

# Shining a Light on Hidden Thyroids: A Case Exploring the Potential of Technetium Imaging for Lingual Thyroid Diagnosis

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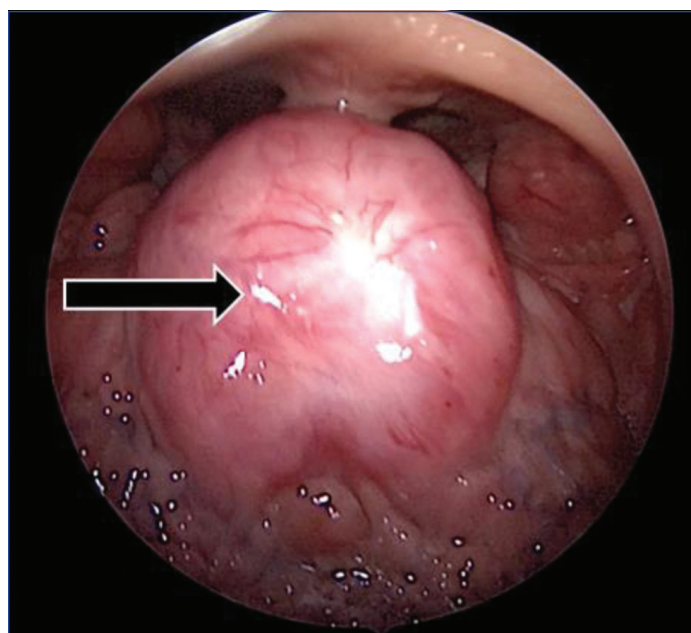
## ABSTRACT

Ectopic thyroid, the presence of thyroid tissue in locations other than the normal anterior neck region between the second and fourth tracheal cartilages, is the most common form of thyroid dysgenesis. A 32-year-old female patient sought medical attention at the Otolaryngology Department with a foreign body sensation in her throat. To ensure an accurate diagnosis, hereby, the authors conducted a comprehensive diagnostic work-up, which included Technetium-99 (Tc-99m) scanning. Remarkably, the scanning results revealed radiotracer uptake in the base of the tongue while indicating an absence of uptake in the thyroid bed. By shedding light on present captivating case, the present report offers valuable insights into the usage of Technetium imaging in diagnosing doubtful Lingual Thyroid (LT) cases.

**Keywords:** Ectopic thyroid, Otolaryngology, Radionuclide imaging

## CASE REPORT

A 32-year-old female patient presented to the Otolaryngology Department with a complaint of a foreign body sensation in the throat for six months. Physical examination, including an Ear, Nose and Throat (ENT) examination, showed no abnormal findings. However, a video laryngoscopy image was captured using a 70-degree rigid endoscope (Karl Storz) and a video camera system (Olympus), revealing the presence of a 2.5×3 cm midline smooth, reddish mass located at the base of the tongue [Table/Fig-1]. Further examination of the neck revealed the absence of a palpable thyroid gland.



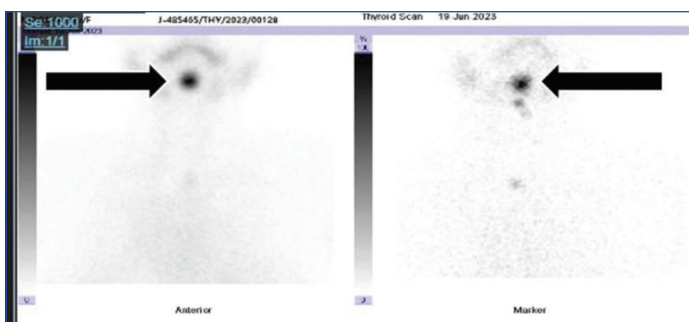
**[Table/Fig-1]:** Video laryngoscopy image of midline smooth, reddish mass located at the base of the tongue (black arrow).

For one year, she has been receiving 100 microgram Thyroxine supplements due to hypothyroidism and currently exhibits euthyroid status according to thyroid function test results. A Computerised Tomography (CT) scan of the neck demonstrated a well-defined

hyperdense nodular structure measuring 1.7×1.6×1.9 cm {Anteroposterior (AP)\* Mediolateral (ML)\* Cranial Circumference (CC)\*} located in the midline posterior aspect of the base of the tongue [Table/Fig-2]. Furthermore, the scan discovered that the thyroid gland was absent in its usual position, indicating the presence of a LT. A Technetium (Tc-99m) thyroid scan showed isotope uptake at the base of the tongue, supporting the diagnosis of LT [Table/Fig-3]. After discussing the available treatment options and the lack of any other symptoms other than occasional foreign body sensation in the throat, it was decided to manage conservatively using oral thyroxine tablets as a suppression therapy. She was then followed-up over a period of 12 months and was found to have a decreased foreign body sensation.



