



## Evaluation on Diagnostic Accuracy of FNAC in Thyroid Lesions: A Hospital-Based Study

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### ABSTRACT

Thyroid swelling is a very frequent dilemma in developing countries like India. It is the more common in females as compared to males and is linked with assorted disorders. Aim of this study was to evaluate the reliability of FNAC in thyroid disease in picking up malignant and benign lesions. Thus, we conclude from the study that FNAC is an outstanding, harmless, and less invasive diagnostic procedure with a high degree of accuracy.

**KEYWORDS :** Diagnosis, Thyroid, FNAC and Histopathology.

### Introduction:

Thyroid swelling is a very frequent dilemma in developing countries like India. It is the more common in females as compared to males and is linked with assorted disorders.<sup>1</sup> Thyroid swellings are classified on the basis of cytoarchitecture of the growth. Besides it, the treatment and prognosis of disease also depends on the cellular pattern of the swelling (benign or malignant).<sup>2</sup> Neck swelling is a common clinical presentation all over the world. Thyroid gland enlargement is a common presentation in the general population and in the FNAC OPD, but all thyroid enlargements do not require surgery.<sup>3</sup> Thyroid nodules are common but thyroid cancer is uncommon.<sup>4</sup> FNAC is a very useful modality to decide on the patients requiring surgery from those who need not be operated.<sup>5</sup> Introduction of FNAC in the field of thyroid diagnostic tests has reduced thyroid surgeries considerably.<sup>6</sup> The main requirement for thyroid FNAC is to differentiate neoplastic from non neoplastic lesions and get a definite diagnosis of the enlargement.<sup>7</sup> FNAC is usually the first line of investigation followed by ultrasound examination, thyroid function tests and antibody levels.<sup>8</sup> FNAC is widely accepted as the most cost-effective diagnostic procedure in the assessment of thyroid nodules and also helps to select patients preoperatively for surgery.<sup>9</sup> FNAC is safe, inexpensive and less invasive diagnostic modality with cost-effective by avoiding the unnecessary operation. FNAC has high sensitivity in picking up malignancy in thyroid.<sup>10</sup> Most studies show accuracy rate exceeding 80%.<sup>11-13</sup> Its limitation includes false negative, false positive, indeterminate or suspicious results.<sup>14</sup> The false negative is defined as the patients in which FNAC shows benign pathology but histopathology reveals malignancy<sup>15</sup>, while false positive indicates malignancy in FNAC but histopathology shows benign pathology. False positive result ranges 0-8%.<sup>16</sup>

Hence, the aim of this study was to evaluate the cyto-architecture of clinically palpable thyroid lesions and compare the results with the histopathological examination and to assess its sensitivity and specificity.

### Material and Methods:

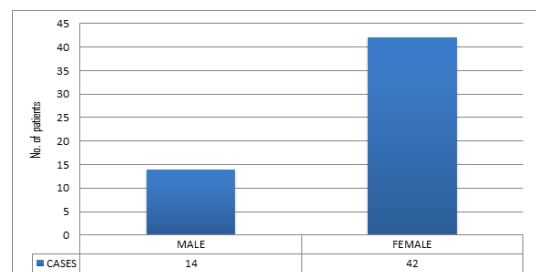
This present study was conducted in Department of Pathology, Narayan Medical College and Hospital, Sasaram, Jamuhar, Bihar, India. After obtaining Institutional Ethical approval, we conducted a prospective study in the Department of Pathology, Narayan Medical College and Hospital, during the period from September 2016 to August 2017. We included 56 patients in our study referred from different clinical departments with thyroid swelling. Patients' clinical profile, relevant investigations and informed consent were obtained before commencing the study. The patients in whom malignancy was suspected, CT scan was performed to see the extent of tumour, its spread in surrounding structure and neck nodes. Surgery of all these patients was done and the specimen sent for histopathology.

### Results and Discussion:

Total 56 patients were selected for this study. Mean age of the patients was  $36 \pm 10.04$  years. Among the 56 patients, fourteen cases were male

(25.0%) and forty two cases were female (75.0%). In FNAC most common lesion was benign nodule 80.3% and 19.6% cases were malignant.

