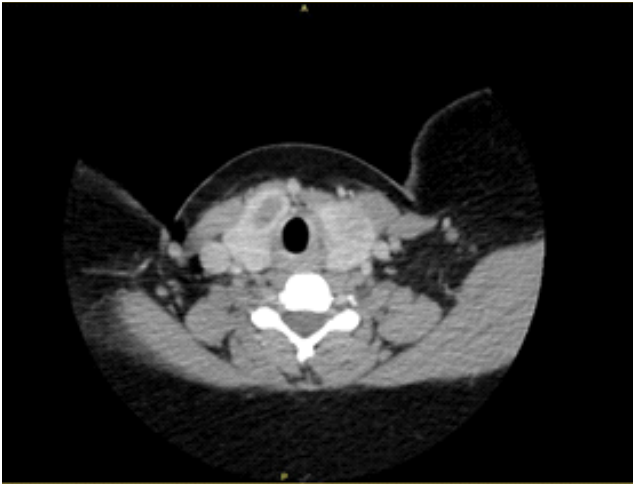


**Figure 3: X-ray film showing mediastinal mass**

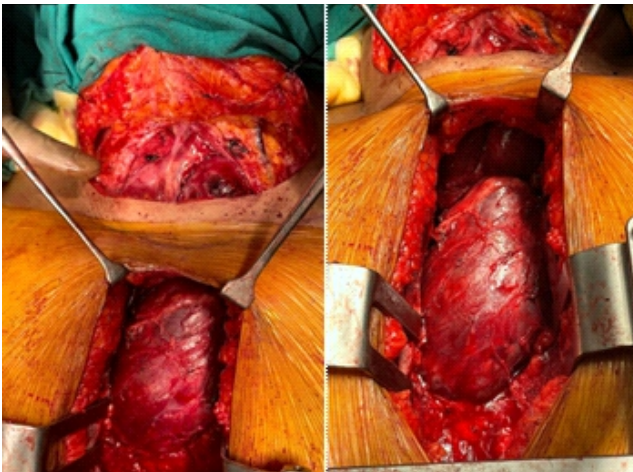


**Figure 4: CECT chest showing retrosternal goiter**





**Figure 5: CECT neck showing multinodular goiter**



**Figure 6: Intraoperative image showing the mediastinal and cervical portion of thyroid**



**Figure 7: Resected specimen of the cervical and mediastinal thyroid gland**

## DISCUSSION

Cervico-mediastinal goiters typically originate from any lobe of the thyroid extending into the mediastinum. They commonly manifest with symptoms of pressure, compressing the upper airway and esophagus, potentially mimicking malignancy due to their rapid enlargement. Recent research indicates that these goiters predominantly present as a neck mass accompanied by dyspnea in approximately 65% of cases, dysphagia in around 25-30% of cases, and thyrotoxicosis in roughly 10-12.5% of patients. Surgical excision is imperative for these thyroid masses, regardless of symptomatology, as it is the sole preventive measure against future complications such as compression of mediastinal structures resulting from their enlargement. In the case of our patient, a multi-nodular goiter with a retrosternal component was observed, albeit without any associated pressure symptoms[21-25].

Prior to operating on cervico-mediastinal thyroids, a computed tomography (CT) scan is crucial as it serves as the gold standard imaging modality for preoperative assessment. It aids in determining the size and anatomical extent of the mass and its relationship with surrounding mediastinal structures. This information is essential for preoperative planning, especially regarding anesthesia and the choice of surgical approach, whether through a cervical incision or with the addition of sternotomy for complete mass removal. In anticipation of sternotomy requirement, a multidisciplinary approach involving a cardio-thoracic surgeon was adopted for our patient[26-29].

Various criteria have been established in the literature for selecting patients for sternotomy. These criteria primarily consider the location of the thyroid relative to important mediastinal structures. Additionally, CT features such as the volume of the thyroid gland, extension below the carina, the primary source of its blood supply, and the risk of bleeding are considered. Presence of mediastinal lymphadenopathy is also considered, especially in cases of suspected malignancy. It's worth noting that approximately 97% of mediastinal goiters can be safely approached through a cervical incision alone, with only 3-8% of cases necessitating sternotomy[30-32].

Despite the need for sternotomy in select cases, the prognosis for patients with cervico-mediastinal thyroids, both in our case and in the literature, is generally excellent with minimal mortality. Attempting to extract encapsulated masses through a cervical incision without proper preoperative assessment can lead to catastrophic bleeding and life-threatening consequences. Therefore, careful consideration of surgical approach based on preoperative imaging findings is crucial for ensuring optimal outcomes and minimizing risks for patients undergoing surgery for cervico-mediastinal thyroids[33-35].

The standard approach outlined not only addresses the prim-

primary cervico-mediastinal thyroid mass but also helps mitigate the risk of a rare condition known as "forgotten goiter." This condition involves a thyroid mass that is encapsulated and located separately within the mediastinum, unrelated to the cervical goiter. If left unremoved or missed during the initial surgery for the cervical thyroid, it can necessitate reoperation, significantly heightening the risk of morbidity and mortality. Additionally, the presence of a forgotten goiter is associated with an increased likelihood of complications. Therefore, thorough preoperative imaging and careful surgical planning are essential to identify and address all thyroid masses, ensuring comprehensive removal and reducing the risk of subsequent complications[36-38].

## CONCLUSION

Patients presenting with both neck and mediastinal masses typically necessitate a multidisciplinary team (MDT) approach within a tertiary care hospital setting. This case underscores the importance of such an approach, particularly considering the possibility of a retrosternal goiter as a distinct entity. Attempting to extract such a mass solely through the neck carries a high risk of catastrophic complications. Therefore, a collaborative effort involving specialists from various disciplines is essential for comprehensive evaluation, careful surgical planning, and optimal management of these complex cases. By leveraging the expertise of a multidisciplinary team, patients can receive tailored treatment plans that prioritize safety and maximize outcomes.

## ETHICS APPROVAL

All necessary approval including ethical approval has been taken before conducting this study.

## AVAILABILITY OF DATA AND MATERIAL

Not Applicable.

## CONFLICT OF INTERESTS

Authors declared that there is no conflict of interest.

## FUNDING

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