Original Research Article

Autoimmune thyroiditis – Correlation of clinico-radiological presentation, thyroid profile and cytomorphological spectrum

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Abstract

Background: Thyroiditis is the second most common thyroid lesion next to endemic goitre diagnosed on FNA in iodine (I2) deficient areas. Although FNAC is the gold standard for diagnosis of thyroiditis, accurate diagnosis of a thyroid lesion at FNAC requires not just an in depth study of the cytomorphology but also a thorough clinico- radiological and serologic correlation.

Aim: To study and correlate the clinical, radiologic, serologic and cytomorphological spectrum of autoimmune thyroiditis.

Materials and methods: Retrospective study involving 150 cases was conducted. Clinical history (age, sex, symptoms with their duration and other signs, other significant medical/surgical history), TFT, were noted from the medical record available with the patient and also from Endocrinology department records.

Results: Incidence of autoimmune thyroiditis was found to be 13.4%. Majority of the patients were females (96.7%), 53.3% of cases were seen in the age group of 21-40 years. 80.6% patients had a diffusely enlarged thyroid gland clinically. 92.7% patients showed grade I/II goitre. USG also showed a diffuse enlargement in 85.3% cases. Of the 150 patients with autoimmune thyroiditis, 110(73.3%) patients were euthyroid while 32 (21.3%) patients were hypothyroid at the time of FNAC. Only 8(5.3%) patients showed evidence of hyperthyroidism. 8% patients showed subclinical hypothyroidism. Prevalence of euthyroid autoimmune thyroiditis appeared high in our study. Among the cytomorphological features, presence of lymphocytes was consistently seen in all cases of chronic lymphocytic thyroiditis /mixed thyroiditis. Hurthle cells were seen in 68.6%, eosinophils were seen in 16.6%, giant cells and granulomas were noted in 29.3% and 8.6% cases respectively. L:E ratio was

high in 101 (67.3%) cases ranging from 2:1 to 10. TFC destruction and grade III thyroiditis showed a significant association.

Conclusion: Autoimmune thyroiditis was seen more commonly in females. Majority cases were seen in age group of 21-40 years of age. Lymphocytes, germinal centre cells, thyroid follicular destruction and Hurthle cells form important cytological features, while giant cells, eosinophils, granulomas were other cytomorphologic features in the diagnosis of autoimmune thyroiditis. Clinically and radiologically most of patients showed diffuse enlargement of thyroid gland. Majority of patients in our study were euthyroid at time of presentation. Prevalence of euthyroid autoimmune thyroiditis appeared high in our study. TFC destruction and grade III thyroiditis showed a significant association.

Key words

Autoimmune thyroiditis, Clinico-radiological findings, Thyroid function test, Cytomorphological features.

Introduction

Thyroiditis is the second most common thyroid lesion next to endemic goitre diagnosed on FNA in iodine (I2) deficient areas [1].

Autoimmune thyroiditis

There is no internationally accepted classification of autoimmune thyroid diseases. Hashimoto's / chronic lymphocytic thyroiditis are a part of the spectrum of autoimmune thyroid diseases. At one end of this spectrum is Hashimoto's thyroiditis, which usually presents as hypothyroidism and at other end is Grave's disease [2]. In favour of this interpretation is the existence of cases sharing features of both disease (sometimes designated as Hashitoxicosis), suggesting that one may evolve into another [3, 4].

Some investigators consider autoimmune thyroiditis as a histologic diagnosis that may be subdivided into lymphocytic thyroiditis if only lymphocytic infiltration is present and as Hashimoto's thyroiditis if atrophy and oncocytic change of the epithelium is seen [2]. Many others use chronic lymphocytic thyroiditis and Hashimoto's thyroiditis as synonymous terms [5, 6].

Clinically, chronic autoimmune thyroiditis is said to have two forms – A goitrous form which is often referred to as Hashimoto's thyroiditis and an atrophic form called atrophic thyroiditis [7].

Grave's disease – diffuse goitre with hyperthyroidism, ophthalmopathy or both is thus a related autoimmune disease but not a form of autoimmune thyroiditis.

Hashimoto's thyroiditis was first described in 1912 by Dr. Hakuru Hashimoto. Based on the histological findings, Hashimoto originally used the term "Struma Lymphomatosa." Over the years, this disease has been called by several names including lymphocytic thyroiditis, autoimmune thyroiditis, chronic thyroiditis, and lymph adenoid goiter [8].

Incidence and distribution of the disease

During the past few decades there has been a reported increase in the incidence of Hashimoto's thyroiditis, which could be attributed to newer diagnostic modalities such as needle biopsies and serological tests, and their increased sensitivity when compared to the older methods [9]. Autoimmune thyroiditis is about 15-20 times more common in women than in men and frequently involves people between the ages of 30 and 50 years of age. Chronic autoimmune thyroiditis is rare in children younger than five years of age, but it does occur in children and accounts for 40 percent or more of cases of goitre in adolescents [10].

