

## Cytomorphological diversity in Hashimoto's Thyroiditis

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### Abstract

**Introduction:** Hashimoto's thyroiditis is recognized as the next most common thyroid lesion after goiter, diagnosed on fine needle aspiration cytology. It is also considered as the foremost cause of hypothyroidism. Fine needle aspiration cytology is notably perceptive in diagnosing Hashimoto's thyroiditis with a striking diagnostic preciseness. Our analysis is to scrutinize the cytomorphological diversity of Hashimoto's thyroiditis.

**Materials and Method:** This study includes 56 patients presented with a solitary thyroid nodule and few cases with diffuse thyroid enlargement and those cases, with cytomorphological features favoring Hashimoto's thyroiditis. Few cases were confirmed by histopathology following surgery and reported as Hashimoto's thyroiditis and immunological results were correlated whenever available.

**Results:** The majority of the patients in our study were females in their middle age group. In the present study lymphoid aggregates, lymphocytic infiltration amidst follicular epithelial cells and Hurthle cell change were the main highlights along with other cells like eosinophils, epithelioid cells, Plasma cells and multinucleated giant cells seen in few cases. The antibody profile was available in only 60% of the cases of which 72.72% showed evidence of raised anti-thyroid peroxidase antibody titers. The histopathological correlation was obtained only 12.5% cases.

**Conclusion:** Hashimoto's thyroiditis is considered a disease of middle age with female predominance, clinical history and immunological profile alone is not sufficient in diagnosing Hashimoto's thyroiditis. FNAC plays a symbolic portrayal in the diagnosis of thyroid lesions due to its ease and reasonable price. It can precisely diagnose Hashimoto's thyroiditis in utmost patients.

**Keywords:** Cytology, Hashimoto's, Autoimmune, Hurthle cells, Thyroiditis.

### Introduction

In the year 1912, Haku Hashimoto, A physician from Japan reported the first case of Hashimoto thyroiditis in the German publication, displaying intense lymphocytic infiltrate which he named as struma lymphomatosa, which was later named as Hashimoto's thyroiditis.

The first disorder recognized an autoimmune disease is Hashimoto's thyroiditis characterized by autoimmune antibodies mediated immune responses causing inflammation of the thyroid gland. The synonyms considered for Hashimoto's thyroiditis are chronic lymphocytic thyroiditis, autoimmune thyroiditis, non goitrous thyroiditis and atrophic thyroiditis.

The incidence rate of Hashimoto's thyroiditis is rising nowadays has been linked to excess iodine intake and supposed to be 10-15 times more common in females in their middle age ranging 30-50 years

**Materials and methods:** This was a retrospective study conducted by the department of Pathology, Shridevi Institute of Medical Sciences and Research Hospital from January 2015 to June 2016 which includes a total number of 56 patients presented with a solitary thyroid nodule and few of them with diffuse thyromegaly and FNAC showed features of Hashimoto's thyroiditis.

FNAC procedure was done by non-aspiration technique, occasionally USG guided procedure was done. Smears were air dried for Giemsa and Leishman stain, alcohol fixed for Hematoxylin and Eosin stain.

The cytomorphological observations from 56 cases of Hashimoto's thyroiditis diagnosed by fine-needle aspiration were reviewed by two pathologists. This study was carried out mainly to review the cytomorphological diversity of Hashimoto's thyroiditis and correlate with histopathological diagnosis and thyroid anti-TPO antibody profile whenever available.

### Results

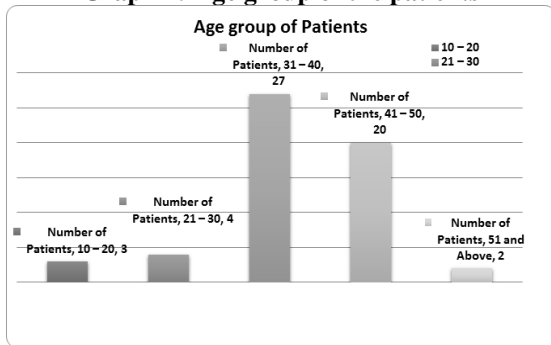
This study includes 56 patients presented with solitary nodule and diffuse thyromegaly of which majority of the patients were females (78.57%) between the age group 31-50 with a male to female ratio of 1:4.

