



A PROSPECTIVE EVALUATION OF THYROID LESIONS-A CYTOLOGIC INSIGHT ON 501 CASES.

Pathology

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ABSTRACT

The thyroid gland may develop with age as a diffuse growth or a single nodule depending on the various etiological reasons. The FNAC has greater reliability and has exceeded other tests as the initial test for the evaluation of thyroid lesions. Aim of the study is to Evaluate and categorise thyroid lesions by The Bethesda system of reporting thyroid cytology. Fine needle aspiration were done for the cases after taking written consent and the results was interpreted as per The Bethesda System of Reporting Thyroid cytology (TBSRTC). Out of 501 patients. who underwent FNAC, majority of them belongs to the age group 31-40 years with predominance of Female patients. Out of 501 cytology cases evaluated, 32(6.38%) were found to be unsatisfactory and remaining 469(93.62%) found satisfactory for evaluation and categorized according to the Bethesda categorization of thyroid cytology. FNAC is the safe non-invasive simple technique for cytological evaluation of thyroid lesions with no major complications.

KEYWORDS

Thyroid, cytology, FNAC, Bethesda, TBSRTC

INTRODUCTION

The thyroid gland may develop with age as a diffuse growth, a single nodule, or many nodules depending on the various etiological reasons.¹ There are approximately 2 billion cases of goiter worldwide, with 40 million cases in India.² It is a very useful technique for identifying benign and malignant tumors and helps avoid needless surgery.³ As a preliminary diagnostic method for the assessment of thyroid nodules, FNAC is also advised. The FNAC has greater reliability and has exceeded other tests as the initial test for the evaluation of thyroid lesions because it provides a direct morphological picture.⁴

Different nomenclature has been employed worldwide for the reporting of FNA thyroid lesions, which has resulted in variations in the information that is meaningful. This prompted the development of the Bethesda system for reporting thyroid cytology (TBSRTC), which divides thyroid lesions into six primary groups. The Bethesda system has been used all around the world, and by offering the quality and reproducibility of cytological diagnosis, it has resulted in a standard approach in thyroid lesion diagnosis and management.⁵

AIMS & OBJECTIVE

To analyze and categorise the cytology of Thyroid lesions by the Bethesda system of reporting thyroid cytology.

Methodology

This is a hospital based prospective study of Thyroid lesions which was carried out at tertiary care hospital in south India for total of 4 years (from September 2018 to August 2022).

Method Of Collection Of Data

Age, sex, address, duration of swelling, family history with detailed clinical examination has been recorded. Findings of thyroid function tests and ultrasound thyroid collected after due permission. Fine needle aspiration done for the cases after taking written consent and the results was interpreted as per The Bethesda System of Reporting Thyroid cytology (TBSRTC). Data was entered in Microsoft excel sheet and analysis done in IBM SPSS (Statistical Package for social Sciences) version 27 software. The data was expressed in percentage and evaluation was done. All the patients were clinically examined and after brief explanation about the procedure, aspiration done. Under all aseptic precautions using a 2.5 cm long, 23 gauge needle attached to a 5cc disposable syringe using standard procedures.⁶ Wet smear was transferred into fixative alcohol for Papanicolaou staining and haematoxyllin and eosin stain and air-dried smears is stained with May-Grunwald-Giemsa stain. Adequate aspirates taken, when cytology smears contain 5-6 groups of well-preserved follicular cells with each group containing 10 or more cells.⁷

RESULTS

501 patients underwent FNAC of thyroid lesions from September 2018 to august 2022, out of which 20 patients underwent

ultrasonography guided FNAC for non-palpable thyroid lesions. Most of the patients belong to the age group 31-40 years. The age of the youngest patient was 6 year and the eldest patient was 87 years old. Among the 501 patients, female patients were predominant and comprising 83% of cases and male patients were 17% and Male to Female ratio was. 1:6.6. Among 501 for whom ultrasonography done for thyroid lesions, 23(5.6%) were categorized under TIRADS I. 411(82.03%) patients were categorized under category II, 38 were categorized under category III (7.6%), 18 (3.6%) under category IV, 8 (1.6%) under V and 3(0.6%) categorized under TIRADS VI. Out of 501 cytology cases evaluated 32 were found to be unsatisfactory (6.38%) and remaining 469 were satisfactory. Thus 93.62 % of cases were found satisfactory for evaluation and categorized according to the Bethesda categorization of thyroid cytology.

