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STUDY ON THE DIAGNOSTIC EFFICACY OF FNAC ALONG WITH ASSAY OF THYROID HORMONES AND THYROID PEROXIDASE ANTIBODIES IN CHRONIC THYROIDITIS PATIENTS.

Pathology

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ABSTRACT

Objectives: This present study was to evaluate the prevalence of chronic thyroiditis and diagnostic efficacy of FNAC along with assay of thyroid hormones and thyroid peroxidase antibodies in chronic thyroiditis patients. **Methods:** FNAC was performed by using standard techniques and aseptic methods with 5cc syringe and 23-25G needle. Both aspiration and non-aspiration techniques were used. Material obtained were smeared on glass slides and fixed in ethanol and stained with Papanicolaou stain and Giemsa stain. Detailed cytomorphological features were studied. Clinical history, ultrasonography findings, serum T3, serum T4, and thyroid stimulating hormone (TSH) and anti-TPO antibodies were noted and correlated with FNA features. **Results:** Most of the patients 57(57%) were belonged in age group of 41-60 years. Male and female ratio was 3:7. Diffuse and nodular clinical presentation were seen in 43(43%) and 57(57%) patients respectively. 47(47%) were showing grade 2 thyroiditis features, followed by 31(31%) grade 1. Thyroid function tests along with Anti-TPO and FNAC were done in 38(38%) patients. Thyroid function tests and FNAC together was done in 61(61%). FNAC along with anti-TPO alone was done in 24(24%) chronic thyroiditis patients. **Conclusions:** This present study concluded that the chronic thyroiditis was commonly seen in females. Middle age population was more suffered. Grading of FNAC material based on lymphocytic infiltration of thyroid follicles along with positivity for antithyroid antibodies (anti-TPO antibody) was strongly associated with chronic lymphocytic thyroiditis but no correlation was seen between the grades of thyroiditis and TSH. FNAC findings along with thyroid hormone and thyroid peroxidase antibody assay is very helpful for diagnosing of chronic thyroiditis. FNAC still remains gold standard for diagnosis of chronic thyroiditis. It is the most accurate, rapid, safe, reliable and cost- effective method used for the evaluation of thyroid disorders.

KEYWORDS

Chronic thyroiditis, FNAC, Anti -TPO, age group, gender

INTRODUCTION

HT or chronic lymphocytic thyroiditis is an autoimmune thyroiditis that is clinically characterized by an initial transient phase of hyperthyroidism followed by a chronic phase of hypothyroidism [1].
The prevalence of clinically inapparent thyroid nodules (on ultrasonography, USG) ranges from 20% to 76% in the general population [2]. Moreover, 20% to 48% of patients with palpable thyroid nodules are found to have additional nodules on USG [3]. In India, the incidence of clinically palpable nodules in adults is around 12.2% [4].

The major cause of hypothyroidism in adults is Hashimoto's thyroiditis an autoimmune-mediated destruction of thyrocytes. A complex immunologic phenomenon results in the formation of immune complexes and complement in the basement membrane of follicular cells. Alterations in thyroid cell function result that impair T3 and T4 production. These cellular reactions ultimately result in the infiltration of lymphocytes and resultant fibrosis, which decreases the number and efficiency of individual follicles [5].

The pathologic changes include marked lymphocytic infiltration of the thyroid with germinal center formation, atrophy of the thyroid follicles accompanied by oxyphil metaplasia, absence of colloid, and mild-to-moderate fibrosis. The presence of thyroid peroxidase (TPO) antibody is a feature of autoimmune thyroiditis. The hyperthyroid variant is closely related to Graves' disease on gross examination and microscopic appearance. Thyroid-stimulating hormone (TSH) receptor antibodies confirm the diagnosis of Graves' disease in such cases [6]. The autoimmune process involves an underlying genetic predisposition and a trigger(s) that initiate the cascade of events. The identified triggers are infections, life stress, iodine intake, smoking, medications such as amiodarone and interferon, radiation, and environmental toxicants [7]. The diagnosis of the disease on fine needle aspiration cytology (FNAC) smears is made by finding the oxyphilic transformation of follicular epithelial cells (Hurthle cells), infiltration of follicles by lymphocytes and plasma cells, presence of moderate number of lymphoid cells in background with scanty or absent colloid in the background [8]. Objectives of our study was to evaluate the diagnostic efficacy of FNAC along with assay of thyroid hormones and thyroid peroxidase antibodies in chronic thyroiditis patients.

