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ECTOPIC INTRATHYROIDAL THYMIC TISSUE IN AN ADULT: A RARE INCIDENTAL FINDING COEXISTING WITH DUAL THYROID NEOPLASMS

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ABSTRACT

Ectopic intrathyroidal thymic tissue is an exceptionally rare developmental anomaly, particularly in adults. Although it has been increasingly recognized in children, where it is often detected incidentally during imaging performed for unrelated conditions, its occurrence in adults is exceedingly uncommon. Consequently, it is frequently mistaken for benign thyroid nodules or malignant thyroid neoplasms, creating a diagnostic challenge for both clinicians and radiologists [1].

INTRODUCTION

The thymus reaches its greatest functional and structural development during childhood and the prepubertal period, when rapid proliferation of thymic lymphoid tissue occurs. Ectopic thymic tissue is therefore more readily identified during this stage of life. Following puberty, the thymus undergoes physiological involution, with progressive replacement of lymphoid tissue by adipose tissue. As a result, persistent ectopic thymic remnants within the thyroid gland are rarely encountered in adults. High-resolution ultrasonography remains the preferred initial imaging modality because of its accessibility, cost-effectiveness, and ability to characterize thyroid lesions while identifying imaging features suggestive of ectopic thymic tissue [2].

Embryologically, the thymus originates from the ventral wing of the third pharyngeal pouch, whereas the inferior parathyroid glands develop from its dorsal wing. During fetal development, both structures descend caudally from the neck toward their definitive anatomical locations. Failure or interruption of this migration may result in ectopic thymic tissue anywhere along the thymopharyngeal tract, extending from the angle of the mandible to the superior mediastinum. The thyroid gland represents one of the most common sites of ectopic thymic tissue because of its close relationship to this embryological migratory pathway [3].

Conversely, developmental abnormalities may also result in ectopic thyroid or parathyroid tissue within a normally descended thymus, reflecting the shared embryological origin and migratory course of these structures [4].

Most cases of ectopic thymic tissue remain asymptomatic and are discovered incidentally during thyroidectomy or investigation of cervical masses. The marked predominance of reported cases in children is attributed to the greater size and activity of the thymus during early life. In contrast, adult cases are exceptionally rare because progressive thymic involution largely replaces thymic tissue with fibrofatty stroma, making persistent ectopic thymic remnants uncommon [5].

The present report describes an exceptionally rare adult case in which ectopic intrathyroidal thymic tissue coexisted with papillary thyroid microcarcinoma and non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP). This unique combination emphasizes the importance of careful histopathological evaluation of thyroidectomy specimens and broadens the differential diagnosis of unusual thyroid lesions.

Case Presentation

A 52-year-old woman presented with a one-year history of swelling over the anterior aspect of the neck, localized to the left of the midline. The swelling was insidious in onset and had remained non-progressive. She also complained of gradually developing mild hoarseness of voice. There was no history of dysphagia, odynophagia, neck pain, fever, or significant weight loss.

On physical examination, the right thyroid lobe was palpable, measuring approximately 2 × 1 cm. It was smooth, firm, and mobile. The left thyroid lobe was enlarged, measuring approximately 6 × 4 cm, with a multinodular consistency on palpation. There was no cervical lymphadenopathy, and the overlying skin appeared normal.

Ultrasonography (USG) of the neck demonstrated a well-defined, wider-than-taller, isoechoic nodule in the inferior aspect of the right thyroid lobe, classified as TIRADS III. The left thyroid lobe showed an almost completely solid, wider-than-

