

# FNAC & Post Operative Histopathology In Thyroid Masses

Asef A Wani, Raphella Khan, Ayaz Rehman, Masood H Kirmani, J.B Singh, Afiya Shafi

## Abstract

**Introduction:** To evaluate a case of thyroid mass multitude of diagnostic tests like ultrasound, FNAC etc are available. Final diagnosis always requires morphological examination of lesions for which FNAC and histopathological examination (HPE) become mandatory. **Methods:** Study was conducted on 195 patients with thyroid masses who had undergone pre-operative FNAC which was compared with the histopathology and conclusions were drawn after statistical analysis. **Results:** In 92.8% patients FNAC and histopathology correlated very well. In 7.2 % patients FNAC and Histopathology did not correlate. 9 patients diagnosed as colloid goitre / cyst on FNAC, subsequently on HPE proved as Follicular adenoma in 5 patients and Papillary carcinoma in 4 patients, thus false negative results on FNAC were seen in 9 patients . 5 patients diagnosed as Follicular Neoplasm on FNAC turned out to be Colloid Goitre/cyst on histopathology, thus false positive diagnosis on FNAC was seen in 5 patients . Sensitivity, specificity, positive predictive value , negative predictive value and efficacy of FNAC in predicting neoplastic lesions were 90.4%, 95.04%, 94.4%, 91.4% and 92.8% respectively. **Conclusion:** Benign FNAC diagnosis should be viewed with caution as false negative results do occur and these patients should be followed up for any clinical suspicion of malignancy.

## Key Words

Thyroid masses, FNAC, Histopathology, Non-neoplastic, Neoplastic

## Introduction

It is estimated that 4 to 7% adults have palpable enlargement of thyroid and 10 times more patients have nodules which are not clinically palpable and fewer than 5% among them are actually malignant.<sup>[1]</sup>

A multitude of diagnostic tests like ultrasound of neck, fine needle aspiration cytology (FNAC) ,CT Scan and MRI are available to evaluate a case of thyroid swelling. Final diagnosis always requires morphological examination of lesions for which FNAC and histopathological examination (HPE) are mandatory tests. <sup>[2]</sup>

Though FNAC as a method was first published by Leyden in 1883 <sup>[3]</sup>, the application for thyroid lesions was first reported by Martin and Ellis in 1930.<sup>[4]</sup> Practice guidelines set forth by American Thyroid Association and National

Comprehensive Cancer Network state that FNAC should be used as initial diagnostic test because of its superior diagnostic reliability and cost-effectiveness.

As FNAC distinguishes between benign and malignant lesions quite effectively, it is the pre-operative screening method of choice worldwide. <sup>[5]</sup> Simplicity, diagnostic accuracy and most of all cost effectiveness has given FNAC the status of first line diagnostic test in pre-operative evaluation of thyroid lesions. Its accuracy when applied by experienced and well trained practitioners, can approach that of histopathology in providing unequivocal diagnosis. Its use has decreased the number of thyroid surgeries performed and increased the ratio of malignant to benign lesions resected. As a result, many thyroid

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Deptt. of ENT, SKIMS MCH, Srinagar , J&K India

**Correspondence to:** Asef A Wani, Professor Deptt. of ENT, SKIMS MCH, Srinagar , J&K India

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surgeries for benign non-neoplastic diseases have been avoided. [6]

**Material and Method**

The study was conducted retrospectively in SKIMS Medical College Srinagar from available data of 6 years (2013-2019) on 195 patients with thyroid gland masses who had undergone pre-operative FNAC and were subsequently operated on the basis of FNAC findings. . The pre- operative FNAC was compared with the post-operative histopathology and conclusions were drawn after statistical analysis. The sensitivity, specificity, positive predictive value, negative predictive value and efficacy of FNAC were evaluated.

**Results**

In the 195 patients enrolled for study, 156 (80%) were females and 39 (20%) were males. The non-neoplastic lesions were more common and were observed in 105 (53.84%) patients. As per Bethesda classification, 105 (53.84%) patients belonged to group B2 , 50(25.64%) patients to group B4 and 40( 20.52%) patients to group B6. (Table 1). On histopathology, colloid goitre/cyst were observed in 101 (51.80%) patients, follicular adenoma in 40 (20.52%) patients, follicular carcinoma in 05 (2.56%) patients and papillary carcinoma in 49 (25.12%) patients. Pre-operative FNAC was correlated with postoperative histopathology in all cases. In 181 ( 92.8%) patients pre-operative FNAC and post-operative histopathology correlated very well. In 14 ( 7.2 %) patients FNAC and post-operative histopathology did not correlate. 9 patients which were diagnosed as colloid goitre / cyst on FNAC, subsequently on HPE were diagnosed as Follicular adenoma in 5 patients and Papillary carcinoma in 4 patients, thus false negative results on FNAC were seen in 9 (4.61%) patients (Table 2) . 5 patients diagnosed as Follicular neoplasm on FNAC turned out to be Colloid Goitre/cyst on histopathology, thus false positive diagnosis on FNAC was seen in 5 (2.56% ) patients. (Table 3) The sensitivity, specificity, positive predictive value , negative predictive value and efficacy of FNAC for the diagnosis of thyroid lesions in predicting neoplastic lesions were 90.4%, 95.04%, 94.4%, 91.4%

and 92.8% respectively.

