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REAL PARTER	A STUDY OF CYTO-HISTOLOGICAL CORRELATION IN THE DIAGNOSIS OF THYROID SWELLING	<b>KEY WORDS:</b> Thyroid swelling, FNAC, Histopathology.	
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**Background:** Thyroid swelling remains a problem of enormous magnitude all over the world. The majority of clinically diagnosed thyroid swelling are non-neoplastic; only 5% to 30% are malignant and require surgical intervention. Fine needle aspiration cytology (FNAC), being simple, readily available, reliable, time saving, minimally invasive, cost effective, having high sensitivity and specificity have been applied routinely as a useful and indispensible method to diagnose thyroid lesions.

**Objectives:** This study was aimed to evaluate the effectiveness of FNAC in the clinical management of thyroid disease, co-relate with histopathological examination and also to reduce the rate of surgery in benign cases.

**Material and Methods:** This was a retrospective study of thyroid lesions carried out at Department of Pathology, Career Institute of Medical Sciences, Lucknow, Uttar Pradesh over a period of 2-year (June 2015 to May 2017). FNACs were done during this period. Patients of all ages and both the sexes were included in the study. Out of 150 patients, histological confirmation was available in 50 cases.

**Results:** Majority of the cases were non-neoplastic. The accuracy of cytodiagnosis was 95%.

**Conclusion:** FNAC of thyroid lesion has a high accuracy in differentiating between malignant and benign lesions. It is safe cost effective, minimally invasive, and OPD procedure. Using FNAC as the first line of investigation, the number of surgeries for thyroid lesion has reduced greatly.

#### Introduction:

ABSTRACT

Thyroid swelling remains a problem of enormous magnitude all over the world. The problem in clinical practice is to distinguish reliably the few malignant tumors from the many harmless nodules so that a definitive preoperative tissue diagnosis of the malignancy allows planning of appropriate surgery and relevant patient counseling. The prevalence of thyroid swelling ranges from 4% to 10% in the general adult population and from 0.2% to 1.2% in children<sup>1</sup>. The majority of clinically diagnosed thyroid swelling are non-neoplastic; only 5% to 30% are malignant and require surgical intervention<sup>2</sup>. In India, thyroid cancer comprises of 1% of all head and neck cancers.

Nodular lesions in thyroid are so common and it presents as solitary or multiple nodules and are mostly benign and cancerous lesions are at the most instance of relatively low malignant potential. As the incidence of malignancy presenting on nodular lesion is quite low compared with the overall incidence of thyroid nodule, emphasis is placed upon finding diagnostic modalities that may improve the ability to differentiate between benign and malignant lesions.

Various non-invasive methods used for diagnosis of thyroid lesions do not make a definitive diagnosis of malignant lesions. FNAC (Fine Needle Aspiration Cytology) has now replaced most other tests used for pre-operative diagnosis of thyroid lesions. Now-a-day, most clinicians rely solely on FNAC for making a diagnosis of benign lesions. As a result the incidence of malignancy in thyroidectomy patients has increased from 10% to 30-50% in recent years.<sup>3</sup> In spite of the first choice of investigation in thyroid lesions, it also has some limitations. The reported pitfalls are mostly related to sampling techniques, the skill of doctor performing the aspiration, sample adequacy, the experience of pathological features between benign and malignant follicular neoplasm.<sup>4,5</sup> FNAC is safe relatively simple and cost effective for evaluation of thyroid patients.

### Aims and objectives:

This study was aimed to evaluate the effectiveness of FNAC in the clinical management of thyroid disease, co-relate with

histopathological examination and also to reduce the rate of surgery in benign cases.

#### Material and methods:

This was a retrospective study of thyroid lesions carried out at Department of Pathology, Career Institute of Medical Sciences, Lucknow, Uttar Pradesh over a period of 2-year (June 2015 to May 2017). Patients from ENT outpatient department (OPD) and from medicine OPD were taken for FNAC. 150 FNACs were done during this period. Patients of all ages and both the sexes were included in the study. Out of 150 patients, histological confirmation was available in 50 cases. A sample of histopathology was collected from our own surgical department as well as from the surgeries done outside. Methods used in this study included a clinical presentation, thyroid function test, FNAC, and histopathology. Sign and symptoms related to thyroid gland were a solitary nodule, multinodular, and diffuse goiter. Sign of compression, hoarseness of voice, cough, pain, dysphagia, and symptoms related with hypo functioning or hyper functioning of thyroid gland. Thyroid function test was used to determine the level of free T3, T4 and free T4, and thyroid stimulating hormone.

All FNAC was done by the pathologist as the outpatient procedure; no ultrasound guided FNAC was done. Air-dried smears were stained with May–Grunwald–Giemsa, and wet smears were stained with papanicolaou and hematoxylin and eosin stain. The results of FNAC were compared with histopathology in 50 cases. The cytological results were also correlated with clinical features and thyroid function test. The statistical analysis included sensitivity, specificity, accuracy, false positive rate, and false negative rate.