taller, isoechoic lesion with smooth margins and focal cystic degeneration, also categorized as TIRADS III. No abnormal cervical lymph nodes were identified.
Fine-needle aspiration cytology (FNAC) of the left thyroid nodule revealed thyroid follicular epithelial cells arranged in clusters, sheets, papillary fragments, and microfollicular structures. Numerous cells demonstrated Hurthle cell change. Focal nuclear enlargement and overlapping were observed. The background contained scant thick colloid with areas of hemorrhage. Based on these findings, the lesion was categorized as Bethesda Category III (Atypia of Undetermined Significance).
Considering the cytological atypia and bilateral thyroid nodules, the patient underwent total thyroidectomy.
Gross examination (Figure 1) revealed a total thyroidectomy specimen weighing 47.5 g. The right thyroid lobe measured 3.5 × 2.8 × 1 cm and contained a well-circumscribed, firm, grey-white to grey-brown nodule measuring 1 × 0.5 cm. The isthmus measured 2 × 1.8 × 1 cm and appeared grossly unremarkable. The left thyroid lobe measured 4 × 1.5 × 0.7 cm with a grey-brown cut surface. In addition, a separate well-circumscribed grey-brown nodular tissue received in the same specimen container, corresponding to the left lobe, measured 5 × 4.5 × 3 cm and exhibited a homogeneous grey-white, firm cut surface.
Microscopic examination of hematoxylin and eosin (H&E)-stained sections demonstrated papillary thyroid microcarcinoma (classic subtype) involving the right thyroid lobe (Figure 2) and non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP) involving the left lobe. In addition, a focus of ectopic intrathyroidal thymic tissue was identified adjacent to the inferior parathyroid gland within the left thyroid lobe (Figures 3–6). The ectopic thymic tissue exhibited preserved corticomedullary differentiation with characteristic Hassall's corpuscles, confirming the diagnosis.

DISCUSSION

Ectopic intrathyroidal thymic tissue is an uncommon developmental anomaly, particularly in adults, where it may mimic benign or malignant thyroid lesions clinically and radiologically. Most reported cases occur in children because the thymus reaches its maximum size and functional activity during early life. Progressive physiological involution after puberty results in replacement of thymic tissue by adipose tissue, explaining the rarity of this entity in adults [6].
Embryologically, the thymus originates from the ventral component of the third pharyngeal pouch and migrates caudally into the anterior mediastinum during fetal development. Failure of complete migration may result in ectopic thymic tissue anywhere along the thymopharyngeal tract, including the thyroid gland. Such ectopic tissue is usually asymptomatic and is most often discovered incidentally during thyroid surgery or histopathological examination [7].
In the present case, the patient presented with unilateral thyroid enlargement and mild hoarseness of voice. Ultrasonography demonstrated bilateral TIRADS III nodules, while FNAC revealed Bethesda Category III cytological atypia, warranting surgical excision. Histopathological examination established two distinct thyroid neoplasms: papillary thyroid microcarcinoma in the right lobe and NIFTP in the left lobe. NIFTP has emerged as a separate pathological entity because of its indolent biological behaviour and excellent prognosis, making accurate histopathological diagnosis essential to prevent overtreatment [8].
An additional noteworthy finding was the presence of ectopic thymic tissue adjacent to the parathyroid gland within the left thyroid lobe. Histologically, thymic tissue demonstrates characteristic lobulation with distinct cortical and medullary regions containing numerous Hassall's corpuscles, features that reliably distinguish it from metastatic lymph nodes, lymphoid aggregates, or thyroid malignancies. Failure to recognize this entity may lead to unnecessary additional investigations or inappropriate therapeutic intervention [9].
Only a limited number of adult cases describing intrathyroidal ectopic thymic tissue have been reported in the literature, and coexistence with thyroid neoplasms is exceedingly rare. The simultaneous occurrence of papillary thyroid microcarcinoma, NIFTP, and ectopic intrathyroidal thymic tissue, as observed in the present case, appears to represent an incidental embryological anomaly rather than a pathogenetically related process. Nevertheless, this unique coexistence emphasizes the importance of meticulous gross sampling and careful histopathological evaluation of thyroidectomy specimens, particularly in patients with multifocal thyroid disease [10].

CONCLUSION

Ectopic intrathyroidal thymic tissue is a rare embryological anomaly that should be considered in the differential diagnosis of thyroid lesions, particularly when unusual histological findings are encountered. Although typically identified in children, it may rarely persist into adulthood and be discovered incidentally during thyroidectomy. The present case demonstrates the exceptionally rare coexistence of papillary thyroid microcarcinoma, non-invasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP), and ectopic intrathyroidal thymic tissue within a single thyroidectomy specimen. Recognition of this entity is essential to avoid diagnostic pitfalls, prevent unnecessary treatment, and ensure appropriate patient management. This case further highlights the indispensable role of meticulous histopathological examination in identifying rare developmental anomalies coexisting with thyroid neoplasms.

