



## **Spectrum of Fine Needle Aspiration Cytology of Thyroid Neoplasms in Correlation with Histopathology**

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### **ABSTRACT**

#### **Introduction**

Thyroid swellings are common clinical findings that are more common in women than men. They may cause pressure symptoms to underlying structures. FNAC is a simple, cost-effective, quick to perform procedure in the out-patient department with excellent patient compliance. It is often used as initial investigation of choice for the diagnosis of thyroid diseases

#### **Aim**

The study aimed to know the spectrum of FNAC in thyroid neoplasms and to compare the diagnostic accuracy of FNAC in correlation with histopathology results.

#### **Materials & Methods**

In this retrospective study FNAC results of 125 thyroid lesions done over a period of 1 year (April 2022-April2023). The FNAC results are correlated with the available histopathological results to calculate the sensitivity, specificity of FNAC

#### **Results**

A total of 125 cases were obtained out of which Benign (108) -86.4% malignant (17)-13.6% Biopsy specimens were obtained for 36 cases. The correlation between FNAC & histopathology is obtained in 30 cases. The sensitivity was 61.53% and specificity was 95.45%

## Conclusion

FNAC is a good screening test that has high sensitivity & is cost effective

## Keywords

Thyroid swellings, FNAC, retrospective study, histopathological results to calculate.

## INTRODUCTION

Thyroid nodules are communal clinical findings and have a reported prevalence of 4–7% of adult population. However, less than 5% of adult thyroid nodules are malignant, and majority is non-neoplastic lesions. It is ideal to operate only on those patients who are suspicion of cancer, thereby avoiding unnecessary surgery and injury of the recurrent laryngeal nerve, hypoparathyroidism, and thyroid hormone dependence in patients with benign thyroid nodules. However, the distinction of benign lesions from malignant lesions cannot be based reliably on the clinical presentation alone <sup>[1]</sup>.

FNAC of the thyroid gland is now considered first line diagnostic test for the evaluation of diffuse thyroid lesions as well as thyroid nodules with the main purpose of confirming benign lesions and thereby, reducing unnecessary surgery <sup>[2]</sup>.

Regardless of different imaging techniques are now used for diagnosis of thyroid nodules like radionuclide scanning, high-resolution ultrasonography, etc. FNAC is still regarded as the single most accurate and cost-effective procedure, particularly if ultrasound is used as a guide for better sample collection, especially for cystic lesion [3].

Like every other procedure, FNA has pitfalls like inadequate sampling, inappropriate sampling technique, experience of the pathologist interpreting

the aspirate, and morphological overlap between certain benign and malignant lesions. Follicular neoplasms and suspicious cytology in particular pose diagnostic challenges, and accuracy is lower in such cases [4,5]. In a study by Handa et al., [6] (2008) on thyroid swellings, the sensitivity and specificity of FNAC was 97% and 100% respectively.

## AIM

To compare the diagnostic accuracy of FNAC of thyroid neoplasms in correlation with histopathology results

## OBJECTIVES

1. To study the cytological spectrum of all thyroid lesions.
2. Study the age group & sex distribution.
3. Correlate the histopathology and cytology of thyroid lesions.

## MATERIALS & METHODS

A retrospective study is being conducted on 125 patients who have thyroid nodules and underwent FNAC during the period from April 2022 April 2023. Of 125 patients, 36 were treated by surgery such as total, subtotal, and hemithyroidectomy. Histopathological examination of these specimens was done.

Results obtained from FNAC were compared with histopathological diagnosis of specimen after surgery to study diagnostic accuracy of FNAC.

## RESULTS

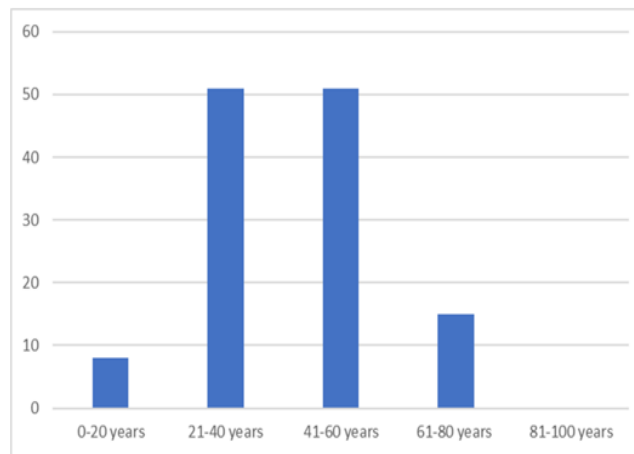
### Age Incidence:

Age group of 21-40 years & 41-60 years had maximum number of patients. Least number of patients were in the group of 0-20 i.e.6.4%. The age distribution of patients depicted below.

