



## CLINICOPATHOLOGICAL STUDY OF THYROID SWELLINGS PRESENTING TO ENT DEPARTMENT -A CROSS-SECTIONAL STUDY

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### ABSTRACT

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**Background:** Thyroid enlargement is a frequent finding in ENT practice. Although most thyroid nodules are benign, distinguishing malignant lesions remains clinically essential. Fine-needle aspiration cytology (FNAC) and ultrasonography aid preoperative evaluation, while histopathological examination (HPE) confirms the final diagnosis. **Objective:** To analyze the clinical, cytological, and histopathological profile of thyroid swellings and to determine the diagnostic performance of FNAC using HPE as the reference standard. **Methods:** This cross-sectional study included 150 patients presenting with palpable thyroid swelling over a 24-month period. Clinical findings, thyroid function tests, ultrasonography, FNAC findings, and histopathology (in operated cases) were documented. Diagnostic indices including sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall accuracy were calculated. **Results:** The study population showed a strong female predominance (9:1) with a mean age of  $38.7 \pm 12.4$  years. Among 120 surgically treated cases, 81.7% were benign and 18.3% malignant, with papillary carcinoma being the most frequent malignancy. Considering indeterminate and malignant FNAC categories as positive, FNAC demonstrated 81.8% sensitivity, 87.8% specificity, 60% PPV, 95.5% NPV, and 86.7% overall diagnostic accuracy. **Conclusion:** Thyroid swellings presenting to ENT clinics are largely benign. FNAC, especially when combined with ultrasound, provides reliable preoperative assessment, though histopathology remains the definitive diagnostic modality.

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**Keywords:** Thyroid swelling, FNAC, Histopathology, Thyroid nodule, ENT, Clinicopathological study

### INTRODUCTION

Thyroid nodular disease represents a common endocrine condition frequently encountered in ENT outpatient settings. Increased utilization of high-resolution ultrasonography has led to higher detection rates of thyroid nodules in recent years [1,2]. Although the majority of nodules are non-neoplastic, approximately 5–15% may harbor malignancy, necessitating systematic evaluation [3]. Thyroid disorders predominantly affect females and are commonly diagnosed during the third to fifth decades of life [4]. Various etiological factors including iodine imbalance, radiation exposure, and genetic susceptibility contribute to thyroid enlargement and nodular transformation [5]. Clinical manifestations range from painless anterior neck swelling to compressive symptoms such as dysphagia or voice changes in advanced cases [6]. The principal aim of assessment is to differentiate benign from malignant lesions to guide appropriate management [7]. FNAC is widely accepted as a first-line diagnostic tool because of its safety, affordability, and diagnostic reliability [8]. The Bethesda System has improved standardization and risk stratification of thyroid cytology [9]. However, cytology has limitations, particularly in follicular-pattern lesions where capsular or vascular invasion can only be confirmed histologically [10]. Given regional variations in disease patterns, institutional clinicopathological studies are important to

evaluate diagnostic concordance and local epidemiology. This study was therefore conducted to assess the clinical profile and cytological-histopathological correlation of thyroid swellings presenting to a tertiary ENT department.

## Materials and Methods

This cross-sectional observational study was conducted in the Department of ENT at a tertiary care hospital over a period of 24 months. Institutional ethical approval was obtained and informed consent was secured from all participants.

### Inclusion criteria

- All consecutive patients presenting to the ENT outpatient department with clinically palpable thyroid swelling (solitary nodule, multinodular goitre or diffuse enlargement) during the study period.
- Age  $\geq$  12 years.
- Patients who underwent FNAC; those undergoing surgery had histopathological examination.

### Exclusion criteria

- Patients with purely lateral neck masses not arising from the thyroid.
- Patients with known prior thyroid malignancy under follow-up.
- Patients declining FNAC or consent for participation.
- Inadequate cytology samples despite repeat FNAC (for FNAC-HPE correlation analysis, only adequate samples were included).

