Research Article

Trends in Cytomorphological Study of Thyroid lesions: A two year prospective study in the malwa region of central India

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Abstract

Background: Thyroid lesions are commonly encountered in daily clinical practice. However, excision of thyroid lesions is associated with risk. Hence an effective preliminary test is needed to avoid unnecessary surgery. An assessment of thyroid lesion by FNAC has proved to provide early diagnosis and hence helps in avoiding invasive surgery. **Aims and Objectives**: The purpose of present study was to study various cytomorphological features of thyroid lesions in the tertiary teaching hospital of Malwa region with respect to age, sex and to categorize them into neoplastic and non-neoplastic lesions. **Materials and methods**: FNAC was performed on patients who presented with thyroid swelling in department of pathology of Sri Aurobindo Medical College and PG Institute, from 1st January 2014 to 31st December 2015**. Results:** Out of 186 patients in our study group 161(86.56%) were benign, 23(12.37%) were malignant and 2 were inconclusive. Benign follicular lesion 108 (67%) was commonest under non-neoplastic category and follicular neoplasm 19 (82.6%) under neoplastic category. Male to female ratio was 1:4. **Conclusion:** FNAC plays an important role in thyroid lesions as it is safe, cost effective and also helps in selections of patients for surgery, thus minimizing risk associated with surgery.

Keywords: FNAC, Thyroid, Benign follicular lesions, Lymphocytic thyroiditis.

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Introduction

Thyroid swelling is commonest presentation of patients encountered in FNAC OPD. FNAC of thyroid is non-invasive, cost effective, efficient and time saving procedure with minimal risk and early diagnosis. FNAC is usually considered as 1st line of investigation followed by ultrasound examination, thyroid function and antibody level [1]. According to projection from various studies on thyroid diseases it has been estimated that about 40 million people in India suffer from thyroid diseases. It has also been reported that endemic goiter is common in all over India and not just from Himalayan and Sub-Himalayan region [2]. The main purpose of FNAC in thyroid lesions is to differentiate between neoplastic and non-neoplastic lesions and avoid unnecessary surgery [3].

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Aims and Objectives

1) To study the various cytomorphological spectrum of thyroid lesion in the tertiary teaching hospital of Malwa region.
2) To study the thyroid lesions with respect to age and sex.
3) To categorize as non-neoplastic and neoplastic lesion and thus avoiding unnecessary surgery.
4) To highlight the limitations and pitfalls of FNAC.

Materials and Method

Our study was prospective study carried out in the Department of Pathology, Sri Aurobindo Medical College and Post Graduate Institute, Indore, Madhya Pradesh from 1st January 2014 to 31st December 2015. FNAC were performed in 186 patients, presented with thyroid swelling referred from various departments. Inclusion criteria consisted of all the cases of palpable

thyroid swelling and non-palpable lesions through ultrasound and CT guided FNAC. Exclusion criteria consisted of all the cases having neck swelling other than thyroid. A detailed clinical history pertaining to thyroid profile, ultrasonography, previous surgery, etc were noted.

Patients were clinically examined for thyroid swelling and features related to consistency, type of enlargement (diffuse/ nodular), movement on deglutition and protrusion of tongue. FNAC of thyroid swelling was performed under aseptic precautions using 23-24 G needle. Patients were made to lie down flat with pillow under the shoulder, head falling back with neck extended. Patients were asked not to speak or deglutinate during procedure. Needle was inserted in the gland, to and fro movement of needle was done, with minimal negative pressure, material was aspirated and expelled on slides.

Smears were made and slides were air dried and stained by Giemsa stain and alcohol fixed slides were stained by PAP stain. In fluid aspirates material was centrifuged and slides were prepared with sediment. Repeat FNAC was carried out in case of hemorrhagic aspirates. Thyroid profile reports were available of 162 patients and correlated respectively.

Results

Out of 186 cases of thyroid swelling 151 (81.1%) were females and 35 (18.8%) were males (M: F ratio- 1:4). The age ranged from 5 to 72 years. Among the diagnostic outcomes, 161 (86.56%) were non-neoplastic (Benign), 23 (12.37%) cases were malignant and 2 cases were Inconclusive. [Table1]

Table 1: Distribution of various thyroid lesions

Diagnosis	No of Cases (n=186)	Percentage (%)
Non-neoplastic thyroid lesions	161	86.56
Neoplastic thyroid lesions	23	12.37
Inconclusive	02	1.08

Of 161 benign lesions, Benign follicular lesion (Colloid/Nodular/Adenomatoid) were commonest 108(67.0%) followed by lymphocytic thyroiditis 23 (14.2%) [Table 2]. Both Goitre (32 cases) and lymphocytic thyroiditis (7 cases) were most commonly encountered in 4th decade [Table 3].

