



## ORIGINAL RESEARCH PAPER

## Pathology

### Evaluation on Accuracy of FNAC in Diagnosis of Cyto-Architecture of Thyroid Lesions at a Tertiary Care Teaching Hospital

**KEY WORDS:** Thyroid FNAC, Histopathology and Diagnosis.

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## ABSTRACT

Palpable thyroid nodule is very common all globally and it occurs in about 4% to 7% of all the population. Thyroid swelling is a very frequent dilemma in developing countries like India. Aim of this study was to evaluation of thyroid lesions and diagnostic accuracy of FNAC in the diagnosis of thyroid lesions and to compare it with histopathology. The sensitivity, specificity and diagnostic accuracy of FNA were high, thus confirming the important role of fine needle aspiration cytology as the initial diagnostic utility in management of thyroid nodules.

## Introduction:

Thyroid Fine Needle Aspiration Cytology (FNAC) was introduced in Scandinavian countries in 1950s and became popular in the United States in 1970s and then worldwide in the 1980s.<sup>1</sup> 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>2</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>3</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>4</sup> Thyroid nodules are common but thyroid cancer is uncommon.<sup>5</sup> FNAC is a very useful modality to decide on the patients requiring surgery from those who need not be operated.<sup>6</sup> Introduction of FNAC in the field of thyroid diagnostic tests has reduced thyroid surgeries considerably.<sup>7</sup> The main requirement for thyroid FNAC is to differentiate neoplastic from non neoplastic lesions and get a definite diagnosis of the enlargement.<sup>8</sup> FNAC is usually the first line of investigation followed by ultrasound examination, thyroid function tests and antibody levels.<sup>9</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>10</sup> FNAC is safe, inexpensive and less invasive diagnostic modality with cost-effective by avoiding the un-necessary operation. FNAC has high sensitivity in picking up malignancy in thyroid.<sup>11</sup> Most studies show accuracy rate exceeding 80%.<sup>12-14</sup> Its limitation includes false negative, false positive, indeterminate or suspicious results.<sup>15</sup> The false negative is defined as the patients in which FNAC shows benign pathology but histopathology reveals malignancy<sup>16</sup>, while false positive indicates malignancy in FNAC but histopathology shows benign pathology. False positive result ranges 0-8%.<sup>17</sup> My aim was to evaluation 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, Shantiram Medical College & General Hospital, Nandyal, Kurnool, Andhra Pradesh, India.. After obtaining Institutional Ethical approval, we conducted a prospective study in the Department of Pathology, Shantiram Medical College & General Hospital, during the period from December 2014 to November 2016. We included 48 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.

## Results and Discussion:

This present study was conducted in the Department of Pathology, Shantiram Medical College & General Hospital. Mean age of the patients was 38 ± 21.5 years. Among the 48 patients, sixteen cases were male (33.3%) and thirty two cases were female (66.6%). In

FNAC most common lesion was benign nodule 81.2% and 18.7% cases were malignant. According to histopathology results, the benign nodules were 79.2% and malignant cases were 20.8%. Summary of FNAC and Histopathology given in table-2.

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

Thyroid nodules	FNAC	Percentage (%)	Histopathology	Percentage (%)
Benign	39	81.2	38	79.2
Malignant	9	18.7	10	20.8

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>18</sup> The FNAC is cost-effective, less traumatic, less invasive, and easily performed procedure.<sup>19</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>20</sup> 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>

**Table-2: Cytological and histopathological diagnoses:**

FNAC Findings	Histopathology Findings	
	Malignancy Present	Malignancy Absent
<b>Malignancy Positive</b>	8 (16.6%) (True Positive(a))	2(4.16%) False Positive(b)
<b>Malignancy Negative</b>	2(4.16%) False Negative(c)	38(79.16%) True Negative(d)

\*Sensitivity =  $a / (a + c) \times 100 = 80\%$

\*Specificity =  $d / (d + b) \times 100 = 95\%$

\*Positive predictive value =  $a / (a + b) \times 100 = 80\%$

\*Negative predictive value =  $d / (d + c) \times 100 = 95\%$

Russel et al showed male to female ratio 1:32. Mahar et al found 78% of thyroid nodules in females.<sup>11</sup> 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>11</sup> Another study also showed that 83.33% cases were benign lesions.<sup>20</sup> Histopathology revealed 40 cases were benign nodules and 10 cases were malignant nodules. Two (4.16%) cases were false negative. Different studies show ranges from 1.5-11.5%.<sup>22-24</sup> Ashcraft and Van Herle noted that false negative result varied in reported series from 2-50%.<sup>25</sup> False positive result in our study was 1(4.16%). Other studies show range from 0-8%.<sup>22,24</sup> Campbell and Pillsbury reported 1.2% false positive results.<sup>26</sup> In my study sensitivity was 80% and specificity was 95%. Humberger concluded sensitivity around 65.53% and specificity 72-100%.<sup>17</sup> The study of Naggada et al reported 88.9% sensitivity and 96% specificity of FNAC in thyroid masses.<sup>16</sup> The FNAC is a sensitive and specific method of evaluating thyroid nodules for malignancy.<sup>27</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>19</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>28</sup> According to earlier studies,<sup>29,30</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. Positive predictive value (PPV) in my study 80% which was comparable with the study of Yeoh<sup>31</sup> who reported PPV as 74%. Negative predictive value (NPV) in my study was 95%, which was also comparable with the study of Yeoh as rate of 80%.<sup>31</sup>

**CONCLUSION:**

In conclusion, the sensitivity, specificity and diagnostic accuracy of FNA were high, thus confirming the important role of fine needle aspiration cytology as the initial diagnostic utility in management of thyroid nodules. 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. This is very helpful in patient counselling and defining the extent of surgery.

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