

## Cytomorphological Correlation of Lymphocytic Thyroiditis with Serological and Ultrasound Findings

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**Abstract:** Chronic lymphocytic ( Hashimotos ) thyroiditis ( HT ) is a common autoimmune disease in which the thyroid follicles are destroyed by a marked lymphoid infiltrate . Almost 95 % of HT occurs in women, with a peak incidence between ages 40 and 60. HT is the most common cause of goiter and hypothyroidism. Chronic lymphocytic thyroiditis can be graded based on cytomorphology. In this study an attempt has been made to correlate the grades with clinical findings, biochemical levels and ultrasonography findings. A total of 70 patients diagnosed on FNAC as Hashimoto's thyroiditis were included in the study done at the Department of Pathology, Government Medical College, Ongole .The various parameters like patient's clinical presentation, biochemical levels and thyroid ultrasound were studied. Fine needle aspiration of thyroid gland and grading of thyroiditis was done on smears. The grades were correlated with above parameters and the correlation indices were evaluated statistically. Females (92.9%) were affected more than males (7%). Maximum number of cases were seen between 2nd to 4th decades of life. 25.7% patients had grade I thyroiditis. 60% had grade II disease. Grade III thyroiditis was noted in 14.3% patients. Most of the patients showed diffuse goiter (46, 65.71%) by ultrasound . 44(62.87%) cases were biochemically hypothyroid, 19 (27.1%) cases were euthyroid and 7% cases were hyperthyroid. FNAC provides the most direct and specific information about a thyroid nodule .FNAC is a simple, safe and cost effective procedure and is a sensitive and specific diagnostic tool in diagnosing chronic lymphocytic thyroiditis. Clinical, biochemical, cytological and radiological parameters should be taken into consideration together to reach a final diagnosis. However, in spite of the availability of different diagnostic modalities, demonstration of lymphocytic infiltration by fine needle aspiration cytology still remains the gold standard.

**Keywords:** Thyroiditis, Lymphocytic, Hypoechoic nodules

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### I. Introduction

Hashimoto's thyroiditis ,a synonym of chronic lymphocytic thyroiditis ,struma lumphomatosa ,autoimmune thyroiditis was first described by Hakaru Hashimoto's in 1912 ,which bears his name .Hashimotos thyroiditis is an autoimmune disease that affects women more frequently than men. Hashimoto's thyroiditis is characterized by the presence of hurthle cell change and increased number of mature and transformed lymphocytes impinging on follicular cells. Presence of these cytological features along with biochemical,ultrasound and clinical features help in making the diagnosis. Cytological grading of thyroiditis on smears was based on a set of predifened criteria for the first time by Bhatia et al.(2). In Our study we have correlated the cytological grades of lymphocytic thyroiditis based on the criteria of Bhatia et al (2) with TSH values and ultrasound findings.

### II. Materials and Methods

This is a prospective and retrospective study done in the department of pathology, Government Medical College , Ongole,Andhra pradesh.

During a period of 1 year from august 2018 to july 2019 , a total no of 236 cases underwent thyroid FNACs at Department Of Pathology , Government Medical College, Ongole, Andhra pradesh. A written consent was obtained from each patient for inclusion in the study.The patients who had estimation of T3,T4, TSH and thyroid ultrasound were included in this study. .FNAC of thyroid was performed from several locations on thyroid swellings using 25 guage needle by both aspiration and non aspiration techniques..smears were prepared ,fixed in ethylalcohol and stained with Haematoxyline and Eosin.In case of unsatisfactory smears, a repeat aspiration was done but not more than 2-4 aspirations were tried on each patient .

During this period ,70 cases showed cytological features of lymphocytic thyroiditis .

The qualitative critera for making the cytologic diagnosis are

1.Increased population of lymphocytes and plasma cells infiltrating the thyroid follicles and in the background

2. Hurthle cell change
3. Epithelioid cell collections
4. Multinucleated giant cells .

Presence of all /some of these features along with biochemical, ultrasound and clinical features help in making the diagnosis.