### Clinical evaluation

Detailed history and clinical examination were recorded (duration, pain, rapid enlargement, pressure symptoms, hoarseness, family history, radiation exposure). Thyroid function tests (T3, T4, TSH) and neck ultrasound (size, echotexture, suspicious features) were performed as per departmental protocol. FNAC was performed under palpation or ultrasound guidance dependent on nodule characteristics.

### FNAC and histopathology

FNAC was reported by experienced cytopathologists using local institutional criteria (and where available Bethesda categories). Surgical specimens were processed with routine H&E staining and diagnosed per WHO criteria. For analysis, FNAC diagnoses were categorized into benign, suspicious/indeterminate (including follicular neoplasm/AUS), and malignant.

### Statistical analysis

Data were analyzed using SPSS version 25. Continuous variables were expressed as mean  $\pm$  standard deviation, and categorical variables as frequencies and percentages. Diagnostic indices of FNAC were calculated using histopathology as the gold standard. Statistical significance was set at  $p < 0.05$ .

## RESULTS

A total of 150 patients with thyroid swelling were included. Mean age was  $38.7 \pm 12.4$  years (range 13–76); 135 (90%) were female and 15 (10%) male. Duration of swelling averaged  $2.1 \pm 1.6$  years. Presenting complaints: cosmetic swelling (85%), pressure symptoms (18%), dysphagia (8%), hoarseness (3%). Thyroid function: euthyroid in 138 (92%), hypothyroid in 9 (6%), hyperthyroid in 3 (2%).

**Table 1: Age and sex distribution**

Age group (years)	Male (n)	Female (n)	Total (n)
12–20	1	8	9
21–30	3	40	43
31–40	4	45	49
41–50	4	28	32
>50	3	14	17
Total	15	135	150

Multinodular goitre was the most common clinical presentation (70 cases, 46.7%), followed by solitary thyroid nodule (60 cases, 40%). Diffuse goitre was observed in 10 cases (6.7%), and 10 patients (6.6%) presented with suspicious neck masses or cervical lymphadenopathy. Out of total 120 (80%) underwent surgical management, while 30 (20%) were managed conservatively.

**Table 2: Clinical types and surgery performed**

Clinical type	n (%)	Common surgical procedure
Solitary thyroid nodule	60 (40%)	Hemithyroidectomy
Multinodular goitre	70 (46.7%)	Subtotal/near-total thyroidectomy
Diffuse goitre	10 (6.7%)	Conservative/medical
Suspicious neck mass/cervical nodes	10 (6.6%)	Total thyroidectomy + neck dissection (as needed)

Of the 90 cases reported as benign on FNAC, 86 were benign and 4 were malignant on histopathology. Among the 16 indeterminate/suspicious cases (AUS/follicular neoplasm), 10 were benign and 6 were malignant on histopathology, whereas 14 cases diagnosed as malignant on FNAC, 12 were confirmed malignant and 2 were benign on histopathology

**Table 3: FNAC vs Histopathology (n = 120 operated cases)**

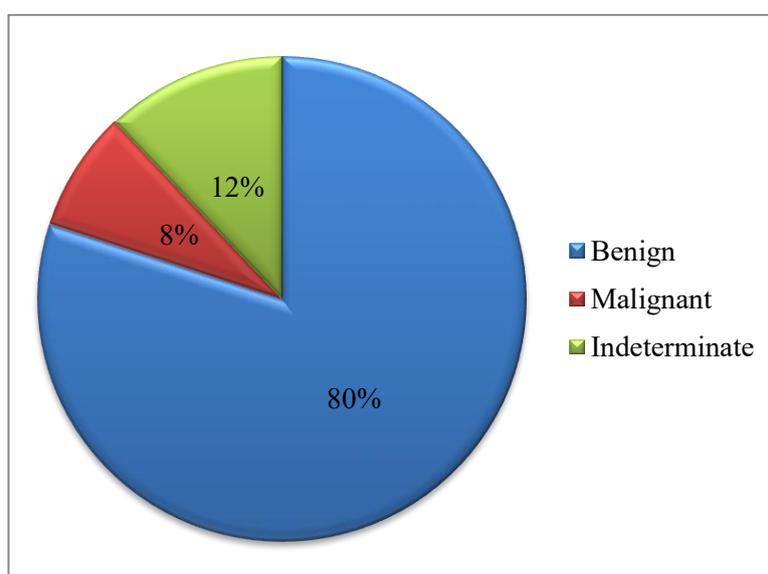
FNAC category	HPE benign	HPE malignant	Total
FNAC benign	86	4	90
FNAC indeterminate/suspicious (AUS/follicular neoplasm)	10	6	16
FNAC malignant	2	12	14
Total	98	22	120