MATERIALS & METHODS

This present study was conducted in Department of Pathology with collaboration of Department of Biochemistry in Katihar Medical College and Hospital, Katihar, Bihar India during a period from March 2014 to April 2015. Entire subject signed an informed consent approved by institutional ethical committee of KMCH, Katihar, Bihar was sought.

A detail history, clinical examinations and relevant investigations were performed to all chronic thyroiditis patients.

All patients with thyroid swellings and having clinical/ radiological features of hypothyroidism were included in the study. A total of 100 Patients of chronic thyroiditis with age group 0 to 80 years were enrolled in this study. Patients with clinical / radiological evidence of malignancy were excluded from the study.

METHODS:

FNAC was carried out using standard techniques and aseptic methods with 5cc syringe and 23-25G needle. Both aspiration and nonaspiration techniques were used. A maximum of two attempts were made to procure material. Material obtained were smeared on glass slides and fixed in ethanol and stained with Papanicolaou stain and Giemsa stain. Detailed cytomorphological features were studied.

The criteria used for making a diagnosis of chronic lymphocytic thyroiditis were the presence of increased lymphocytes, lymphocytes/ plasma cells infiltrating follicular cells, fine chromatin of follicular cells, and presence of Hurthle cells, anisonucleosis, epithelioid cells, and giant cells. The grading of the thyroiditis was done by the criteria used by Bhatia et al [14]. Clinical history, ultrasonography findings, serum T3, serum T4, and thyroid stimulating hormone (TSH) and anti-TPO antibodies were noted and correlated with FNA features.

STATISTICALANALYSIS

Data was analysed by using simple statistical methods with the help of MS-Office software. All data was tabulated and percentages were calculated.

RESULTS

A total of 100 chronic lymphocytic thyroiditis patients were enrolled in this study. Most of the patients 57(57%) were belonged in age group of 41-60 years. Male and female ratio was 3:7.

Table.1. Age wise distributions of chronic thyroiditis patients.

Age wise	No. of patients	% of patients
0-20	2	2%
21-40	30	30%
41-60	57	57%
61-80	11	11%
Total	100	100%

Grade 1 thyroiditis was characterized by the presence of increased number of lymphocytes in the background or the presence of lymphoid cells infiltrating follicular cells. Smears of patients with grade 2 thyroiditis showed the presence of Hurthle cells, epithelioid cells, giant cells, and anisonucleosis and increased number of lymphocytes. Grade 3 thyroiditis that was characterized by the presence of florid lymphocytic infiltration with germinal center formation and the presence of scanty follicular cells.

Table. 2. Showing the grading and morphological features of chronic thyroiditis patients.

Grade	Morphological features	No. patients
Grade 0	No lymphoid cells	0
Grade 1 (mild)	Few lymphoid cells infiltrating the follicles / increased number of lymphocytes in the background.	31(31%)
Grade 2 (moderate)	Moderate lymphocytic infiltrate / mild lymphocytic infiltration with Hurthle cell change / giant cells / anisonucleosis	47(47%)
Grade 3(severe)	Florid lymphocytic inflammation with germinal centre formation / very few follicular cells left	22(22%)

In the present study, majority of the cases 47(47%) were showing grade 2 thyroiditis features followed by 31(31%) grade 1. Diffuse and nodular clinical presentation were seen in 43(43%) and 57(57%) patients respectively.

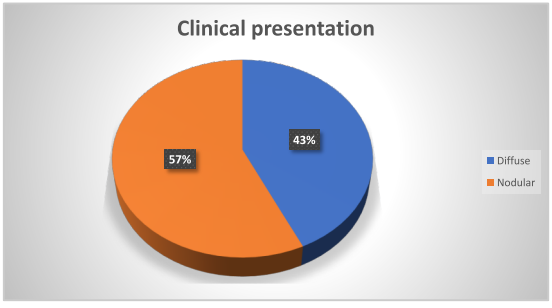

Figure.1. Clinical presentations of patients with chronic thyroiditis.

Table.3. Cytological grading in cases of chronic thyroiditis.

Cytological Grade	TSH (Normal)	TSH (Increased)	TSH (Decreased)	Anti-TPO (Normal)	Anti-TPO (Elevated)	Total
Grade 0	-	-	-	-	-	-
Grade 1	12	2	10	2	5	31
Grade 2	25	6	3	2	11	47
Grade 3	10	2	2	2	2	22
Total	47	10	15	6	18	100

Out of 100 cases, majority of patients 31(31%) were showed Grade 1 cytomorphological features of chronic thyroiditis, among them majority of the patients 12(38.71%) were euthyroid and 10(32.26%) hypothyroid. 5(16.13%) cases showed elevated Anti-TPO levels.