Table No 1 Distribution Of Cases According To Age & Sex

Age Groups (in years)	Male	Female	Total	% age
0-10	0	6	6	1.2%
11—20	9	41	50	10%
21-30	16	114	130	26%
31-40	17	134	151	30.13%
41-50	12	72	84	16.76%
51-60	10	43	53	10.6%
61-70	1	20	21	4.2%
70-80	1	4	5	1%
>80	0	1	1	0.2%
TOTAL	66	435	501	100

Table No 2. Distribution Of Cases Based On The Bethesda System Of Thyroid Cytopathology

Categorization	Number	%
I	32	6.38
II	430	85.8
III	4	0.8%
IV	22	4.4%
V	5	1%
VI	8	1.6%

Out of 501 patients evaluated on FNAC, 469 cases (93.62%) which were found to be adequate, 430 patients had non-neoplastic lesions forming 85.8% of cases and remaining 39 forming 7.82% were found to be neoplastic lesions. Among the 430 cases, colloid nodule was the most common benign lesions forming 44.4% followed by Hashimoto thyroiditis (20%), colloid nodule with cystic change (15.35%), Lymphocytic thyroiditis (14.42%), hyperplastic nodule (2.56%), follicular nodule (2.56%), adenomatoid hyperplasia (0.5%) and 1 case of Dequervian thyroiditis. Among the 501 cases evaluated, 39 cases were categorised as neoplastic forming 7.78%. Among the neoplastic lesion detected on Cytology findings, Follicular neoplasm/Suspicious for follicular comprises the major part among neoplastic lesions forming 56.4% cases followed by Papillary thyroid carcinoma

comprising 20.8%, suspicious for malignancy -8% and atypia of undetermined significance forming 10% of cases.



Fig 1. Patient presenting with diffuse thyroid swelling- Thyroiditis



Fig 2. Large thyroid mass encircling neck and causing respiratory distress- Anaplastic carcinoma

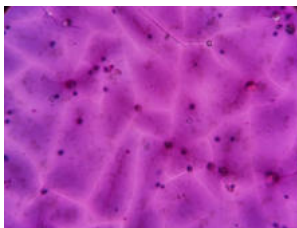


Fig 3 Abundant colloid like crazy pavement with foamy macrophages and follicular cells. Leishman-10X

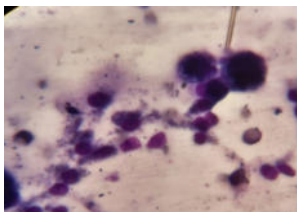


Fig 4 showing thyroid follicle cells mixed with macrophages, Leishman-100X

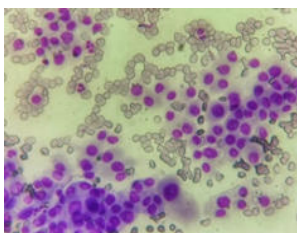


Fig 5 Granular eosinophilic cytoplasm with pleomorphic centrally placed nuclei. Follicular neoplasm-Oncocytic type H&E-100X

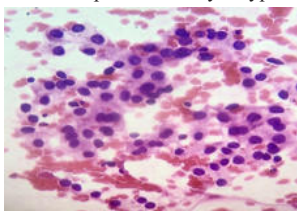


Fig 6. Thyroid follicle cells with nuclear pleomorphism and overlapping- Follicular Neoplasm; H&E -100X

DISCUSSION

During the study period of 4 years from September 2018 to august 2022, 501 patients underwent FNAC of thyroid lesions. Thyroid disease are frequently more seen in females due to presence of estrogen receptors.⁸ In our study, females constitutes 85% of cases and thus male

and female ratio is 1:6.6, which is comparable to previous studies ratio is 1:6.6, which is comparable to previous studies. Out of 501 cases evaluated, 435 patients were female and 66 were male forming male to female ratio of 1:6.6. Results were comparable to study done by Handa et al⁶ and falls within range from 1:4.2 to 1:7.7.

Table No 3- Comparison Of Sex Distribution With Previous Studies

Study	Cases	Male	Female	Male: Female ratio
Present study	501	66	435	1:6.6
Handa et al ⁶	434	59	375	1: 6.35
Muratil et al ⁷	1333	226	1107	1:4.89
Nandedkar et al ²	606	115	491	1:4.2
Swati Patel et al ¹	291	46	245	1:5.1
Kanukuntla et al ⁹	248	16	232	1:7.7

Table No 4. Comparison Study Of Adequacy Rates.

