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Research Article

# Cytological Classification of Thyroid Lesions Based on The Bethesda System

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**Abstract:** ***Introduction:*** **Objective:** To analyze thyroid fine-needle aspiration cytology smears and classify thyroid lesions according to the Bethesda System for Reporting Thyroid Cytopathology. **Materials and Methods:** A retrospective descriptive study was conducted in the Department of Pathology and Central Laboratory, Koppal Institute of Medical Sciences, Koppal, Karnataka, India. A total of 100 thyroid FNAC cases collected over a three-year period from March 2019 to March 2022 were reviewed and categorized according to the six Bethesda diagnostic categories. Demographic and cytological data were analyzed using descriptive statistics. Histopathological correlation was performed in 35 surgically treated cases to assess the risk of malignancy and diagnostic performance of FNAC. **Results:** Nodular goitre was the most common cytological diagnosis (45%), followed by Hashimoto thyroiditis (18%) and colloid nodule (19%). According to the Bethesda System, Category II (Benign) was the predominant category, accounting for 85% of cases, while Categories I, III, IV, V, and VI constituted 3%, 3%, 5%, 2%, and 2% of cases, respectively. Histopathological correlation in 35 surgically resected cases demonstrated an observed risk of malignancy (ROM) of 0.0% for Category II, 50% for Category III, 20% for Category IV, and 100% for Categories V and VI. Using Bethesda Categories III–VI as cytology-positive and Bethesda Category II as cytology-negative, thyroid FNAC demonstrated a sensitivity of 100.0%, specificity of 82.8%, positive predictive value of 54.5%, negative predictive value of 100.0%, and an overall diagnostic accuracy of 85.7%. **Conclusion:** The Bethesda System is an effective and standardized reporting system for thyroid FNAC that facilitates uniform cytological interpretation and appropriate clinical management. Most thyroid lesions in the present study were benign, with nodular goitre being the predominant lesion. The high diagnostic accuracy of FNAC and the increasing risk of malignancy across higher Bethesda categories reaffirm its value as a reliable first-line investigation for the evaluation of thyroid nodules.

**Keywords:** TBSRTC; Thyroid lesions; Fine-needle aspiration cytology (FNAC); The Bethesda System (TBS); Thyroid cytopathology; Thyroid nodules; Risk of malignancy (ROM); Histopathological correlation.

## INTRODUCTION

Thyroid disorders are among the most common endocrine diseases worldwide, with thyroid nodules representing one of the most frequent clinical presentations encountered in routine practice. Although the majority of thyroid nodules are benign, approximately 5–15% are malignant, making accurate preoperative diagnosis essential for appropriate patient management. Fine-needle aspiration cytology (FNAC) is regarded as the investigation of choice for evaluating thyroid nodules because it is a minimally invasive, safe, rapid, cost-effective, and highly accurate diagnostic technique. It helps distinguish benign from malignant lesions, thereby reducing unnecessary surgical interventions while facilitating early treatment of malignant thyroid disease.[1-3]

Before the introduction of a standardized reporting system, thyroid cytology suffered from considerable inter-observer variability and inconsistent terminology, resulting in communication gaps between pathologists and clinicians. To overcome these limitations, the National Cancer Institute (NCI) convened the Thyroid Fine Needle Aspiration State of the Science Conference in 2007, which led to the development of *The Bethesda System for Reporting Thyroid Cytopathology* (TBSRTC). Since its initial publication in 2010, TBSRTC has undergone three editions (2010, 2017, and the most recent third edition in 2023) to incorporate advances in thyroid cytopathology, molecular diagnostics, and clinical management. The Bethesda System classifies thyroid fine-needle aspiration cytology (FNAC) specimens into six diagnostic categories: (I) Nondiagnostic, (II) Benign, (III) Atypia of Undetermined Significance (AUS), (IV) Follicular Neoplasm, (V) Suspicious for Malignancy, and (VI) Malignant. Each category is associated with an estimated risk of malignancy and recommended clinical management, thereby improving diagnostic reproducibility and facilitating uniform communication among clinicians and cytopathologists.[4, 5]

