

## UTILITY OF CYTOLOGICAL EXAMINATION IN THYROID LESIONS AND ITS CORRELATION WITH HISTOPATHOLOGICAL DIAGNOSIS

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### Abstract

**Background:** Fine needle aspiration cytology (FNAC) is very useful tool to distinguish between benign and malignant lesions which is less invasive and cost-effective. It is considered as gold standard screening test in evaluation of thyroid nodule. However final diagnosis is made only on histopathology specimen. We studied the cytopathology of various thyroid lesions and compared it with the histopathological diagnosis. **Materials and Methods:** The present study was carried out at cytopathology and histopathology section of pathology department during the period of January 2023 to June 2023. Total 25 cases were included in this study for which both FNAC examination and histopathological examination were done. The FNAC findings were correlated with histopathological diagnosis. **Result:** Total 25 cases were included, out of which 08 cases are of 51-60 age group followed by 06 cases are of 41-50 age group. Female: Male ratio in our study was 11.5:1, showing female preponderance. In cytological examination, 20 cases (80 %) cases were diagnosed as non-neoplastic, 3 cases (12 %) were neoplastic and 2 cases (8 %) were labelled inconclusive. On histopathological examination, 20 cases (80 %) were diagnosed as non-neoplastic and 5 cases (20 %) were diagnosed as neoplastic. **Conclusion:** FNAC is safe, reliable and accurate method as an initial simple diagnostic test for thyroid nodules in decision making about surgical intervention.

## INTRODUCTION

Thyroid gland is one of the important organs, which play a wide and vital physiological role in the body. The thyroid hormones affect all body organs and are responsible for maintenance of homeostasis and the body integrity.<sup>[1]</sup> Thyroid lesions are common among all endocrine disorders. In clinical practice, a majority are benign but in a significant percentage they are underlying malignant. Thyroid lesions are very common in surgical practice and their worldwide prevalence is 4-7%. The incidence of malignancy in thyroid goitre is 10%. It affects women more commonly than men. It is not practical to excise all the thyroid lesions because of certain risks associated with it. To avoid unwanted surgery, an effective screening test is required.<sup>[2]</sup>

In the management of thyroid lesions, fine needle aspiration cytology (FNAC) has been accepted as the first line investigation, especially for solitary nodules. It is a screening tool to decide whether a patient needs surgical intervention or can be managed conservatively.<sup>[3]</sup> Fine needle aspiration cytology (FNAC) is simple, cheap, easily available, reliable,

time saving, easy to perform, effective and almost accurate diagnostic technique for investigation of thyroid swelling.<sup>[4]</sup> FNAC has its limitations like sample adequacy, techniques of sampling, experience of the cytopathologists. Also, there are difficulties in differentiating between benign and malignant follicular neoplasms because of many overlapping cytological features. Hence for final diagnosis, histopathological examination is necessary.<sup>[5]</sup>

### Aim

To study the spectrum of various thyroid lesions in our geographical area and to correlate cytological findings with histopathological diagnosis.

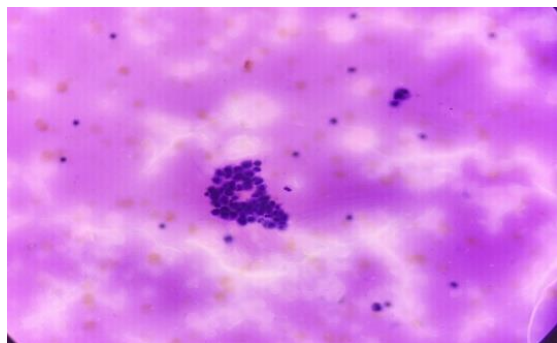
## MATERIALS AND METHODS

The present study was carried out at cytopathology and histopathology section of pathology department during the period of January 2023 to June 2023. The FNAC procedure was performed after obtaining informed consent of all patients included in this study. Careful palpation of the thyroid nodule was done to decide the location of aspiration. FNAC was

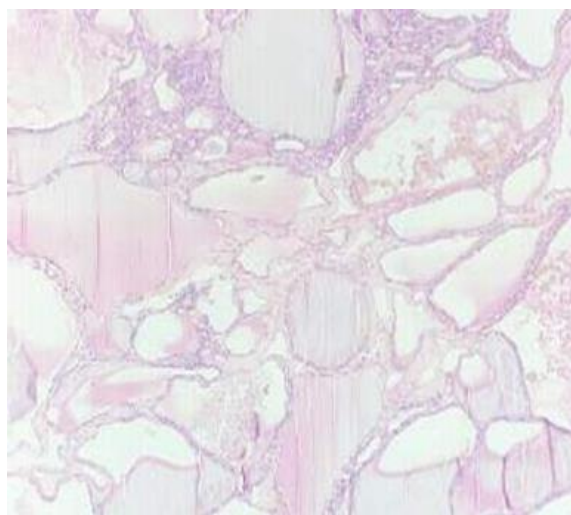
done under aseptic conditions by using 10 cc disposable syringe with 23-gauge needle. Two to three passes were made if the swelling was cystic or fluid was aspirated. Smears were fixed immediately in a fixative and stained by hematoxylin and eosin (H&E) stain and Papanicolaou stain. A total of 25 thyroidectomy specimens were processed in an automated tissue processing units and stained with routine H&E stain for histopathological examination.