**Table 1: Gender Distribution of Patients**

Gender	Number of Patients	Percent
Male	12	21.43
Female	44	78.57
Total	56	100.0

Out of 56 patients, 21.43% (n = 12) were males and 78.57% (n = 44) were females

**Graph 1: Age group of the patients**



Age of the patients ranged from 10 to 51 years & above with 48.21% (n = 27) in the age group 31-50 years.

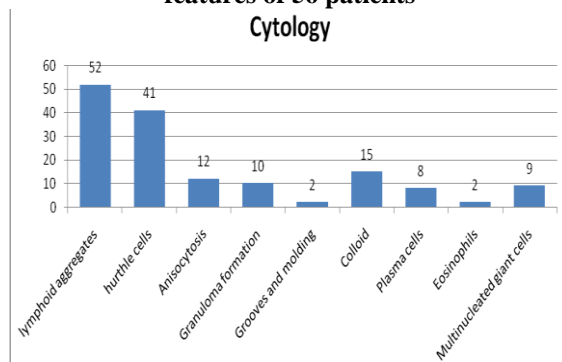
**Cytomorphological features:** Our cytomorphological study displayed lymphoid aggregates in 92.86% of cases, 73.21% of cases showed Hurthle cell change. Follicular cells anisonucleosis was seen in 21.43% of cases. Granuloma formation in 17.86%, eosinophils was seen in 3.57%, plasma cells were seen in 14.29% of cases, multinucleated giant cells in 16.07% and grooves and molding in 3.57% cases and few cases showed only scanty colloid material in the background.

From our observation, we felt that the majority of the lesions of Hashimoto's are firm in nature unlike tense or cystic like goiter or as hard as the tumor. The aspirate from majority cases of Hashimoto's exhibited strands of lymphoid tissue on smearing the material onto the slide. These are our personal dictum which needs to be fortified in further studies.

**Table 2: Frequency of all cytomorphological features of 56 patients**

Cytology	Frequency	Percent
Lymphoid aggregates	52	92.86
Hurthle cells	41	73.21
Anisocytosis	12	21.43
Granuloma formation	10	17.86
Nuclear grooves and molding	2	3.57
Colloid	15	26.79
Plasma cells	8	14.29
Eosinophils	2	3.57
Multinucleated giant cells	9	16.07

**Graph 2: Frequency of all cytomorphological features of 56 patients Cytology**



Our data indicates that the prevalence of Hashimoto's thyroiditis on FNAC is noticeably greater than when diagnosed only by serological antibody profile.

The antibody profile was available in only 60% of patients, among these anti-thyroid peroxidase antibodies were raised only in 68% of cases.

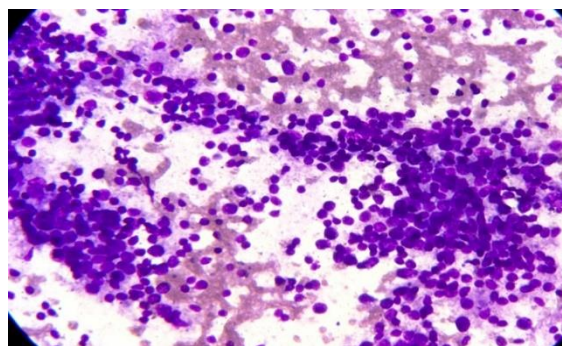
**Table 3: Antibody titers**

Reports available for Anti-thyroid peroxidase antibodies	34 / 56 = 60.71%
Raised Anti-TPO antibody titers	23 / 34 = 67.64%

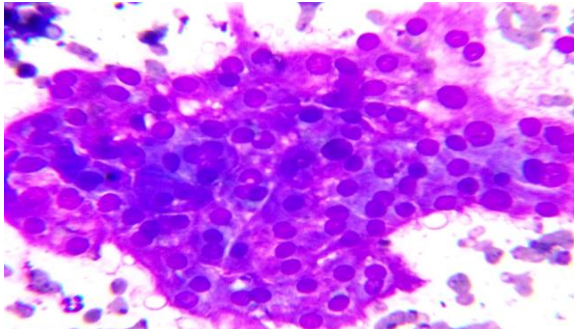
**Histopathology:** Few cases were confirmed by histopathology following surgery and reported as Hashimoto's thyroiditis. Histopathological correlation was available in only 12.5% cases.

