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UNRAVELLING THE LINK: PAPILLARY THYROID CARCINOMA IN HASHIMOTO'S THYROIDITIS- A RARE PRESENTATION

Pathology

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ABSTRACT

Introduction: Papillary thyroid carcinoma (PTC) is the most widespread endocrine malignancy, and its incidence is rapidly rising. It is a well differentiated carcinoma with most favourable prognosis and has a female predominance between ages 30 - 40 years. Hashimoto's Thyroiditis (HT) is another common autoimmune endocrine disease. In primary disease the cause is unknown and secondary disease is mostly iatrogenic due to immunomodulatory drugs. This disease is again more common in female with age ranging between 30-50 years. But, the connection between these two diseases have not been postulated till date. The only presentable and still debatable explanation is the connection between chronic inflammation and carcinoma development. **Case Details:** A 36-year-old woman, who has been experiencing neck swelling for the past two years and known case of hypothyroidism for the last nine years, underwent a subtotal thyroidectomy. The removed tissue was analyzed in department of pathology . Both gross and microscopic examinations revealed characteristics of Hashimoto's Thyroiditis. Additionally, a single microscopic focus of Papillary Thyroid Carcinoma was unexpectedly found in the left lobe. **Conclusion:** The role of the pathologist in diagnosing PTC in HT is crucial as the existence is not so common and may influence prognosis and treatment decisions.

KEYWORDS

Hashimoto's thyroiditis, Papillary carcinoma thyroid

INTRODUCTION

Hashimoto's thyroiditis (HT) is the most common autoimmune thyroid disorder (AITD) and is the primary cause of hypothyroidism in regions with adequate iodine levels. Approximately 20–30% of patients are affected by HT. This condition is believed to result from a combination of genetic predisposition and environmental factors, which disrupt immunological tolerance and lead to an autoimmune assault on thyroid tissue, resulting in the development of the disease.[1]

Hashimoto thyroiditis, first identified by Hakaru Hashimoto in 1912 and originally termed struma lymphomatosa, which is characterized by significant damage to the thyroid tissue.[2]

Another entity, Papillary thyroid carcinoma (PTC) is an epithelial cancer that exhibits follicular cell differentiation and distinctive nuclear characteristics. As the most common type of thyroid cancer, it generally has the most favourable prognosis. Typically, it presents as an irregular solid mass, though it can occasionally have cystic components. Approximately 10% of patients may present with metastatic disease at the time of diagnosis. Overall, the prognosis is good for most patients, particularly those under the age of 45years.[3] The incidence of papillary thyroid carcinoma is higher in areas with elevated dietary iodine levels and among individuals with preexisting benign thyroid conditions.[4]

CASE REPORT

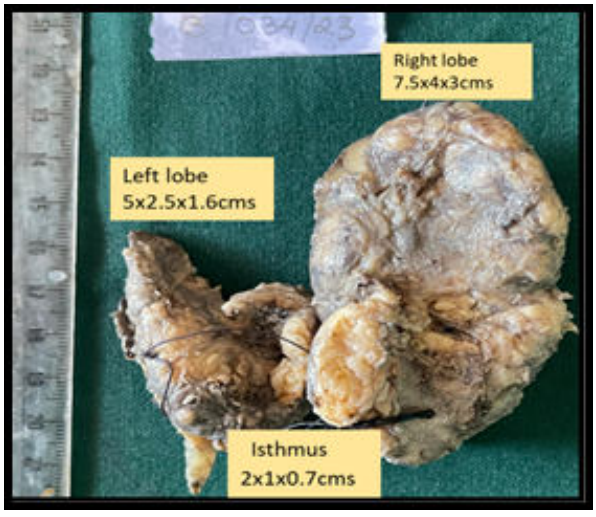

Figure A

A 36-year-old woman presented with swelling in the front of her neck that had been present for the past two years. She has a history of hypothyroidism for the last nine years and has been undergoing treatment for it. An ultrasound of the neck indicated acute thyroiditis, which was confirmed by a cytopathology report diagnosing Hashimoto's thyroiditis. Subsequently, the patient underwent a subtotal thyroidectomy.

Gross Examination: -

The entire specimen measured 7.5 x 6.5 x 3 cm, with the right lobe being larger. The outer surface of both lobes appeared grey-brown and nodular (figure a), and the cut surface revealed multiple grey-white nodules (figure b). On microscopic examination: The right lobe exhibited lobulation of the thyroid parenchyma due to fibrotic bands. The lobules contained atrophic thyroid follicles, some lined by oncocytic cells with mild anisonucleosis. There was diffuse infiltration of thyroid tissue by lymphoid follicles with germinal center formation (figure c).

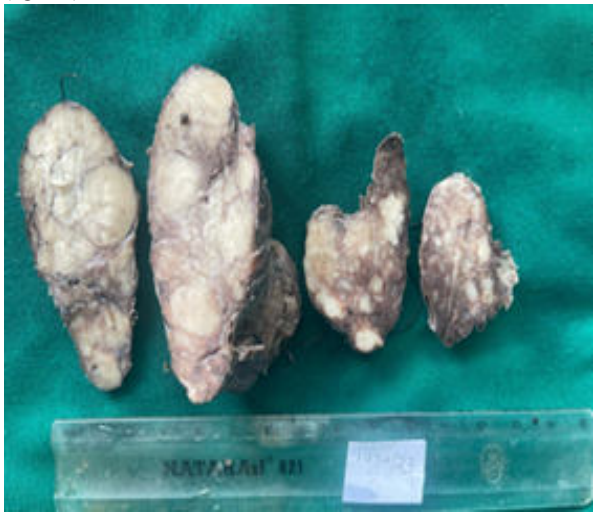

Figure b

In the left lobe, a single focus of tumor was observed, featuring papillae with a fibrovascular core (figure d) and lined by stratified columnar epithelium. The epithelium had moderate cytoplasm and round to oval "Orphan Annie eye" nuclei (figure e). The tumor was found to invade the surrounding thyroid tissue, which was surrounded by fibrosis with adjacent areas showing a feature of Hashimoto's thyroiditis.