**Discussion**

Fine Needle Aspiration Cytology of the thyroid is widely used as it is safe, rapid ,inexpensive and reliable in the diagnosis of thyroid nodules. The sensitivity of thyroid FNAC ranges from 80-98% [7] and its specificity from 58-100%. Because of its simplicity ,safety and diagnostic accuracy, FNAC has replaced open biopsy and has been accepted worldwide as a screening test to distinguish nodules that require surgery from those that do not. However despite its well recognized role there are limitations to its use. One of the drawbacks of FNAC is the high inadequate sample rate and has been reported as 2-21% patients.[8] Thyroid aspiration under ultrasound guidance may improve sample accuracy. The other drawback of routine Thyroid FNAC is its inability to distinguish Follicular Adenoma from Follicular Carcinoma, as this differentiation can be made only on the basis of vascular or capsular invasion. [9] In the present Study we observed that Thyroid masses are more prevalent among females (4:1). The results of the present study are comparable to the studies done by Parikh U R *et al* [10] and Patel MM *et al* [11], they observed male ,female ratio of 5:1 and 5.25:1 respectively. In the present study we observed that among non-neoplastic lesions, Colloid goitre/ cyst was most common result and was observed in 105 (53.84%) patients on FNAC. Similar observations were made by Abdulkader A *et al* [12] ,Tazeen J *et al* [13],

**Table.1 FNAC Diagnosis of Thyroid masses (BETHESDA Classification)**

FNAC Diagnosis (BETHESDA Classification)	Number of patients	Percentage
B1 Nondiagnostic/ Unsatisfactory	0	0
B2 Benign	105	53.85
B3 Atypia of Undetermined significance/follicular lesions of undetermined significance	0	0
B4 Follicular Neoplasm	50	25.64
B5 suspicious of malignancy	0	0
B6 Malignancy	40	20.51

**Table.2 Comparison of Pre-Operative FNAC with Post-Operative Histopathology in Non-Neoplastic Lesions**

FNAC Report	No. of patients	Histopathological report	No. of patients	Remarks
Colloid goitre/cyst	105	Colloid goitre/cyst	96	True negative
		Follicular adenoma	5	False negative
		Papillary carcinoma	4	False negative

**Table.3 Comparison of Pre-Operative FNAC With Post-Operative Histopathology in Neoplastic Lesions.**

FNAC Report	No.of patients	Histopathological report	No.of patients	Remarks
Follicular neoplasm Papillary carcinoma	50 40	Colloid goitre/cyst	5	False positive
		Follicular adenoma	35	True positive
		Follicular carcinoma	5	True positive
		Papillary carcinoma	5	True positive
		Papillary carcinoma	40	True positive

**Table.2 Comparison of Pre-Operative FNAC with Post-Operative Histopathology in Non-Neoplastic Lesions**

Study	Sensitivity	Specificity	Positive predictive value	Negative predictive value	Accuracy
Present Study	90.4%	95.04%	94.4%	91.4%	92.8%
Y Bajaj et al <sup>19</sup>	93.18%	73.14%	-	-	78.94%
Harsolius P et al <sup>20</sup>	89.4%	95.4%	92.5%	88.33%	94.2%
Hawkins F et al <sup>21</sup>	86.3%	95.3%	85.4%	92.3%	93.7%
Radwa A et al <sup>22</sup>	80%	87.5%	68.75%	87.5%	80%
Shankuntala S et al <sup>23</sup>	96.36%	100%	100%	96.3%	96.66%

Senthiil K *et al*<sup>[14]</sup> and Karthick G *et al*<sup>[15]</sup>. In the present study 50 patients were recorded as follicular neoplasm on FNAC and subsequently on post operative histopathology were diagnosed as follicular adenoma in 35 (70%) patients, follicular carcinoma in 5(10%) patients ,papillary carcinoma in 5(10%) patients and colloid Goitre/Cyst in 5 (10%) patients. Similar results were seen by Lewis *et al*<sup>[16]</sup> who reported that 15-30% of FNACs diagnosed as Follicular neoplasm were actually carcinoma. In the present study 54(27.7%) were diagnosed to be malignant on histopathology. Among the malignant lesions Papillary carcinoma was the commonest. Similar observations were made by Sri Lekh bodepudi *et al*<sup>[17]</sup> and Sukumaran R *et al*<sup>[18]</sup> in their studies. In the present study sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 90.40%, 95.04%, 94.40%, 91.40% and 92.80% respectively and are in accordance with studies by Bajaj Y *et al*<sup>[19]</sup>, Harsolius P *et al*<sup>[20]</sup>, Hawkins F *et al*<sup>[21]</sup>, Radwa A *et al*<sup>[22]</sup>, Shankuntala S *et al*<sup>[23]</sup>, Yanli Zhu *et al*<sup>[24]</sup> and Debanu *et al*<sup>[25]</sup> (Table 4)

### Conclusion

Surgical excision of all thyroid nodules would entail a large number of unnecessary procedures. FNAC is a simple, safe, rapid, cost-effective and reliable diagnostic

modality in the investigation of thyroid disease with high specificity and accuracy. It helps the surgeon in differentiating lesions that require surgery from those that can be managed conservatively. A benign FNAC diagnosis should be viewed with caution as false negative results do occur and these patients should be followed up and any clinical suspicion of malignancy even in the presence of benign FNAC should be an indication for surgery, So final diagnosis and treatment plan should be based upon histopathology.

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### Conflicts of Interest

There are no conflicts of interest.

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