The Bethesda System (TBS) has gained widespread international acceptance because of its ability to standardize thyroid cytology reporting, improve diagnostic accuracy, and provide reliable estimates of the risk of malignancy. Several studies have validated its usefulness in predicting malignancy, guiding patient management, and enabling meaningful comparison of institutional data across different populations. However, the distribution of Bethesda categories varies among institutions due to differences in demographic characteristics, referral patterns, and local disease prevalence. Therefore, periodic institutional audits are essential to evaluate the applicability of the Bethesda system in different clinical settings and to understand the spectrum of thyroid lesions encountered in individual centers.[6-8]

# MATERIALS AND METHODS

**Study Design and Setting:** This retrospective descriptive study was conducted in the Department of Pathology, Koppal Institute of Medical Sciences (KIMS), Koppal, Karnataka, India. The study design included 100 thyroid FNAC cases or all eligible cases received over a period of three years between March 2019 and March 2022, whichever was fulfilled earlier.

**Study Population:** A total of 100 thyroid FNAC cases were retrieved from the departmental archives. Previously stained cytology smears, requisition forms, and relevant laboratory records were reviewed. The original cytological diagnoses, reported during the study period, had been assigned according to TBSRTC, second edition (2017)**.** For the purpose of the present study, all available smears were independently reassessed by experienced pathologists, and the cytological diagnoses were reclassified according to the third edition of TBSRTC (2023).

**Inclusion Criteria**

- All thyroid FNAC specimens received during the study period.
- Smears that were adequate for cytological evaluation and available for review.

**Exclusion Criteria**

- Thyroid biopsy and thyroidectomy specimens.
- Unavailable or damaged cytology slides precluding review.
- Duplicate FNAC samples from the same patient (only the initial diagnostic smear was included).

**Cytological Evaluation:** FNAC had been performed using standard cytological techniques by trained clinicians and pathologists. Air-dried and alcohol-fixed smears were stained using routine laboratory protocols, including May-Grünwald-Giemsa (MGG) and Papanicolaou (Pap) stains, wherever available. Archived slides were retrieved and reviewed microscopically by experienced pathologists.

Cytomorphological features were reassessed, and each case was reclassified according to the diagnostic criteria of TBSRTC, third edition (2023). The six diagnostic categories are as follows:

1. Category I – Nondiagnostic
2. Category II – Benign
3. Category III – Atypia of Undetermined Significance (AUS)
4. Category IV – Follicular Neoplasm (FN)
5. Category V – Suspicious for Malignancy (SFM)
6. Category VI – Malignant

**Data Collection:** Demographic variables including age and sex, along with cytological diagnosis and Bethesda category, were recorded in a structured data collection proforma. The frequency and percentage of cases in each Bethesda category were calculated.

**Statistical Analysis:** Data were entered into Microsoft Excel and analyzed using SPSS 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were summarized as frequencies and percentages. Descriptive statistics were used to evaluate the distribution of thyroid lesions according to Bethesda categories.

**Ethical Considerations:** The study was conducted after obtaining approval from the Institutional Ethics Committee of Koppal Institute of Medical Sciences, Koppal (Approval No. KIMS-Koppal/IEC/94/2022-23). As this was a retrospective record-based study utilizing archived cytology smears and anonymized patient data, the requirement for individual informed consent was waived. Patient confidentiality was maintained throughout the study in accordance with institutional ethical guidelines.

# RESULTS

**Demographics:** A total of 100 thyroid FNAC cases were included in the study. The patients ranged in age from less than 20 years to over 60 years, with the highest proportion belonging to the 31–40 years age group (31.0%), followed by the 41–50 years age group (24.0%) and 21–30 years (19.0%). Patients aged 51–60 years constituted 15.0%, while those aged <20 years and >60 years accounted for 5.0% and 6.0%, respectively. The mean age of the study population was 39.8 ± 12.6 years. There was a marked female predominance, with 86 (86.0%) females and 14 (14.0%) males, yielding a female-to-male ratio of approximately 6.1:1 (Figure 1).