The pathogenesis of Hashimoto's thyroiditis is a complex multistep process which involves

various genetic, environmental and immunological factors [11].

Hashimoto's thyroiditis has a highly variable clinical presentation. Only about 20% of the patients exhibit signs and symptoms of mild hypothyroidism at initial presentation.

Materials and methods

This was a retrospective study carried out in a tertiary care teaching hospital, KEM hospital, Mumbai, Maharashtra. All case diagnosed as chronic lymphocytic thyroiditis and mixed thyroiditis in a two year period from January 2010 to December 2011 formed the study group. Total 150 cases were included in study.

The terminology autoimmune or Hashimoto's thyroiditis was not used while giving the cytologic diagnosis, as is the prevalent practice in our institute. A case was put in the category of mixed thyroiditis if it showed Hurthle cells while, in the absence of Hurthle cells a diagnosis of chronic lymphocytic thyroiditis was given. This category represents autoimmune thyroiditis in our study.

The clinical history (age, sex, symptoms with their duration and other signs, other significant medical/surgical history), TFT, were noted from the medical record available with the patient and also from Endocrinology department records.

TFTs obtained by chemiluminescent technique. Reference range of TFTs shown in **Table - 1**.

Table – 1: Reference range of thyroid function test [12].

Parameters	Reference range
T_3	60-160µg/dL
T_4	5-12.5µg/dL
TSH	0.5-5.0mIU/L

FNACs had been performed using a 24 gauge sharp disposable needle and 10 ml disposable syringes using both aspiration and non-aspiration techniques. Standard procedure was followed and with each pass the smears obtained were equally distributed.

Smears were air dried and alcohol fixed. The air dried smears were stained with Geimsa stain and Papanicolaou staining was done on the fixed smears.

All the smears were reviewed and the following parameters were studied:

1. Amount of lymphocytic infiltration [Number of lymphocytes/high power field (hpf) [13]

Based on the number of lymphocytes per hpf lymphocytic infiltration was graded as.

Grade I: <10 lymphocytes/hpf,

Grade II: 11-20 lymphocytes/ hpf,

Grade III: >21 lymphocytes/hpf

2. Presence of follicular centre cells

3. Presence of Oxyphil cells/ Hurthel cells

4. Presence of follicular destruction

5. Thyroiditis was graded as follows using the criteria proposed by Bhatia, et al. [6]:

Grade 0: No lymphoid cells.

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.

6. Ratio of lymphocytes to epithelial cells recorded where follicular epithelium as well as background epithelium were represented in the smears [14]. Ratio >2:1 is considered high.

7. Eosinophils – number, infiltration of TFC clusters by eosinophils

8. Amount and type of colloid

9. Presence of granuloma, giant cells

Results

In 2 year period i.e. from January 2010 to December 2011, total 7,756 FNACs were performed and out of these 1113 were thyroid FNACs (**Table – 2**).

Table – 2: Total number of thyroid FNACs in retrospective 2 years among total FNACs performed.

	Number	Percentage (%)
Total FNACs	7756	100
Thyroid FNACs	1113	14.4

Table – 3: Distribution of cases of autoimmune thyroiditis (n=150 cases).

Type of thyroiditis	No. of cases	%
Mixed thyroiditis	103	68.7
Chronic lymphocytic thyroiditis	47	31.33

Table - 4: Age and sex wise distribution of autoimmune thyroiditis cases (n=150).

Age range (Years)	Male	Female	Total
0-12	-	06	06
13-20	03	22	25
21-30	01	49	50
31-40	-	30	30
41-50	-	21	21
51-60	01	15	16
61 – 70	-	02	02
Total	05	145	150

Table - 5: Clinical presentation in cases of autoimmune thyroiditis (n=150).

Symptoms	Number	%
Only enlargement of thyroid (Otherwise asymptomatic)	74	49.3
Thyroid enlargement with other symptoms	76	50.7
Total	150	100

Table - 6: Grade of thyroid enlargement (grade of goitre) in patients with only thyroid enlargement (n = 74).

Grade of thyroid enlargement	No. of cases
Grade I	45
Grade II	27
Grade III	01
Grade IV	01
Total	74

Thyroid aspirations accounted for 14.4% of all FNAs. 152 cases of thyroiditis were identified, of which 150 cases were chronic lymphocytic thyroiditis/ mixed thyroiditis and 2 were subacute thyroiditis. Autoimmune thyroiditis was thus diagnosed in 13.4% of thyroid aspirates. Mixed thyroiditis was seen in 68.7% and chronic lymphocytic thyroiditis in 31.33% cases (**Table – 3**).

