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Case Report

Fine needle aspiration cytology of Hashimoto's thyroiditis – A diagnostic pitfall with review of literature

ABSTRACT

Hashimoto's thyroiditis is the second most common thyroid lesion next to goiter diagnosed on fine needle aspiration cytology (FNAC). It is also an important cause for hypothyroidism. FNAC plays a significant role in the diagnosis of thyroid lesions due to its simplicity and low cost. It can accurately diagnose Hashimoto's thyroidits in most patients. However, a small percentage of cases may be missed due to the inherent limitations of this procedure and the varied cytomorphology of this lesion. Therefore thorough cytological evaluation and an integrated approach are necessary to pick up correct diagnosis and to avoid unnecessary surgery. We present a 56-year-old female with solitary thyroid nodule diagnosed as Hurthle cell neoplasm on FNAC, but subsequent histopathological diagnosis following resection revealed Hashimoto's thyroiditis with marked Hurthle cell change.

Key words: Fine needle aspiration cytology; Hashimoto's thyroiditis; Hurthle cell neoplasm.

Introduction

Hashimoto's thyroiditis (HT) has a prevalence rate of 1-4% and incidence of 30-60/100000 population per year. This disorder is more common in women.[1] Fine needle aspiration cytology (FNAC) is highly sensitive in diagnosing HT, with a diagnostic accuracy rate of 92%, however, diagnosis of HT is likely to be missed in smears showing cytological evidence of hyperplasia as in Grave's disease or abundant colloid.[2] Follicular cells that exhibit some features of papillary carcinoma and a minimum lymphoid population in the background can be a diagnostic pitfall. Sometimes there might be marked Hurthle cell change with sparse inflammatory cells mimicking Hurthle cell neoplasm.[1]

Case Report

A 56-year-old female presented with a swelling in front of the neck since 10 years. It was insidious in onset and gradually progressive, initially 3 cm × 2 cm to current 6 cm × 5 cm. There was no history of pain, difficulty in swallowing, change in voice and palpitation. Local examination revealed a midline solitary neck swelling, which moved with deglutination, and was non-tender. Thyroid function tests revealed normal T3 and T4 levels but increased thyroid stimulating hormone (TSH). On sonography, solitary thyroid nodule was reported. FNAC from multiple sites revealed high cell yield consisting of Hurthle cells with delicate vascular channels running through these cells [Figure 1a]. Pleomorphic Hurthle cells had moderate to abundant cytoplasm, central to peripheral nucleus, increased nuclear-cytoplasmic ratio, binucleate forms were also noted [Figure 1b]. These cells were arranged in crowded three-dimensional aggregates, sheets, and in microfollicular pattern. Background showed sparse lymphocytes, scant colloid, and erythrocytes [Figure 1c and 1d]. Repeat FNAC was done and showed similar features. Cytological diagnosis of Hurthle cell neoplasm, with differential diagnosis of medullary carcinoma-oncocytic variant was considered.

The patient subsequently underwent total thyroidectomy with partial neck dissection.

Grossly, specimen consisted of both lobes of thyroid with isthmus. Left lobe measured 6 cm × 3 cm × 2 cm; cut surface

