Case Report

Hyalinizing trabecular tumor: Sheep in the Wolf's clothing! – A case report and review of the literature

ABSTRACT

Hyalinizing trabecular tumor (HTT) is a rare neoplasm of follicular origin. It is often mistaken for classic papillary thyroid carcinoma (PTC) or medullary thyroid carcinoma (MTC) due to overlapping cytological and architectural features. We report a 49-year-old woman presenting with a left-sided thyroid nodule of 6 months' duration. Ultrasound had shown a solid hypoechoic TIRADS 3 lesion (29 mm × 14 mm), and FNAC was suggestive of Bethesda category V. Her thyroid-stimulating hormone was 4.04 μIU/ml. She underwent total thyroidectomy with bilateral lymph node dissection. After histopathology, it showed a classic trabecular growth pattern and prominent hyalinization. Immunohistochemistry revealed a low proliferation index (Ki-67-peripheral staining), absent BRAF mutation, and PAS-positive, Congo red-negative stroma-differentiating it from PTC and MTC. A diagnosis of a hyalinizing trabecular tumor of the thyroid was made.

Keywords: Hyalinizing trabecular tumor, immunohistochemistry, Ki-67, papillary thyroid carcinoma, RET/papillary thyroid carcinoma, thyroid neoplasm

INTRODUCTION

Hyalinizing trabecular tumor (HTT) is a rare thyroid neoplasm, first described as a hyalinizing trabecular adenoma (HTA) by Carney *et al*.[1] It is defined as a rare tumor of follicular cell origin with a trabecular pattern of growth and marked intratrabecular hyalinization.[2] HTT is characterised histologically by the trabecular arrangement of cells with marked intra-trabecular hyalinization and nuclear features that often mimic papillary thyroid carcinoma (PTC), including nuclear grooves and pseudo-inclusions.[1] It is classified as a benign risk neoplasm in the 2022 WHO classification of thyroid neoplasms. We present a case of HTT in a middle-aged patient, highlighting the importance of histopathologic and immunohistochemical confirmation to avoid unnecessary aggressive treatment.

CASE REPORT

A 49-year-old female presented with a left-sided neck swelling, insidious in onset and noticed over the past 6 months. The swelling was nonprogressive and was not associated with any compressive symptoms. A grade 2 goiter was observed on local examination, with more prominence on the left side. The goitre was nontender, moving with deglutition, and had a solid consistency. The biochemical evaluation revealed thyroid-stimulating hormone (TSH) 4.04 μIU/ml, T3 120 ng/dl, and T4 10 μg/dl (within normal limits). The ultrasonography of the thyroid revealed the following findings: The right thyroid lobe measured 4.8 cm × 1.5 cm × 1.6 cm, with a volume of 5.5 mL, and the left thyroid lobe measured 4.6 cm × 1.4 cm × 1.5 cm, with a volume of 4.8 m. Isthmus had a thickness of 0.3 cm. The thyroid gland appeared normal in size and shape. The parenchyma was homogeneous in echotexture. However, a

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nodule measuring 29 mm × 14 mm was present in the left lobe of the thyroid, extending to the isthmus. This nodule was well defined, wider than tall, and presented as a solid, hypoechoic lesion with smooth margins (TIRADS 3). There were a few left middle and lower jugular lymph nodes with preserved fatty hilum and short axis measuring 6 mm. She was advised to have a fine needle aspiration cytology procedure due to a suspicious nodule. The smears revealed a cellular aspirate of follicular cells organized in crowded, microfollicular, and trabecular patterns. The follicular cells displayed the following features: nuclear enlargement, irregular nuclear contours, nuclear overlapping and crowding, pale chromatin, and occasional nuclear grooves were noted with minimal colloid present in the background and no significant lymphocytic activity. The findings were suspicious but not definitive for PTC (Bethesda 5). With the suspicion of PTC, she underwent a total thyroidectomy. The postoperative period was without any complications. During her follow-up visit, her TSH level was 108 µIU/ml (normal range 0.4–4.2 µIU/ml), and serum Thyroglobulin was measured at 0.1 ng/ml. She was started on thyroxine replacement therapy at a dosage of 125 mcg per day. Histopathology revealed a well-circumscribed growth pattern composed of trabeculae, nests, and occasionally polygonal or elongated cells with characteristic nuclear grooves and intranuclear cytoplasmic inclusions. A distinctive feature was the presence of dense, PAS-positive, diastase-resistant hyalinized material separating the trabeculae. Mitoses were rare, and no capsular or vascular invasion was typically observed. Immunohistochemistry showed peripheral cytoplasmic staining and low Ki-67 positivity (<1%), which confirmed its benign nature. The patient was reassured regarding the benign nature of the HTT, which required less stringent follow-up.