REFERENCE

1. Moradian S, Delazar S, Yazdani F, Mohammadzadeh M. Ectopic intrathyroidal thymic tissue in an adult patient: a case report and review of the literature. J Med Case Rep. 2022 May 25;16(1):224. doi: 10.1186/s13256-022-03434-3.
2. Fukushima T, Suzuki S, Ohira T, Shimura H, Midorikawa S, Ohtsuru A, et al. Prevalence of ectopic intrathyroidal thymus in Japan: the Fukushima Health Management Survey. Thyroid. 2015;25(5):534–537. doi: 10.1089/thy.2014.0367.

3. Moon WS, Hwang SB, Hong KH. Intrathyroidal thymic tissue in an adult. Korean J Pathol. 2011;45(5):547. doi: 10.4132/KoreanJPathol.2011.45.5.547.
4. Wu SL, Gupta D, Connelly J. Adult ectopic thymus adjacent to thyroid and parathyroid. Arch Pathol Lab Med. 2001;125(6):842–843. doi: 10.5858/2001-125-0842-AETATT.
5. O'Connor K, Alzahrani H, Murad F, Daroca P, Kandil E. An ectopic intrathyroidal thymic tissue and intrathymic parathyroid tissue in a patient with Graves disease. Gland Surg. 2017;6(6):726–728. doi: 10.21037/gs.2017.08.11.
6. Bang MH, Shin J, Lee KS, Kang MJ. Intrathyroidal ectopic thymus in children: a benign lesion. Medicine (Baltimore). 2018;97(14):e0282. – NO DOI AVAILABLE
7. Kim A, Kang SH, Bae YK. Ectopic intrathyroidal thymus accompanied by intrathyroidal parathyroid as a cause of a solitary thyroid nodule in adult. Int J Clin Exp Pathol. 2014;7(9):6375–6378. – NO DOI AVAIALBLE
8. Velimezis G, Ioannidis A, Apostolakis S, Chorti M, Avramidis C, Papachristou E. Concurrent intrathyroidal thymus and parathyroid in a patient with papillary thyroid carcinoma: a challenging diagnosis. Endocrinol Diabetes Metab Case Rep. 2017;2017:17–0015. – NO DOI AVAILABLE
9. Frates MC, Benson CB, Dorfman DM, Cibas ES, Huang SA. Ectopic intrathyroidal thymic tissue mimicking thyroid nodules in children. J Ultrasound Med. 2018;37(3):783–791. doi: 10.1002/jum.14360.
10. Ito Y, Miyauchi A, Nakamura Y, Miya A, Kobayashi K, Kakudo K. Clinicopathologic significance of intrathyroidal epithelial thymoma/carcinoma showing thymus-like differentiation: a collaborative study with Member Institutes of the Japanese Society of Thyroid Surgery. Am J Clin Pathol. 2007;127(2):230–236. doi: 10.1309/VM7E52B6U9Q729DQ.

Fig 1. Gross image of total thyroidectomy specimen.

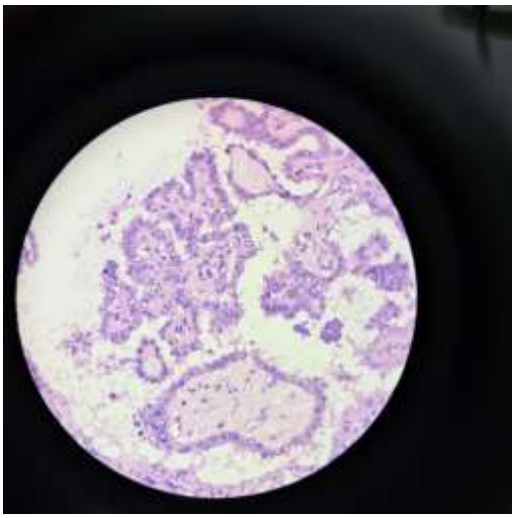

Fig 2. Papillary microcarcinoma in right lobe of thyroid. (H&E, x10)

