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Original Research Article

Analysis of the Finding of Fine Needle Aspiration Cytology in Cases of Chronic Lymphocytic Thyroiditis with Thyroid Function Tests, Anti-Thyroid Antibodies, and Clinical Pathological Parameters

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Abstract

Background: After colloid goiter, chronic lymphocytic thyroiditis, an autoimmune thyroid condition, is the second most frequent thyroid condition identified by FNAC. For the diagnosis of various thyroid lesions, FNAC is a dependable and effective technique. Women are more likely than men to have chronic lymphocytic thyroiditis, which is typically associated with hypothyroidism, euthyroidism, or occasionally hyperthyroidism. Hashimoto's thyroiditis occurs 30–60 times per 100,000 people annually, with an incidence rate of 1-4%. The cytomorphological characteristics of FNAC can be used to classify autoimmune thyroiditis. Aim of this study to compare FNAC cytological findings with TFT in Chronic lymphocytic thyroiditis.

Methods: From June 2025 to May 2026, 220 patients with thyroid swellings were seen for FNAC testing, TFT and anti-TPO antibody serology, and ultrasound. Additionally, aspiration or non-aspiration methods were used for fine needle aspiration cytology. Using an auto analyzer based on the chemiluminescence method, TFT and anti-TPO antibodies were tested.

Results: 86 of the 220 cases of midline neck edema that were reported to our department had autoimmune thyroiditis. The male to female ratio was 1:3, and the age group most affected by lymphocytic thyroiditis was 21–30 years old. Few patients had nodular swelling, while the majority had diffuse swelling. TSH was raised in 56 cases (40.81%) and anti-TPO antibody was elevated in 38 cases (26.2%), according to the criteria employed by Bhatia et al. to grade the lymphocytic thyroiditis. Cytology, clinical diagnosis, and radiographic evidence all supported the diagnosis of autoimmune thyroiditis in these individuals. 16 (62.50%) had Grade 2 lymphoid infiltrate, whereas 53.33% (32/60) had Grade 3 lymphoid infiltrate. 10 cases (11.63%) had grade 1 lymphoid infiltration. Of the 86 cases, 56 (65.12%) have hypothyroidism, 14 (16.28%) have hyperthyroidism, and 16 (18.60%) have euthyroidism. Of these 86 individuals, 14 had a single nodule and 52 had diffuse thyroid enlargement on ultrasonography.

Conclusion: When combined with ultrasonography results of diffuse thyroid gland enlargement, grade 3 lymphocytic infiltration statistically correlates with anti-TPO and TSH. Hurthle cell change, large cells, anisonucleosus, and granulomas do not statistically correlate with lymphocytic thyroiditis because these conditions are mainly associated with Grade 1 and Grade 2. Despite the availability of various diagnostic modalities for the diagnosis of thyroid abnormalities, we conclude from this study that FNAC is still the gold standard approach. FNAC Smear grading is based on TSH and antithyroid antibody (anti-TPO antibody) positive, as well as lymphocytic infiltration of the thyroid follicles. These results are strongly linked to Chronic Lymphocytic Thyroiditis.

Keywords: Chronic thyroiditis, FNAC, Thyroid hormones, Antibody levels.

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Introduction

One of the most prevalent autoimmune thyroid conditions is chronic lymphocytic thyroiditis. Approximately 42 million people in India are thought to have thyroid disorders, based on projections from numerous thyroid disease research.[1] Nonneoplastic thyroid lesions include chronic lymphocytic thyroiditis (CLT).

Thyroid follicular lymphocytic infiltration leading to autoimmune glandular destruction is its pathophysiological characteristic. Iodine supplements in the diet and better diagnostic methods have led to an increase in the incidence and diagnosis of CLT, respectively. [2] Although CLT has always been classified as a widespread thyroid enlargement linked to hypothyroidism, there has been a shift in the way it manifests clinically.