**Table 1: Age Incidence**

Age Group[Yrs.]	Number	Percentage
0-20	8	6.4%
21-40	51	40.8%
41-60	51	40.8%
61-80	15	12%
81-100	0	0

**Table 1.1 Histogram Showing Age Incidence**



**Gender Wise Distribution:**

Majority of the patients were Females that accounted for 103(82.4%) & males accounted for 22(17.6%) of patients.

Among the females 89% had benign swellings &

11% had malignant tumors of thyroid. Among the males 68 % had benign swelling & 31% had malignant tumors of the thyroid gland. The gender wise distribution is depicted in table 2 below

	BENIGN	MALIGNANT	TOTAL
MALES	15	7	22
FEMALES	92	11	103

**Table 2.2 Histogram Showing Gender Wise Distribution of Cases**

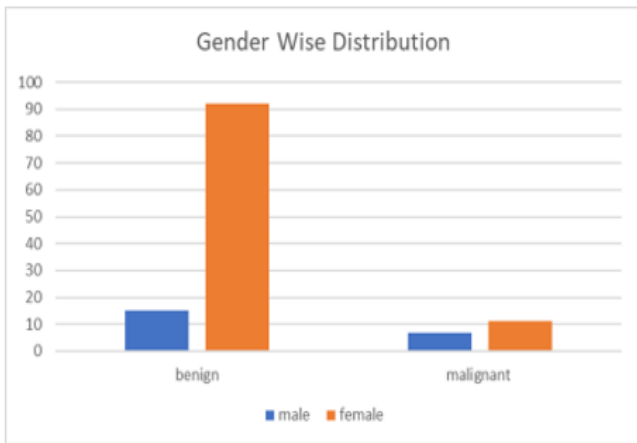


Table 3 Gives The Number of Cases in Each Pathological Variant of Thyroid Disease as Per Fnac Diagnosis

**Table 3 Fnac Diagnosis**

Cytological variants	Numbers	Percentage
Goitre	87	69.6%
Thyroiditis	21	16.8%
Suspicious of malignancy	1	0.8%
Malignancy	2	1.6%
Follicular neoplasms	2	1.6%
Papillary carcinoma	8	6.4%
Medullary carcinoma	1	0.8%
Metastasis	3	2.4%
Total cases	125	100%
Total benign	108	86.4%
Total malignant	17	13.6%

The final histopathological diagnosis of all the above cases were made after surgery. Below are the variants

**Table 3 Histopathology**

Nodular goitre	19
Follicular adenoma	1
Thyroiditis	2
Papillary carcinoma	8
Follicular carcinoma	2
Poorly differentiated	2
NIFTP	2

Comparison of the histopathological diagnosis with fine needle aspiration reports is cited below:

Of 36 cases, 1 case of Suspicious of Malignancy in FNAC turned out to be follicular adenoma in histopathology.

1. Case of goitre in FNAC turned out to be NIFTP in histopathology
2. Case of thyroiditis turned out to be papillary carcinoma in histopathology.

3. Cases of goitre turned out to be papillary carcinoma in histopathology.

4. Case of goitre turned out to be NIFTP.

Differences in diagnosis of FNAC & HISTOPATHOLOGY were grouped under benign & malignant conditions & true positives, true negatives, false negatives & false positives were calculated and mentioned below.

**Table 4:** Fnac & Histopathology

FNAC		HISTOPATHOLOGY	
		BENIGN	MALIGNANT
BENIGN	27	21 (true negative)	5 (false negative)
MALIGNANT	9	1 (false positive)	8 (true positive)

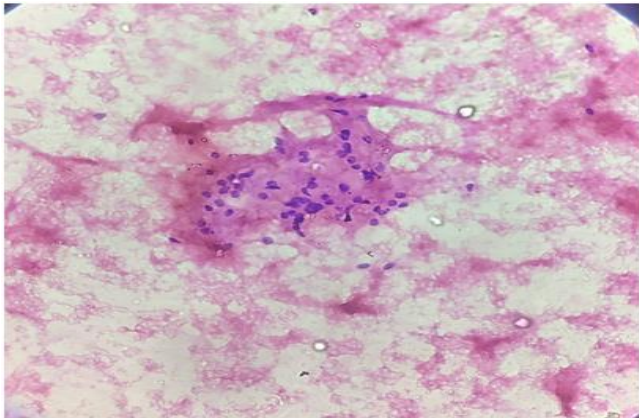


Fig A. Benign, colloid nodule shows sheets of normal follicular epithelial cells(H&E) stainx40

