

## Cytomorphological Evaluation of Thyroid lesions in a Rural setup.

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### **Abstract:**

**Background:** Fine Needle Aspiration Cytology (FNAC) is a cost effective, minimally invasive, diagnostic tool in evaluation thyroid lesions. Thyroid lesions are more common in females than in males. Both benign and neoplastic lesions of thyroid can be diagnosed on thyroid FNAC and categorised using The Bethesda System for Reporting Thyroid Cytology.

**Aims and Objectives:** Present study was done to evaluate the thyroid lesions by FNAC with the help of The Bethesda System for reporting thyroid cytopathology at a tertiary care hospital in rural area.

**Materials and Methods:** This is a one year prospective study done from March 2018 to March 2019 on 189 thyroid lesions. Routine FNAC procedure was performed and reporting was done according to the Bethesda System.

**Results:** Total FNAC's done were 970, of which 189 cases were of thyroid lesions. Out of 189 cases 89% of cases were females and 11% of cases were males. Most of the cases were in the age group of 20-29 years. Nodular goitre is the most common benign lesion.

**Conclusion:** FNAC is easy and inexpensive in evaluation of thyroid lesions. Categorisation of thyroid lesions made with The Bethesda System of Reporting Thyroid Cytopathology. Thyroid lesions are common among females. The Bethesda Category 2 & category 5 lesions were common in the age group of 30-39 Years and Bethesda Category 4 & Category 6 lesions were common in age group of 20-29 Years.

**Keywords:** Thyroid lesions, Fine Needle Aspiration Cytology.

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### **I. Introduction**

Fine Needle Aspiration Cytology (FNAC) is a cost effective, minimally invasive, diagnostic tool with high sensitivity and specificity in evaluation thyroid lesions.<sup>1,2</sup> Thyroid gland is the largest endocrine gland in the body and the first to develop in fetal life and produces thyroxine hormone, which is most important for maintenance of the metabolism of the body. Palpable thyroid nodules are commonly seen in India (4 to 5 % incidence) and the incidence of malignancy in those nodules varies from approximately 0.1% in the general population to 20% in surgically resected specimens.<sup>3-6</sup> FNAC can diagnose most benign lesions like colloid goitre, thyroiditis, Grave's disease, cystic lesions and also malignant lesions like papillary, medullary, anaplastic, poorly differentiated carcinoma. However, sometimes definitive diagnosis with FNAC may not be possible because of scanty aspirate, high vascularity of the gland leading to bloody aspirates, variation in sampling technique and observer variations.<sup>13</sup> Different terminologies were used while reporting thyroid FNAC. To overcome the confusion in reporting, The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) was introduced in 2007, and revised in the year 2016.

#### **Bethesda classification**

Category 1 - Non Diagnostic/ Unsatisfactory

Category 2 - Benign

Category 3 - AUS/FLUS – Atypia of Undetermined Significance/ Follicular Lesion Of Undetermined Significance

Category 4 - FN (Follicular Neoplasm) / Suspicious For FN

Category 5 - Suspicious For Malignancy

Category 6 - Malignant

## II. Material and Methods

The present study was conducted over a period of one year, from March 2018 to March 2019, at Department Of Pathology, Government General Hospital, Nizamabad, Telangana, India. Government general hospital provides services for the rural area of Nizamabad district with more than 3 lakh outpatients and inpatients around 75000 per year. A total of 977 cases were referred for Fine Needle Aspiration Cytology(FNAC) which included 189 thyroid lesions. FNAC procedure was clearly explained to the patient and written consent was taken. Detailed clinical history, data regarding thyroid profile, Ultra Sonogram (USG) findings noted. Clinical examination was done. FNAC was carried out using 23 gauge 5cc disposable syringes. Aspirated material was smeared on minimum three labelled glass slides. All the slides were fixed with 95% isopropyl alcohol, stained with routine haematoxylin and eosin stain as per protocol and smears were submitted for microscopic examination and interpretation was done using The Bethesda System.

## III. Results

Present study included a total 189 (20%) cases of thyroid lesions out of 977 cases referred for FNAC to the department of pathology, of which 89% (168) were female patients and 11% (21) were male patients with a M: F ratio of 1:8. Age range is between 12-79 years.