Recent developments in diagnosis aid in the early identification of thyroid lesions and make treatment planning easier. Thyroid autoantibodies, ultrasound, thyroid function tests, and fine needle aspiration cytology (FNAC) are some of the diagnostic techniques. Serum TSH, T4, and T3 levels are measured to determine thyroid functional status; however, significant changes in these values occur late in the course of the disease. Thyroid hormone's primary job is to raise the body's basal metabolic rate. Thyroiditis symptoms are mostly caused by thyroid tissue damage, which lowers thyroid hormone production and, eventually, metabolism. [3]

Ultrasonography seems to be the best way to test for both nodular and diffuse thyroid conditions. The thyroid glands echogenecity is decreased (hypoechoic) in lymphocytic thyroiditis due to underlying lymphocytic infiltration of the gland. [4] Although thyroid autoantibodies have opened up new avenues for the identification of autoimmune thyroid disorders, none of the aforementioned studies can provide a morphological lesion diagnosis. For the morphological diagnosis of thyroid lesions, FNAC is a great, affordable, and straightforward technique.[3]

Although CLT's cytological characteristics vary, FNAC has a 92% diagnostic accuracy and a high sensitivity for CLT. In the current investigation, we have tried to link cytological findings with TFT, USG, and thyroid auto-antibodies because Bhatia et al. proposed cytological grading of thyroiditis based on several criteria such as lymphocytic infiltrate, follicular destruction, Hurthle cell metaplasia, etc. [5].

Correlating lymphocyte density with clinical, radiological, and biochemical markers is the primary goal. By grading the cytological characteristics of thyroid FNAC according to lymphocyte infiltration and comparing them with TFT and anti-TPO ab levels, the objective was to ascertain the incidence of chronic lymphocytic thyroiditis and assess the sensitivity and specificity of FNAC, thyroid hormone assay, and anti-TPO antibody levels prior to surgery in patients with thyroid swellings.

Material and Methods

From June 2025 to May 2026 in Department of Pathology at Katihar Medical College and Hospital, Katihar, Bihar, 220 patients with thyroid swellings were seen for FNAC testing, TFT and anti-TPO antibody serology, and ultrasound.

A 23-gauge needle was put into a 10-milliliter syringe to perform Fine Needle Aspiration Cytology (FNAC) of the thyroid gland utilizing a non-aspiration/aspiration approach. Multiple-point aspirations were performed when there was substantial edema. After the samples were air-dried and stained with May-Grunwald-Giemsa (MGG), a single pathologist assessed the smears' suitability using Hamberger's criteria [6]. For example, two slides made from different aspirations should each include at least six clusters of follicular cells.

A repeat aspiration was tried in situations when the first sample was inadequate, but each patient was given no more than three aspirations. The presence of lymphocytes and plasma cells infiltrating the thyroid follicles, an increase in background lymphocytes, Hurthle cell change, multinucleated giant cells, epithelioid cell clusters, and anisonucleosis in the aspirate were among the qualitative criteria used for cytological diagnosis. After that, the smears were assessed and quantitatively graded using the standards set by Bhatia et al. [5].

An automated hormone analyzer was used to determine anti-TPO antibody levels and thyroid function tests (TFT) at the same time. The patient's clinical presentation, TFT results, and anti-TPO antibody levels were then linked with these findings.

Results

Of the 220 cases of midline neck edema that our department received reports of, 86 had autoimmune thyroiditis. The age group most affected with lymphocytic thyroiditis was 21–30 years old, with a male to female ratio of 1:3. Most patients had widespread swelling, with very few having nodular swelling. The criteria used by Bhatia et al. to grade the lymphocytic thyroiditis showed that TSH was high in 56 cases (40.81%) and anti-TPO antibody

was elevated in 38 cases (26.2%). These people were diagnosed with autoimmune thyroiditis based on radiographic evidence, clinical diagnosis, and cytology. 53.33% (32/60) of the patients exhibited Grade 3 lymphoid infiltrate, while 16 patients (62.50%) had Grade 2 lymphoid infiltrate. Grade 1 lymphoid infiltration was present in five patients (11.63%). Of the 86 patients, 16 (18.60%) have euthyroidism, 14 (16.28%) have hyperthyroidism, and 56 (65.12%) have hypothyroidism. Of these 86 people, 52 exhibited diffuse thyroid enlargement on ultrasonography, and 14 had a solitary nodule.

Table 1: Age & sex distribution of autoimmune thyroiditis cases

Age Group in yrs.	Male N (%)	Female N (%)	Total Cases N (%)
0–10	0 (0.0%)	0 (0.0%)	0 (0.0%)
11–20	0 (0.0%)	4 (4.7%)	4 (4.7%)
21–30	14 (16.3%)	44(51.2%)	58(67.4%)
31–40	6 (7.0%)	12 (14.0%)	18 (20.9%)
41–50	0 (0.0%)	4 (4.7%)	4 (4.7%)
51–60	0 (0.0%)	2 (2.3%)	2 (2.3%)
61–70	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	20(23.3%)	66(76.7%)	86(100%)