Follow-up

Advised to follow-up with TSH report every 6–8 weeks.

DISCUSSION

HTT is included in the latest 2022 WHO classification of thyroid neoplasms.[3-6] It was first described by Carney *et al*. in 1987. It is a rare neoplasm with an incidence of <1% and is more common in middle-aged women. The usual presentation is a solitary, painless thyroid nodule detected incidentally during imaging for unrelated thyroid conditions, and most patients are euthyroid. It is a great masquerade as it has similar features overlapping with PTC as well as with medullary thyroid carcinoma (MTC).[5,7] It is difficult to differentiate it from PTC or MTC based on fine-needle aspiration cytology alone. It exhibits characteristic nuclear features, such as unclear grooves, intranuclear pseudo-inclusions, and overlapping nuclei, which are also observed in classic PTC [Figure 1].[8] These findings may misdiagnose PTC unless they are confirmed through immunohistochemistry. The abundant hyalinized stroma in HTT resembles the amyloid stroma in MTC.[7] It is crucial to distinguish these malignancies from HTT, as treatment differs for each type. The HTT is a benign neoplasm; it does not recur after surgery and requires less stringent follow-up. PTC and MTC come under malignant neoplasm, requiring regular monitoring.[3] A school of thought suggests that HTT may represent a PTC variant, primarily because both have been shown to harbour RET/PTC rearrangements.[9] Classic PTC typically exhibits complex branching papillae lined by epithelial cells with characteristic nuclear features and lacks prominent hyalinized stroma, distinguishing it from HTT[6] [Figure 2]. However, subsequent molecular and histopathological studies have supported the benign nature of HTT, distinguishing it from malignant thyroid neoplasms.[8] Histopathology revealed a well-circumscribed tumor with cells arranged as composed of trabeculae and nests [Figure 3]. The cells were polygonal to elongated cells with characteristic nuclear grooves and intranuclear cytoplasmic inclusions [Figure 4]. A distinctive feature was the presence of dense, PAS-positive, diastase-resistant hyalinized material separating the trabeculae. Mitoses were rare, and no capsular or vascular invasion was observed. Immunohistochemistry revealed a low Ki-67 index (<1%) and peripheral cytoplasmic staining, which is atypical since the usual pattern of Ki-67 is nuclear [Figure 5]. This finding confirmed its diagnosis and benign nature. Immunohistochemistry plays a crucial role in identifying HTT. In a study by Casey *et al*.,[4] Ki-67 and MIB1 staining

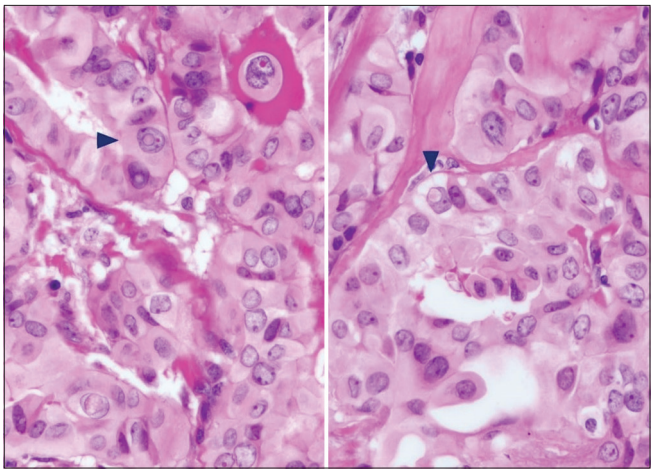

Figure 1: High-power photomicrograph of classic papillary thyroid carcinoma (H and E, ×40) showing characteristic nuclear features including overlapping nuclei, nuclear clearing (Orphan Annie eye nuclei), grooves, and occasional intranuclear inclusions. Arrowheads indicate nuclear pseudoinclusions, which are cytoplasmic invaginations into the nucleus, commonly seen in papillary thyroid carcinoma