Quantitatively the smears were evaluated and graded based on the criteria given by Bhatia et al.(2)

In our study ,we have correlated the cytological grades of lymphocytic thyroiditis based on the criteria of Bhatia et al. with TSH values .All 70 cases have ultrasound and biochemical correlation Bhatia et al grading system.(2)

**Grade I [Mild]:** Few lymphoid cells infiltrating the follicles /increased number of lymphocytes in the background.

**Grade II [Moderate]:** Moderate lymphocytic infiltration or mild lymphocytic infiltration with Hurthle cell change/giant cells / anisonucleosis.

**Grade III [Severe]:** Florid lymphocytic inflammation with germinal centre formation, very few follicular cells left'

Thyroid function test (TFT) was used to determine the blood concentrations of thyroid hormones. The patients had estimation of T3, T4 & TSH by enzyme linked immunosorbent assay. The reference normal range used were, T4 = 5 – 12 µg/dl, T3 = 80 – 180 ng/dl and TSH = 0.4 – 4.8µIU/L. Depending on these results patients were graded as euthyroid, hypothyroid or hyperthyroid.

USG of thyroid gland was performed by a single sonologist using high resolution ultrasound machine with 5 – 10 MHz Broad band linear transducer who was blinded to the clinical and biochemical status of the subjects.

### III. Results

**Table 1:** Age & Sex Wise Distribution Of Hashimoto's Thyroiditis Cases.

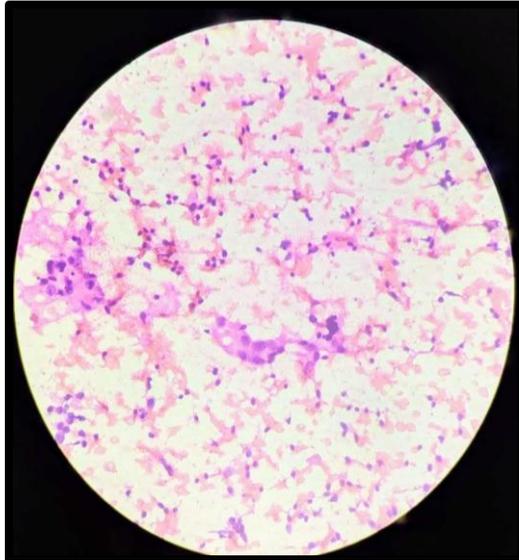
Sex	Female	Male	Total (%)
Age			
10- 20	6(8.5%)	1(1.4%)	7%
21 - 30	20(28.6%)	0	20%
31 - 40	21(30.3%)	0	21%
41 - 50	13(18.5%)	2(2.85%)	17%
51 - 60	2(2.8%)	1(1.4%)	3%
61-70	3(4.2%)	1(1.4%)	4%
Total	65(92.9 %)	5 (7%)	70(100%)

Females (92.9%) were affected more than males (7%). Maximum number of cases( 59%) were seen between 2<sup>nd</sup> to 4<sup>th</sup> decade of life.

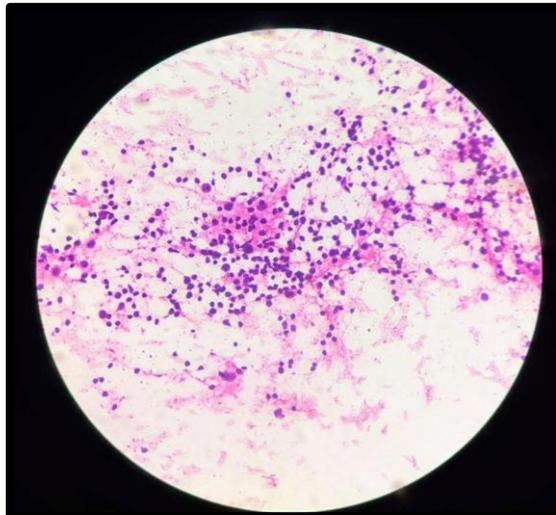
**Table 2:** Cytological grading of Hashimoto's thyroiditis cases.