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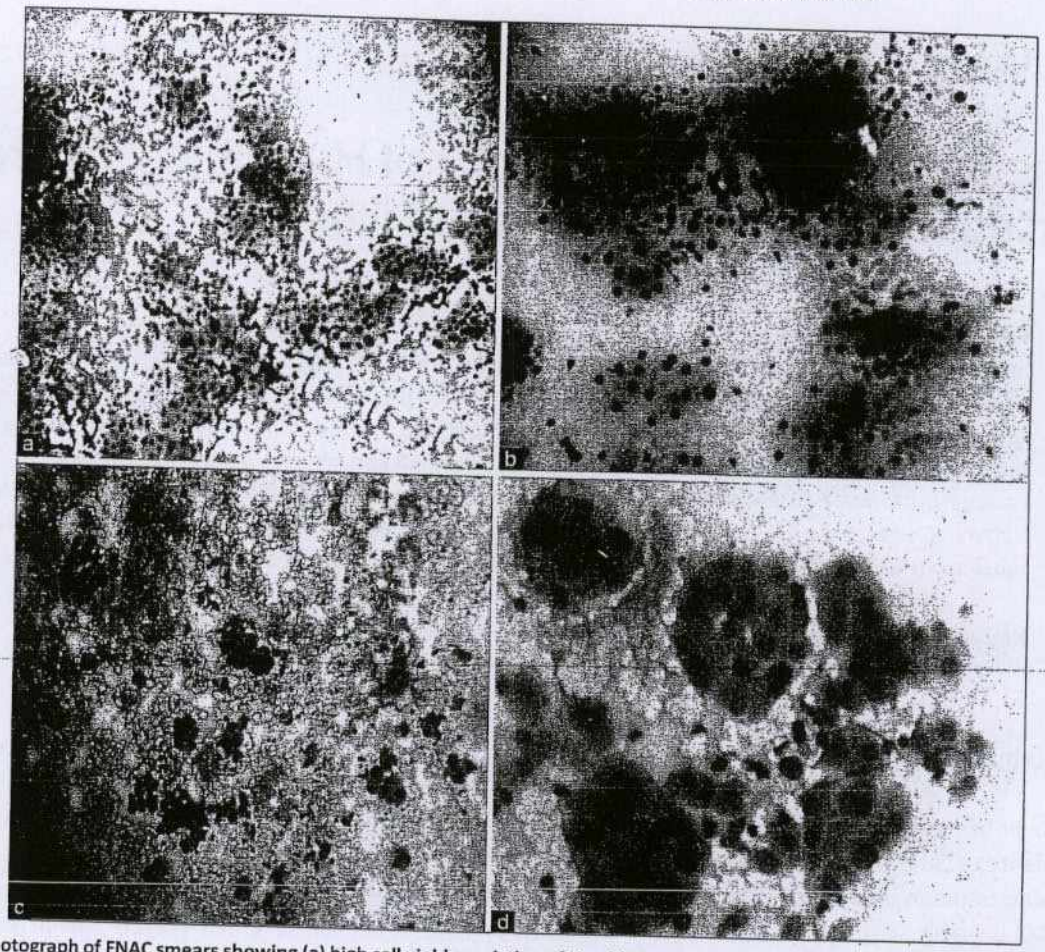

Figure 1: Microphotograph of FNAC smears showing (a) high cell yield consisting of Hurthle cells with delicate vascular channels (Giemsa, ×40), (b) Hurthle cells showing anisokaryosis with few binucleate forms (Giemsa, ×100), (c,d) Hurthle cells arranged in cohesive clusters, microfollicular pattern and discretes, with scant colloid and sparse lymphocytes in the background (H and E, ×40, H and E, ×400)

was unremarkable. Right lobe measured 8 cm × 6 cm × 4 cm. Cut surface revealed a well-demarcated grey brown to grey white nodule which measured 6 cm × 5 cm with foci of colloid [Figure 2a]. Also four lymph nodes were retrieved from the partial neck dissection specimen.

Microscopically, both lobes of the thyroid showed lymphocytic infiltration with germinal centres [Figure 2b], and thyroid follicles of varying sizes contained colloid with marked Hurthle cell metaplasia [Figure 2c and 2d]. Hence diagnosis of Hashimoto's thyroiditis with marked Hurthle cell change was considered. Lymph nodes showed reactive changes.

Discussion

The first report of chronic thyroiditis, struma lymphomatosa was described by Hakaru Hashimoto in 1912, which bears his name.[3] Patients usually present with a diffuse enlargement of the thyroid gland or less frequently with one or two prominent nodules.[1] Our case presented with solitary thyroid nodule.