Table 2: Cytomorphological grading of Hashimoto's thyroiditis cases

Grades of Hashimoto's Thyroiditis	Number of Cases N (%)
1	10 (11.63%)
2	16 (18.60%)
3	60 (69.77%)
Total	86 (100%)

Table 4: Comparison of cytological grades of Hashimoto's thyroiditis with ultrasonography findings

Grades	Diffuse Thyroiditis N (%)	Goitre N (%)	Thyroid Nodule N (%)	Normal Study N (%)
1	4 (4.65%)	2 (2.33%)	2 (2.33%)	2 (2.33%)
2	8 (9.30%)	4 (4.65%)	2 (2.33%)	2 (2.33%)
3	40(46.51%)	10 (11.63%)	10 (11.63%)	0 (0.00%)
Total	52 (60.47%)	16 (18.60%)	14 (16.28%)	4 (4.65%)

Table 5: Correlation between cytomorphological grading of chronic lymphocytic thyroiditis with increased anti-TPO Ab level and TSH level

Cytological Grade	TSH (Normal) N (%)	TSH (Increased) N (%)	TSH (Decreased) N (%)	Anti-TPO (Normal) N(%)	Anti-TPO (Elevated) N (%)
Grade1	2 (1.43%)	6 (4.29%)	2 (1.43%)	2 (1.43%)	2 (1.43%)
Grade2	4 (2.86%)	10 (7.14%)	2 (1.43%)	4 (2.86%)	6 (4.29%)
Grade3	10 (7.14%)	40(28.57%)	10 (7.14%)	10 (7.14%)	30 (21.43%)