## RESULTS

Total 25 cases of thyroid lesions were evaluated for cytopathological and histopathological correlation. The patient age ranged from 18 years to 75 years. Majority of the patients belonged to 51-60 years of age, (8 cases, 32 %) followed by 41-50 years of age, (6 cases, 24 %). Maximum patients were females which were (23 cases, 92 %) with female to male ratio being 11.5:1 [Table 1,2]



**Figure 1: Multinodular goiter (40X, H&E, Cytopathology): showing benign thyroid follicular cells in clusters with background showing abundant colloid**



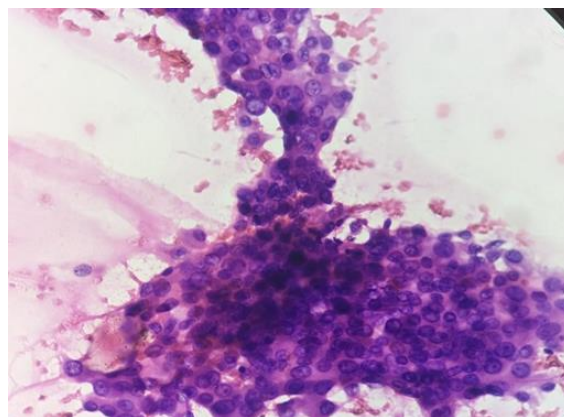
**Figure 2: Multinodular goitre (40X, H&E stain, Histopathology): showing thyroid follicles of varying size lined by flattened epithelium and filled with colloid.**

In present study, on cytological examination (20 cases, 80 %) were diagnosed as benign non-neoplastic lesions followed by neoplastic lesions

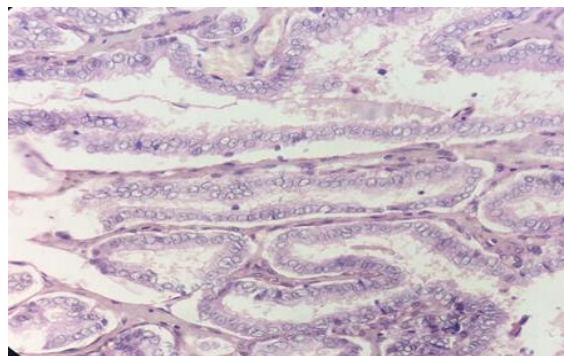
which comprised of (3 cases, 12 %). Among non-neoplastic lesions colloid goitre was most common (6 cases, 30%) [Figure 1]. Among neoplastic lesions, suspicious of malignancy was the most common which include (2 cases, 66.7 %) [Figure 3]. Two cases (8 %) were inconclusive cytologically. [Table 3,4]

On histopathological examination (20 cases, 80%) were diagnosed as benign non-neoplastic and (5 cases, 20%) were diagnosed as neoplastic. Among benign non-neoplastic lesion multinodular colloid goitre was the most common diagnosis comprised of (8 cases, 40%) [Figure 2] and all neoplastic lesions were papillary carcinoma including its variant [Figure 4]. [Table 5,6]

In present study, all 20 lesions diagnosed benign non-neoplastic cytologically were also diagnosed benign non-neoplastic histologically in thyroidectomy specimen. Among cytologically neoplastic cases, 2 cases of suspicious for malignancy and 1 case of atypia of undetermined significance were finalised as papillary carcinoma, classical type histologically. Cytologically inconclusive cases were also diagnosed as papillary carcinoma classical and follicular variant in association with adjacent changes of goitre. [Table 7]



**Figure 3: Suspicious for malignancy (40X, H&E stain, Cytology): showing sheets of follicular cells with nuclear overlapping, overcrowding, powdery chromatin and occasional intranuclear grooves**



**Figure 4: Papillary Carcinoma (40x, H&E stain, Histopathology): showing tumor cells having optically clear nuclei (Orphan-Annie eye appearance) and nuclear grooves.**

**Table 1: Distribution of thyroid lesions on basis of Gender.**

Gender	Number	Percentage
Females	23	92 %
Males	2	8 %

**Table 2: Age wise distribution among males and females**

Age group	Males	Females
10-20	00	01
21-30	00	03
31-40	01	02
41-50	01	05
51-60	00	08
61-70	00	03
71-80	00	01

**Table 3: Distribution of benign non-neoplastic lesions on Cytology**

Non-neoplastic lesions	Number of cases	Percentage
Colloid nodule	04	20 %
Colloid goiter	06	30 %
Benign thyroid lesion	05	25 %
Hashimoto's thyroiditis	01	5 %
Colloid cyst	02	10 %
Nodular goiter with hurthle cell changes	02	10 %
Total	20	100 %