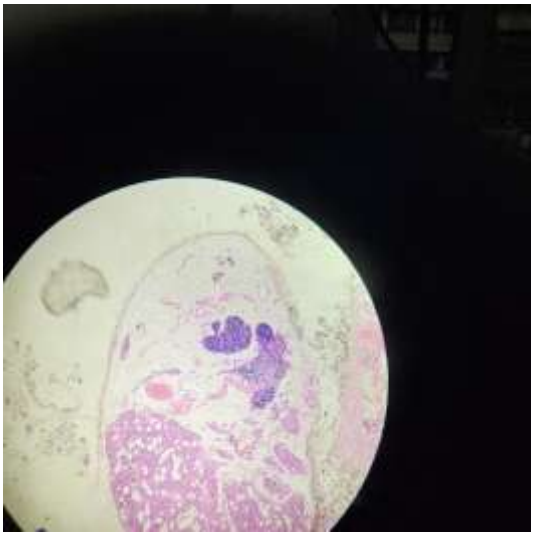

Fig 3. Intrathyroidal thymic tissue (ectopic thymus) in the left lobe of thyroid near parathyroid. (H & E, x5)

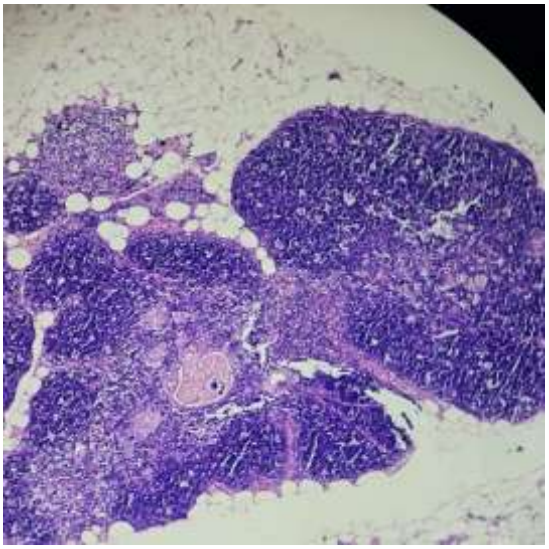

Fig 4. Intrathyroidal thymic tissue (ectopic thymus) in the left lobe of thyroid. (H & E, x10)

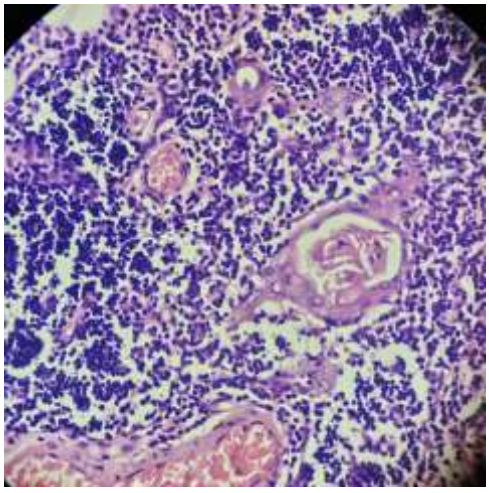

Fig 5. Intrathyroidal ectopic thymic tissue showing Hassall corpuscles. (H&E, x40)

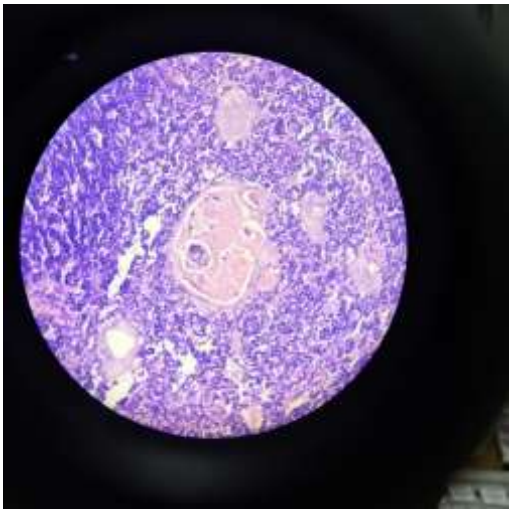

Fig 6. Intrathyroidal ectopic thymic tissue showing Hassall corpuscles. (H&E, x40)