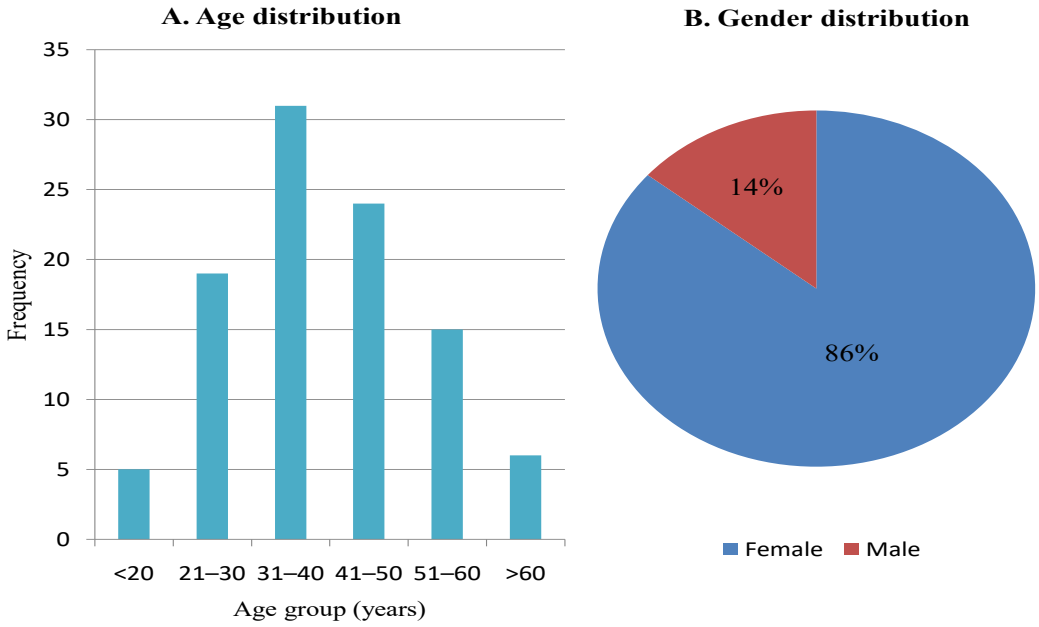


**Figure 1. Demographic characteristics of the study population (n =100) showing (A.) age distribution of patients and (B.) sex distribution**

Among the 100 thyroid FNAC specimens evaluated, nodular goitre constituted the majority of cases (45.0%), followed by colloid nodule (19.0%), and hyperplastic nodule (3.0%). Hashimoto thyroiditis accounted for 18.0% of cases. Follicular neoplasms (FN) comprised 5.0% of cases, while Atypia of Undetermined Significance (AUS) and Nondiagnostic smears were each observed in 3.0% of cases. Cytological diagnoses Suspicious for Malignancy (SFM) and Malignant (Papillary Thyroid Carcinoma, Figure 2.) constituted 2.0% each.

On retrospective reassessment according to TBSRTC, third edition (2023), the majority of cases (85.0%) belonged to Category II (Benign), which included Follicular Nodular Disease (previously reported as colloid nodule, colloid goitre, nodular goitre, and hyperplastic nodule) and Hashimoto thyroiditis. Category I (Nondiagnostic) and Category III (AUS) each accounted for 3.0% of cases. Category IV (FN) comprised 5.0% of cases, whereas Category V (SFM) and Category VI (Malignant) represented 2.0% each (Table 1). Thus, benign thyroid lesions constituted the predominant cytological category in the present study.