**Table 4: Distribution of neoplastic lesions on Cytology**

Neoplastic lesions	Number of cases	Percentage
Atypia of Undetermined significance	01	33.3 %
Suspicious of malignancy	02	66.7 %
Total	03	100 %

**Table 5: Distribution of benign non-neoplastic lesions on Histopathology**

Non-neoplastic lesions	Number of cases	Percentage
Multinodular colloid goiter	08	40 %
Colloid goiter with cystic changes	05	25 %
Benign thyroid lesion	04	20 %
Colloid nodular goiter with Hurthle cell changes	03	15 %
Total	20	100 %

**Table 6: Distribution of neoplastic lesions on Histopathology**

Neoplastic lesions	Number of cases	Percentage
Papillary carcinoma, classic variant	04	80 %
Papillary carcinoma, follicular variant	01	20 %
Total	05	100 %

**Table 7: Cytological and Histopathological correlation of thyroid lesion**

Sr. No	Cytological Diagnosis	Histopathological Diagnosis
1	Bethesda Category-II - colloid nodule.	Colloid multinodular goiter with cystic degeneration
2	Bethesda category- II - colloid nodule.	Colloid goiter with cystic degeneration
3	Bethesda Category- II - benign thyroid follicular nodule	Multinodular goiter.
4	Bethesda category-II suggestive of colloid nodule	Multinodular goiter.
5	Bethesda category-II- Benign	Multinodular goiter.
6	Bethesda category II- Benign thyroid lesion.	Multinodular goiter.
7	Bethesda - Category II - Benign thyroid lesion	Nodular colloid goiter
8	Bethesda category- II - colloid goiter.	Nodular colloid goiter.
9	Bethesda category-II - Colloid goiter.	Colloid goiter
10	Colloid cyst	Benign cystic lesion of thyroid
11	Bethesda category II- Benign thyroid lesion - Hashimoto's thyroiditis	Benign thyroid lesion
12	Bethesda category-II: Benign thyroid lesion-Nodular goiter with focal changes of thyroiditis.	Benign colloid nodular goiter with Hurthle cell changes.
13	Nodular colloid goiter with Hurthle cell change.	Colloid goiter with cystic changes
14	Bethesda category - II - Nodular goiter.	Colloid goiter with cystic changes and calcification
15	Bethesda category II- BENIGN	Benign thyroid lesion.
16	Bethesda category-II, Benign thyroid lesion with cystic changes,	Benign colloid nodular goiter with Hurthle cell changes
17	Bethesda category II, Benign thyroid lesion -Colloid Goiter.	Benign Thyroid Nodule with cyst.
18	Nodular colloid goiter with Hurthle cell change	Multinodular goiter with degenerative changes, calcification and hyperplastic foci
19	Bethesda category - II - Nodular goiter.	Nodular (Adenomatoid) hyperplasia with Hurthle cell change.
20	Colloid cyst.	colloid goiter with marked cystic change

21	Bethesda category-3, atypia of undetermined significance	Papillary carcinoma, Classical
22	Bethesda system of thyroid reporting - Category V - Suspicious of malignancy	Papillary carcinoma
23	Bethesda Category-V- suspicious for malignancy.	Papillary carcinoma, Classic type
24	Inconclusive	Papillary carcinoma- classical type surrounded by adjacent adenomatoid goitre
25	Inconclusive	Papillary carcinoma (predominant follicular pattern) Other nodules with goitrous changes.

## DISCUSSION

Both the neoplastic and non-neoplastic diseases of thyroid are common all over the world with varying frequency and incidence. In India about 42 million people suffer from thyroid disease.<sup>[1]</sup> For preoperative investigation of thyroid nodules, fine needle aspiration cytology is a well-established technique. To differentiate between benign and malignant thyroid nodules, this non-invasive technique is an efficient method.<sup>[2]</sup> In the present study, age of the patients ranged from 18- 75 years with a mean age of 47 years. This was comparable to Bamanikar S et al, Nagare MR et al.<sup>[2,6]</sup> The number of males in the present study was 02(8 %) and females were 23 (92 %) with a male to female ratio of 1: 11.5. Sex distribution was comparable with Bhamanikar S et al.<sup>[6]</sup> In the present study, the most common non-neoplastic lesion was Colloid goiter accounting for 06 (30%) on cytology and 08 (40 %) on Histopathology. A comparable observation was made by Singh P. et al. where 45 cases (64.3%) were colloid goiter out of 70 cases.<sup>[7]</sup> The most common neoplastic lesion in our study was suspicious of malignancy accounting for 2 cases on cytology and papillary thyroid carcinoma on histopathology accounting 5 cases (100 %). A comparable observation was made by Bodepudi et al. where 13 cases (93 %) were papillary thyroid carcinoma out of 14 cases.<sup>[8]</sup>

## CONCLUSION

FNAC is safe, reliable and accurate method as an initial simple diagnostic test for thyroid nodules in decision making about surgical intervention. Though FNAC cannot replace the gold standard of histopathology, this technique has many advantages and helps in preoperative diagnosis of thyroid lesions which guides the further clinical management of thyroid swellings.

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