Among the 120 operated cases, 98 (81.7%) were histopathologically benign and 22 (18.3%) were malignant

**Table 4: Histopathological distribution (n = 120)**

Histopathological diagnosis	n	Percent
Nodular goitre	54	45%
Follicular adenoma	22	18.3%
Hashimoto's thyroiditis	8	6.7%
Papillary carcinoma	18	15%
Follicular carcinoma	8	6.7%
Medullary carcinoma	4	3.3%
Anaplastic / other	6	5%
Total	120	100

Among FNAC findings 80% cases reported as benign, 12% indeterminate and 8% were malignant

**Graph 1: FNAC diagnostic categories among study participants**

## DISCUSSION

The findings of this cross-sectional study conducted in an ENT setting are in agreement with existing literature, demonstrating that thyroid swellings are more frequently observed in middle-aged females and are predominantly benign in nature, with papillary carcinoma representing the most common malignant entity [11]. The marked female

preponderance and concentration of cases within the third to fifth decades of life in our series parallel observations from multiple tertiary care studies conducted in India and other regions, which report a female-to-male ratio ranging from 4:1 to 10:1 [12,13]. Fine-needle aspiration cytology continues to serve as a valuable diagnostic modality, particularly due to its high specificity. Published meta-analyses and institutional experiences indicate that the diagnostic performance of FNAC improves when combined with ultrasound guidance and standardized reporting systems such as the Bethesda classification [14]. Despite its utility, FNAC has inherent diagnostic constraints, especially in follicular-pattern lesions. Differentiation between follicular adenoma and follicular carcinoma requires demonstration of capsular or vascular invasion on histopathological examination, which cannot be reliably assessed cytologically. This limitation was reflected in our indeterminate FNAC cases, where final histopathology revealed both benign and malignant outcomes [15]. Ultrasonography played an important role in risk assessment by identifying suspicious sonographic features and facilitating targeted aspiration of nodules, thereby enhancing diagnostic accuracy [16]. The sensitivity, specificity, and predictive values observed in our study fall within the range reported in contemporary literature, where FNAC accuracy typically varies between 80% and 95% in centers utilizing ultrasound-guided sampling and standardized cytological reporting [17]. From a clinical management perspective, patients with benign cytology and non-suspicious imaging findings can generally be managed conservatively, whereas those with malignant or strongly suspicious cytology warrant definitive surgical intervention. Indeterminate cytological categories remain diagnostically challenging. Although molecular diagnostic techniques may improve risk stratification, their availability is limited in many institutions, and surgical excision continues to be the preferred approach for definitive diagnosis and treatment in such cases [18]. The present study has certain limitations, including its single-center design and possible referral bias, as histopathological confirmation was available only for surgically treated cases. Additionally, the relatively small number of rare malignancies limits subgroup analysis. Nevertheless, the study contributes meaningful regional clinicopathological data and reinforces the importance of integrated clinical, cytological, and histopathological evaluation in the management of thyroid swellings within ENT practice.

## CONCLUSION

Thyroid swellings encountered in ENT practice are predominantly benign and show a strong female preponderance. FNAC offers reliable preoperative assessment with high specificity and acceptable sensitivity, particularly when interpreted alongside ultrasonographic findings. However, histopathological examination remains essential for definitive diagnosis, especially in indeterminate lesions. A structured clinic radiological and cytological approach enhances diagnostic accuracy and optimizes surgical decision-making.

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