The incidence of HT seems to be increasing in the recent times.[4] It has become 10 times more common than it was until the early 1990s. This increase in incidence has been linked to excess iodine intake, particularly in coastal areas.[5]

It is important to diagnose HT because patients subsequently become hypothyroid and require lifelong thyroxin supplementation. Also there is an increased risk of extranodal marginal B cell lymphoma in patients with HT.[1] The frequency of carcinoma in patients with HT varies between 0.5 and 23.5% which emphasizes the need for long-term follow-up. It is also important not to over-diagnose this entity as neoplasms so that unnecessary surgery can be avoided.[2]

HT, on FNAC smears, is diagnosed by oxyphilic (Hurthle) cells, infiltration of follicles by lymphocytes/plasma cells and the presence of moderate amount of colloid in the background. FNAC is considered superior as well as more cost-effective in diagnosing HT than antibody screening.[1] Despite its superiority FNAC has some pitfalls in diagnosing HT. Sometimes an overlap in the cytomorphological features of HT with other lesions like multinodular goiter with degenerative changes, follicular neoplasm, Hurthle cell neoplasm, papillary

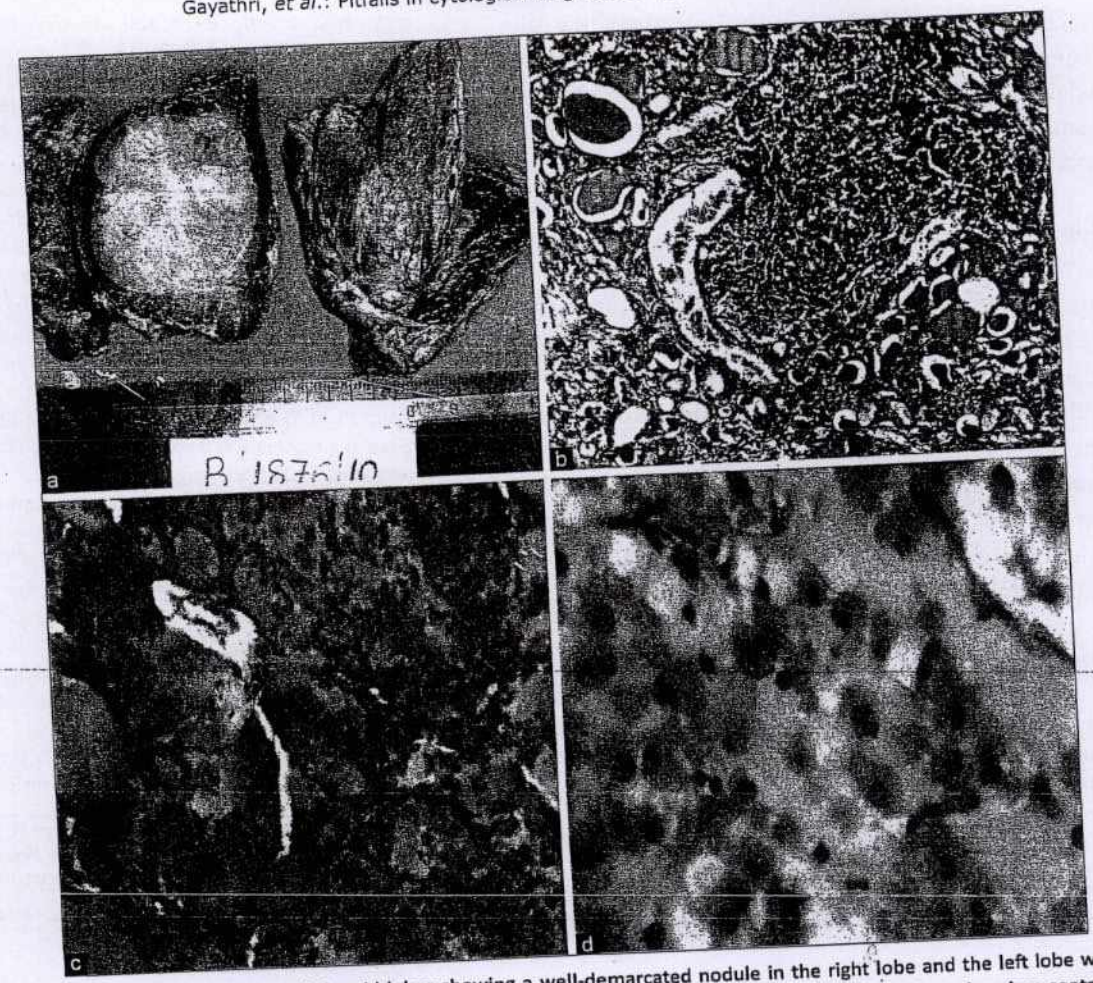

Figure 2: Gross photograph (a) cut surface of thyroid lobes showing a well-demarcated nodule in the right lobe and the left lobe was unremarkable, (b) microphotograph showing lymphocytic infiltration with germinal centre (H and E, ×40), (c) thyroid follicles of varying sizes containing colloid with marked Hurthle cell metaplasia (H and E, ×100), (d) Hurthle cells with eosinophilic granular cytoplasm, few binucleate forms were seen (H and E, ×400)

carcinoma, reactive lymphnode and lymphoma can be seen.[6]

The false negative rate (FNR) is defined as the percentage of patients with benign cytology in whom malignant lesions are later confirmed on thyroidectomy. Some authors reported FNR ranging from 1.5-11.5%.[7] Ashcraft and Van Herle[8] noted that FNR results varied in reported series from 2-50% and that among 1330 patients, all of whom had a histological examination, the FNR was 1.7%. Campbell and Pillsbury[9] analyzed combined data from 912 patients with benign cytological results who had a histological examination and found an FNR between 0.5% and 11.5%, with a pooled rate of 2.4%. In one series they reported two cases which translated to 11.1% FNR. These two cases were however confirmed