**Table 1:** Age & Gender wise distribution of cases

Age in years	Females	Males	Total
10-19	12 (7.2%)	01 (4.8%)	13 (7%)
20-29	46 (27.4%)	03 (14%)	49 (26%)
30-39	38 (22.7%)	10 (47.8%)	48 (25%)
40-49	41 (24.5%)	04 (19%)	45 (24%)
50-59	20 (12%)	00 (0%)	20 (10%)
60-69	07 (4.2%)	02 (9.6%)	09 (5%)
70-79	03 (2%)	01 (4.8%)	05 (3%)
Total	168 (100%)	21(100%)	189(100%)

Table 1, in present study, maximum number of cases (26%) were seen in age group of 20-29 years followed by 30-39 years. Least number of cases (3%) were seen in age group of 70-79 years. Majority of patients (75%) were under the age group of 20-49 years. In females 27.4% cases were seen in 20-29 years age group. In males maximum number of cases (47.8%) were seen in 30-39 years age group. All patients presented with swelling in front of neck (at thyroid region), few patients also had complaints of dysphasia, generalised weakness. On examination, 106 cases (56%) had diffuse swelling where as 83 cases (44%) had a solitary thyroid nodule. In 151 cases (80%) it was a blood mixed aspirate, in 36 cases (19%) it was either colloid or blood mixed colloid and in 2 cases aspirate was inadequate for evaluation.

**Table 2:** Categorisation of Thyroid Lesions.

BETHESDA CATEGORY	CYTOLOGICAL DIAGNOSIS	No. Of Cases in each category	Total no. Of Cases
Cat- 1 [NON DIAGNOSTIC/ UNSTISFACTORY]	Inadequate for reporting	02 (1%)	02 (1%)
Cat-2 [BENIGN]	BFN- c/w Colloid Nodule	16 (8.5%)	139 (74%)
	BFN- c/w Nodular Goiter	47 (25%)	
	BFN- C/w Hyperplastic/ Adenomatoid nodule	28 (15%)	
	Benign- Cystic lesion of the thyroid	05 (2.5%)	
	Benign- f/c/w Hashimoto thyroiditis	40 (21%)	
	Benign- f/c/w Lymphocytic thyroiditis	02 (1%)	
Cat-3 [AUS/FLUS]	---	00	00
Cat-4 [FN/ SUSPICIOUS FOR FN]	Suspicious for Follicular neoplasm	06 (3%)	40 (21%)
	Follicular neoplasm	33 (18%)	
	Hurthle cell adenoma	01 (0.5%)	
Cat-5 [SUSPICIOUS FOR MALIGNANCY]	Suspicious of PTC	03 (1.5%)	03 (1.5%)
Cat-6 [MALIGNANT]	PTC	05 (2.5%)	05 (2.5%)
<b>Total</b>		<b>189 (100%)</b>	<b>189 (100%)</b>

Cytological evaluation of the all cases were done using The Bethesda System for Reporting thyroid cytopathology and the results were shown in table 2.

BFN- Benign Follicular Nodule; C/w- Consistent With; f/c/w – Features Consistent with. Table2 it is evident that 139 cases (74%) were reported as benign (Bethesda category 2), 40 cases (21%) were reported as follicular neoplasm or suspicious for follicular neoplasm (Bethesda category 4), 5 cases(2.5%)were reported as malignancy (Bethesda category 6), 3 case (1.5%) were reported as suspicious for malignancy (Bethesda category 5), only 2 cases (1%) were reported as Non Diagnostic/ Unsatisfactory (Bethesda category 1) and no cases were reported as AUS/FLUS (Bethesda category 3).

Majority of the cases (75%) were reported as Bethesda category 2 (Benign), among benign lesions most of the cases were reported as Nodular goiter followed by hashimoto thyroiditis. One fourth of the cases (25% cases) were reported to be neoplastic which includes Bethesda category 4, 5 and 6.

**Table 3:** Age wise distribution of reported case

Age in Years	Bethesda Cat-1	Bethesda Cat-2	Bethesda Cat-3	Bethesda Cat-4	Bethesda Cat-5	Bethesda Cat-6	Total
10-19	-	11(7.9%)	-	02(5%)	-	-	13
20-29	-	32(23%)	-	13(32.5%)	01(33.33%)	03(60%)	49
30-39	-	40(28.7%)	-	06(15%)	02(66.67%)	-	48
40-49	1(50%)	35(25.2%)	-	07(17.5%)	-	02(40%)	45
50-59	-	13(9.3%)	-	07(17.5%)	-	-	20
60-69	-	05(3.5%)	-	04(4%)	-	-	09
70-79	1(50%)	03(2.15%)	-	01(2.5%)	-	-	05
Total	2	139	0	40	03	05	189

Table 3it is clear that most of the neoplastic lesions (Bethesda category 4,5,6) were reported in the age group of 20-29 years, followed by 40-49 years. Whereas most of the benign lesions were reported in the age group of 30-39 years followed by 40-49 years. Out of 48 cases which were reported as neoplastic lesions, only 6 (12.5%) were seen in males and 42 (87.5%) were seen in females. In case of non-neoplastic conditions i.e. Bethesda category 1, 2 and 3 a total of 126 cases (89%) were seen in females and 15(11%) cases were seen in males. Out of 21 male patients included in the present study, 15 patients (71%) were having non neoplastic thyroid lesions and 6 patients (29%) were having neoplastic lesion. Out of 168 female patients, 126 (75%) patients were having non neoplastic lesions, whereas 42 (25%) patients were having neoplastic lesions.