Table 2: Cyto-morphological spectrum of various thyroid lesions

Diagnosis	No of Cases (n=186)	Percentage (%)
Colloid cyst	16	8.60
Benign follicular lesion	108	58.10
Lymphocytic thyroiditis	23	12.37
Hashimoto thyroiditis	10	5.38
Granulomatous thyroiditis	04	2.15
Follicular neoplasm	19	10.22
Papillary carcinoma	02	1.07
Medullary carcinoma	01	0.54
Anaplastic carcinoma	01	0.54
Inconclusive	02	1.07

Of 23 neoplastic lesions, follicular neoplasm was the commonest 19 (82.6%), followed by papillary carcinoma 2 (8.6%). Follicular neoplasm was most commonly encountered in 5th Decade (5 cases) and papillary carcinoma in 3rd decade (2 cases) [Table 3]. Two cases were under the category of inconclusive where diagnosis of follicular neoplasm/nodular goitre was given.

Table 3: Age wise distribution of Thyroid lesions

Diagnosis	Age groups (yrs)							
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	>70
Colloid cyst	01	02	02	07	02	00	01	01
Benign follicular lesions	01	03	26	30	32	10	05	01
Lymphocytic Thyroiditis	00	06	04	07	01	04	01	00
Hashimoto thyroiditis	00	00	06	04	00	00	00	00
Granulomatous thyroiditis	01	00	00	01	02	00	00	00
Follicular neoplasm	00	02	03	02	05	04	03	00
Papillary carcinoma	00	00	02	00	00	00	00	00
Medullary carcinoma	00	00	00	00	00	01	00	00
Anaplastic carcinoma	00	00	00	00	00	00	01	00
Inconclusive	00	00	00	01	00	01	00	00
Total	**03**	**13**	**43**	**52**	**42**	**20**	**11**	**02**

Discussion

Thyroid Lesions are observed in 4-7% of the population and affect women more commonly than men. Excision of all the thyroid lesion is impracticable and associated with risks.[4,5] Hence, an effective screening test is needed to avoid unnecessary surgery. The diagnosis of thyroid lesions using aspiration cytology was first reported by Mortin and Ellis in 1930[6]. FNAC has become extremely valuable and is recommended as first choice of investigation for evaluation of thyroid lesions [7]. It has decreased the number of patients who underwent surgical treatment by 25-30%, thus increasing the percentage of malignancy in operated group of patients [8].

In present study, FNAC of thyroid lesion was performed in 186 patients. The age of patients ranged from 5 years to 72 years with peak incidence in 4th decade which was in concordance with previous studies [9,10]. Females outnumbered males with ratio of 4:1 which was consistent with other studies [10,11,12].

Benign follicular lesions (Nodular goitre/ Colloid goitre) formed majority of the cases in the present study with peak incidence in 4th decade. Most of these patients presented with nodular or diffuse swelling and were euthyroid. Similar findings were also observed in other studies [13,7]. Cytological examination revealed abundant colloid admixed with monolayered sheets of hyperplastic and involution follicular epithelial cells, foamy macrophages, bare nuclei [Figure1].

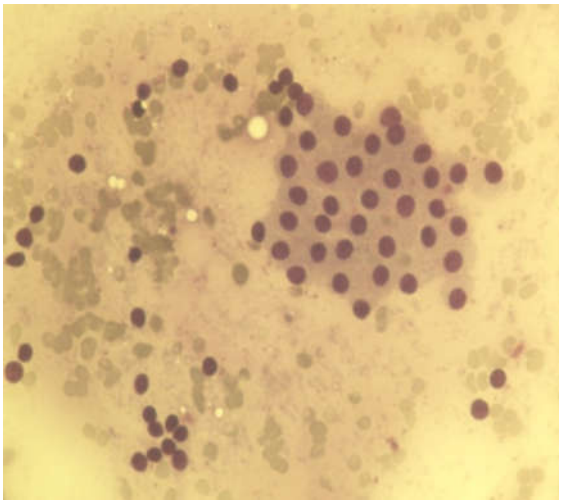

Fig-1: High pow er view of colloid goitre displaying sheets of follicular epithelial cells (Pap- 400 X)

Following colloid goitre, thyroiditis (lymphocytic) was the next most common lesion seen. Majority of the patients were in 2nd and 4th decade of life. Cytological examination revealed dense infiltration by lymphocytes, admixed with follicular epithelial cells and scant colloid [Fig 2]. However in another study, Hashimoto thyroiditis was common lesion following colloid goitre [13]. Cytological examination of Hashimoto thyroiditis revealed predominantly hurthle change with lymphocytic infiltrate [Fig3]. In few cases of thyroiditis, initial aspirate did not yield enough material by non-

aspiration technique; hence aspiration was carried out by giving negative suction with syringe. This was mainly due to solidification of thyroid gland by dense infiltration by lymphocytes and decreased vascularity compared to other thyroid lesions [14].