Majority of the patients were females (96.7%), only 5 male patients (3.3%) were seen. M: F ratio was 1:29. 53.3% of cases were seen in age group 21-40 years age group, maximum number of cases seen in the 3rd decade (33.4%). The youngest patient was a 7 year old girl while the oldest patient was a 63 year old female (**Table – 4**).

There was nearly an equal distribution of patients who presented only with a thyroid swelling (goitre) (49.3%) and patients with an enlarged thyroid along with symptoms related to the thyroid (50.7%) (**Table – 5**).

97.2% patients presented with grade I / II thyroid enlargement and majority (60.8%) patients had just grade I thyroid enlargement (**Table – 6**).

Pressure symptoms were more frequent in patients with grade III and IV thyroid enlargement and were seen in 35.7% patients with grade II thyromegaly. Only 8 patients had definite symptoms of hypothyroidism. Miscellaneous complaints included headache, chest pain, low grade fever, fatigue, decreased hearing, loss of hair etc. None of the patients had a known predisposing factor (**Table – 7**).

121/150 i.e. 80.6% of patients had diffuse enlargement on palpation (**Table – 8**).

In 27 cases USG findings were not available. Of the 123 cases where USG findings were available, 85.3% cases showed a diffusely enlarged gland. 14.7% cases showed focal nodularity, the nodules ranged in size from 1.0 to 3.2 cm.

Table - 7: Presenting symptoms and their correlation with the grade of thyroid enlargement in 'symptomatic' (n = 76).

Grade of thyroid enlargement	No. of patient	Pressure symptoms	Menstrual Disturbances	Cold intolerance	Heat intolerance	Palpitation, tremors	Weight gain	Weight loss	Miscellaneous symptoms
I	41	14	4	2	2	5	3	11	27
II	28	10	0	2	0	4	4	4	5
III	5	3	0	0	0	1	1	0	2
IV	2	2	0	0	0	0	0	0	0

Table - 8: Nature of enlargement of thyroid clinically (n = 150).

Age range in years	Thyroid enlargement (clinically)	
	Nodular	Diffuse
0-12	01	05
13-20	05	20
21-30	08	33
31-40	09	30
41-50	02	19
51-60	04	12
61- 70	-	02
TOTAL	29	121

Table - 9: Nature of thyroid enlargement on radiology (USG) (n=123).

Age range in years	Thyroid enlargement (USG)		
	Focal	Diffuse	Data not available
0-12	-	05	01
13-20	02	17	06
21-30	07	35	08
31-40	04	20	06
41-50	02	17	02
51-60	03	10	03
61- 70	-	01	01
Total	18	105	27

3 patients who initially had a diffusely hypoechoic gland at presentation developed nodularity in the gland at follow up USG. However repeat FNA/ guided FNA was not performed in these patients (**Table – 9**).

110 /150 i.e.73.3% patients were euthyroid while 32 (21.3%) patients were hypothyroid at the time of FNAC. 2 patients who were euthyroid at the time of FNA became hypothyroid on follow up.
Only 5.3% patients showed evidence of hyperthyroidism. T3 and T4 levels were normal in 121 and 130 cases respectively while they were decreased in 20 and 14 cases respectively.

12 patients showed evidence of subclinical hypothyroidism (Increased TSH with normal T3, T4) (**Table – 10**).

Table - 10: Thyroid hormone status (n = 150).

Thyroid status	TSH	Number
Euthyroid	Normal	110
Hypothyroid	Increased	32
Hyperthyroid	Decreased	08

All the 8 cases with a hyperthyroid status were symptomatic, while in the euthyroid and hypothyroid patients only 46% and 53% patients respectively were symptomatic (**Table – 11**).

81.8% of the euthyroid patients and 81.2% of the hypothyroid patients had diffuse enlargement of

thyroid clinically. In 27 cases USG findings were not available. Of the 123 cases where USG findings were available, 87.5% of euthyroid, 78.9% of hypothyroid and 62.5% of hyperthyroid patients presented with diffuse enlargement of thyroid (**Table – 12**).

Table - 11: Correlation of thyroid status with clinical presentation (n=150).

Clinical presentation	**Euthyroid**	**Hypothyroid**	**Hyperthyroid**
Only enlargement of thyroid (Asymptomatic) (n = 74)	59	15	0
Symptomatic with enlargement of thyroid (n = 76)	51	17	08
Total	110	32	08

Table - 12: Comparison between thyroid status and thyroid enlargement.