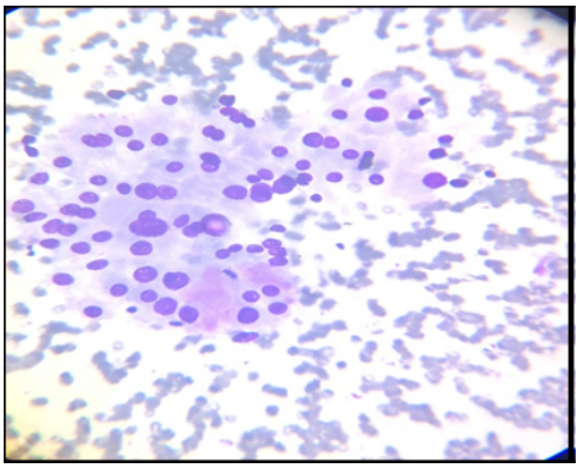

Figure 1: Grade 2 Lymphocytic thyroiditis with Hurthle cell 400X

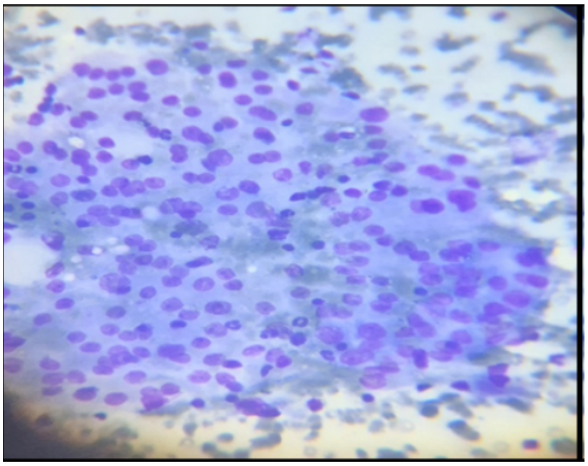

Figure 2: Grade 1 Lymphocytic thyroiditis 400X

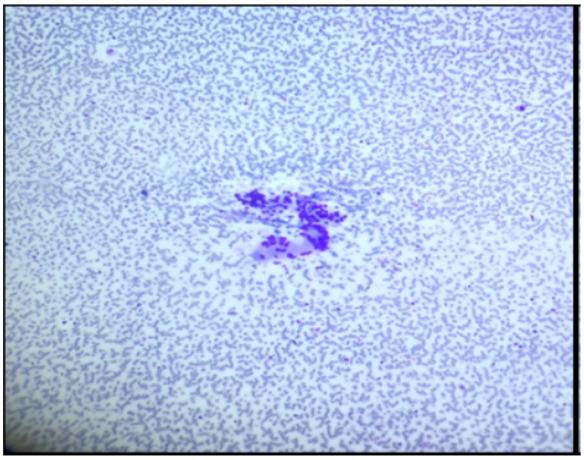

Figure 3: Giant cell and, granuloma 100X

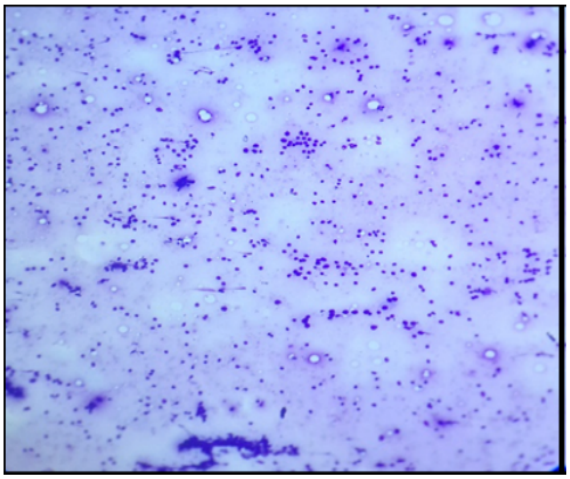

Figure 4: Grade 3 Lymphocytic thyroiditis 100X

Discussion

The thyroid is an essential endocrine gland that generates three hormones: the peptide hormone calcitonin and the thyroid hormones triiodothyronine (T3) and thyroxine (T4).

These hormones are essential for controlling children's growth, development, protein synthesis, and metabolic rate. Additionally, they are essential for healthy pregnancy and reproduction. Hypothyroidism is frequently caused by autoimmune thyroiditis. It can result in a number of problems, including aberrant sexual development, irregular menstruation, infertility, subfertility in women of reproductive age, miscarriages, and congenital deformities during pregnancy, if it is not

identified and treated.[7, 8] It can be difficult to diagnose subclinical hypothyroidism since autoimmune thyroiditis is becoming more common, particularly in women of reproductive age. Thyroiditis is characterized by the infiltration of T and B lymphocytes, which attack thyroid antigens and can result in the destruction of the thyroid gland's follicular structure and replacement with fibrosis. Elevated levels of thyroid autoantibodies in the blood are frequently observed in these cases, making cytological and serological evaluations crucial for accurate diagnosis. Hypothyroidism is frequently caused by autoimmune thyroiditis, particularly in women who are fertile.

The active stage of the illness may manifest as thyrotoxicosis, but it may also develop into overt or subclinical hypothyroidism.

Although the precise origin of autoimmune thyroiditis is unknown, it is believed to be impacted by iodine shortage, medication, infection, stress, and smoking. Additionally, there is a higher chance that autoimmune thyroiditis will progress to cancer, especially papillary carcinoma and extra nodal marginal B-cell lymphoma.[9,10] Because autoimmune thyroiditis can significantly affect a patient's health, it is a disorder that needs to be continuously monitored. In line with earlier research by Ashwin et al.[11,] who also discovered a high frequency in the 20–40 age range, our analysis of 220 cases revealed that the most prevalent age group among patients was 21–30 years. Diffuse thyroid swelling 52 (60.47%) was the most common manifestation in our analysis, which is similar to research by Kartha S et al.[12] (66%) and Ashwin et al.[12] (50.81%). Grade 3, 60 (69.77%) accounted for the majority of our cases. After analyzing the TSH levels, we discovered that 40 (28.57%) of the patients were hypothyroid. This finding was consistent with research by Rathi et al. [13], Ashwin et al. [11], and P Agrawal et al. [14], who identified hypothyroidism in 56.1%, 50%, and 50% of cases, respectively. However, 73.6% of patients had hypothyroidism, according to Bhatia et al. [5]. Anti-TPO antibody was elevated in 30 (21.43%), 6 (4.29%), and 2 (1.43%) of the Grade 3, Grade 2, and Grade 1 autoimmune thyroiditis cases in our study, respectively.

In a similar vein, Neelam Sood et al. study [15] discovered raised levels of TSH and Anti-TPO Antibody in a significant proportion of cases across all grades of autoimmune thyroiditis, with elevated levels seen in 91.67%, 94.12%, and 96.16% of patients in Grades 1, 2, and 3, respectively.

Conclusion

An autoimmune condition that usually affects people in their 20s and 30s, Hashimoto's thyroiditis is more common in women than in men. Hypothyroidism is the most prevalent clinical characteristic and may be the first manifestation. In higher grades of Hashimoto's thyroiditis, the results of fine-needle aspiration cytology (FNAC) are frequently linked to aberrant biochemical findings.

Ultrasonography, biochemical measurements, and cytological grading of Hashimoto's thyroiditis can all be used to identify subclinical hypothyroidism and direct treatment.

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