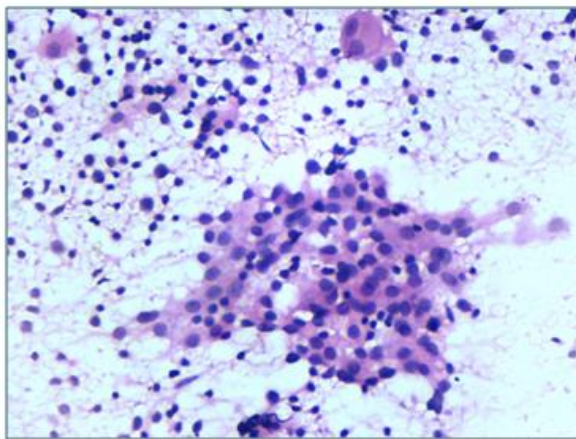


Fig: 1. Hashimoto thyroiditis showing lymphocytes and few giant cells.

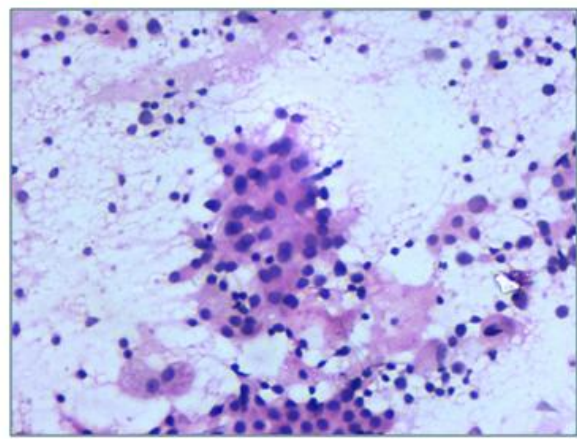


Fig: 2. Hashimoto thyroiditis showing Hurthle cell change and lymphocytic impingement

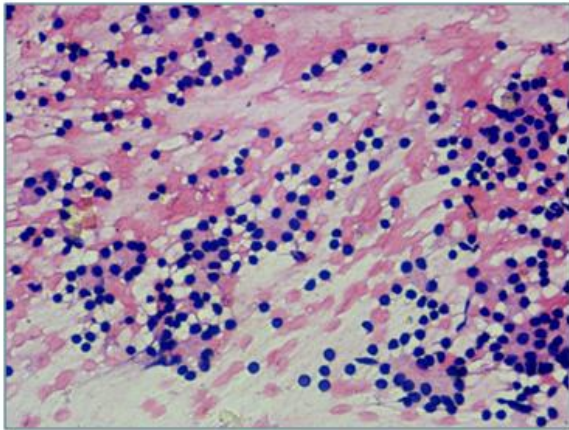


Fig: 3. Follicular neoplasm showing repetitive follicular pattern.

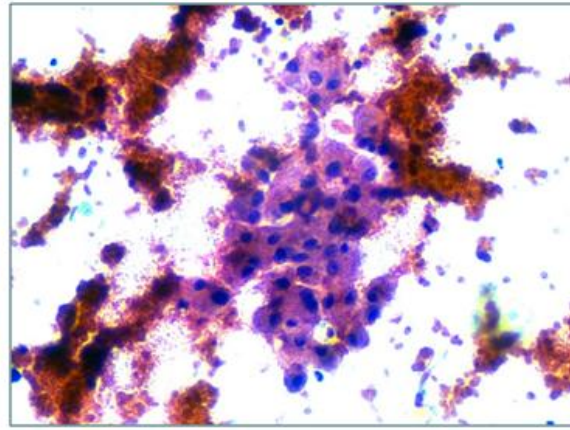


Fig: 4. Nodular goiter with follicular cells and hemosiderin laden macrophages

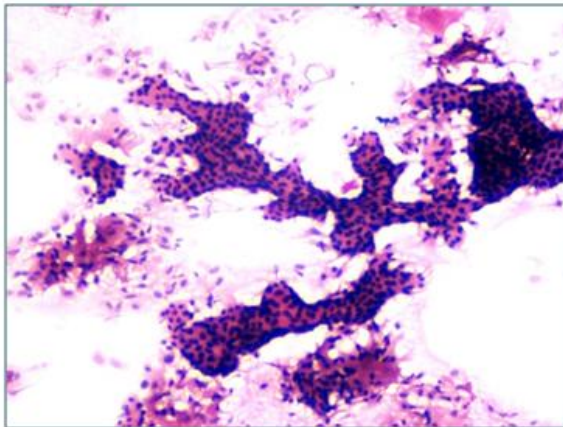


Fig: 5. Papillary thyroid carcinoma with papillary fronds with nuclear overcrowding and anatomical bordering.

