International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Infrequent Anatomical Variants of the Thyroid Gland: A Detailed Case Report and Literature Synthesis

María Guadalupe Nieblas Serrano[1], Sarahí Carrillo Barraza[2], Axell Daniel Lugo Rodríguez[3], Jorge Luis Vargas Lugo[4], Lucero de María Moran Luna[5], Edgar Isidro Sánchez Sampedro[6]

[1]Hospital General Regional No.1, Ciudad Obregón, Sonora.
[2]Hospital Universitario de Torreón Dr. Joaquín Del Valle Sánchez.
[3]Instituto Mexicano del Seguro Social, Unidad Médica de Alta Especialidad H. E. No 71, Torreón, Coahuila.
[4]Hospital Universitario de Torreón.
[5]Hospital Universitario de Torreón.
[6]Hospital Universitario de Torreón

Abstract: ***The thyroid gland, a key endocrine structure, is typically located in the anterior neck, spanning the second to fourth tracheal rings. However, anatomical variations in its location, size, and morphology can occasionally occur, posing challenges in diagnosis and surgical management. These variations are particularly significant when associated with thyroid malignancies, as they can influence the extent of disease and surgical planning. This article explores unusual anatomical aspects of the thyroid gland through a review of the literature and a detailed analysis of a clinical case.***

Keywords: thyroid gland, anatomical variations, papillary thyroid carcinoma, TIRADS 5, thyroidectomy, ectopic thyroid, infrahyoid infiltration

1. Case Report

A 70 - year - old female presented with a progressively enlarging cervical mass over four months, first noticed in January 2024 (Figure 1). Thyroid ultrasound revealed a suspicious nodule classified as TIRADS 5. Fine - needle aspiration biopsy (FNAB) confirmed a diagnosis of papillary thyroid carcinoma (PTC). Surgical planning commenced for a total thyroidectomy. Intraoperative findings included a thyroid gland with tumor infiltration involving the infrahyoid muscles, hyoid bone, mylohyoid muscle, and subcutaneous tissue, measuring approximately 8x8x6 cm (Figure 2). Notably, the thyroid gland was abnormally positioned, located anterior to the thyroid cartilage and hyoid bone with anterior protrusion.

Figure 1: Irregular tumor of the thyroid gland.

2. Discussion

The thyroid gland's embryological development involves migration from the foramen cecum to its typical pretracheal location. Aberrations during this process can result in ectopic thyroid tissue or unusual gland positioning. While ectopic thyroid tissue is well - documented in regions such as the base of the tongue or mediastinum, thyroid glands entirely outside their usual anatomical location are rare.

In this case, the gland's abnormal position, anterior to the thyroid cartilage and hyoid bone, represents a unique variation. Such ectopia may be asymptomatic until pathological processes, such as malignancy, occur. The tumor's extensive local infiltration highlights the aggressive nature of the disease, emphasizing the importance of thorough preoperative imaging and careful surgical planning.

Anatomical variations can complicate both diagnosis and treatment. The misidentification of ectopic thyroid tissue as other cervical masses or metastatic lesions can delay appropriate intervention. Surgeons must also be vigilant for these anomalies during procedures, as unrecognized ectopic tissue can lead to incomplete resection or complications.

Figure 2: Tumor which infiltrates the infrahyoid muscles, bone hyoid, mylohyoid and subcutaneous cellular tissue

3. Conclusion

Unusual anatomical variations of the thyroid gland, though rare, have significant clinical implications. This case underscores the importance of recognizing and addressing these variations in the context of thyroid malignancies. The atypical positioning of the thyroid gland, as observed in this patient, highlights the need for heightened awareness among clinicians regarding potential deviations from normal anatomy, which can influence both diagnosis and surgical management.

Advanced imaging techniques, such as high - resolution ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI), play a crucial role in preoperative planning by providing detailed insights into the extent of tumor involvement and any anatomical anomalies. These modalities help in differentiating ectopic thyroid tissue from other cervical masses and contribute to more precise surgical strategies.

Multidisciplinary collaboration is essential in managing complex thyroid malignancies with anatomical variations. The combined expertise of endocrinologists, radiologists, and surgeons ensures comprehensive assessment and appropriate therapeutic interventions. Moreover, histopathological evaluation post - surgery remains critical to confirming the extent of disease and guiding further treatment, such as adjuvant radioactive iodine therapy when indicated.

From a surgical perspective, careful preoperative evaluation and intraoperative adaptability are paramount. Recognizing aberrant thyroid anatomy can prevent intraoperative complications, such as incomplete resection or injury to adjacent structures. Surgeons must be prepared for unexpected anatomical findings and adjust their approach accordingly to achieve complete tumor excision while preserving vital structures.

In conclusion, this case highlights the complexity posed by anatomical variations of the thyroid gland and their impact on the management of thyroid malignancies. Continuous advancements in diagnostic imaging, surgical techniques, and interdisciplinary collaboration are fundamental to optimizing patient outcomes. Further research and case documentation will enhance our understanding of these rare presentations, ultimately improving recognition and therapeutic approaches in clinical practice.

References

[1] Shaha AR. Ectopic thyroid. *Clinical Anatomy*.2022; 35 (5): 653 - 661.
[2] Henry BM, Sanna B, Vikse J, et al. Anatomical variations of the thyroid gland: A systematic review and meta - analysis. *Clinical Anatomy*.2020; 33 (1): 17 - 31.
[3] Leonardi C, Frasoldati A, Cosentino A, et al. TIRADS: New insights into thyroid imaging and reporting. *Radiology*.2021; 300 (3): 635 - 644.
[4] Haugen BR. Management of thyroid nodules and differentiated thyroid cancer. *Thyroid*.2016; 26 (1): 1 - 133.
[5] Dean DS, Gharib H. Epidemiology of thyroid nodules. *Best Practice & Research Clinical Endocrinology & Metabolism*.2020; 34 (1): 101560.
[6] Rossi ED, Faquin WC, Baloch ZW. The role of FNAB in thyroid nodule management. *Endocrine Pathology*.2020; 31 (3): 240 - 254.
[7] Randolph GW, Duh Q - Y, Heller KS, et al. The importance of surgical margins in thyroid cancer. *Thyroid*.2020; 30 (8): 1083 - 1092.
[8] Schneider DF, Chen H. New developments in the diagnosis and treatment of thyroid cancer. *CA Cancer Journal for Clinicians*.2022; 72 (3): 223 - 244.
[9] Salmaslioglu A, Erbil Y, Dural C, et al. Predictive value of sonographic features in the diagnosis of malignant

thyroid nodules. *European Journal of Radiology*.2008; 70 (3): 459 - 464.

[10] Pellegriti G, Frasca F, Regalbuto C, et al. Worldwide increasing incidence of thyroid cancer: Update on epidemiology. *Endocrinology & Metabolism Clinics of North America*.2020; 49 (3): 339 - 353.