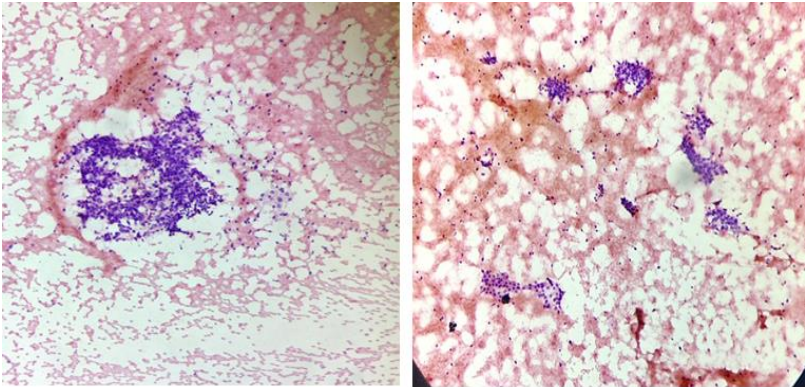


Fig B & C Benign, lymphocytic thyroiditis, cellular aspirate shows follicular epithelial cells in background of numerous lymphocytes(H&E) x20.

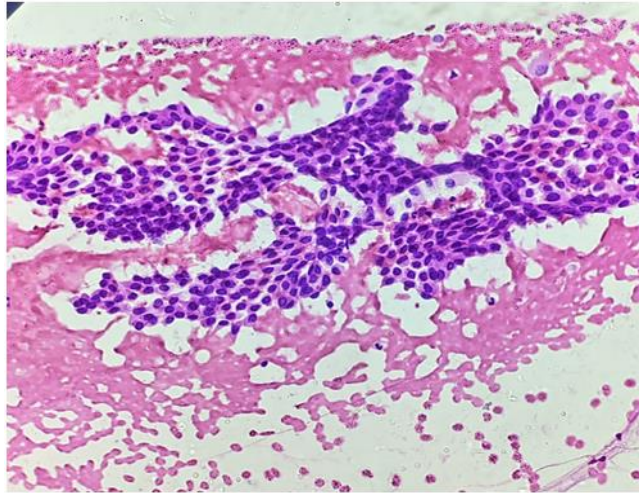


Fig C. Papillary carcinoma showing increased cellularity & maintained anatomical border

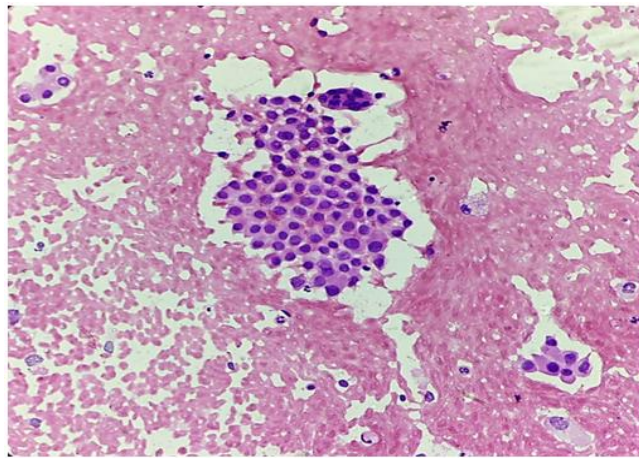


Fig D. Shows nuclear features like nuclear clearing, inclusions.

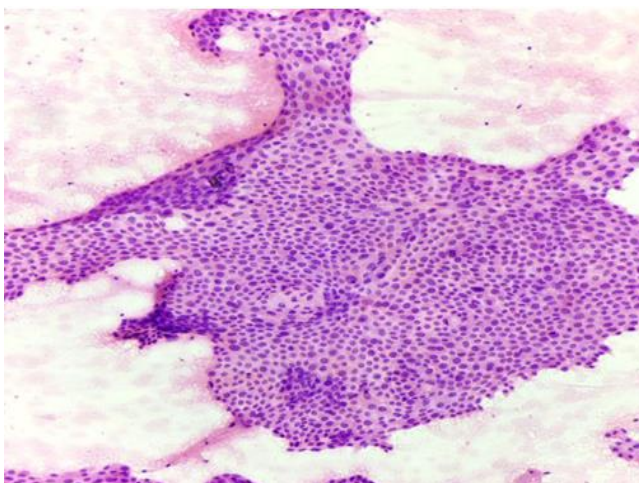


Fig e. Smear shows oncocytic variant of papillary carcinoma.