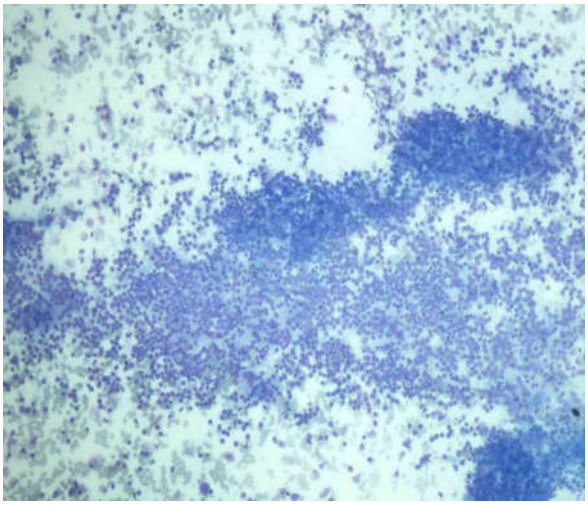

Fig-2: Low power view of lymphocytic thyroiditis showing numerous lymphocytes admixed with follicular epithelial cells.(Giemsa-100 X)

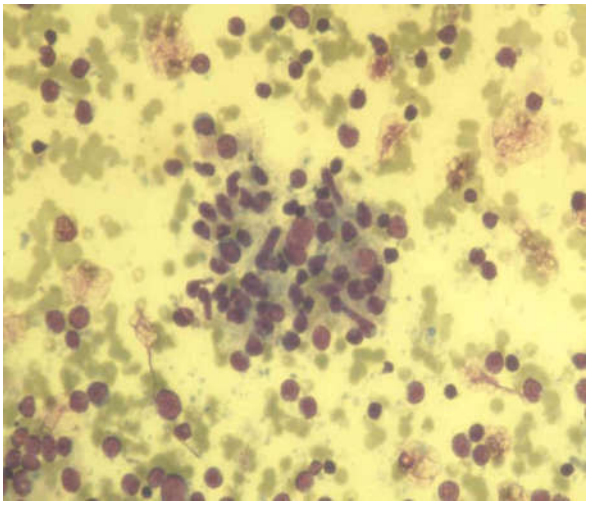

Fig-3: High power view of Hashimoto's thyroiditis displaying hurthle cell change with lymphocytic infiltration in follicular cells. (Giemsa -400 X)

In present study, out of 23 neoplastic thyroid lesions, maximum no of cases 19(82.6%) were reported as follicular neoplasm followed by papillary carcinoma 2(8.6%). Cytological examination of follicular neoplasm revealed high cellularity with microfollicles forming repetitive follicular pattern with minimal anisonucleosis, nuclear overcrowding at places with scant to absent colloid[Fig 4]. One of the pitfalls of FNAC is marked cellularity. Loss of cohesion with increased cellularity may be present in hyperplastic nodule, adenoma or in carcinoma. It is also, difficult to differentiate follicular adenoma from carcinoma on the cytological assessment because cytological examination cannot assess the criteria for vascular and capsular invasion or of intrathyroid spread [15].

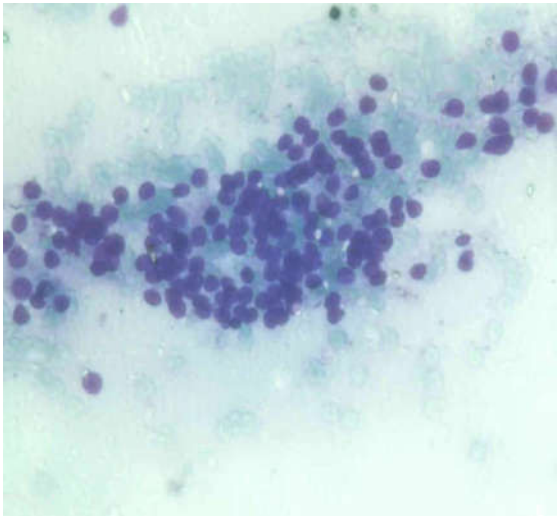

Fig-4: High power view of follicular neoplasm showing monomorphic microfollicular repetitive pattern. (Giemsa-400X)