**Table 1. Distribution of thyroid FNAC cases according to TBSRTC (3rd edition) and corresponding cytological diagnoses (n = 100).**

| Bethesda Category | Cytological Diagnosis | Frequency, n (%) | Category Total, n(%) |
|---|---|---|---|
| I. Nondiagnostic | Scant cellularity | 3 (3.0) | 3 (3.0) |
| II. Benign | Nodular goitre | 45 (45.0) | 85 (85.0) |
| | Colloid nodule | 19 (19.0) | |
| | Hashimoto thyroiditis | 18 (18.0) | |
| | Hyperplastic nodule | 3 (3.0) | |
| III. Atypia of Undetermined Significance (AUS) | Atypia of Undetermined Significance | 3 (3.0) | 3 (3.0) |
| IV. Follicular Neoplasm | Follicular neoplasm | 5 (5.0) | 5 (5.0) |
| V. Suspicious for Malignancy | Suspicious for malignancy | 2 (2.0) | 2 (2.0) |
| VI. Malignant | Papillary thyroid carcinoma | 2 (2.0) | 2 (2.0) |
| **Total** | | **100 (100.0)** | **100 (100.0)** |

Histopathological examination (HPE) was available for 35 patients who subsequently underwent thyroid surgery. Nodular goitre was the most frequent histopathological diagnosis, accounting for 18 (51.4%) cases, followed by colloid goitre in 5 (14.3%) cases. Papillary thyroid carcinoma was identified in 4 (11.4%) patients, while follicular adenoma was observed in

3 (8.6%) cases. Hashimoto thyroiditis accounted for 2 (5.7%) cases. Hurthle cell adenoma**,** follicular carcinoma**,** and anaplastic carcinoma were the least common histopathological diagnoses, each identified in 1 (2.9%) patient (Table 2).

**Table 2. Histopathological diagnoses among surgically resected thyroid lesions (n = 35).**

| Histopathological Diagnosis | Number (n = 35) | Percentage (%) |
|---|---|---|
| Nodular goitre | 18 | 51.4 |
| Colloid goitre | 5 | 14.3 |
| Hashimoto thyroiditis | 2 | 5.7 |
| Follicular adenoma | 3 | 8.6 |
| Hurthle cell adenoma | 1 | 2.9 |
| Papillary thyroid carcinoma | 4 | 11.4 |
| Follicular carcinoma | 1 | 2.9 |
| Anaplastic carcinoma | 1 | 2.9 |
| **Total** | **35** | **100.0** |

Cytohistopathological correlation was performed in all 35 surgically resected cases with available histopathological follow-up. All of the 24 Bethesda Category II (Benign) cases were confirmed to be benign on HPE, yielding an observed ROM of 0.0%. Of the two Bethesda Category III (AUS) cases, one was benign and one was malignant on histopathology, corresponding to an observed ROM of 50.0%**.** Among the five Bethesda Category IV (FN) cases, four were benign and one was malignant, resulting in an observed ROM of 20.0%**.** All cases categorized as Bethesda Category V (SFM) and Bethesda Category VI (Malignant) on cytology were confirmed to be malignant on HPE, corresponding to an observed ROM of 100.0% for both categories. Overall, 6 of the 35 surgically resected cases (17.1%) were malignant on HPE (Table 3). A statistically significant association was observed between Bethesda category and histopathological diagnosis (Fisher's exact test, $P < 0.001$), supporting the effectiveness of TBSRTC in stratifying the risk of malignancy.

**Table 3. Cytohistopthological Correlation and Risk of Malignancy (n = 35)**

| Bethesda Category | Cases with HPE | Benign | Malignant | Observed ROM (%) |
|---|---|---|---|---|
| II | 24 | 24 | 0 | 0.0 |
| III | 2 | 1 | 1 | 50.0 |
| IV | 5 | 4 | 1 | 20.0 |
| V | 2 | 0 | 2 | 100.0 |
| VI | 2 | 0 | 2 | 100.0 |
| **Total** | **35** | **29** | **6** | — |