25(53.19%) and 10(45.45%) patients of grade 2 and grade 3 had euthyroid respectively. And 11(23.41%) and 2(9.09%) patients had an elevated anti-TPO levels respectively.

Out of 100 patients, thyroid function tests along with Anti-TPO and FNAC were done in 38(38%). Thyroid function tests and FNAC together was done in 61(61%) out of 100 cases. FNAC along with anti-TPO alone was done in 24(24%) cases.

DISCUSSIONS

Chronic lymphocytic thyroiditis is synonymous with autoimmune thyroiditis and includes Hashimoto's thyroiditis (goitrous thyroiditis) and nongoitrous atrophic thyroiditis. The disorder is most common in women, and the spectrum of clinical presentation ranges from asymptomatic, large goiter (diffuse or nodular) to an atrophic gland, euthyroidism, hypothyroidism, and rarely hyperthyroidism [9].

In our present study, 100 patients of chronic thyroiditis were included. Most of the patients 57(57%) were belonged in age group of 41-60 years. Chronic thyroiditis was commonly seen in female 70(70%) than male 30(30%).

Mehment Erdogan et al, [10] in his retrospective study investigated the clinical and demographic features of patients who were diagnosed and treated with Hashimoto's thyroiditis, the referral centre in the Aegean region of Turkey. Out of 769 patients who fulfilled criteria for Hashimoto's thyroiditis diagnosis in his study (725 were females, 44 were males; mean age was 41.76±12.49 years). Around 62.7% of patients were in 30–50 years age group. Diffuse thyromegaly was observed in 3.3% of females and 63.6% of males. He found TSH level was more than 4.0 IU/l in 27.4% of males, and 25.6% of females. Anti-thyroglobulin antibody was found to be positive in 92% females, and 93.2% males. In their study anti-TPO antibody was found to be positive in 98.4% females (713 patients), and 100% males. Ultrasonography of the thyroid demonstrated multiple nodules in 11.3% cases and single nodules in 52.2% cases of female patients in study population while in male patients single nodule was 32% and multiple nodules was 20%.

Hurthle cell is a diagnostic feature of lymphocytic (Hashimoto's) thyroiditis highlighting moderate to marked anisonucleosis and is described in wide range (48-98%) of lymphocytic thyroiditis by various authors [11].

In our present study, thyroid function tests along with Anti-TPO and FNAC were done in 38(38%). Thyroid function tests and FNAC together was done in 61(61%) patients. FNAC along with anti-TPO alone was done in 24(24%) patients.

In our present study, grade 2 thyroiditis features 47(47%) was more common followed by 31(31%) grade 1 thyroiditis. Diffuse and nodular clinical presentation were seen in 43(43%) and 57(57%) patients respectively. This is comparable with the observations made by Anila et al, [12]. But this is significantly higher when compared to a study done by Bhatia A et al., where, only 2.63% of patients presented with nodular disease [13]. The authors have opined that nodular disease is usually representing the early stages of Hashimoto's (lymphocytic) thyroiditis. But the patient usually reports to the physician in the advance stage of the disease, where the clinical and hormonal changes have already been established and patient clinically presents with diffuse thyroid swelling [12]. This was supported by our observation that in the present study a normal TSH values was observed in 47(47%) while Anti-TPO value was raised in 18(18%) cases.

Out of 100 cases, majority cases 31(31%) were showed Grade 1 cytomorphological features of chronic thyroiditis, among them majority of the patients 12(38.71%) were euthyroid and 10(32.26%) hypothyroid. 5(16.13%) cases showed elevated Anti-TPO levels. 25(53.19%) and 10(45.45%) of grade 2 and grade 3 patients had euthyroid respectively. Among them, 11(23.41%) and 2(9.09%) patients had an elevated anti-TPO levels respectively.

TPO is a membrane-associated hemoglycoprotein expressed only in thyrocytes and is one of the most important thyroid gland antigens. Disorders of the thyroid gland are frequently caused by autoimmune mechanisms with the production of autoantibodies. Anti-TPO antibodies activate complement and are thought to be significantly involved in thyroid dysfunction and the pathogenesis of hypothyroidism.