**Table 4: Histopathological correlation**

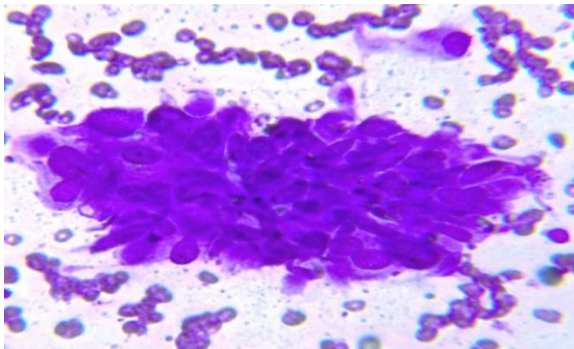
Histopathological correlation	7 / 56 = 12.50%
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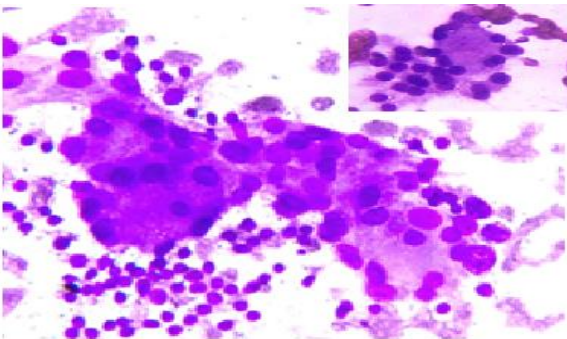
**Fig. 1: lymphocytic infiltrates and aggregates within thyroid follicular epithelial cells**



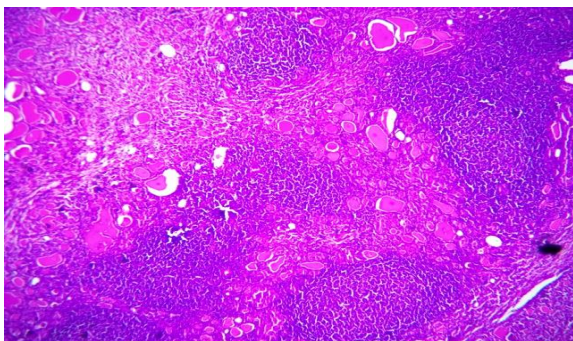
**Fig. 2: Marked hurthle cell metaplasia and thyroid follicular cells and few lymphocytes**



**Fig. 3: Epithelioid cell granuloma**



**Fig. 4: Follicular atypia and Hurthle cell metaplasia and multinucleated giant cell formation**



**Fig. 5: 10X: histopathology image displaying varying sizes of thyroid follicles with Hurthle cell metaplasia, variable anisonucleosis and prominent germinal centres**

## Discussion

The acquired hypothyroid state is the most common clinical presentation of Hashimoto's thyroiditis. Cytological study on fine needle aspiration method is one of the keys and relevant conclusive means in diagnosing Hashimoto's thyroiditis in conjunction with clinical details, biochemical test results, immunological studies and ultrasound techniques.<sup>(1,2,3)</sup>

Diagnosis of Hashimoto's thyroiditis can go unnoticed in smears showing cytological features of Graves' disease with hyperplasia and presence of voluminous colloid. Thyroid follicular epithelial cells that display papillary carcinoma features with sparse lymphoid aggregates in the backdrop can be a significant drawback.<sup>(4,5)</sup>

Pronounced Hurthle cell metaplasia with scanty inflammatory infiltrate simulates Hurthle cell neoplasm in fewer cases which are a diagnostic pitfall.<sup>(6)</sup>

Hashimoto's thyroiditis is an autoimmune disease represented by increased levels of anti-thyroid antibodies profile in most cases directed in contrary to thyroglobulin and thyroid peroxidase antigens are most important for diagnosis. Hashimoto's thyroiditis is considered the most common cause of hypothyroidism in Iodine sufficient levels.<sup>(7,8)</sup>

Hashimoto's thyroiditis is always considered as a risk factor for papillary carcinoma thyroid and malignant lymphoma most commonly extranodal marginal zone b-cell lymphomas. Hence careful interpretation is very much necessary to diagnose Hashimoto's thyroiditis which can be treated by medical modalities and to prevent undue outcomes.<sup>(15,16,17)</sup>