*Overall malignancy rate among surgically resected cases = 17.1% (6/35).*

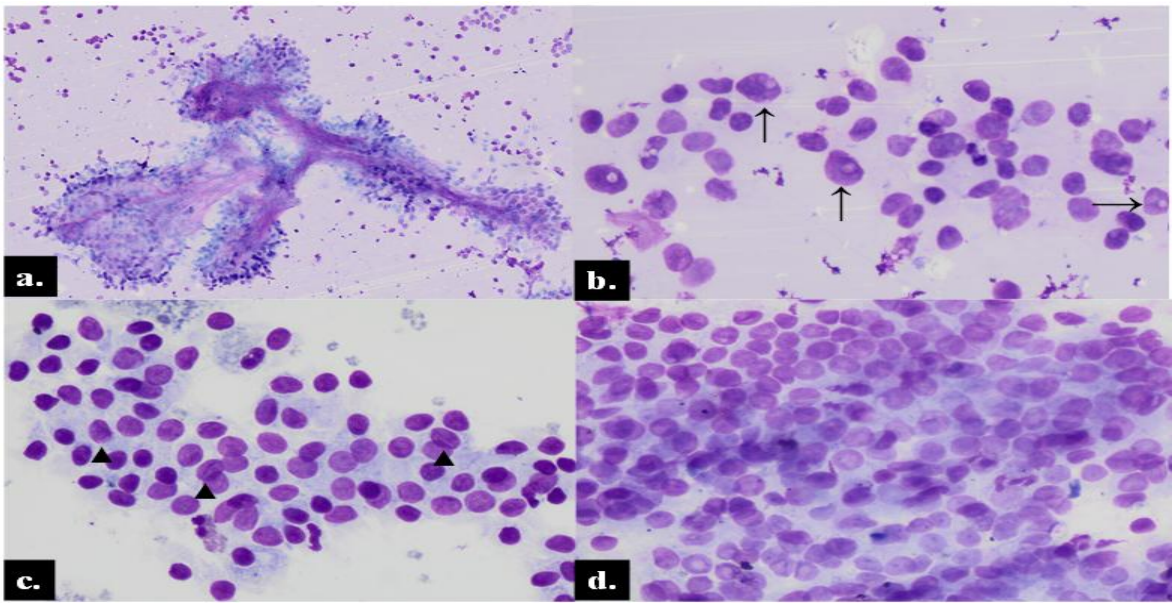


**Figure 2.** Cytomorphological features of Papillary Thyroid Carcinoma on FNAC showing (a) papillary architecture (Giemsa, 100x); (b) enlarged nuclei with intranuclear pseudoinclusions (arrows ↑); (c) nuclear grooves (arrowheads ▲); (d) nuclear overlapping and characteristic optically clear "Orphan Annie eye" nuclei with finely dispersed (powdery) chromatin. (b, c, and d. Giemsa, 400x)

# DISCUSSION

FNAC remains the first-line investigation for thyroid nodules owing to its simplicity, safety, cost-effectiveness, and high diagnostic accuracy. Since its introduction in 2007, TBSRTC has standardized thyroid cytology by providing uniform diagnostic categories, estimated risks of malignancy (ROM), and evidence-based management recommendations, thereby improving communication between cytopathologists and clinicians. Three editions of TBSRTC have been published (2009, 2017, and 2023), with the third edition (2023) introducing refinements in terminology, diagnostic criteria, and ROM estimates while retaining the six-tier reporting system.[9–12]

The present retrospective study evaluated 100 thyroid FNAC cases over a three-year period. All archived smears, originally reported according to the second edition (2017), were retrospectively reassessed using the third edition (2023) to ensure uniform application of the updated criteria and terminology. Histopathological correlation was available in 35 surgically resected cases, enabling assessment of the observed institutional ROM and diagnostic performance of thyroid FNAC.

**Age Distribution**

In the present study, patients ranged from less than 20 years to over 60 years of age, with the highest proportion (31.0%) belonging to the 31–40 years age group. The mean age of the study population was 39.8 ± 12.6 years. These findings are comparable with previous Indian studies. Qureshi et al[8] reported that the majority of patients (29.5%) were between 30 and 39 years of age, while Nandedkar et al[10] observed that nearly three-fourths of patients belonged to the 21–50 years age group. Similarly, Garg et al[11] documented the maximum incidence of thyroid lesions in the 31–40 years age group, whereas Gupta et al[12] reported a mean patient age of 41.6 years. These observations suggest that thyroid lesions predominantly affect individuals during the third and fourth decades of life, possibly reflecting the increased prevalence of benign thyroid disorders during the economically productive years.