Thyroid status	**Thyroid enlargement**				
	Clinically		**USG (n = 123)**		
	Nodular	Diffuse	Focal	Diffuse	Data not available
Euthyroid	20	90	12	84	14
Hypothyroid	06	26	04	15	13
Hyperthyroid	03	05	03	05	0

Table – 13: Cytomorphological features in cases of autoimmune thyroiditis.

Cytomorphological features			**No. of cases**	**Percentage**
Number of lymphocytes	Grade I		13	8.7
	Grade II		57	38
	Grade III		80	53.3
Grade of thyroiditis	No. of lymphocytes	Mild	13	8.7
		Moderate	57	38
		Severe	80	53.3
	TFC destruction		103	68.6
	Hurthle cells		103	68.6
	GCC		70	46.6
	Giant cells		44	29.3
	Grade	I	07	4.6
		II	63	42
		III	80	53.3
Eosinophils	Infiltrate of TFC		13	8.6
	Clusters		12	08
Granulomas			13	8.6
L:E Ratios	High		101	67.3
	Low		49	32.6
Colloid	Thick and thin		77	51.3
	Scanty thick		69	46
	No colloid		04	2.6

The cases were studied as per the various parameters proposed. The number of lymphocytes was graded independently and they also formed one of the parameters for grading thyroiditis. Granulomas were seen in 13 cases (8.6%) and giant cells were noted in 44 cases (29.3%). 4 cases did not show any colloid while the colloid was scanty and thick in 69 cases (46%). Both thick and scanty thin colloid was present in 77 cases. Abundant colloid was not seen in any of the cases (**Table – 13**).

Grading of lymphocytes

53.3% cases showed grade III lymphocytes i. e. more than or equal to 21 lymphocytes per high power field while 9 cases showed less than 10 lymphocytes per hpf.

Grade of thyroiditis

7 patients (2%) patients had grade I thyroiditis while 80 patients showed grade III thyroiditis.

Thyroid follicle destruction was seen in 103 cases (68.6%) cases. 47 (31.3%) cases showed mild lymphocytic infiltration of a few thyroid follicular cell (TFC) clusters without destruction of thyroid follicular cell clusters. 7 of these were of grade I thyroiditis while 40 cases were of grade II thyroiditis. 52.3% cases of grade II thyroiditis showed follicular destruction. In 10 cases with grade III thyroiditis where follicular destruction was not identified, very few residual thyroid follicular cells were seen. TFC destruction and grade III thyroiditis showed a significant association with p value- 0.003 (**Table – 14**).

Table - 14: Thyroid follicle destruction on cytology smears in autoimmune thyroiditis cases (n=103).

TFC destruction n = 103	**Grade of thyroiditis**	**No. of cases**
	I (n=7)	0
	II (n=63)	33
	III (n =80)	70

Table – 15: Hurthle cells on cytology smears (n=103).

Hurthle cells n=103	**Grade of thyroiditis**	**No. of cases**
	I (n=7)	0
	II (n=63)	48
	III (n= 80)	55

Table - 16: Germinal centre cells on cytology smears in autoimmune thyroiditis (n=70).

Germinal centre cells	**Grade of thyroiditis**	**No. of cases**
	I(n=7)	0
	II (n=63)	8
	III (n= 80)	62

Hurthle cells were seen in 103 (68.6%) cases out of 150 cases. 47 cases did not show any Hurthle cells. 76% of grade II and 69% of grade III thyroiditis patients showed Hurthle cells (**Table – 15**).

Table - 17: Giant cells on cytology smears in various grades of thyroiditis (n=44).

Presence of giant cells n=44	**Grade of thyroiditis**	**No. of cases**
	I	0
	II	18
	III	26

Table – 18: Eosinophils on cytology smears of autoimmune thyroiditis (n=25).

Distribution of eosinophils	**No. of cases**
Infiltration of thyroid follicular cell clusters by eosinophils	13
Eosinophils seen in the thyroiditis	12

Table – 19: Lymphocytes to Epithelial cell ratio.

L:E ratio	**No. of cases**	**Percentage**
High	101	67.3%
Low	49	32.7%
Total	150	100%

70 cases (46.6%) showed the presence of germinal centre cells. 62 of these (88.5%) belonged to the category of grade III thyroiditis. There were 8 cases of grade II thyroiditis which showed moderate lymphocytic infiltration and occasional germinal centre cells (**Table – 16**).

Giant cells were present in 44 (29.3%) of all cases and of these 26 cases showed features of grade III thyroiditis (**Table – 17**). 25 cases (17%) showed the presence of eosinophils. Eosinophils were seen within the thyroid follicular cell clusters in 9% of cases and in the background in 8% of cases (**Table – 18**). L: E ratio was high in 101 (67.3%) cases ranging from 2:1 to 10:1 (**Table – 19**).

