Case Report

Follicular Thyroid Carcinoma Arising in a Background of Hashimoto's Thyroiditis

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Abstract

A prevalent autoimmune condition affecting the thyroid gland known as Hashimoto's thyroiditis (HT) is linked to a higher chance of developing thyroid cancer, especially papillary thyroid carcinoma (PTC) and primary thyroid mucosal-associated lymphoid tissue lymphoma. It is extremely rare for follicular thyroid neoplasms whether adenoma or carcinoma to develop in conjunction with Hashimoto's disease. In this case report, a left thyroid lobe large nodule was diagnosed by US as TIRAD IV. Cytology using fine-needle aspiration was done, and the case was designated as Thy3f (suspicious of follicular neoplasm). The patient underwent total thyroidectomy, gross examination revealed a large capsulated left thyroid lobe nodule and histological examination revealed minimally invasive follicular carcinoma on a background of Hashimoto's disease. The nuclear features of PTC were focal and immunostaining for CK19 was focal and weak. Furthermore, HBME1 IHC was negative and Glypican3 IHC showed focal weak cytoplasmic staining. In conclusion, rather than PTC and lymphoma, HT could coexist with other forms of thyroid neoplasms as follicular carcinoma.

Keywords: CK19, follicular thyroid carcinoma, Hashimoto's thyroiditis

Introduction

Hashimoto's thyroiditis (HT) is a prevalent autoimmune disease of the thyroid gland affecting 20%–30% of the population.[1] It has been hypothesized that HT is linked to an increased risk of thyroid cancer, and therefore, assessment of HT is crucial for any thyroid nodule evaluation.[2] The autoimmune process, increased thyroid-stimulating hormone and persistent inflammatory process associated with chronic HT are potential risk factors for thyroid cancer development.[3]

The majority of published literature indicated that papillary thyroid carcinoma (PTC)[4] and primary thyroid mucosal-associated lymphoid tissue lymphoma[5] are the most common cancers associated with HT. The common association between PTC and HT was further supported by the presence of the same oligoclonal RET/PTC rearrangement in both of them.[6]

On the other hand, oncogenic RAS activation is the most common genetic variation discovered in follicular thyroid carcinoma (FTC).[7] Furthermore, iodine insufficiency appears to be the primary cause of FTC, with the incidence being higher in regions with endemic goiter. Rarely, FTC may arise in a preexisting follicular adenoma. It may also be predisposed by dyshormonogenesis and radiation exposure.[8]

The simultaneous occurrence of follicular thyroid neoplasms whether adenoma or carcinoma with HT in the thyroid gland is extremely rare. This case report demonstrates coexistence between HT and minimally invasive FTC. This case report was approved by the ethics committee for scientific research at our institution.

Case Report

A 61-year-old man complained of neck swelling. The patient was submitted to multislice computed tomography which

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revealed a left thyroid lobe large nodule for ultrasound study. The ultrasonographic examination of the neck revealed the enlarged size and echogenicity of the thyroid gland left lobe with mildly heterogeneous texture showing large heterogeneous mainly hyperechoic solid mass lesion measured 4 cm × 3.9 cm × 4.8 cm with internal vascularity and peripheral macrocalcifications (TIRAD IV). The right thyroid lobe was of normal size and echogenicity with no focal lesions or pathological cysts. No evidence of cervical lymphadenopathy was noted.

The patient was then referred to the Pathology Department for FNAC of the left thyroid lobe nodule. Smears examined were hypercellular and formed of clusters and complex microfollicles of follicular epithelial cells. Follicular cells exhibited enlargement, crowding, and powdery chromatin. No evidence of cytological nuclear features of PTC was detected. FNAC was diagnosed as Thy3f (suspicious of follicular neoplasm) [Figure 1a].