**[Table/Fig-2]:** Axial section showing well-defined hyperdense nodular structure in the base of tongue.



**[Table/Fig-3]:** Isotope uptake at the base of the tongue in Technetium scintigraphy.

## DISCUSSION

Ectopic thyroid is the presence of thyroid tissue in locations other than the normal anterior neck region between the second and fourth tracheal cartilages. The prevalence of this condition is reported to be between 1 per 100,000-300,000 persons, occurring in one out of every 4,000-8,000 patients with thyroid disease [1].

The most important diagnostic tool for detecting ectopic thyroid tissue and determining the presence or absence of the thyroid in its normal location is scintigraphy. Scintigraphy utilises Tc-99m, Iodine-131 (I-131) or I-123 as radioactive tracers. It is a sensitive and specific method that can differentiate ectopic thyroid from other causes of midline neck masses. Additionally, a thyroid scan can reveal any additional sites of thyroid tissue that may be present [2].

Ectopic thyroid tissue is an uncommon developmental anomaly that affects the embryogenesis of the thyroid gland as it moves from the primitive foregut's floor to its ultimate pretracheal location [2]. During early embryogenesis, the thyroid gland appears as a proliferation of endodermal tissue. It is in the floor of the pharynx between the tuberculum impar and the hypobranchial eminence, which later becomes the foramen caecum. The normal descent of the thyroid gland begins at the foramen caecum in the tongue and progresses past the hyoid bone, ultimately reaching its final position in front and to the side of the second, third, and fourth tracheal rings by the 7<sup>th</sup> week of gestation. During this descent, the thyroid tissue is linked to the foramen caecum through the thyroglossal duct. After the thyroid reaches its proper location, the thyroglossal duct degenerates [3].

The exact pathogenesis of present condition remains unclear, and its underlying mechanisms have yet to be fully elucidated. Some hypotheses propose that the arrest of thyroid tissue descent may be attributed to maternal antibodies, while familial cases may exhibit a higher incidence compared to the general population [4]. Additionally, the unique architectural variations of cervical vessels and the diverse origins of carotid arteries from the aortic arch have been implicated in influencing thyroid morphogenesis. These factors may contribute to the presence of ectopic thyroid tissue, providing a plausible explanation for its occurrence [5].

Lingual and sublingual areas are the most common locations in the head and neck region. The trachea, submandibular gland, maxilla, palatine tonsils, iris of the eye, and pituitary gland are some other locations [6,7].

In 70% of cases with LT, the orthotopic thyroid gland is absent [7]. In present case, the thyroid was absent in its normal location. The symptoms related to LT primarily depend on the size of the ectopic tissue and are predominantly attributed to oropharyngeal obstruction. These symptoms include dysphonia, dysphagia (ranging from mild to severe), a lump-in-throat sensation, dysapnoea, and even chronic cough or sleep apnoea. However, the specific manifestation and severity of these symptoms may vary [8]. Hypothyroidism is present in 70% of LT patients. The diagnosis of ectopic thyroid tissue-related diseases typically occurs during early childhood or puberty adolescence in up to 60% of patients. This is because ectopic tissue is unable to meet the physiological requirements, which often

results in the development of hypothyroidism in affected patients [9]. Additionally, LT rarely causes hyperthyroidism and has a malignant potential of 1 in 300 cases [7].

For diagnosis, Technetium-99m pertechnetate is used to find a radionuclide tracer uptake in the thyroid tissue at ectopic locations or in the normal thyroid bed. However, tiny ectopic rests can be difficult to recognise since a normal thyroid gland can capture most of the radionuclide [5].

There are several treatment options available for LT, which include clinical surveillance, levothyroxine suppressive therapy, radioactive iodine ablation, and surgery. Suppressive therapy can be considered in mild cases and patients with normal thyroid function. Through this, the chances of the occurrence of hypothyroidism can be avoided, and it helps in reducing the size of the gland and prevents malignant transformation [10]. Entities who have exclusively operational LT tissue, it can be removed and auto-transplanted into the neck [11].

Another alternative is radiation ablation, which is used in cases where the individual was either symptomatic or did not benefit from medical management [12].

Surgical excision of the ectopic thyroid is an option in cases where the ectopic thyroid gland is large and causing pressure symptoms such as difficulty in breathing, swallowing, voice changes, or bleeding. It is also considered in cases where the histology of the ectopic thyroid suggests malignancy. Ultimately, the choice of treatment depends on the individual patient's symptoms, thyroid function, and preferences, and should be made in consultation with a healthcare professional, experienced in managing thyroid disorders [13].

## CONCLUSION(S)

Careful planning for the management of LT, an uncommon clinical entity, is essential following a comprehensive diagnostic work-up, and the availability of Technetium imaging can become a very useful tool in the arsenal of imaging modalities. In cases of LT with mild symptoms and subclinical hypothyroidism, conservative management by means of suppressive therapy can be pursued. For patients with minimal symptoms and no doubt of malignant conversion, a wait-and-see approach can be adopted while maintaining long-term follow-up. It is important to note that malignant transformation of LT is a rare occurrence. Therefore, it is crucial to conduct thorough evaluations using appropriate diagnostic techniques and implement suitable treatment modalities. Misinterpretation or oversight by the surgeon may result in lifelong misery and discomfort for the patient.

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