Discussion

Incidence

The incidence of autoimmune thyroiditis in present study was 13.4%. The incidence of

autoimmune thyroiditis in literature has been quite variable, the prevalence in general population varies from 0.3 to 5% [15, 16]. Studies that estimated the incidence in thyroid aspirates have also showed a wide range from 7.5 to 64%. Three large studies that analysed thyroid aspirates, namely those by Kapila, et al. [17], Gagneten, et al. [18] and Staii, et al. [15], have found an incidence of 14.3%, 13.4% and 13.4% respectively. Our incidence of autoimmune thyroiditis was concordant with these large studies.

Age and sex wise distribution

Autoimmune thyroiditis is more common in females and the reported mean age in literature is as high as 58 years in the Whickham survey [19]. Livolsi described the patient population predominantly affected as females over 40 years with a M: F ratio of 1:20 [20].

Our patients were also predominantly females (96.7%), M: F ratio 1:29, but most of our cases were in the age group of 21-40. The age in our study is in concordance with the study by Bhatia, et al. [6], carried out in Indian patients, where the peak incidence was also between 21 – 40 years. Kapila, et al. [17] too reported maximum cases in the age group of 16 – 35 years.

This disparity between the ages in the Western and Indian literature may be explained by the theory put forth by Kumar, et al. [12] wherein they have proposed that Hashimoto's thyroiditis occurs earlier in Iodine deficient areas such as ours, compared to Iodine sufficient areas.

Children and young adults were also affected, there were six cases between 0- 12 years of age and 25 cases between the age of 13-20 years. Most of these presented as diffuse goitre. Marwaha, et al. [21] have proposed that chronic lymphocytic thyroiditis must be ruled out in all children presenting with a firm goitre as only 20.5% of their patients had clinical symptoms.

Clinical and radiological presentation

74 patients (49%) had no symptoms other than thyroid enlargement while the 76 patients who were symptomatic showed pressure symptoms, menstrual irregularities, heat and cold intolerance, weight gain or loss etc. 29.3% patients in Guntekunst, et al. [22] study were also asymptomatic.

In our study, in both groups grade I and grade II enlargement of thyroid (goitre) were common, seen in 72/74 patients of the goitre only group and 69/76 patients of the symptomatic group. 81.8% of the euthyroid patients and 81.2% of the hypothyroid patients had diffuse enlargement of thyroid clinically.

Pressure symptoms were more common with grade III/IV thyroid enlargement. Only 8 patients had definite symptoms of hypothyroidism. Nodules were noted in 29 (19%) cases. Other authors have also documented nodular presentation in chronic lymphocytic thyroiditis, which might mimic malignancy clinically [23]. Friedman, et al. [24] found nodular presentation in as many as 80% of their patients while Ngyugen, et al. [23] found one or two prominent nodules in 39% cases. Bhatia, et al. [6] found nodules in 2.6% patients only.

Thyroid profile

TSH was elevated in 32 (21.3%) of cases and they showed either decreased (20/32) or normal T3, T4 (12/32).

Normal T3, T4 levels in the presence of elevated TSH indicates sub clinical hypothyroidism (SCH). The incidence of SCH in our study was 8% which compared well to the available literature on Indian population where subclinical hypothyroidism is reported in 8–17% patients [6].

Prevalence of euthyroid autoimmune thyroiditis appeared high in our study, 73.3% of the patients were euthyroid [15].

3 cases with grade I thyroiditis were also hypothyroid, this may be because of a sampling

error at FNA as the distribution of thyroid follicular destruction may not be uniform throughout the gland.

Cytological parameters

Cytological parameters as seen in our material are summarized in **Table – 13**.

Lymphocytes form an important cytomorphological feature and were found in all i.e. 100% of proven cases. It might be difficult to distinguish thyroid follicular cell nuclei from lymphocytes, especially when material is poorly fixed or poorly air dried. A thin rim of cytoplasm is characteristic of lymphocytes and this is not seen in single thyroid cells as they are almost always stripped nuclei. Thyroid cell nuclei are also more oval and regular than lymphocyte with smooth outline [25]. Lymphocyte vary in size and larger, immature forms are usually present. Streaks of smeared lymphocytic material are often found; blue cytoplasmic fragments (lymphoid tangles) are characteristic of lymphoid tissue and do not derive from breakdown of thyroid cells [16].

