



## DIAGNOSTIC ACCURACY OF FINE NEEDLE ASPIRATION CYTOLOGY IN THYROID LESIONS AT DARBHANGA MEDICAL COLLEGE, LAHERIASARAI, BIHAR

### Pathology

<b>Dr. Megha Jha*</b>	M.B.B.S., M.D. (Pathology), Tutor, Department of Pathology, Darbhanga Medical College, Laheriasarai, Bihar. *Corresponding Author
<b>Dr. [Prof.] Ajit Kumar Chaudhary</b>	M.B.B.S., M.D. (Pathology), Professor and Head of Department, Department of Pathology, Darbhanga Medical College, Laheriasarai, Bihar.
<b>Dr. Debarshi Jana</b>	PhD, Young Scientist (DST) Department of Gynecology and Obstetrics Institute of Post-Graduate Medical Education and Research, A.J.C. Bose Road, Kolkata-700020, West Bengal, India

### ABSTRACT

**Background:** Fine needle aspiration cytology (FNAC) is the commonly used test for diagnosis of thyroid nodules. FNAC is a cost-effective procedure that provides specific diagnosis rapidly with minimal complications. Based on the cytology findings, patients can be subjected to surgery only in cases of malignancy, thereby decreasing the rate of surgery and its consequent complications. The purpose of our study was to find the diagnostic accuracy of FNAC in thyroid lesions and to compare it with histopathology.

**Materials and Methods:** A retrospective hospital-based study was conducted at Department of Pathology, Darbhanga Medical College & Hospital, Laheriasarai, Bihar. Data were collected from the records of FNAC and histopathology of thyroid lesions, done in last 1 year duration. Analysis was done by entering data in SPSS software, and Chi-square test was applied to find statistical significance.

**Results:** FNAC was done on 234 patients in 2 years duration. The most common thyroid lesions were benign [221 (94.4%)], followed by malignant only [6 (2.6%)], indeterminate [3 (1.3%)], and inadequate [4 (1.7%)]. Out of 221 (94.4%) benign thyroid lesions, 33% were simple colloid goiter, 27.6% goiter with cystic changes, 16.28% nodular colloid goiter, 10.41% lymphocytic thyroiditis, 4.53% thyroglossal cyst, 4.07% colloid goiter with hemorrhage, 0.9% were follicular adenoma, and others formed 3.17%. Out of six (2.6%) malignant thyroid lesions, three were papillary carcinoma and the other three were follicular neoplasm.

**Conclusions:** The cytological criterion for the diagnosis of thyroid lesions as benign and malignant by FNAC is a highly reliable method for the diagnosis. FNAC showed sensitivity, specificity, and diagnostic accuracy of 100% in the diagnosis of malignant lesions like papillary carcinoma as well as thyroglossal cyst and abscess.

### KEYWORDS

Diagnostic accuracy, fine needle aspiration cytology, thyroid lesions

### INTRODUCTION

Fine needle aspiration cytology (FNAC), being reliable, minimally invasive, cost effective, and having high sensitivity and specificity, has been applied routinely as a useful and indispensable method to diagnose thyroid lesions. FNAC has allowed a dramatic decrease in unnecessary surgeries with thyroid nodular disease, enhancing the percentage of malignant operated nodules over 50%.

Practice guidelines set forth by the American Thyroid Association and National Comprehensive Cancer Network state that FNAC should be used as an initial diagnostic test because of its superior diagnostic reliability and cost-effectiveness, before both thyroid scintigraphy and ultrasonography. As FNAC distinguishes between benign and malignant lesions quite effectively, it is the preoperative screening method of choice worldwide. Its use in recent years has resulted in a significant decrease in the number of surgeries being performed, while increasing the yield of malignant lesions of patients who have undergone surgery.

FNAC of thyroid is firmly established as a first line diagnostic test for evaluation of goiter and the single most effective test for pre-operative diagnosis of a solitary thyroid nodule. It is used as a routine first-line diagnostic method to assess thyroid diseases. As it is a simple technique which can be carried out in the out-patient department, it can be readily repeated if necessary and has good patient compliance. FNAC is therefore used as the key investigation in combination with radiological investigations in many recognized centers to assess discrete thyroid swellings to diagnose or exclude a malignancy. FNAC has also reduced the need of isotope scans and the necessity for surgery. Thyroid nodules that are considered for FNAC include firm, palpable, solitary nodules, nodules associated with suspicious clinical or ultrasonographic features, dominant nodules in a multinodular goiter, recurrent cystic nodules, and nodules associated with palpable lymph nodes.

Several studies based on different methodologies have reported a high degree of sensitivity, specificity, positive and negative predictive values of FNAC for thyroid. <sup>[4]</sup> It has a diagnostic accuracy of over 90% in terms of predictive value, sensitivity, and specificity in the diagnosis

of malignancy. Accuracy of the diagnosis has been shown to increase with the experience of the pathologist.

### AIMS OF THE STUDY

This study is aimed to determine the pattern of thyroid lesions and diagnostic accuracy of FNAC in the diagnosis of thyroid lesions and to compare it with histopathology.

### MATERIAL AND METHODS

A retrospective hospital-based study was conducted at Department of Pathology, Darbhanga Medical College & Hospital, Laheriasarai, Bihar. Data were collected from the records of FNAC of thyroid lesions done in 1 year. Inclusion criteria were all patients with thyroid lesions who had undergone FNAC on out-patient and in-patient basis in the cytology section. FNAC results were then compared with the available histopathologic results to find the diagnostic accuracy of FNAC.