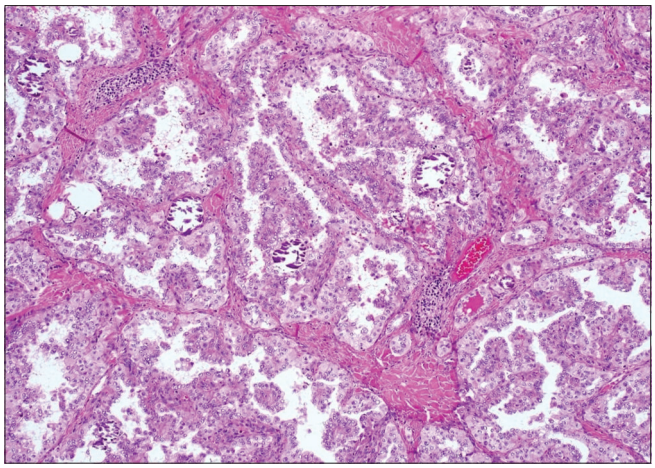

Figure 2: Low-power photomicrograph of classic papillary thyroid carcinoma (PTC) (H and E, ×10) showing complex, branching papillary structures lined by follicular epithelial cells. The papillae have fibrovascular cores and are lined by cells with overlapping nuclei and clear chromatin, typical of PTC. No prominent stromal hyalinization is seen

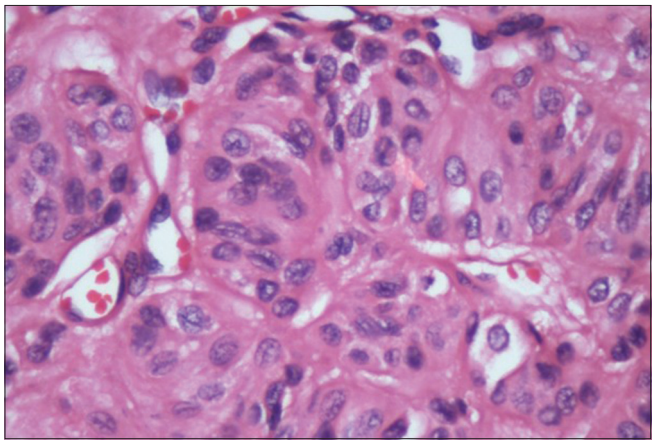

Figure 4: High power (×400) H- and E-stained section shows elongated cells with oval to elongated cells with many cells showing nuclear grooves and intranuclear inclusions

successfully identified seven cases as HTT, previously labelled as PTC. A lobectomy is sufficient if the neoplasm is localized to one lobe and adjuvant therapy (such as radioactive iodine or chemotherapy) is not required. Postoperative thyroid hormone supplementation is necessary if a total thyroidectomy is performed. The prognosis is excellent, and minimal follow-up is needed. She was advised to continue thyroxine 125 mcg per day and asked to follow up after 2 months with a TSH report.

CONCLUSION

An HTT is a benign thyroid neoplasm. Accurate differentiation from malignant lesions is crucial as it eases follow-up in terms of visits, laboratory, and imaging studies, which the other varieties of thyroid cancer entail, thereby reducing the anxiety and burden for both the patient and the healthcare system.