Grading of lymphocytes

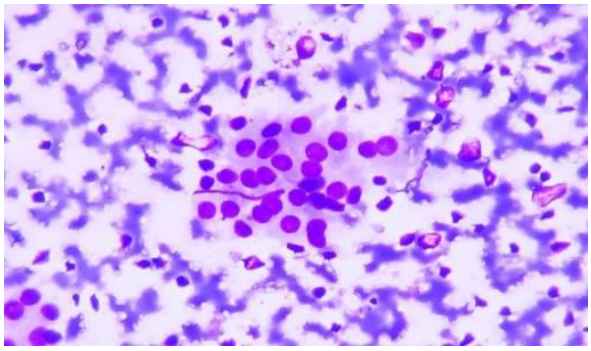
The number of lymphocytes per high-power field was counted. Grading of lymphocytes was done as grade 1 (<10/HPF) which was seen in 13 cases, grade 2 (11-20/HPF) found in 56 cases, and grade 3 (>/=21/HPF) found in 81 cases.

Grading of thyroiditis

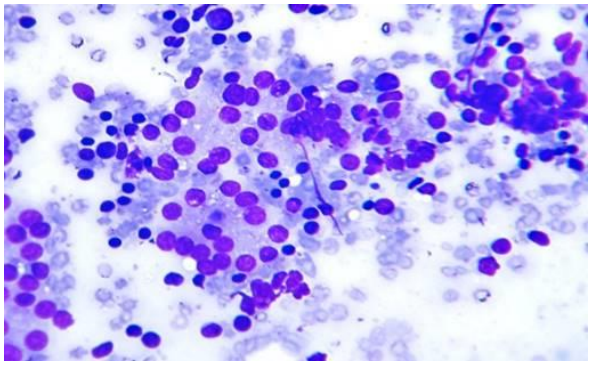
Grading of thyroiditis had been carried out on histological specimens in the past based upon number of foci of lymphocytes per standard representative section [9]. On the other hand, grading on cytology smears has been done by only a few workers.

7 (4.6%) patients had mild lymphocytic infiltration of the gland and were graded as Grade I thyroiditis (**Microphotograph - 1**). 63 (42%) patients had grade II disease characterized by mild to moderate degree of infiltrate with evidence of follicular destruction, Hurthle cell change, giant cells etc. (**Microphotograph - 2, 3, 4**). Grade III thyroiditis was noted in 80 (53.3%) patients who showed dense infiltrates with germinal centre cells, very few follicular cells left (**Microphotograph - 5**). The prevalence of grade III thyroiditis was higher in our study compared to Bhatia, et al. [6] but is similar to the study by Singh, et al. [26] who also found grade III thyroiditis in 56%. The difference compared to Bhatia, et al. [6] study may be because ours is a tertiary care referral centre predominantly catering to patients of a low socioeconomic status while the patients in the study by Bhatia, et al. [6] were from a clinic population who, according to the authors, seek medical advice even with subtle symptoms.

Microphotograph – 1: Grade I thyroiditis with mild lymphocytic inflammatory infiltrate (Giemsa, 40X).



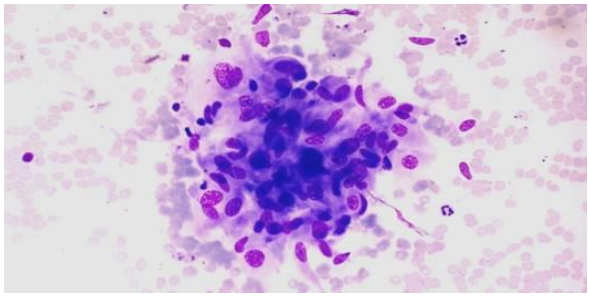
Microphotograph – 2: Grade II thyroiditis with moderate lymphocytic inflammation (Giemsa, 40X).



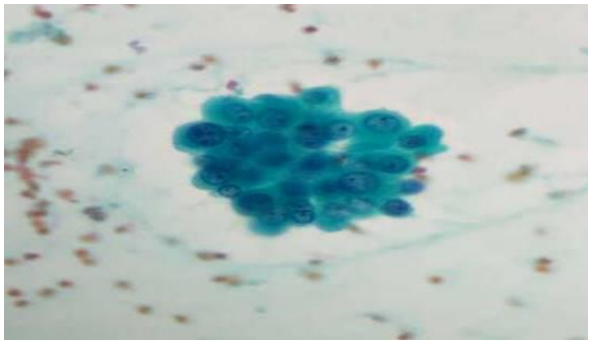
Colloid - Absent or scanty thick colloid is a usual feature of Hashimoto's thyroiditis, as it is associated with the destruction of follicles in the long run. However various authors have emphasized the presence of colloid in

Hashimoto's thyroiditis on FNAC. Poropatich, et al. [27] found varying amounts of colloid in 80% of their cases.

