



**ORIGINAL RESEARCH PAPER**

**Surgery**

**A COMPARATIVE STUDY OF FNAC AND HISTOPATHOLOGY OF THYROID SWELLINGS**

**KEY WORDS:** Fine needle aspiration cytology, Histopathology, Thyroid

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**ABSTRACT**

**Background:** FNAC is the most common and accepted investigation for the histopathological diagnosis of Thyroid swellings prior to surgery. It has therefore commonly been used to determine the need for surgery particularly in the un-complicated and non toxic goitres. But FNAC has few limitations that necessitate histopathological examination of the excised thyroid tissue for accurate diagnosis. The objective of this study was to compare fine needle aspiration cytology of thyroid swellings to histopathological sections of removed specimens. **Methods:** A retrospective study was conducted in the patients admitted with thyroid swelling to the Departments of General Surgery and ENT at Yenepoya Medical College and Hospital between 2014 and 2019. Their pre-operative FNAC reports were compared to the histopathology reports obtained after surgery. **Results:** Data from 45 patients were available for analysis. FNAC and HPE showed a significantly strong positive association ( $r=0.82, p<0.001$ ). FNAC exhibited a sensitivity of 75%, a specificity of 100%, and a PPV and NPV of 100% and 91.67%, respectively, for diagnosing a malignant lesion. **Conclusion:** FNAC is a cost effective, simple, rapid, and efficient method for identifying benign and malignant lesions. It had a strong significant correlation with HPE in diagnosing malignant thyroid neoplasms.

**INTRODUCTION**

The low cost and high patient acceptance of fine needle aspiration cytology (FNAC) make it an ideal first line diagnostic modality for thyroid abnormalities. Thyroid swellings are common causes of worry in both patients and surgeons, and precise diagnosis is critical to care. They produce trachea, oesophageal, and blood vessel pressure symptoms. Thyroidectomy is commonly performed for goitres and has known complications including neuro vascular injury and the need for long term thyroxine and calcium supplementation. So getting an accurate diagnosis prior to surgery is quite essential in differentiating benign and malignant lesions in thyroid with exception of follicular neoplasm's sometimes lymphomas. It is easy, quick, and requires no expensive equipment.

FNAC has limitations in specimen adequacy, sampling techniques, aspiration skill, interpretation of aspirate, and detection of some papillary carcinomas due to associated thyroid pathology such as multinodular goitre, thyrotoxicosis, and significant cystic changes. The final diagnostic test, histopathology, is required here. Even if non-surgical and non-invasive procedures can provide a diagnosis, the excised thyroid tissue must be histopath-ologically examined. This raises question of efficacy in the accurate diagnosis of thyroid swellings. (3) The current study was thus intended to compare fine needle aspiration cytology of thyroid swellings to histopathological sections of removed specimens.

**METHODS**

The present study was a retrospective analysis that was carried out in the Department of General Surgery at Yenepoya Medical College and Hospital between 2014 and 2019 after approval from Institutional Ethics Committee. For this study, patients who presented with thyroid swellings and FNAC of the thyroid gland and thyroidectomy thereafter were included. Their post-operative histopathological reports were collected. FNAC reports were compared to post-operative histopathology reports.

**RESULTS**

The data from 45 patients who met the inclusion and exclusion

criteria were available for analysis. The most prevalent benign ailment seen on FNAC was benign follicular nodule, followed by nodular colloid goitre, and papillary thyroid carcinoma was described in malignant occurrences. Histopathological analysis revealed that nodular or multinodular goitre was the most prevalent benign finding, with papillary variant of thyroid cancer being the most common malignant condition. The results of FNAC and HPE showed a significantly strong positive association ( $r=0.82, p<0.001$ ). FNAC exhibited a sensitivity of 75%, a specificity of 100%, and a PPV and NPV of 100% and 91.67%, respectively, for diagnosing a malignant lesion.

**Table 1: Correlation of FNAC with HPE**

Spearman $r = 0.8292$
95% confidence interval: 0.7034 to 0.9046
P value: <0.0001

**Table 2: Sensitivity and Specificity of FNAC for diagnosis of malignant lesion**

Variable interval	Value (%)	95% Confidence (%)
Sensitivity	75	42.83 to 94.52
Specificity	100	89.46 to 100
Positive Predictive Value	100	66.39 to 100
Negative Predictive Value	91.67	77.50 to 98.25

**DISCUSSION**

About 5% of the world's population has some form of thyroid disease, including hypothyroidism, hyperthyroidism, thyroiditis, thyroid cancer, and thyroid nodules. (4) In the treatment of individuals with thyroid lesions, fine needle aspiration cytology has become the most popular and well-established diagnostic method. It's a low-cost procedure with a quick turnaround time for diagnosis. Even in developing nations like India, it's a lifesaver. FNAC is frequently used preoperatively for the assessment of thyroid lesions, according to a study published in 2008 by Handa u et al. This method reduces the number of patients undergoing thyroidectomy for noncancerous conditions of the thyroid by around one-third. (5)

Non-neoplastic lesions accounted for 36 of the 45 cases in the

current study on FNAC, while neoplastic lesions accounted for 9 of the 45 cases. Fine Needle Aspiration Cytology and Histopathology reports correlated well in 42 cases, 93.33 % of the time. (There were 33 cases of non-neoplastic lesions and 9 cases of neoplastic lesions). This was consistent with the findings of Schnurer et al (6), Das et al (7), Hag et al (8), Sandeep R Mathur et al (9), and Kunori et al (10) who found 90 to % concordance between FNAC and Histopathology. It's critical to perform an accurate cytological assessment of thyroid nodules before deciding on unnecessary surgery rather than relying on medical treatment to provide the best results. This test, which correctly diagnoses more than 90% of thyroid nodules in the general population, is the gold standard for ensuring proper management and decreasing the number of benign nodules requiring thyroid surgery. (11)

In the current study, FNAC also demonstrated a significant strong positive correlation with HPE, with sensitivity and specificity of 75% and 100%, respectively, in detecting malignant lesions and differentiating benign lesions. This was consistent with the findings of Suresh K et al. (12), who reported 77 % sensitivity and 100% specificity. However, higher sensitivity was reported in studies conducted by Gupta C et al (13), Kaur K et al (14), Shirish C et al (15), and Bhatta S et al (16). Specificity is crucial in diagnosing a rare or uncommon disease like thyroid cancer because a negative test result means the patient is free of the disease. Thyroid cancer is extremely unlikely when a patient has FNAC-classified benign disease, according to the findings of this study's negative predictive value of 91.67%. (4)

**CONCLUSION**

Fine Needle Aspiration cytology is a cost effective, simple, rapid, almost non-invasive and an efficient method in differentiating benign and malignant lesions, thereby reducing the need for surgery. It is particularly useful in patients not willing for surgery due to complications associated with the same. In the present study Fine Needle Aspiration cytology showed strong significant correlation with HPE with sensitivity and specificity of 75% and 100 % respectively in diagnosing malignant thyroid neoplasms.

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