Grades of Hashimoto's Thyroiditis	No of cases. N(%)
I	18(25.7%)
II	42(60%)
III	10(14.3%)
Total	70 (100%)

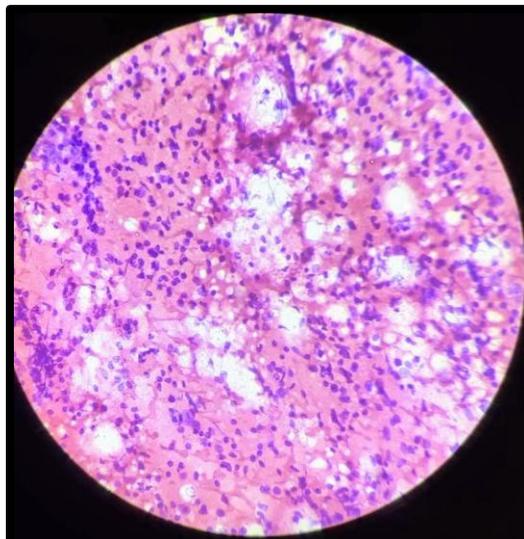
Table-2 shows cytological grading of Hashimoto's thyroiditis cases. Eighteen (25.7%) patients had mild lymphocytic infiltration of the gland and were graded as grade I thyroiditis (Figure-1 ). Forty two(60 %) had grade II disease characterized by moderate degree of lymphocytic infiltrate with evidence of follicular destruction, Hurthle cell change, giant cells (Figure-2 ). Grade III thyroiditis was noted in 10 (14.3%) patients characterized by dense lymphocytic infiltrates with germinal centers and with very few follicular cells left (Figure-3).



**Figure 1 :** Grade I Lymphocytic Thyroiditis.



**Figure 2 :** Grade II Lymphocytic Thyroiditis



**Figure 3:** Grade III Lymphocytic Thyroiditis

**Table 3:** Comparison of Hashimoto’s thyroiditis grades with Biochemical values

Grades	Euthyroid N (%)	Hypothyroid N (%)	Hyperthyroid N(%)
I	11(15.7%)	9(12.9%)	5(7.14%)
II	7(10%)	15(21.4%)	2(2.8%)
III	1(1.4%)	20(28.57%)	0
TOTAL	19(27.1%)	44(62.87%)	7(9.94%)

Table-3 shows, comparison of grades of Hashimoto’s thyroiditis with biochemical parameters. In the present study, 44 (62.87%) cases were biochemically hypothyroid, 19 (27.1%) cases were euthyroid .

**Table 4:** Distribution of cases as per Radiological findings & Cytological Grades

Grades of HT	Hypoechoic( diffuse)	Hyperechoic ( micronodules )	Normal study
I	12(17.14%)	5(7.14%)	4(5.71%)
II	30(42.85%)	11(15.71%)	2(2.8%)
III	4(5.71%)	2 (2.8%)	0
Total	46(65.71%)	18(25.71%)	6(8.57%)

Table: 4 shows, comparison of grades of Hashimoto’s thyroiditis with ultrasonography findings. In the present study, diffuse thyroiditis was observed in 12 (17.14%) cases, 30 (42.85 %) cases and 4 (5.71%) cases in grade I, II and III respectively. Thyroid nodules were observed in 5 (7.14%) cases, 11 (15.71% ) cases and 2 cases ( 2.8% ) of grade I, II and III respectively. Normal study was seen in 4(5.71%) cases , 2 ( 2.8 % ) cases in grade I and grade II Hashimoto’s thyroiditis cases.

#### IV. Discussion

Chronic lymphocytic ( Hashimotos ) thyroiditis ( HT ) is a common autoimmune disease in which the thyroid follicles are destroyed by a marked lymphoid infiltrate . Almost 95 % of HT occurs in women, with a peak incidence between ages 40 and 60 .The disease results in a diffuse painless goiter with or without nodularity . Most patients are hypothyroid . The diagnosis is established by correlating clinical findings with cytomorphology and serological test results .One or more of a variety of circulating auto antibodies are identified in almost all patients . The most common are anti- thyroglobulin and anti-thyroid peroxidase (TPO)<sup>1</sup>.

