

## Original Research Article

# ANALYSIS OF CYTO-HISTOPATHOLOGICAL CORRELATION IN THYROID LESIONS: AN INSTITUTIONAL BASED STUDY

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### ABSTRACT

**Background:** The thyroid gland is recognized as the largest endocrine gland in the human body, situated at the front of the neck. Thyroid lesions are a common clinical concern, with thyroid nodules being prevalent in the general population. Hence, the present study was conducted for analyzing cyto-histopathological correlation in thyroid lesions.

**Materials & Methods:** A total of 100 patients with the presence of thyroid lesions were enrolled. Complete demographic and clinical details of all the patients were obtained. Inclusion criteria for the present study included patients who underwent both fine needle aspiration cytology (FNAC) and subsequent thyroidectomy for thyroid lesions. Relevant data, including patient demographics (age, gender), FNAC reports, and histopathology reports, were collected. All patient data is deidentified to ensure confidentiality. The FNAC reports and histopathology reports are reviewed. Cytodiagnosis was correlated with histopathological diagnosis. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

**Results:** A total of 100 patients were evaluated. The mean age of the patients was 50.7 years. While assessing the cytological findings, benign and malignant lesions were encountered in 83 percent and 17 percent of the patients respectively. While assessing histopathological findings, benign and malignant lesions were encountered in 79 percent and 21 percent of the patients respectively. Sensitivity, specificity and diagnostic accuracy of the cytodiagnosis in identifying benign lesions was 97.47%, 71.43% and 92% respectively. Sensitivity, specificity and diagnostic accuracy of the histopathological diagnosis in identifying malignant lesions was 71.43%, 97.47% and 92% respectively.

**Conclusion:** Fine-needle aspiration cytology (FNAC) represents a highly accurate and efficient method for diagnosing and managing palpable thyroid nodules. This research offers significant insights into the cyto-histopathological relationship in thyroid lesions. The results underscore the critical role of fine needle aspiration cytology (FNAC) as a dependable diagnostic method, while also drawing attention to the necessity of addressing particular factors that could affect diagnostic inconsistencies.

**Key words:** Thyroid, Cyto-histopathological.

## INTRODUCTION

The thyroid gland is recognized as the largest endocrine gland in the human body, situated at the front of the neck. It plays a crucial role in synthesizing and releasing thyroid hormones, which

significantly affect the basal metabolic rate (BMR) and protein synthesis. Additionally, these hormones are essential for the neurocognitive development of children and adolescents, as well as for maintaining normal physiological functions in adults.<sup>[1,2]</sup>

Thyroid disorders are significantly more prevalent in women compared to men, although the underlying reasons for this disparity remain inadequately understood. Thyroid lesions are a common clinical concern, with thyroid nodules being prevalent in the general population. The accurate diagnosis of these lesions is crucial to determine appropriate management strategies. Hyperthyroidism is characterized by an increase in circulating free thyroid hormones, with a prevalence of approximately 2% in women and 0.2% in men. The primary etiological factors include various forms of thyroid autonomy, particularly in older women, as well as Graves' disease, which predominantly affects younger women. Conversely, hypothyroidism is marked by insufficient production of thyroid hormones and is a common endocrine condition that can arise from autoimmune thyroiditis (Hashimoto's thyroiditis), iodine deficiency, or as a consequence of surgical intervention or radioiodine treatment.<sup>[3,4]</sup> Fine needle aspiration cytology (FNAC) serves as a prevalent preliminary diagnostic method for thyroid nodules, offering critical insights into the characteristics of the lesions. Nevertheless, a conclusive diagnosis of thyroid abnormalities typically necessitates histopathological analysis of surgically removed tissues. Evaluating the relationship between cytopathological and histopathological results is essential for determining the dependability and precision of FNAC in the diagnosis of thyroid lesions.<sup>[5-7]</sup> Hence, the present study was conducted for analyzing cyto-histopathological correlation in thyroid lesions.

## MATERIALS AND METHODS

A total of 100 patients with presence of thyroid lesions were enrolled. Complete demographic and clinical details of all the patients were obtained. Inclusion criteria for the present study included patients who underwent both fine needle aspiration cytology (FNAC) and subsequent thyroidectomy for thyroid lesions. Relevant data, including patient demographics (age, gender), FNAC reports, and histopathology reports, were collected. All patient data is deidentified to ensure confidentiality. The FNAC reports and histopathology reports are reviewed. Cytodiagnosis was correlated with histopathological diagnosis. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

## RESULTS

A total of 100 patients were evaluated. The mean age of the patients was 50.7 years. While assessing the cytological findings, benign and malignant lesions were encountered in 83 percent and 17 percent of the patients respectively. While assessing histopathological findings, benign and malignant lesions were encountered in 79 percent and 21 percent of the patients respectively. Sensitivity, specificity and diagnostic accuracy of the cytodiagnosis in identifying benign lesions was 97.47%, 71.43% and 92% respectively. Sensitivity, specificity and diagnostic accuracy of the histopathological diagnosis in identifying malignant lesions was 71.43%, 97.47% and 92% respectively.