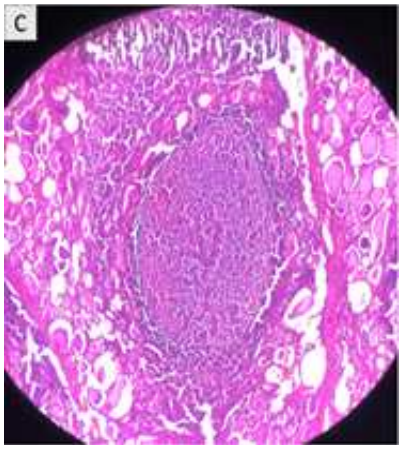

Figure C

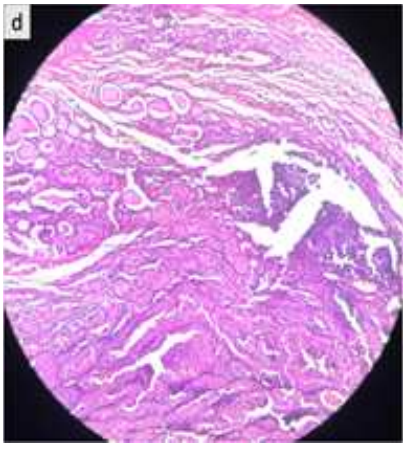

Figure D

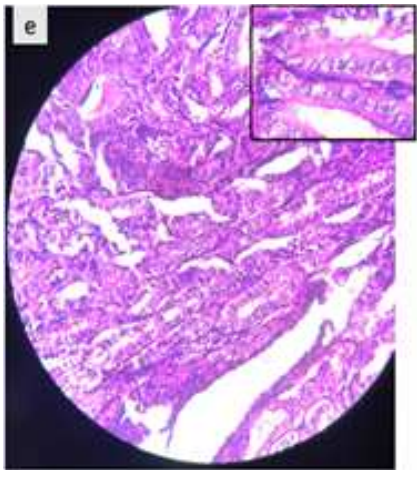

Figure E

DISCUSSION

Hashimoto's thyroiditis is an autoimmune condition that targets specific tissues and is histologically distinguished by widespread lymphocytic infiltration, atrophy of the parenchyma, and fibrosis.[5] Typically, it is either primary, with an unknown origin, or secondary, caused by iatrogenic factors such as the use of immunomodulatory drugs.[6]

Papillary thyroid carcinoma (PTC) is the most prevalent form of endocrine cancer, and its incidence has been increasing rapidly. It represents approximately 80% of all thyroid cancer diagnoses. The primary risk factor is believed to be exposure to radiation, though the precise mechanisms of pathogenesis remain unclear. Nonetheless, specific genetic changes have been implicated in the development of the disease, including point mutations in BRAF and RAS, as well as rearrangements of the RET/PTC oncogene.[7]

The link between Hashimoto's thyroiditis (HT) and papillary thyroid cancer (PTC) was initially documented by Dailey in 1955. HT is more commonly associated with PTC in women, who also have higher rates of PTC and other thyroid conditions when considered separately. The chronic inflammation present in HT may act as a contributing factor in the development of cancer, which helps explain this association.[8] Fiore et al.'s groundbreaking research on Hashimoto's thyroiditis (HT) and papillary thyroid cancer (PTC) revealed significantly elevated levels of thyroid antibodies (TAb) ($p < 0.001$) in cases involving both conditions compared to HT alone.[9] In longstanding Hashimoto's thyroiditis (HT), immune-related receptors such as TLRs and DNA repair genes like ATM and hOGG mutations can accumulate as abnormal genetic alterations, potentially acting as precursor lesions for papillary thyroid cancer (PTC).[8]

Singh et al. found a positive relationship between Hashimoto's thyroiditis (HT) and improved disease-free survival and overall survival in patients with papillary thyroid cancer (PTC). They concluded that PTC patients with concurrent HT experienced better clinical outcomes regarding recurrence and mortality.[10]

Jiangyue Xu et al. described Hashimoto's thyroiditis (HT) as a 'double-edged sword' because, on one hand, long-standing HT can contribute to the onset of papillary thyroid cancer (PTC) through genetic mutations, while on the other hand, it appears to impede the advancement of PTC by reducing multifocality, extrathyroidal extension, and lymph node metastasis.[11].

CONCLUSION

The pathologist plays a critical role in diagnosing papillary thyroid cancer (PTC) in the context of Hashimoto's thyroiditis (HT), as this combination is relatively rare and can impact prognosis and treatment strategies. Managing Hashimoto's thyroiditis alongside PTC requires a collaborative, multidisciplinary approach.

CONFLICTS OF INTEREST:

The authors declare that they have no conflict of interest.

Acknowledgements:
The authors declare that they have no competing interest.

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