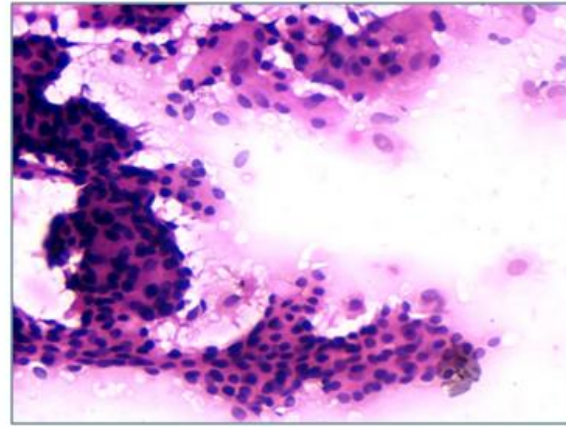


Fig: 6. Papillary carcinoma of thyroid with papillae and few nuclei showing intranuclear inclusions.

#### IV. Discussion

FNAC is now being widely used in evaluation of thyroid lesions. The Bethesda system of reporting thyroid cytopathology has been introduced to avoid confusion in reporting terminologies and it is widely accepted among the physicians in management of thyroid lesions. In our study total of 189 patients underwent FNAC for thyroid lesions. In the present study age range is 12- 79 years and the male to female ratio is 1:8. This sex ratio is comparable with the studies done by Shital Sameer Dharraoet al<sup>2</sup>, ChandanwaleS et al<sup>15</sup> where sex ratio was 1:9. Similarly, the sex ratio was comparable with study by Likhar K S et al<sup>16</sup> and Sharma R et al<sup>7</sup> with sex ratio of 1:7. Most of the patients were in age range of 21-50 years. This is similar with the study done by Nandedkar SS et al<sup>3</sup>. In both the studies 75% of the patients were in the same age group.

In the present study 56% cases showed diffuse swelling and 44% cases showed nodular swelling. It is in discordance with the findings seen in the study done by Dhanadia A et al<sup>17</sup> in which 44% cases showed diffuse enlargement and 56% showed nodular swelling. Similarly in the study done by Sharma et al diffuse swelling seen in 38.5% and nodular swelling seen in 61.5%. Aspirate in the present study was mostly hemorrhagic which is also seen in study done by Nandedkar et al. In the present study 1% cases of thyroid FNAC's were inadequate for reporting. It is 4.3%, 5%, 7% and 18.6% in studies done by Nandedkar et al., Nayar and Ivanovic et al<sup>18</sup>, Yassa et al<sup>19</sup>, and Jo et al<sup>20</sup> respectively. Maximum number of cases (74%) were reported as category 2. Similar findings were seen in studies done by Nandedkar et al (82.67%), Nayar and Ivanovic et al (64%), Yassa et al (66%), and Jo et al (59%). In present study none of the cases were reported as category 3 (AUS/FLUS). 0.8 % cases were reported as category 3 in the study done by Nandedkar et al. 21% of the cases reported as category 4, it is higher compared to the studies done by nandedkar et al (9.7%), yassa et al

(8%). 1.5% cases were reported as category . It is concordant with the studies done by Nandedkaret al<sup>3</sup> (1.15%), Nayar and Ivanovic et al<sup>18</sup> (2%), Jo et al (2.3%). It is higher in study done by Yassa et al (9%). In the present study 2.5% cases were reported as category 6. Similar findings were found in study done by Nandedkar et al (1.98%).

## V. Conclusion

FNAC is an easy and inexpensive evaluation of thyroid lesions. Cytological evaluation of thyroid lesions were done using The Bethesda System of Reporting Thyroid Cytopathology. It has been found that thyroid lesions are more common in females. The Bethesda Category 2 & category 5 lesions were common in the age group of 30-39 Years and Bethesda Category 4 & Category 6 lesions were common in age group of 20-29 Years. In Category 2 lesions Nodular goitre (25% of all cases) is the most common benign lesion and Follicular Neoplasm (18% of all) is found to be most common malignant lesion.

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