**Gender Distribution**

A marked female predominance was observed, with females accounting for 86.0% of cases and males for 14.0%, yielding a female-to-male ratio of approximately 6.1:1.This finding is in agreement with numerous published studies. Qureshi et al. reported a female preponderance of 89.5%, while Reddy et al[9] observed females constituted 75% of their study population. Similar female predominance has also been reported by Kamboj et al[13], Bayrak et al[14], Fischer et al[15], and Sharma et al[16].

The increased frequency of thyroid lesions among women has been attributed to hormonal influences, estrogen-mediated stimulation of thyroid follicular cells, and the greater prevalence of autoimmune thyroid diseases in females.

**Cytological Spectrum of Thyroid Lesions**

The majority of thyroid lesions encountered in the present study were benign, emphasizing the value of FNAC in preventing unnecessary thyroid surgery. On retrospective reassessment according to the third edition of TBSRTC, lesions that had originally been reported as nodular goitre**,** colloid nodule**,** and hyperplastic nodule, were grouped under the unified descriptive term Follicular Nodular Disease (FND) comprised 67% of all thyroid aspirates. Hashimoto thyroiditis (18%) represented the second most common benign lesion, whereas follicular neoplasms and malignant lesions constituted only a small proportion of the study population. These observations are comparable with those reported by Qureshi et al[8], who identified nodular goitre (57.6%) as the most common thyroid lesion, followed by Hashimoto thyroiditis (14.3%) and colloid nodules (7.6%). Likewise, several Indian studies have consistently demonstrated that nodular goitre represents the predominant thyroid lesion encountered on FNAC, reflecting the high prevalence of iodine deficiency-related and multinodular thyroid disease in developing countries.

The introduction of the umbrella term FND promotes greater uniformity in reporting while reducing unnecessary terminological variation. The preferred diagnostic terms Nondiagnostic**,** AUS**,** and FN replace the earlier terms Nondiagnostic/Unsatisfactory**,** Atypia of Undetermined Significance/Follicular Lesion of Undetermined Significance (AUS/FLUS)**,** and Follicular Neoplasm/Suspicious for a Follicular Neoplasm (FN/SFN)**,** respectively. While the six diagnostic categories remain unchanged, these changes simplify reporting resulting in improved interobserver consistency and facilitate comparison between studies employing the latest Bethesda recommendations.

**Distribution According to the Bethesda System**

Application of the TBSRTC demonstrated that Category II (Benign) constituted the overwhelming majority (85.0%) of thyroid FNAC cases. Categories I and III each accounted for 3.0%, Category IV comprised 5.0%, while Categories V and VI each represented 2.0% of cases.The predominance of Category II lesions is comparable with findings reported in previous studies. Anand et al[6] observed 75.9% of cases in Category II, whereas Qureshi et al[8]. reported 84.8% benign lesions. Similarly, Reddy et al[9] documented Category II as the largest diagnostic group, accounting for 66.7% of thyroid FNAC specimens. The high proportion of benign lesions across these studies confirms that most thyroid nodules encountered in routine clinical practice are non-neoplastic and can be managed conservatively following appropriate clinicoradiological correlation.

Only 3.0% of cases were classified as Category III (AUS). This relatively low proportion indicates cautious application of this indeterminate category and adherence to Bethesda diagnostic criteria, thereby minimizing unnecessary repeat aspirations and surgical interventions. Similar low frequencies have been reported by Anand et al[6] and Qureshi et al[8].

Likewise, the relatively small proportions of Category IV (5.0%), Category V (2.0%), and Category VI (2.0%) reflect the low prevalence of thyroid malignancy in routine clinical practice and reinforce the usefulness of FNAC as a triaging tool for selecting patients who require surgery while safely managing the majority of benign lesions conservatively.