Fine needle aspiration (FNA) was done with a 22- or 23-gauge needle attached to a 20 cc airtight disposable syringe fitted in a syringe holding FNA Gun which provides better grip and negative pressure to aspirate adequate sample. The sample was obtained by to and fro motion. Samples were smeared onto glass slides and fixed in 95% methanol, along with one or two air-dried smears for May Grunwald Giemsa (MGG) stain. In cystic lesions, after aspiration of fluids, the lesion was again aspirated. The fluid was centrifuged and smears were made from sediment. Wet-fixed smears were stained with Hematoxylin and Eosin (H and E) and Papanicolaou stains, while air-dried smears were stained with MGG stain. The cytology results were categorized into four groups: inadequate, benign, indeterminate, and malignant. Data were entered in SPSS software and analysis was done. Chi-square test was applied to find statistical significance.

### RESULTS

The study aims to determine the cytological pattern of thyroid lesions and the diagnostic accuracy of FNAC as initial diagnostic method in the investigation of thyroid swelling. Totally 234 patients had undergone FNAC and 27 patients had undergone histopathology also

of thyroid in 2 years duration from September 2016 to August 2018 on OPD basis.

The most common thyroid lesions were benign in 221 (94.4%), followed by malignant only in 6 (2.6%), indeterminate or suspicious in 3 (1.3%), and inadequate for cytological assessment in 4 (1.7%) as per [Table 1]. FNAC categories benign, malignant, indeterminate, and inadequate were found to be significantly associated with age. Benign thyroid lesions were more common in 21-30 years age group, while malignant thyroid lesions were common in 30-60 years age group.

**Table 1 : FNAC category of thyroid lesions**

FNAC category	Frequency	Percent
Benign	221	94.4
Indeterminate	3	1.3
Inadequate	4	1.7
Malignant	6	2.6
Total	234	100.0

Gender distribution of thyroid lesions showed female preponderance, with 86.3% females and 13.7% males and a male: female ratio of 1:7. There was significant association found between benign and malignant thyroid disease with gender, and was higher toward the female side.

Out of 221 (94.4%) benign thyroid lesions, 33% were simple colloid goiter, 27.6% colloid goiter with cystic changes, 16.28% nodular colloid goiter, and 10.41% were lymphocytic thyroiditis. Also, thyroglossal cyst formed 4.53%, colloid goiter with hemorrhage 4.07%, follicular adenoma 0.9%, and others formed 3.17% (which include thyroid cyst, abscess, and Hurthle cell adenoma). Out of six (2.6%) malignant thyroid lesions, three were papillary carcinoma and the other three were follicular neoplasm.

Out of total 234 thyroid FNAC, histological correlation was done in 27 cases only. Histology confirmed 26 benign lesions of FNAC into simple colloid goiter 5 (18.52%), nodular colloid goiter 13 (48.15%), colloid goiter with cystic changes 6 (22.22%) and rest lymphocytic thyroiditis, thyroglossal cyst & others comprise 1 (3.70%) each as per [Table 2]. Out of 6 malignant lesions histology was done in 1 case only, which confirmed the diagnosis by FNAC. Histological correlation was possible in only one malignant lesion because all cases diagnosed as malignant by FNAC were referred to the cancer hospital.

**Table 2 : Histological category of benign and malignant thyroid lesions**

Thyroid lesions	Frequency	Percent
Simple colloid goiter	5	18.52
Nodular colloid goiter	13	48.15
Colloid goiter with cystic changes	6	22.22
Lymphocytic thyroiditis and thyroiditis	1	3.70
Thyroglossal cyst	1	3.70
Others (Cyst and abscess)	1	3.70
Papillary carcinoma	1	3.70
Total	27	100

When FNAC and histopathology results were compared, FNAC showed sensitivity, specificity, and diagnostic accuracy of 100% in the diagnosis of malignant lesions like papillary carcinoma as well as thyroglossal cyst and abscess.

Sensitivity, specificity, and diagnostic accuracy of FNAC were 50%, 94.74%, and 81.48%, respectively, in the diagnosis of simple colloid goiter, and 100%, 70%, and 77.78%, respectively, in the diagnosis of nodular colloid goiter. Sensitivity, specificity, and diagnostic accuracy of FNAC were 66.67%, 100%, and 88.89%, respectively, in the diagnosis of colloid goiter with cystic change as per [Table 3].

**Table 3 : Diagnostic accuracy of FNAC in comparison to histopathology**

Thyroid lesions	Sensitivity (%)	Specificity (%)	Accuracy (%)
Simple colloid goiter	50	94.74	81.48
Others (cyst and abscess)	100	100	100
Nodular colloid goiter	100	70	77.78
Colloid goiter with cystic changes	66.67	100	88.89
Lymphocytic thyroiditis and thyroiditis	-	96.3	96.29

Thyroglossal cyst	100	100	100
Papillary carcinoma	100	100	100

## CONCLUSION

The cytological criterion for the diagnosis of thyroid lesions as benign and malignant by FNAC is the most reliable method for diagnosis. In this study, benign thyroid lesions were the commonest found in 221 (94.4%). Out of all benign lesions, simple colloid goiter (33%) was the most common. Thyroid lesions showed female preponderance, with 86.3% females and 13.7% males and a male: female ratio of 1:7. There was significant association between benign and malignant thyroid disease with gender.

The sensitivity, specificity, and diagnostic accuracy of FNAC in the diagnosis of nodular colloid goiter were 100%, 70%, and 77.78%, respectively. FNAC showed sensitivity, specificity, and diagnostic accuracy of 100% in the diagnosis of malignant lesions like papillary carcinoma as well as thyroglossal cyst and abscess. Thus, it can be said that FNAC is the first-line diagnostic procedure for all thyroid diseases; it replaces the need for histopathology in most of the lesions. However, histopathology remains the investigation of choice for confirmation of malignancy.

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