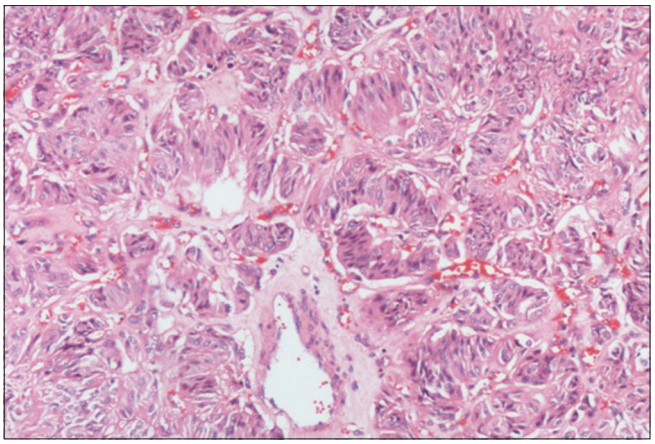

Figure 3: Low power view (×100) H- and E-stained section shows cells arranged in a trabecular pattern separated by fibrovascular septal and hyaline material

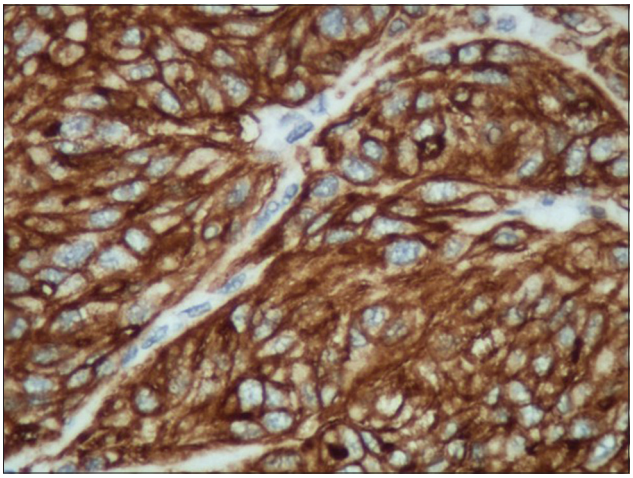

Figure 5: High power (×400) view IHC with Ki67 tumor cells shows intense diffuse membrane staining (Ki67 usually shows nuclear and is used as a proliferation marker)

Author contribution

ANA: manuscript draft, case data collection, literature review. AC Sonwane: histopathology image acquisition and interpretation. BK Sethi: manuscript review. Jayasimha Reddy: surgical management,perioperative care and clinical support. Vijaya Tourani: pathology reporting and IHC interpretation. All authors reviewed and approved the final manuscript.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Carney JA, Ryan J, Goellner JR. Hyalinizing trabecular adenoma of the thyroid gland. Am J Surg Pathol 1987;11:583-91.
2. Carney JA, Hirokawa M, Lloyd RV, Papotti M, Sebo TJ, Erickson LA. Hyalinizing trabecular adenoma of the thyroid: A clinicopathologic study of 25 cases. Am J Surg Pathol 1998;22:264-75.
3. Juhlin CC, Mete O, Baloch ZW. The 2022 WHO classification of thyroid tumors: Novel concepts in nomenclature and grading. Endocr Relat Cancer 2023;30:e220293.
4. Casey MB, Sebo TJ, Carney JA. Hyalinizing trabecular adenoma of the thyroid gland identification through MIB-1 staining of fine-needle aspiration biopsy smears. Am J Clin Pathol 2004;122:506-10.
5. Karak AK, Sahoo M, Bhatnagar D. Hyalinizing trabecular adenoma – A case report with FNAC histologic, MIB-1 proliferative index and immunohistochemical findings. Indian J Pathol Microbiol 1998;41:479-84.
6. Rosai J. Rosai and Ackerman's Surgical Pathology. 11th ed. Philadelphia: Elsevier; 2018. p. 489-508.
7. Kim T, Oh YL, Kim KM, Shin JH. Diagnostic dilemmas of hyalinizing trabecular tumours on fine needle aspiration cytology: A study of seven cases with BRAF mutation analysis. Cytopathology 2011;22:407-13.
8. Casey MB, Sebo TJ, Carney JA. Hyalinizing trabecular adenoma of the thyroid gland: Cytologic features in 29 cases. Am J Surg Pathol 2004;28:859-67.
9. Papotti M, Volante M, Giuliano A, Fassina A, Fusco A, Bussolati G, *et al.* RET/PTC activation in hyalinizing trabecular tumors of the thyroid. Am J Surg Pathol 2000;24:1615-21.