Sl. No.	Study	Adequacy rate
1	Present study	93.62%
2	Handa et al ⁶	94.9%
3	Naz et al ¹⁰	94%
4	Choden et al ¹¹	94%

Out of 501 cases evaluated on FNAC, 469 cases were found satisfactory for evaluation and thus forming 93.62% cases found adequate. Among the 6.38% cases which were unsatisfactory for evaluation, majority of cases had 2-3 cell cluster which doesn't fulfil the satisfactory criteria for cytology evaluation. In our study, we found 6.38% of cases have been categorized to category I (Non diagnostic). Non diagnostic cases have been reported in 2- 20% patients and it should be restricted to less than 10% of aspirates.¹² The non diagnostic cases in this study falls within the range. Benign cytology has been reported in 62-82% cases. Our study shows 85% of benign cases which is slightly higher than reported in previous studies. The majority of cases reported were belong to age group of 31-40 years with a mean age of presentation of 36.85 years which is comparable with previous studies done in previous studies. The inadequacy can be due to cystic lesions which contain cystic fluid and thus yields low cellularity. Also as the thyroid gland is higher vascular and thus with each aspirate there is increase in trauma to gland leading to hemorrhagic aspirate. The number of needle pass in our study was limited to 3. According to the Orell and Jayaram, number of needle pass has been recommended for thyroid sampling is 2 to 5.² Repeated passes has been reported as 5.5% and 6.76% in the studies done by Mondal et al¹³ which is comparable with in our study.

Table No. 5- Comparison Of Age Incidence With Previous Studies

Study	Age Range(in years)	Mean age(in years)
Present study	6-87	36.85
Naz et al ¹⁰	14-84	39.7
Nandedkar et al ²	2-87	37.6
Demirci et al ¹	20-72	47.90
Kapila et al ¹⁴	16-79	41
Abdullah et al ¹⁵	15-92	52
Hajmanoochehri F ¹⁶	15-84	41

In the present study done on 501 patients, we found patients of varying ages ranging from 6 to 87 years. The mean age of the patients were found to be 36.85. Age range and mean age found in our study were similar to the previous studies. Out 501 cases evaluated on FNAC, 6.38% were categorized into unsatisfactory (I), 85.82% into benign (II), 1.4% into atypia of undermined significance (III), 3.3% into follicular neoplasm, 1.6% into Suspicious of malignancy and 1.4% were categorized into malignant lesion. Similar results were seen in the previous studied carried out on Bethesda categorization of thyroid cytopathology.

Table No 6. Comparison Of Thyroid Cytology Categorization With Previous Studies

Diagnostic Category	Present study	Nandedkar et al ²	Swati et al ³	Yang et al ⁸	Choden et al ¹¹
I	6.38%	4.29%	3.09 %	10.4%	6%
II	85.82%	82.67%	82.47%	64.6%	82%
III	1.4%	0.82%	2.06%	3.2%	1.4%
IV	3.3%	9.07%	2.06%	11.6%	3.8%
V	1.6%	1.15%	1.03%	2.6%	2.4%
VI	1.4%	1.98%	9.29%	7.6%	4.4%

CONCLUSION

FNAC is the safe non-invasive simple technique for cytological evaluation of thyroid lesions with no major complications. USG guided FNAC must be done for non- palpable lesions achieve better cellularity.

In the present study, our results were comparable to previous studies and thus established that Bethesda system is a reliable and system in categorization of thyroid lesions into neoplastic and non-neoplastic which can be further also be subtyped. Thyroid function test should be done together with ultrasonography of thyroid for the evaluation of thyroid lesions.

As cystic lesions seen in both neoplastic and non-neoplastic lesions and cystic lesions yields low cellularity when aspirated from cystic area rather than residual area which is also seen in previous studies. Therefore, in cystic lesions, fluids should be aspirated and then FNAC should be done from residual area. Thus it increases cellularity and increases adequacy rates. USG guided FNAC is being recommended in small sub-centrimetric thyroid lesions, thus avoiding false negatives. This also reduce misdiagnosis and increase the diagnostic accuracy of FNAC. In the present study, Adequacy rate was found as 93.62%, which can be increased further by USG guided FNAC.

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