A total thyroidectomy was performed. The received thyroid gland was formed of the right lobe measured 6 cm × 4 cm × 1.5 cm, left lobe measured 6 cm × 4 cm × 3 cm, and isthmus measured 3 × 1.5 cm. On opening of the left lobe, there was a capsulated nodule measured 5 cm × 4.5 cm [Figure 1b]. Histopathological examination revealed left thyroid capsulated nodule showing neoplastic growth formed of follicular cells arranged into microfollicles with multiple foci of capsular invasion (CI) [Figure 1c]. The nuclei of follicular cells exhibited focal clearing (nuclear score 1) [Figure 1d]. A focal area of dystrophic calcification was seen. Coexisting HT was seen in the rest of the left thyroid lobe, isthmus, and right thyroid lobe [Figure 1e]. CK19 immunostaining (IHC) exhibited focal weak positivity [Figure 1f and g]. HBME1 IHC was negative [Figure 1h]. Glypican3 IHC was focal mild cytoplasmic [Figure 1i]. No invasion of the thyroid capsule was detected. A single intrathyroid reactive lymph node was seen in the rest of the left lobe. The case was diagnosed as minimally invasive FTC with coexisting HT, stage pT3a (tumor size 5 cm × 4.5 cm limited to the thyroid), N0 (0/1 lymph nodes), and Mx with free thyroid capsule.

Discussion

The main differential diagnosis of the current reported case falls under the classification of encapsulated follicular patterned thyroid neoplasms including follicular adenoma, minimally invasive FTC, encapsulated angioinvasive FTC, noninvasive follicular thyroid neoplasm with papillary-like nuclear features (NIFTP), well-differentiated tumor of uncertain malignant potential (WDT-UMP), and encapsulated invasive PTC follicular variant.[9]

The criteria of CI, vascular invasion, papillary carcinoma-type nuclear features (PTC-N), and distant metastasis are the main criteria used in the differentiation of those problematic groups of encapsulated follicular patterned thyroid neoplasms according to the updated fourth Edition of the World Health Organization classification for thyroid tumors[9] [Table 1]. Considering that there was a blatant CI, the present case was diagnosed as follicular carcinoma minimally invasive type. PTC diagnosis was excluded due to the absence of prominent

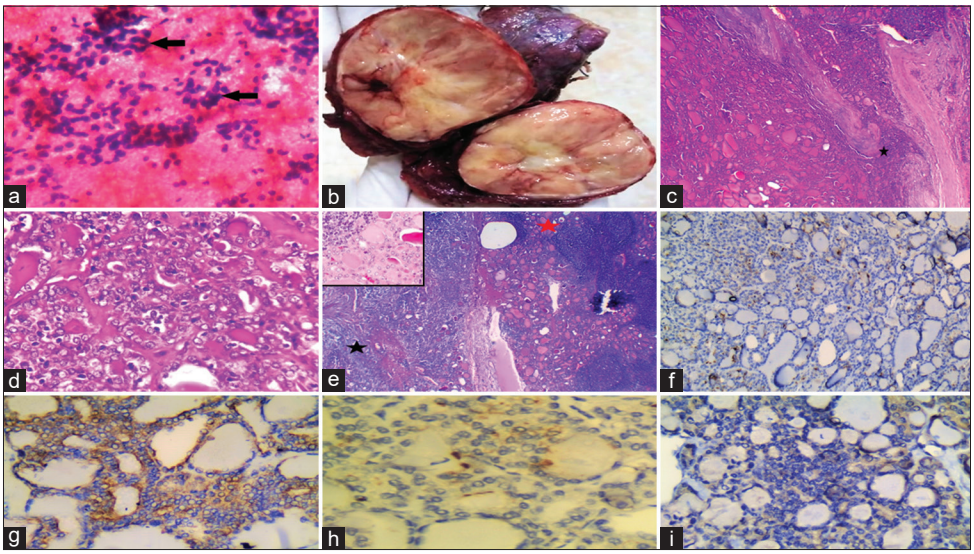

Figure 1: Hypercellular smear formed of clusters and complex microfollicles (black arrows) of follicular epithelial cells with no evidence of PTC-N features (H and E, ×200) (a). Gross examination showed large capsulated grayish-white neoplastic nodule measured 5 cm × 4.5 cm replacing most of the left thyroid lobe (b). A capsulated follicular patterned thyroid neoplasm with a focus of capsular invasion (black star) (H and E, ×40) (c). Higher magnification revealed follicular epithelial cells exhibiting crowding and enlargement with focal clearing (nuclear score 1) (H and E, ×400) (d). Coexisting Hashimoto's thyroiditis (red star) in the rest of left thyroid lobe adjacent to FTC (black star) (H and E, ×40) (e), inset at upper right corner highlights Hhürthle cell metaplasia (H and E, ×400). CK19 immunostaining exhibited focal weak membranous positivity in thyroid follicular cells (IHC, ×100) (f) and (IHC, ×400) (g). Negative HBME1 IHC in thyroid follicular cells (IHC, ×400) (h). Focal faint cytoplasmic IHC staining of Galectin 3 in thyroid follicular cells (IHC, ×400) (i). FTC: Follicular thyroid carcinoma, IHC: Immunostaining