histopathologically as follicular carcinoma and papillary carcinoma. Again, the FNR may be higher if patients with negative cytological results were followed up for months or years. In a study by Boey and colleagues, 365 patients with benign cytological results were followed for a mean of 30 months and they found two cancers. Grant and colleagues also studied 439 patients with benign cytological results who were followed up for 6.1 years and found three patients with malignancies. These findings have definitely increased the FNR.[7]

The false positive rate (FPR) indicates that a patient with malignant FNAC result was found on histological examination to have a benign lesion. Caruso and Mezzaferri reported an FPR of less than 6% while Campbell and Pillsbury reported a rate of 1.2%.[7] In one series they reported two cases as malignant but turned out to be Hashimoto's thyroiditis and nodular colloid goiter with focal areas of adenomatous hyperplasia. The FPR was 3.9% which agreed with other series that ranges from 0-8%.[7,10] In our case the diagnosis made based on the cytology was Hurthle cell neoplasm, but on histopathology it turned out to be Hashimoto's thyroiditis. Others have reported similar results, failure to demonstrate lymphocytes and to appreciate the non-neoplastic nature of Hurthle cells were the causes behind the failure in these cases. Cytological features favoring a diagnosis of thyroiditis over neoplasm in a Hurthle cell-rich smear include the absence of poorly organized cell clusters having nuclear pleomorphism, particularly anisonucleosis of Hurthle cells.[11,12]

Potential pitfalls are cytologic atypia occurring in HT,

abundance or scarcity of background inflammation, low cell-yield, coexisting toxicity and malignancies. But epithelial preponderance over inflammation, nuclear crowding, severe atypia and cell discohesion should raise the possibility of a neoplasm in spite of other features of HT.[6]

Conclusion

FNAC is a safe, sensitive and specific technique in the initial evaluation of thyroid nodules. A correct cytological diagnosis can be achieved in the majority of cases, thus obviating the need for a surgical intervention. A careful and diligent search for various cytological features and accurate sampling can help in reducing the number of indeterminate, false-positive and false-negative diagnoses. However, in difficult situations an integrated approach will minimize potential pitfalls.

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