**Fig-1: Shows age and sex distribution of the subjects:**



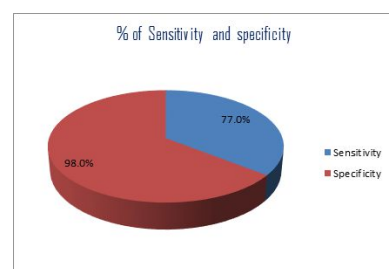
According to histopathology results, the benign nodules were 76.8% and malignant cases were 23.2%. Summary of FNAC and Histopathology given in table-2. Prehand information of nature of disease alters the treatment options greatly. In thyroid, benign nodules require partial thyroidectomy or lobectomy, where as malignant disease demand extensive surgery, i.e., total thyroidectomy, neck dissection followed by radio iodine ablation and lifetime dependency on thyroxine supplement.

**Table-1: Nature of thyroid nodules in FNAC and histopathology:**

Thyroid nodules	FNAC	Percentage (%)	Histopathology	Percentage (%)
Benign	45	80.3	43	76.8
Malignant	11	19.6	13	23.2

In thyroid disease, this benefit of prehand knowledge of pathology is granted by FNAC which is a well establish technique for pre-operative assessment of thyroid nodules.<sup>17</sup> The FNAC is cost-effective, less traumatic, less invasive, and easily performed procedure.<sup>18</sup> FNAC is a useful tool in the diagnosis in thyroid nodules if a suspicion of cancer exists. It has reduced the need of imaging and surgery and increased the yield of cancer in patients who come for surgery.<sup>19</sup>

**Fig-2: Pie chart shows the Sensitivity and specificity:**



Incidence of thyroid nodule is more common in female as is evident in this study with male to female ratio of 1:3. This observation was also made in a study by Hand et al in which male female ratio was 1:6.35.<sup>20</sup> Russel et al showed male to female ratio 1:32. Mahar et al found 78% of thyroid nodules in females.<sup>10</sup>

**Table-2: Summary of FNAC and Histopathology:**

FNAC Findings	Histopathology Findings	
	Malignancy Present	Malignancy Absent
Malignancy Positive	10(17.8%) (True Positive)	1(1.8%) (False Positive)
Malignancy Negative	3(5.3%) (False Negative)	42(75.0%) (True Negative)

The most common type of thyroid nodule was benign nodules. Mahar conducted study on 125 cases, and he found that 63 (50.4%) cases were benign lesion.<sup>10</sup> Another study also showed that 83.33% cases were benign lesions.<sup>19</sup> Histopathology revealed 43 cases were benign nodules and 13 cases were malignant nodules. Three (5.3%) cases were false negative. Different studies show ranges from 1.5–11.5%.<sup>21-23</sup> Ashcraft and Van Herle noted that false negative result varied in reported series from 2–50%.<sup>24</sup> False positive result in our study was 1(1.8%). Other studies show range from 0–8%.<sup>21,23</sup> Campbell and Pillsbury reported 1.2% false positive results.<sup>25</sup>

In our study sensitivity was 77.0% and specificity was 98.0%. Humberger concluded sensitivity around 65.53% and specificity 72–100%.<sup>16</sup> The study of Naggada et al reported 88.9% sensitivity and 96% specificity of FNAC in thyroid masses.<sup>15</sup> The FNAC is a sensitive and specific method of evaluating thyroid nodules for malignancy.<sup>26</sup> Safirullah also reported high accuracy rate of FNAC (94.2% sensitivity and 94% specificity) in cases of diagnosis of malignant thyroid diseases and propose that its routine use can make the management of thyroid swelling cost-effective by avoiding unnecessary surgeries.<sup>18</sup>

So, proper sampling from different areas is extremely important for the correct diagnosis. Some pathologists advocate the preparation of 4–6 smears from different sites of the nodule. Ultrasound-guided FNAC is a better alternative for better sample attainment leading to a little rate of non-diagnostic smears.<sup>27</sup> According to earlier studies,<sup>28,29</sup> the sensitivity and specificity of the thyroid FNAC ranges from 43% to 99% and 72% to 100%, respectively. In the present study, results were analogous with the findings in this sequence.

## CONCLUSION:

Thus, we conclude from the study that FNAC is an outstanding, harmless, and less invasive diagnostic procedure with a high degree of accuracy. The wide range of lesions, both benign and malignant, can be diagnosed by FNAC thus restricting surgery to cases only requiring further histopathological evaluation. The FNAC is very useful and readily available tool for evaluating thyroid nodules with high sensitivity and specificity in picking up benign lesion and excluding the malignant disease. This is very helpful in patient counselling and defining the extent of surgery.

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