Two cases in present study were inconclusive (colloid goitre/ follicular neoplasm). Cytological differentiation between follicular neoplasm and colloid goiter is sometimes difficult [16]. Probably, aspiration in these cases was done from rich cellular macrofollicular area with colloid. However, few important distinguishing features that favors follicular neoplasm over colloid goiter are nuclear crowding, nuclear overlapping, repetitive uniform follicular pattern, syncytial clusters, microfollicular structures, scanty or no colloid, although none of them is conclusive [17].

Proper sampling from a representative site is important for a correct diagnosis. Most authors recommended preparation of 4-6 smears from different areas of nodule. Strict criteria for specimen adequacy could help to reduce erroneous diagnosis [18]. Ultrasound guided FNAC results in better sampling, resulting in lower rate of non-diagnostic smears and high accuracy [19]. In present study, two cases of papillary carcinoma were reported in female patients in 3rd decade. These patients

gave history of slow growing thyroid swelling, associated with pain, discomfort and hoarseness of voice.

Cytological examination revealed high cellularity, syncytial sheets and clusters of follicular epithelial cells showing nuclear grooves, intranuclear cytoplasmic inclusions with scanty colloid[Fig 5]. One case each of medullary and anaplastic carcinoma was reported in 6th decade. Cytological examination of anaplastic carcinoma revelead bizarre pleomorphic tumor cells with necrotic material [Fig 6].

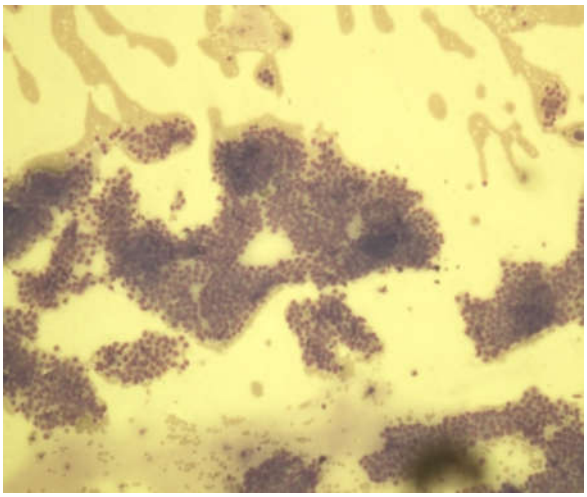

Fig 5: Low power view of papillary carcinoma showing papillary fronds.(Pap- 100 X)

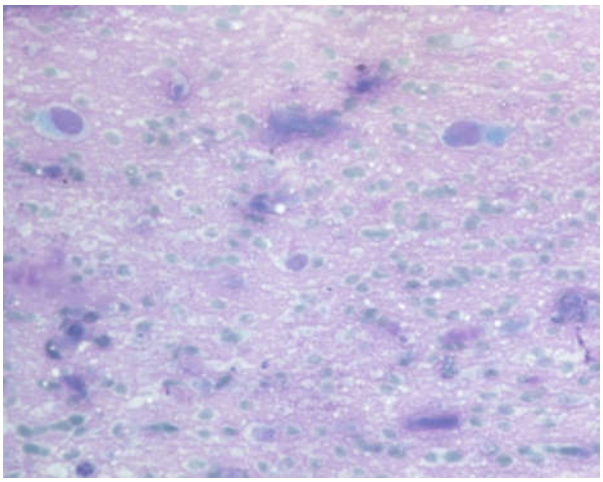

Fig 6: High power view of anaplastic carcinoma showing bizarre tumor cells with necrosis.(Giemsa: 400 X)

A comparative study of FNAC with isotope scanning with I-131 scintiography found FNAC to be more specific than sensitive whereas thyroid isotope scan is more sensitive than specific in detecting thyroid malignancy. Therefore, FNAC should be adopted as an initial investigation of thyroid disease in all tertiary hospitals.[2]

Conclusion

Thus, with present study we conclude FNAC is safe, less invasive preliminary investigation of choice in thyroid lesions which helps in better differentiation between neoplastic and non-neoplastic lesions and hence minimizes surgical burden. Non-neoplastic thyroid lesions were commonly encountered in our study which was consistent with other studies.

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Permission of IRB: Yes

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