### Results:

FNAC performed in 150 patients of which 80% were female, and 20% were male. Most of the patients were in the age group of 21-40 (Table 1). Most common presenting symptom was painless solitary nodule (Table 2). Among 150 patients, 81.6% were non-neoplastic, and 18.4% were reported as neoplastic on cytology (Table 3, Figures 1,2)). 2 were false positive and three were false negative (Table 4). The sensitivity of FNAC was 92%, specifitive was 97% (Table 5).

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Age group in years	No. of Patients
0-20	15
21-40	70
41-60	50
61-80	15
Total	150

# Table 1: Age group distribution of patient with thyroid disorders

Clinical signs and symptoms	No. of patients
Goiter	150
Solitary nodule	120
Multi nodular	22
Diffuse	08
Pain	15
Dysphagia	10
Hoarseness	20
Cough	05
Signs and symptoms of increased hormonal	10
concentration	
Signs and symptoms of decreased hormonal concentration	15

# Table 2: Clinical signs and symptoms of patients with thyroid disorder

Non neoplastic lesions (n=120)			
Nodular Goiter	65		
Benign cyst	30		
Thyroiditis	25		
Neoplastic lesions (n=30)			
Follicular Neoplasm	16		
Papillary Neoplasm	07		
Hurtle cell Neoplasm	05		
Anaplastic	02		
Total	150		

#### Table 3: FNAC of thyroid Nodule

FNAC	Histology		Total
	Neoplastic	Non-Neoplastic	
Neoplastic	23	02	25
Non-Neoplastic	03	22	25
Total	26	24	50

#### Table 4: Cyto Histological Co-relation (n=50)

Statistical Analysis	%
Sensitivity	92
Specificity	97
False positive	3.1
False negative	10.1
Accuracy	95

### **Table 5: Statistical Analysis**



Figure 1: Papillary structure in Papillary carcinoma of thyroid on FNAC

Figure 2: Anisonuleosis and nuclear grooving in Papillary carcinoma of thyroid on FNAC

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Thyroid enlargement is the most common occurrence in the sub-Himalayan region of the India. Thyroid enlargement whether nodular or diffuse needs thorough investigation, mainly to rule out malignancy or thyroiditis. Thyroid malignancy accounts for 1% of all malignancy. Early diagnosis of thyroid cancer provides higher life expectancy due to low malignant potential and slow progressing nature of thyroid cancer.

FNAC has excellent patient acceptance and no morbidity. It is easy and low-cost effective test used in the diagnosis of the thyroid nodule.<sup>67</sup> FNAC of thyroid nodule has decreased the rate of thyroid surgery while increasing the percentage of malignancy in thyroidectomy patients.<sup>8</sup>

The value of any test depends on its ability to detect the presence of disease (sensitivity) and to verify the absence of disease when it is not presence (specificity). The sensitivity of thyroid FNAC ranges from 74% to 92% and specificity ranges from 74% to 100%.<sup>9,10</sup> In our study, sensitivity was 90%, and specificity was 96%, which correlates with other studies.<sup>11,13-18</sup> This shows that FNAC is more specific than sensitive. The reason for the wide range of sensitivity and specificity is the difference in the way of categorization of lesions by a different cytopathologist.

Factors that reduce the efficacy of FNAC of thyroid include inadequate sampling, the inexperience of cytopathologist, and difficulty in differentiating between benign and malignant follicular lesions. Inadequate sampling may result from sclerotic, calcified nodule, or nodule with cystic degeneration in large areas. The solitary thyroid nodule is less likely to be malignant. In our study, of 120 patients of solitary nodule, only six were reported as neoplastic on FNAC. Which correlates with others studies.<sup>12,13</sup>

Most common age group in our study was the 3<sup>rd</sup> and 4<sup>th</sup> decade of life, which is accordance to the study of Bukhari et al. and Khanzada et al. Most of the malignant patients presents after 5th decade of life. Anaplastic carcinoma which is usually seen in late ages, in this study, the age of anaplastic carcinoma was 39 years.

In our study, there was 120 female and 30 male, with a male to female ratio of 1:4 which correlates with the study of Sharma.19 In this study, rate of false negative was 9.7% and false positive rate was 3.1% which was accordance with the study of Sharma.19 In previous studies, false negative rate were reported between 1% and 7% and false positive rate 1-11%.<sup>79</sup> Wide range of false negative and false positive rate 1-11%.<sup>70</sup> Wide range of false negative and false positive rate 1-NAC occurred in two cases. Both cases were diagnosed as adenomatoid goiter on histopathological examination both were confirmed as follicular carcinoma. False positive was only one case which was diagnosed as Hurthle cell neoplasm on cytology, but on histology it was confirmed as Hurthle cell change in hyperplastic goiter.

### Limitations of study:

As it is a single centre study with a relatively small study population, results cannot be generalized to the entire population.

## Conclusion:

FNAC is rapid, simple, cost-effective, and minimally invasive diagnostic tool for making pre-operative assessment of patient with the thyroid nodule. By adopting this method, unnecessary thyroid surgeries for benign lesions can be avoided.

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# Discussion:

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