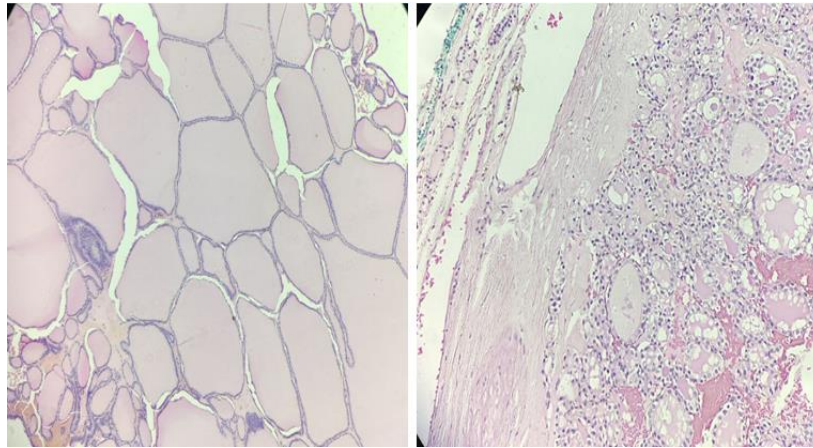


Fig f & g. Colloid goitre (H&E stainx40) Follicular carcinoma (H&E stainx40).

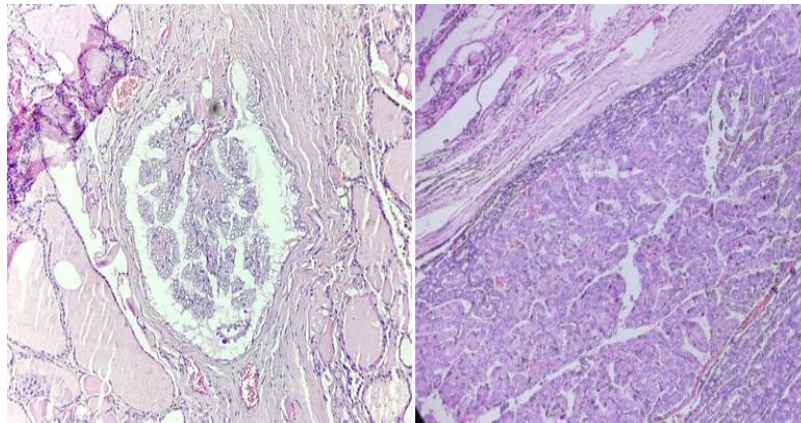


Fig H & I. Papillary carcinoma & Non-invasive follicular neoplasm with papillary like nuclear features.

## DISCUSSION

Thyroid gland enlargement whether diffuse or nodular requires a variety of investigations, mainly to rule out the possibility of neoplasms.

Fine needle aspiration cytology is regarded as gold standard initial investigation in diagnosis of thyroid swellings.

This is a safe, simple, and quick technique with a low complication rate and helps to select people preoperatively for surgery.

FNAC has a high degree of accuracy and specificity and is a straightforward, safe, and easy diagnostic method for examining thyroid swellings. It is

extremely helpful in the diagnosis of benign lesions such as hashimoto's thyroiditis, colloid goitre, and cancers.

Majority of the clinically diagnosed palpable thyroid nodules are non-neoplastic.

FNAC used together with other diagnostic modalities such as ultrasonography, thyroid scanning, thyroid hormone, antibody level enhances the diagnostic accuracy.

The present study showed that thyroid diseases are more common in females. The present study showed

FNAC is highly useful in the initial evaluation of thyroid swellings with sensitivity 61.53% and specificity 95.45%.

The adequacy of the specimen, precise sampling technique, overlapping cytological features between benign and malignant follicular and Hurthle cell lesions, and differentiating lymphocytic thyroiditis from lymphoma are among the FNAC pitfalls that Shaha et al. (2000) [7] mention.

In this study we found out the majority of the patients were in third decade of life. This in accordance with the study of Tariq *et al.* and Zangana *et al.* [8,9]

### **CONCLUSION**

FNAC is a simple, safe and cost-effective diagnostic modality in the investigation of thyroid disease with high specificity and accuracy. But it can give false negative results.

Thus even if FNAC can provide a diagnosis the ultimate answer rests in the histopathologic examination of excised thyroid tissue

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