The cytological grading of thyroiditis on smears was done for the first time by Bhatia et al. [14] wherein the cytological grades of lymphocytic thyroiditis was correlated with the clinical, biochemical, ultrasonographic, and radionuclide parameters and serum thyroid microsomal antibody values [14]. In this study we used an integrated approach by using a combination of 3 tests such as cytological grading of FNAC material, TFT and assay of Thyroid peroxidase antibodies, which together will increase the sensitivity and help to pick up correct diagnosis preoperatively, which will help the clinician to decide on appropriate management and to assess the incidence of chronic thyroiditis.

CONCLUSIONS

This present study concluded that the chronic thyroiditis was commonly seen in females. Middle age population was more suffered. Grading of FNAC material based on lymphocytic infiltration of thyroid follicles along with positivity for antithyroid antibodies (anti-TPO antibody) was strongly associated with chronic lymphocytic thyroiditis but no correlation was seen between the grades of thyroiditis and TSH. FNAC findings along with thyroid hormone and thyroid peroxidase antibody assay is very helpful for diagnosing of chronic thyroiditis. FNAC still remains gold standard for diagnosis of chronic thyroiditis. It is the most accurate, rapid, safe, reliable and cost- effective method used for the evaluation of thyroid disorders.

REFERENCES

1. Anila KR, Nayak N, Jayasree K. Cytomorphologic spectrum of lymphocytic thyroiditis and correlation between cytological grading and biochemical parameters. J Cytol 2016;33:145-9.
2. Ross DM. Diagnostic approach to and treatment of thyroid nodules.I. In: Rose BD, ed. Wellesley(MA): UpToDate; 2005. http://www.uptodate.com/contents/diagnostic-approach-toand- treatment-of-thyroid-nodules
3. Tan GH, Gharib H. Thyroid incidentalomas: Management approaches to nonpalpable nodules discovered incidentally on thyroid imaging. Ann Intern Med. 1997;126:226-231
4. Usha Menon V, Sundaram KR, Unnikrishnan AG, Jayakumar RV, Nair V, Kumar H. High prevalence of undetected thyroid disorders in an iodine sufficient adult south Indian population. J Indian Med Assoc. 2009;107:72–7.
5. Fatima ATS, Shajahan Y. An observational study on anti-thyroperoxidase antibody positivity in thyroiditis cases among adults in a tertiary care center. J. Evolution Med. Dent. Sci. 2019;8(13):1003-1008.
6. Baloch ZW, Livolsi VA. Pathology and cytopathology. In: Braverman LE, Cooper DS, editors. Werner and Ingbar's The Thyroid: A Fundamental and Clinical Text. 10th ed. Philadelphia: Lippincott Williams and Wilkins; 2013; 326-53.
7. Brent GA. Environmental exposures and autoimmune thyroid disease. Thyroid 2010; 20:755-61.
8. Orell SR, Sterrett GF, Darell W. Thyroid. In: Orell SR, Sterrett GF, Darell W, editors. [6]Fine needle aspiration cytology. 4th ed. India: Elsevier Science Ltd; 2005:136-38.
9. Sharma M, Raina RK, Singh S, Raina S. Clinical, biochemical, and cytomorphological profile of lymphocytic thyroiditis: A study from a medical college in the Kangra Valley, India. Thyroid Res Pract 2019;16:66-70.
10. Erdogan M, Erdem N, Cetinkalp S, Ozgen AG, Saygılı F, Yilmaz C, et al. Demographic, clinical, laboratory, ultrasonographic, and cytological features of patients with Hashimoto's thyroiditis: results of a university hospital of 769 patients in Turkey. Endocr. 2009 Oct 24;36(3):486–90.
11. Pradhan SP, Choudhury S, Dash A, Mishra DP. Cytomorphological and serological [4]studies in hashimoto's thyroiditis. Journal of Evidence Based Medicine and Healthcare. 2016;3(93):5111-5115.
12. Anila K, Nayak N, Jayasree K. Cytomorphologic spectrum of lymphocytic thyroiditis and correlation between cytological grading and biochemical parameters. Journal of Cytology. 2016;33(3):145.
13. Bhatia A, Rajwanshi A, Dash R, Mittal B, Saxena A. Lymphocytic thyroiditis- Is [1]cytological grading significant? A correlation of grades with clinical, biochemical, ultrasonographic and radionuclide parameters. Cyto Journal. 2007;4(1):10.
14. Shukla S, Acharya S, Pansey P, et al. Epidemiology of thyroid lesions in Wardha District of Central India. Journal of Evidence Based Medicine and Healthcare 2015;2(7):799-810.