**Table 1: Description of cyto-diagnosis**

Cytodiagnosis	Number	Percentage
Benign	83	83
Malignant	17	17
Total	100	100

**Table 2: Description of histopathological-diagnosis**

Histopathological diagnosis	Number	Percentage
Benign	79	79
Malignant	21	21
Total	100	100

**Table 3: Correlation of cyto-diagnosis with histopathological diagnosis**

Cytodiagnosis	Histopathological diagnosis		Total
	Benign	Malignant	
Benign	77	6	83
Malignant	2	15	17
Total	79	21	100

**Table 4: Diagnostic accuracy of cytodiagnosis in identifying benign lesions**

Variable	Number
Sensitivity	97.47%
Specificity	71.43%
Diagnostic accuracy	92%

**Table 5: Diagnostic accuracy of histopathological diagnosis in identifying malignant lesions**

Variable	Number
Sensitivity	71.43%
Specificity	97.47%
Diagnostic accuracy	92%

## DISCUSSION

Thyroid disorders encompass conditions arising from either excessive or insufficient secretion of thyroid hormones, as well as enlargement of the thyroid gland. These disorders can be classified as primary, which are directly associated with the gland itself, or secondary, which result from external factors affecting thyroid function. Reports indicate that thyroid disorders are prevalent in over 110 countries, placing approximately 1.6 billion individuals at risk. They rank among the most common medical conditions globally. A significant contributor to thyroid disorders is iodine deficiency, with estimates suggesting that around one-third of the global population resides in iodine-deficient regions, and more than 190 million individuals are affected by iodine deficiency disorders. If not addressed, thyroid disorders can lead to complications that adversely affect patients' quality of life.<sup>[6-8]</sup> Accurate diagnosis based solely on clinical evaluation can often be challenging. Therefore, the integration of Fine Needle Aspiration Cytology (FNAC) with clinical assessment is crucial for enhancing diagnostic precision. Since FNAC can be applied to all palpable lesions, it facilitates early diagnosis in many cases. This technique is straightforward, minimally invasive, and serves as an ideal initial diagnostic approach. Furthermore, it is recognized for its speed and accuracy, making it a globally utilized method. Due to its simplicity and low invasiveness, FNAC has gained popularity as a diagnostic tool, particularly for distinguishing between benign and malignant lesions. However, there exists a "grey zone" in thyroid FNAC where the diagnostic accuracy diminishes, resulting in challenges in reliably categorizing the lesion and leading to cases of discrepancy.<sup>[7-9]</sup> A total of 100 patients were evaluated. The mean age of the patients was 50.7 years. While assessing the cytological findings, benign and malignant lesions were encountered in 83 percent and 17 percent of the patients respectively. While assessing histopathological findings, benign and malignant lesions were encountered in 79 percent and 21 percent of the patients respectively. Sensitivity, specificity and diagnostic accuracy of the cytodiagnosis in identifying benign lesions was 97.47%, 71.43% and 92% respectively. Sensitivity, specificity and diagnostic accuracy of the histopathological diagnosis in identifying malignant lesions was 71.43%, 97.47% and 92% respectively. Nagare MR et al correlated cytological and histopathological finding in thyroid lesions. A total of 110 cases were included in this study. Out of the 111 patients studied, on cytology 104 were non-neoplastic lesions, 3 were neoplastic, and 3 were inadequate. Out of 111 patients, Histopathology of 65 thyroid specimens showed 28 Colloid/Nodular goiter, 14 Multinodular goiter, 5 Lymphocytic thyroiditis, 7 Hashimoto's thyroiditis, 1

Granulomatous thyroiditis, 3 follicular carcinoma, 1 undifferentiated Anaplastic carcinoma, 1 Medullary carcinoma, 1 papillary carcinoma. By comparing the results of FNAC and histopathology, FNAC had higher accuracy, sensitivity of 80% and specificity 100% in the diagnosis of neoplastic thyroid lesions. FNAC is safe, inexpensive and less invasive diagnostic method with excellent patient compliance.<sup>[10]</sup> Patel A et al classified the cytomorphology of palpable thyroid lesions by FNAC and correlated the results with histopathology. They analysed 276 cases of palpable thyroid nodule underwent FNAC. Out of them 152 cases underwent surgical procedure like lobectomy or partial or total thyroidectomy Out of these 276 patients, females were 218 and males were 58 with F:M ratio of 3.76:1. Out of total 276 patients, 81 (29.3%) were between 31-40 years followed by 75 (27.2%) were between 21-30 years and 237 (85.9%) were fall into category-II. Out of these 152 patients, 88 (57.9%) having colloid goitre and 79 (89.7%) were confirmed histologically. FNAC is an invaluable tool in management of thyroid lesions. It is a safe, simple and cost-effective procedure and can be performed on outdoor patients.<sup>[11]</sup>

## CONCLUSION

Fine-needle aspiration cytology (FNAC) represents a highly accurate and efficient method for diagnosing and managing palpable thyroid nodules. This research offers significant insights into the cyto-histopathological relationship in thyroid lesions. The results underscore the critical role of fine needle aspiration cytology (FNAC) as a dependable diagnostic method, while also drawing attention to the necessity of addressing particular factors that could affect diagnostic inconsistencies.

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