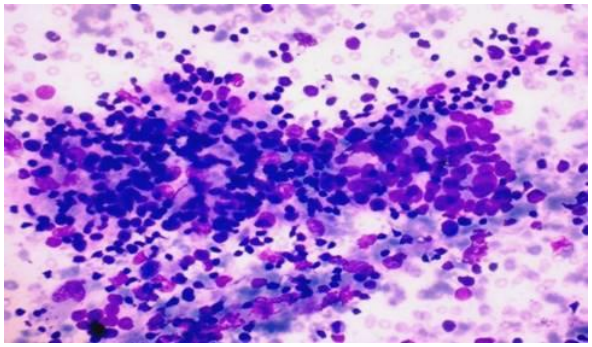
Microphotograph – 3: A case of grade II thyroiditis with Granuloma (Geimsa, 40X).



Microphotograph – 4: A case of grade II thyroiditis showing Hurthle cell (pap, 40X).

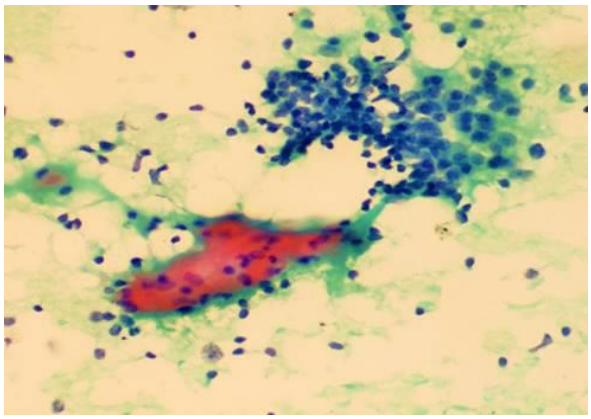


Microphotograph – 5: Grade III thyroiditis, marked lymphocytic inflammation and germinal centre formation as in a reactive node (Giemsa, 40X).

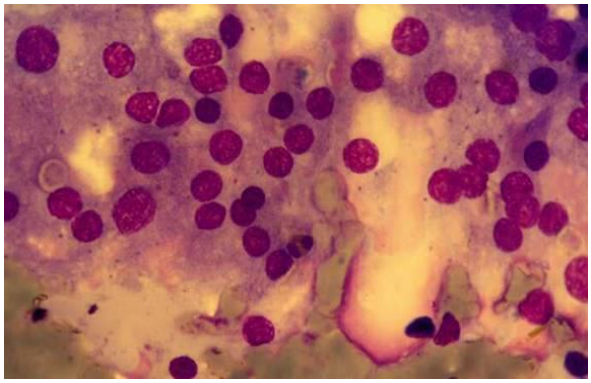


We found at least some colloid in 146 (97.3%) of our cases. Of these patients, 51.3% showed thick and scanty thin colloid, 46% showed only scanty thick colloid (**Microphotograph - 6**) and no colloid was seen in 4 (2.6%) of cases. No case showed abundant colloid. Cytoplasmic colloid inclusions are an additional feature described by Nguyen, et al. [23] in their series of 146 cases of Hashimoto's thyroiditis. This finding was not encountered in our cases.

Microphotograph – 6: Thick colloid (Papanicolau, 40X).



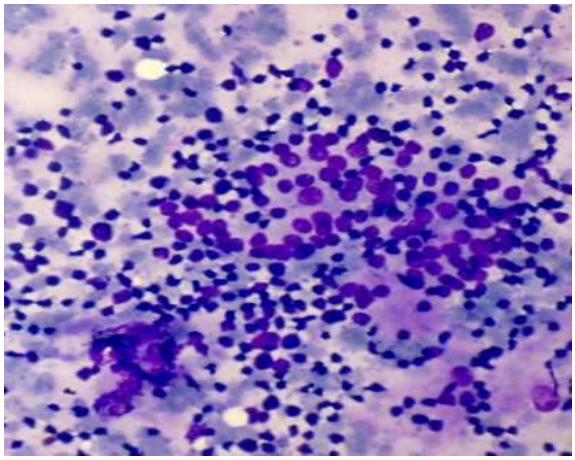
Microphotograph – 7: Thyroid follicular cluster is infiltrated by eosinophil (MMG, 100X).



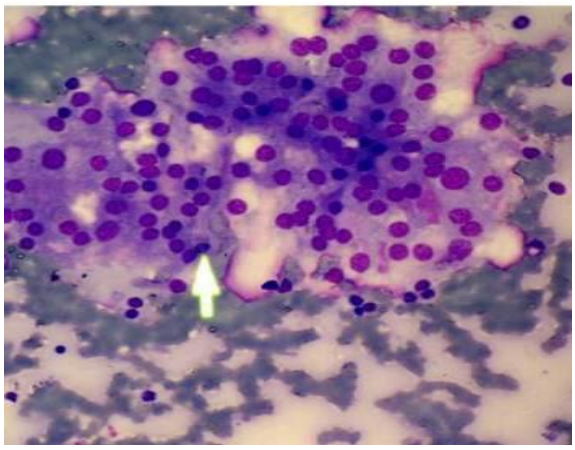
Eosinophils - We found eosinophils in 14.6% cases and infiltration of thyroid follicular cell clusters was seen in 8.6% cases (**Microphotograph - 7**). Singh, et al. [26] have also reported eosinophils in 14% cases (**Table – 18**).