**Histopathological Correlation**

Histopathological follow-up was available for 35 of the 100 cases included in the current study. Benign lesions predominated on histopathological examination, with nodular goitre accounting for 18 (51.4%) cases, followed by colloid goitre in 5 (14.3%) cases and Hashimoto thyroiditis in 2 (5.7%) cases. Among neoplastic lesions, papillary thyroid carcinoma was the most frequent malignant tumour, identified in 4 (11.4%) patients, followed by follicular adenoma in 3 (8.6%) cases. Hurthle cell (oncocytic) adenoma**,** follicular carcinoma**,** and anaplastic carcinoma were each identified in 1 (2.9%) patient. These findings closely parallel those reported by Qureshi et al[8], who found multinodular goitre to be the predominant histopathological lesion (40%), followed by follicular adenoma and papillary carcinoma. Similarly, Anand et al[6] observed that benign lesions constituted the majority of operated cases, with nodular goitre being the commonest diagnosis.

**Observed Risk of Malignancy According to Bethesda Categories**

In the present study, the observed ROM among surgically resected cases was 0% for Bethesda Category II, 50% for Category III, 20% for Category IV, and 100% for Categories V and VI. These findings should be interpreted cautiously because histopathological follow-up was available in only 35 patients, and surgery was performed primarily in clinically or radiologically selected cases. Consequently, the observed ROM does not represent the true prevalence of malignancy within each Bethesda category but rather the malignancy rate among patients selected for operative management.

The absence of malignancy among the operated Category II cases reflects the high reliability of benign cytological diagnoses in the present series. Meanwhile, Anand et al[6] and Acharya et al[7], reported a ROM of 8.5% and 11.7% respectively.

The 50% ROM observed in Category III (AUS) is also comparable with published literature. Anand et al[6] reported a ROM of 66.7%, whereas Acharya et al[7] observed approximately 25%. Variability in the ROM of Category III has been well documented and is primarily related to the heterogeneous nature of this category, differences in cytological interpretation, and the relatively small number of surgically followed cases.

Category IV remains one of the most diagnostically challenging Bethesda categories because FNAC can identify a follicular-patterned neoplasm but cannot distinguish follicular adenoma from follicular carcinoma, as capsular and vascular invasion cannot be assessed cytologically. In the present study, four of five Category IV lesions were benign, while one was confirmed as follicular carcinoma, yielding an observed ROM of 20%**.** One additional case represented an oncocytic (Hurthle cell) adenoma**,** reflecting the third edition of TBSRTC, which recognises oncocytic (Hurthle cell) neoplasm within Category IV. These findings reinforce that Category IV represents a neoplastic, rather than a malignant, category and requires histopathological examination for definitive diagnosis.

In the present study, all Category V and Category VI cases were confirmed as malignant, yielding a 100% observed ROM for both categories. Similar observations have been reported by Anand et al[6] and Qureshi et al[8], emphasizing the excellent predictive value of these categories for thyroid malignancy. The high ROM in Categories V and VI validates the diagnostic reliability of the Bethesda System and supports its recommendations for definitive surgical management in these patients.

**Diagnostic Performance of FNAC**

Assessment of diagnostic performance in thyroid cytopathology is inherently challenging because TBS is multicategorical rather than binary. In particular, Bethesda Categories III and IV represent indeterminate lesions with variable malignant potential and cannot be unequivocally classified as benign or malignant. For the purpose of statistical analysis, Bethesda Categories III–VI were classified as test-positive and Bethesda Category II as test-negative, with histopathology as the reference standard.[17] Although this binary approach facilitates calculation of diagnostic indices, it inevitably oversimplifies the biological spectrum of thyroid lesions and should be interpreted in this context.

Using these criteria, thyroid FNAC demonstrated a sensitivity of 100.0%**,** specificity of 82.8%**,** positive predictive value of 54.5%**,** negative predictive value of 100.0%, and an overall diagnostic accuracy of 85.7% (Table 4)**.** The lower positive predictive value primarily reflects the inclusion of indeterminate Category III and IV lesions, several of which were benign on histopathology. This should not be considered a diagnostic error, as FNAC is intended to identify lesions requiring further evaluation or surgical excision rather than to establish malignancy in all indeterminate cases.