FNAC is a part of basic investigation done for patients presenting with thyroid enlargements. The classical features of HT on aspirates of FNA are Hurthle cell change with anisonucleosis and varying amount of polymorphous lymphoid infiltrate in a background of scant colloid. Epithelioid granulomas, plasma cells, giant cells, and occasional follicular cells can be seen.[8] The above-mentioned features were all seen in varying proportions in our study.

In this study, we have correlated the cytological grades of thyroiditis as proposed by Bhatia *et al.*(2) with TSH, values and ultrasound findings of thyroid swellings . We have also done a descriptive analysis of the data of the patients included in the study.

Lymphocytic thyroiditis can affect any age group, but in the present study, the peak age incidence of HT was seen in second and third decades constituting 58.9 % cases. This is in concordance with other studies conducted by Ashwin.P . et al .(6) and Bhatia et al.(2). The age of occurrence of lymphocytic thyroiditis ranged from 11-70 years. The incidence of the juvenile hashimoto’s thyroiditis was 9.9 % which is similar to the study conducted by uma P et al et al, who reported 12 .94 % incidence of the juvenile hashimoto’s thyroiditis in their study.

Female predominance was seen in our study with a female : male ratio of 13:1, similar to other studies by Bhatia et al(2) and Singh et al (4) who reported a female : male ratio of 11.6:1 and 14:1 respectively.

In our study majority, 62.87 % of the patients were hypothyroid and 27.1% were euthyroid. This is in concordance with the studies conducted by Uma P et al(5) , Singh et al (4)and Bhatia et al (2)in whose study majority of the patients were hypothyroid (62.46% , 63.3% and 73.68% respectively).

Grade II Hashimoto’s thyroiditis was seen in 60% of cases in the present study, which is similar to the study conducted by Uma P et al(5) who reported incidence of 55.53% of grade II lesions.

It was observed that biochemical hypothyroid cases showed high association with grade II and grade III thyroiditis with majority of the grade III thyroiditis (95.23%) cases showed hypothyroidism. Majority of the biochemical euthyroid (57.89%) cases were seen in grade I lesions.

In the present study, 65.71 % of cases showed diffuse thyroiditis on USG which is similar to the study conducted by Shreechitra K et al,(7) who reported 66% cases of diffuse thyroiditis in their study. Most of the cases ( 65.21 % ) with diffuse thyroiditis showed grade II Hashimoto’s thyroiditis. In cases of grade III Hashimoto’s thyroiditis, most were goiter cases on USG. USG abnormality was found to be associated with different grades of

Hashimoto's thyroiditis than normal study. Though ultrasound is not diagnostic, it can be helpful in assessing size of the thyroid gland, echotexture and presence of the thyroid nodules.

Limitation of the study- Anti thyroid antibody testing was not done in the present study. Hence no correlation with anti thyroid antibodies was possible.

## V. Conclusion

Hashimoto's thyroiditis is the most common thyroiditis seen more commonly in females with a peak incidence in second and third decades .

Hypothyroidism is the most common clinical feature . Most of the hypothyroid cases are associated with grade II and grade III chronic lymphocytic thyroiditis. Among the observed sonographic features in the present study, hypoechoic micronodules was the most commonly observed feature and hypoechogenicity was the second most commonly observed feature associated with grade I and grade II lymphocytic thyroiditis on cytology. Ultrasonography can be used to screen the patient with chronic lymphocytic thyroiditis.

To conclude we are of the opinion that the lymphocytic thyroiditis should be diagnosed by a multidisciplinary approach. Many patients with lymphocytic thyroiditis may have neither symptoms nor physical signs of the disease. Thus, Clinical features and serum findings when used alone to make a diagnosis may result in missed diagnosis.

FNAC provides the most direct and specific information about a thyroid nodule

Clinical, biochemical, cytological and radiological parameters should be taken into consideration together to reach a final diagnosis. However, in spite of the availability of different diagnostic modalities, demonstration of lymphocytic infiltration by fine needle aspiration cytology still remains the gold standard.

A combined approach of cytological grading of Hashimoto's thyroiditis along with ultrasonography and biochemical parameters should be used to enhance the diagnostic accuracy and reproducibility

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