However, a meagre percentage of cases may be forfeited due to the indwelling constraints of this procedure and the cytomorphological metamorphosis of this lesion. Accordingly, thorough cytological interpretation and a consolidated pursuit are elementary to pick up accurate diagnosis and to ward off redundant surgeries.<sup>(18,19)</sup>

It is of paramount importance to diagnose Hashimoto's thyroiditis anticipating that sustained cases revamp into hypothyroid state and crave for lifelong thyroxin additives and patients may hog more chances to suffer from Papillary carcinoma thyroid and malignant lymphoma.<sup>(20,21,22)</sup>

FNAC is considered a gold standard procedure in diagnosing Hashimoto's thyroiditis beyond its limitations. However, a meagre percentage of cases may be forfeited due to the indwelling constraints of this procedure and the cytomorphological metamorphosis of this lesion. Accordingly, thorough cytological interpretation and a consolidated pursuit are elementary to pick up accurate diagnosis and to ward off redundant surgeries.<sup>(23,24)</sup>

Individuals with Hashimoto's thyroiditis are at increased risk of developing other autoimmune diseases, both endocrine and non-endocrine- like type 1 diabetes,

autoimmune adrenalitis, SLE, myasthenia gravis and Sjogren syndrome.<sup>(25,26)</sup>

Wakasa T et.al described that benign follicular epithelial cells in Hashimoto disease can mimic papillary thyroid carcinoma, in cases where there are sparse lymphocytes, nuclear crowding, overlapping and atypia with occasional grooves and molding, which has to be ruled out by repeated aspirations and thorough cytological examination.<sup>(10)</sup>

Sanyal.D described that Hashimoto's thyroiditis is predominant in women most commonly presents with hypothyroidism and cytologically characterized by lymphocytic infiltration, Ashkenazy cells. There was a lack of cytological correlation in patients with antibody titers in euthyroid state.<sup>(11)</sup>

Gayathri B N et.al reported a case which was diagnosed has hurthle cell neoplasm on cytology and turned out to be Hashimoto's thyroiditis on subsequent histopathology. So thorough cytological evaluation and an integrated approach are necessary to pick up correct diagnosis will minimize potential pitfalls in strenuous situations thus obviating the need for a surgical intervention.<sup>(12)</sup>

Ekambaram M.et.al concluded in their study that eosinophilic infiltration seen most commonly in the lymphoid aggregates in the thyroid gland is significant and has the higher association with Hashimoto thyroiditis and it is important to diagnose Hashimoto's because patients need lifelong thyroxin supplement for hypothyroidism.<sup>(13)</sup>

Rathi M et.al described in their study of cytomorphological aspects of Hashimoto's thyroiditis in 50 patients from a tertiary care center. Hashimoto's thyroiditis is more common between 23-49 years, 56% were hypothyroid, in 81.81% of the patient's anti-thyroid peroxidase antibodies were raised and anti-thyroglobulin in 63% of patient's. High lymphoid: epithelial cell ratio was seen in 39 patients (78%). Hurthle cell change was seen in 37 cases (74%). Lymphoid follicle formation was seen in 27 cases (54%) and Follicular atypia was seen in 18 cases (36%), Follicular cell infiltration by lymphocytes 36 cases (72%), eosinophils seen in 24 cases (48%), neutrophils in 13 cases (26%) and plasma cells in 9 cases (18%), fire flares, granuloma, and giant cells are seen only in few cases.<sup>(14)</sup>

## Conclusion

Hashimoto thyroiditis is considered as a disease of women common in their middle age group. The initial stages and in diseases with mild form the results of immunological profile like thyroid function tests and TPO antibodies are not a reliable indicator because of quite variations, FNAC plays a symbolic portrayal in the diagnosis of thyroid lesions due to its simplicity and reasonable price. It can precisely diagnose Hashimoto's thyroiditis in utmost patients.

An increased number of lymphocytic infiltrations in the background and within follicular epithelial cell

clusters and hurthle cell change are pathognomic features of Hashimoto's thyroiditis. In the presence of abundant colloid, anisonucleosis and marked Ashkenazy cells in the cytology smears, interpreting the diagnosis based on diverse cytomorphological features should be done carefully to reduce the diagnostic flaws. Aspiration from more than one site and ultrasound guided aspiration to be done to minimize the diagnostic errors.

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