Notably, the overall cytohistological concordance was 94.3% (33/35 cases) with a Cohen's κ coefficient of 0.645, indicating substantial agreement between cytological and histopathological diagnoses. These

findings reaffirm the reliability of thyroid FNAC while highlighting the inherent limitations of cytology in the evaluation of follicular-patterned and other indeterminate thyroid lesions.

**Table 4. Confusion matrix and diagnostic performance of thyroid FNAC using histopathology as the reference standard (n = 35)**

| **FNAC Diagnosis** | **Histopathology Malignant, n (%)** | **Histopathology Benign n (%)** | **Total, n(%)** |
|---|---|---|---|
| **Positive (Bethesda III–VI)** | 6 (17.1) *(TP)* | 5 (14.3) *(FP)* | **11(31.4)** |
| **Negative (Bethesda II)** | 0 (0.0) *(FN)* | 24 (68.6) *(TN)* | **24 (68.6)** |
| **Total** | **6** | **29** | **35(100.0)** |
| **Diagnostic Performance** | **Formula** | **Value (%)** | |
| Sensitivity | TP / (TP + FN) | **100.0** | |
| Specificity | TN / (TN + FP) | **82.7** | |
| Positive Predictive Value (PPV) | TP / (TP + FP) | **54.5** | |
| Negative Predictive Value (NPV) | TN / (TN + FN) | **100.0** | |
| Overall Diagnostic Accuracy | (TP + TN)/Total | **87.9** | |
| Cytohistological Concordance | Concordant cases/Total | **94.3 (33/35)** | |
| Cohen's κ coefficient | Agreement beyond chance | **0.645** | |
| Interpretation of κ | | **Substantial agreement** | |

*TP* = true positive; *FP* = false positive; *TN* = true negative; *FN* = false negative, FNAC = Fine needle aspiration cytology.

**Clinical Significance of The Bethesda System:** One of the major advantages of TBSRTC, 3rd edition is that it provides refined and standardized terminology with defined risks of malignancy and evidence-based management recommendations. In the present study, the majority of thyroid lesions were categorized as benign, enabling conservative management, while patients categorized under Bethesda Categories IV, V, and VI could be appropriately selected for surgical treatment. The findings therefore reaffirm that the Bethesda System is a practical, reproducible, and clinically relevant reporting system that facilitates effective communication between cytopathologists, surgeons, radiologists and endocrinologists while minimizing unnecessary surgical procedures.

**Strengths and Limitations:** A major strength of the present study is the retrospective reassessment of all thyroid FNAC smears according to the third edition (2023) of TBSRTC, ensuring uniform application of updated diagnostic criteria and terminology. Histopathological correlation in surgically resected cases enabled assessment of the observed institutional risk of malignancy and diagnostic performance using the revised reporting system.

The study is limited by its retrospective, single-centre design and relatively small sample size. Histopathological follow-up was available only for surgically managed patients, introducing potential verification bias in estimating the observed risk of malignancy. Additionally, binary analysis of diagnostic performance simplifies the inherently multicategorical Bethesda system, particularly the indeterminate Categories III and IV. Larger prospective multicentre studies are warranted to further validate the third edition of TBSRTC in the Indian population.

## CONCLUSION

Thyroid FNAC remains a simple, safe, minimally invasive, and highly reliable first-line investigation for the evaluation of thyroid nodules. The present study demonstrated a predominance of benign lesions, with Bethesda Category II representing the largest diagnostic group. Retrospective reassessment according to the third edition (2023) of TBSRTC enabled adoption of contemporary terminology, including Follicular Nodular Disease and revised nomenclature for the indeterminate Bethesda categories. Histopathological correlation confirmed increasing observed risks of malignancy across higher Bethesda categories while highlighting the diagnostic challenges associated with follicular and oncocytic neoplasms, in which definitive distinction between benign and malignant lesions requires assessment of capsular and vascular invasion on histopathology. Overall, the findings support the continued clinical utility of TBSRTC as a standardized reporting system that improves communication, facilitates risk stratification, guides evidence-based clinical management, and promotes uniform reporting of thyroid cytopathology.

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