Thyroid follicle cell (TFC) destruction - Thyroid follicle cell (TFC) destruction was seen in 103 cases (68.6%) cases(Table 14). 47 (31.3%) cases showed mild lymphocytic infiltration of a few thyroid follicular cell clusters without destruction of thyroid follicular cell clusters. 7 of these were of grade I thyroiditis while 40 cases were of grade II thyroiditis

Microphotograph – 8: L: E ratio (MGG, 40X).
High L: E ratio



Low L: E ratio



70 /80 cases of grade III thyroiditis showed thyroid follicular destruction. Association of thyroid follicle destruction and grade III thyroiditis was found significant (p-0.003).

Hurthle cells - Hurthle cells were observed in 103 (68.6%) cases while in 47 cases Hurthle cells were absent. Similar results were obtained by Singh, et al. [26] wherein the number of cases with Hurthle cells was 105 (70%) (**Table - 15**).

Germinal centre cells - 70 cases (46.6%) showed the presence of germinal centre cells. 62 of these (88.5%) belonged to the category of grade III thyroiditis (table 16). Poropatich, et al. [27] found germinal centre cells in 74% of their cases.

Giant cells - Giant cells were present in 29.3% of our cases (**Table - 13**). Jayram, et al. [28] reported giant cells in 33% cases and granuloma in 8% cases. In present study Granulomas were seen in 13 (8.6%) cases (**Table - 17**). However, giant cells and granulomas were few and lymphoid follicles and lymphoid infiltration of follicular cells were present, helping to rule out subacute thyroiditis [14].

L: E ratio - L: E ratio is characteristically high in HT, ranging from 2:1 to 10:1 with smear cytology in florid cases often mimics a reactive lymph node [14]. Lymphoid: epithelial ratio was graded as 'low' and 'high' depending on the relative proportion of lymphoid and epithelial components [14]. In the present study, we found a high L: E ratio in 101 (67.3%) of the patients ranging from 2:1 to 10:1. Most of these patients had grade II or III thyroiditis, where the lymphoid population dominated the epithelial component (**Microphotograph - 8**).

Our findings of a high L:E ratio are in accordance with those of Friedman, et al. [24], Jayram, et al. [28], Jayram, et al. [14] and Kini, et al. [29]. In the present study anti-thyroid antibodies showed a statistically significant correlation with high L: E ratio. Similar correlation was also seen by Singh, et al. [26] as per **Table - 20**.

Conclusion

Autoimmune thyroiditis was seen more commonly in females. Majority cases were seen in age group of 21-40 years of age. Lymphocytes, germinal centre cells, thyroid follicular destruction and Hurthle cells form important cytological features, while giant cells, eosinophils, granulomas were other cytomorphologic features in the diagnosis of autoimmune thyroiditis. Clinically and radiologically most of patients showed diffuse enlargement of thyroid gland. Majority of patients in our study were euthyroid at time of presentation. Prevalence of euthyroid autoimmune thyroiditis appeared high in our study. TFC destruction and grade III thyroiditis showed a significant association.

Table - 20: Comparison of cytological features of HT in various studies.

Cytological features	Jayram, et al, [28] (1987)	Friedman, et al. [24] (1981)	Kini, et al. [29] (1981)	Jayaram, et al. [14] (2007)	Singh, et al. [26] (2009)	Present series (2012)
Number of cases	40	40	87	88	150	150
Nodular presentation	Few	80%	22%	33%	13.3%	19.3%
Hurthle cells	Many	98%	Variable	56%	70%	68.6%
Lymphoid follicles	Not recorded	Present	Present	Present (67%)	Present	Present
Follicular cells infiltrated by lymphocytes	Present	Not recorded	Present	69%	Present	Present
L:E ratio	High	High	High	High	High	High
Giant cells	33%	Infrequent	Rare	39%	38%	29.3%
Eosinophils	Not recorded	Not recorded	Not recorded	-	14%	16.6%
Granuloma	8%	Not recorded	Not recorded	16%	Simulating granuloma in 56%	8.6%
Fire flares	25%	Not recorded	Not recorded	23%	6.7%	5.3%
Grade of thyroiditis	N=37 I =13.51% II =62.16% III=24.34%	Not recorded	Not recorded		N= 150 I=18% II=26% III=56%	I =4.6% II =42% III=53.3%

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