Table 1: The differential diagnosis of follicular patterned thyroid tumors[9]

CI	VI	PTC-N	DM	Diagnostic category
−	−	−	−	Follicular adenoma
−	−	Score 2-3	−	NIFTP
−	−	Unequivocal	−	WDT-UMP
+	−	Equivocal	−	Encapsulated invasive PTC follicular variant
+	−	−	−	Minimally invasive FTC
NA	+	−	May be present	Encapsulated angioinvasive FTC

−: Absent, +: Present, NA: Not applicable, PTC: Papillary thyroid carcinoma, PTC-N: PTC-nuclear features, NIFTP: Noninvasive follicular thyroid neoplasm with papillary-like nuclear features, WDT-UMP: Well differentiated tumor of uncertain malignant potential, FTC: Follicular thyroid carcinoma, CI: Capsular invasion, VI: Vascular invasion, DM: Distant metastasis

features and lack of diffuse and strong CK19, HBME1, and Galectin 3 expression.

Very few cases of thyroid follicular neoplasms arising in a background of HT were mentioned incidentally in previous literature, one case of follicular adenoma stated by Won *et al*.[10] in addition to three cases of FC and 13 cases of follicular adenoma listed by Graceffa *et al*.[11]

In conclusion, HT may coexist with other types of thyroid neoplasms rather than PTC and lymphoma as follicular adenoma and carcinoma. Any patient who had HT should be followed up with and periodically checked for underlying thyroid cancer.

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. Ragusa F, Fallahi P, Elia G, Gonnella D, Paparo SR, Giusti C, *et al.* Hashimotos' thyroiditis: Epidemiology, pathogenesis, clinic and therapy. Best Pract Res Clin Endocrinol Metab 2019;33:101367.
2. Fish SA. Hashimoto's thyroiditis is a risk factor for thyroid cancer. Clin Thyroidology 2019;31:333-5.
3. Jackson D, Handelsman RS, Farrá JC, Lew JI. Increased incidental thyroid cancer in patients with subclinical chronic lymphocytic thyroiditis. J Surg Res 2020;245:115-8.
4. Ahn D, Heo SJ, Park JH, Kim JH, Sohn JH, Park JY, *et al.* Clinical relationship between Hashimoto's thyroiditis and papillary thyroid cancer. Acta Oncol 2011;50:1228-34.
5. Lan XB, Cao J, Zhu XH, Han Z, Huang YQ, Ge MH, *et al.* Concomitant papillary thyroid carcinoma and mucosa-associated lymphoid tissue thyroid lymphoma in the setting of Hashimoto thyroiditis. Int J Clin Exp Pathol 2018;11:3076-83.
6. Marotta V, Guerra A, Sapio MR, Vitale M. RET/PTC rearrangement in benign and malignant thyroid diseases: A clinical standpoint. Eur J Endocrinol 2011;165:499-507.
7. Acquaviva G, Visani M, Repaci A, Rhoden KJ, de Biase D, Pession A, *et al.* Molecular pathology of thyroid tumours of follicular cells: A review of genetic alterations and their clinicopathological relevance. Histopathology 2018;72:6-31.
8. Evans HL, Vassilopoulou-Sellin R. Follicular and hurthle cell carcinomas of the thyroid: A comparative study. Am J Surg Pathol 1998;22:1512-20.
9. Kakudo K, Bychkov A, Bai Y, Li Y, Liu Z, Jung CK. The new 4th edition World Health Organization classification for thyroid tumors, Asian perspectives. Pathol Int 2018;68:641-64.
10. Won JH, Lee JY, Hong HS, Jeong SH. Thyroid nodules and cancer in children and adolescents affected by Hashimoto's thyroiditis. Br J Radiol 2018;91:20180014. doi: 10.1259/bjr.20180014.
11. Graceffa G, Patrone R, Vieni S, Campanella S, Calamia S, Laise I, *et al.* Association between Hashimoto's thyroiditis and papillary thyroid carcinoma: A retrospective analysis of 305 patients. BMC Endocr Disord 2019;19:26.