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THE BETHESDA SYSTEM FOR REPORTING THYROID CYTOPATHOLOGY: ONE YEAR CYTOLOGICAL STUDY IN A NORTHEASTERN TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Thyroid fine needle aspiration cytology (FNAC) is an important diagnostic tool for thyroid disorders. The Bethesda technique for Reporting Thyroid Cytopathology (TBSRTC) is an unambiguous, six-category reporting system for thyroid fine needle aspiration (FNA) that is widely acknowledged as a standard reporting guideline for institutes across continents which can minimize needless surgeries. **Material and Methods:** The study was carried out at the Pathology Department of the Assam Medical College and Hospital, Dibrugarh, Assam, India, from March 2023 to February 2024. The aim is to study the different cytological pattern in thyroid lesion by FNAC The results are interpreted using the features and categories specified in the TBSRTC. A total of 182 cases were studied. The distribution of the various categories from evaluated thyroid FNAs are as follows: nondiagnostic/unsatisfactory-8.2%, benign-75.9%, atypia of undetermined significance-6.0%,follicular neoplasm (FN) or suspicious for a FN-4.3%,suspicious for malignancy - 1%, malignant - 4.3%.**Conclusion:** The results of a FNA according to The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) give a standard and systematic approach to managing these nodules. Its standardized nomenclature enhanced thyroid FNAC reporting by facilitating communication and interlaboratory agreement among cytopathologists and clinicians, potentially leading to more standardized patient care management.

INTRODUCTION

Thyroid fine needle aspiration cytology (FNAC) serves a crucial role throughout several nations. This minimally invasive and inexpensive technique is of great value in lowering the unwanted surgery for patients with benign disease and in identifying a substantial proportion of thyroid nodules as benign (1).Documentation of clinical and family history, clinical examination, thyroid and neck ultrasound imaging, hormonal studies and ultrasonography-guided fine-needle aspiration (FNA) are an essential component of the management of thyroid nodules.(2)In the course of a lifetime, up to 27% of people may have a thyroid nodule found on ultrasonography (US), and between 4% and 10% of people will have a single palpable nodule.(3)

Thyroid Cytopathology reports play a pivot role in the management of Thyroid swellings encountered on day-to-day basis in a tertiary care hospital. Pathologists have a responsibility to provide referring physicians with concise, clear, and clinically useful interpretations of thyroid FNAs. In the past, laboratory terminology for thyroid FNA has varied greatly, even to

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this day, it has led to misunderstandings and made it more difficult for different institutions to share clinically useful data.(4)

There are lots of inter-laboratory variations regarding terminologies used with respect to thyroid FNA's by Cytopathologists even within a single Hospital. This has made it challenging for different individuals as well as organizations to share information and often produces confusion.(5) The Bethesda technique for Reporting Thyroid Cytopathology (TBSRTC) provides an unambiguous, six-category reporting system for thyroid fine needle aspiration (FNA) which is widely accepted as a standard reporting guideline for institutes across continents.(6)Clinicians can minimize the peril of needless procedures when provided with proper guideline for Thyroid Nodule management according to the Bethesda system for Reporting Thyroid Cytopathology(TBSRTC) . As a result, the number of surgeries for benign lesions has decreased. (6)

The aim is to study the different cytological pattern in thyroid lesion by FNAC and to distinguish between benign , atypical and suspicious for malignancy thyroid lesion based on The Bethesda System for Reporting Thyroid Cytopathology for making judicious use of surgical intervention in thyroid lesions.

METHODS AND MATERIALS

The study was conducted at the Pathology Department of the Assam Medical College and Hospital, Dibrugarh, Assam, India from March 2023 to February 2024.182 patients with thyroid swelling were referred from various departments underwent FNAs. Every patient was thoroughly examined, and the thyroid's movement while swallowing was noted. The FNA procedure was done after complete explanation of the risk and benefits of the procedure in their own language and written consent. For a better accessibility, the patients were made to lie supine with their necks extended.

Two to three passes were made in each case to minimise sampling error. 23-gauge needle was inserted into the lesion and the contents were aspirated. In the case of cystic nodules, the cysts contents were aspirated, centrifuged, and slides were made from the sediment for cytological analysis. Any residual mass in that area were further subjected to aspiration for obtaining the parenchymal tissue. In case when material could not be retrieved by direct aspiration, ultrasound-guided aspiration was done. The procedure had no major complications, like penetration into the trachea and laryngeal nerve Palsy, or hematoma. The smears prepared were stained with Papanicolaou and May-Grünwald-Giemsa (MGG) stains and the results were categorized according to The Bethesda System for Reporting Thyroid Cytopathology. The lesions were identified as unsatisfactory/non-diagnostic, benign, follicular lesion of undetermined significance (FLUS)/ atypia of undetermined significance (AUS), suspicious for malignancy and malignant. The FNAC diagnoses were correlated with clinical features, radiological investigations, and hormonal findings.

OBSERVATIONS AND RESULTS

A total of 182 cases were included in the study. There is female predominance with female: male ratio of 9.7:1, and the most common age group encountered is in the age group of 31–40 years. The age distribution ranged from 15 to 87 years, with a mean age of 53 years. The most common age group affected by thyroid lesions was the 3rd to 4th decade [Table 1]. The most common thyroid lesion was colloid goitre [Fig 1]. Category wise distribution of aspirates was Non diagnostic (ND) 15(8.2), Benign (BN) 138(75.9 %),Atypia of Undetermined significance /Follicular lesion of uncertain significance (FLUS) 11(6.0),Follicular Neoplasm/Suspicious for

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Follicular Neoplasm 8(4.3%)Suspicious for Malignancy 2(1%) and Malignant category 8(4.3 %).The distribution of the 182 cases into the six categories is shown in Table 2. Benign cases constitute the largest category with 75.8%, of which benign follicular nodule was the most common lesion. Among the malignant group, papillary carcinoma thyroid was the most common lesion with 4 cases along with 2 cases of Medullary Thyroid Carcinoma and 2 cases of Anaplastic Thyroid Carcinoma.

Table 1: Age Distribution of the cases

Age Group (Years)	Female	Male	Total	Percentage
≤ 20	11	0	11	6.04
21-30	38	2	40	21.97
31-40	50	3	53	29.12
41-50	33	7	40	21.97
51-60	20	3	23	12.63
61-70	11	1	12	6.59
71-80	2	0	2	1.09
81-90	0	1	1	0.54
Total	165	17	182	100

[Fig 1]: Distribution of Thyroid lesions as per TBSRTC

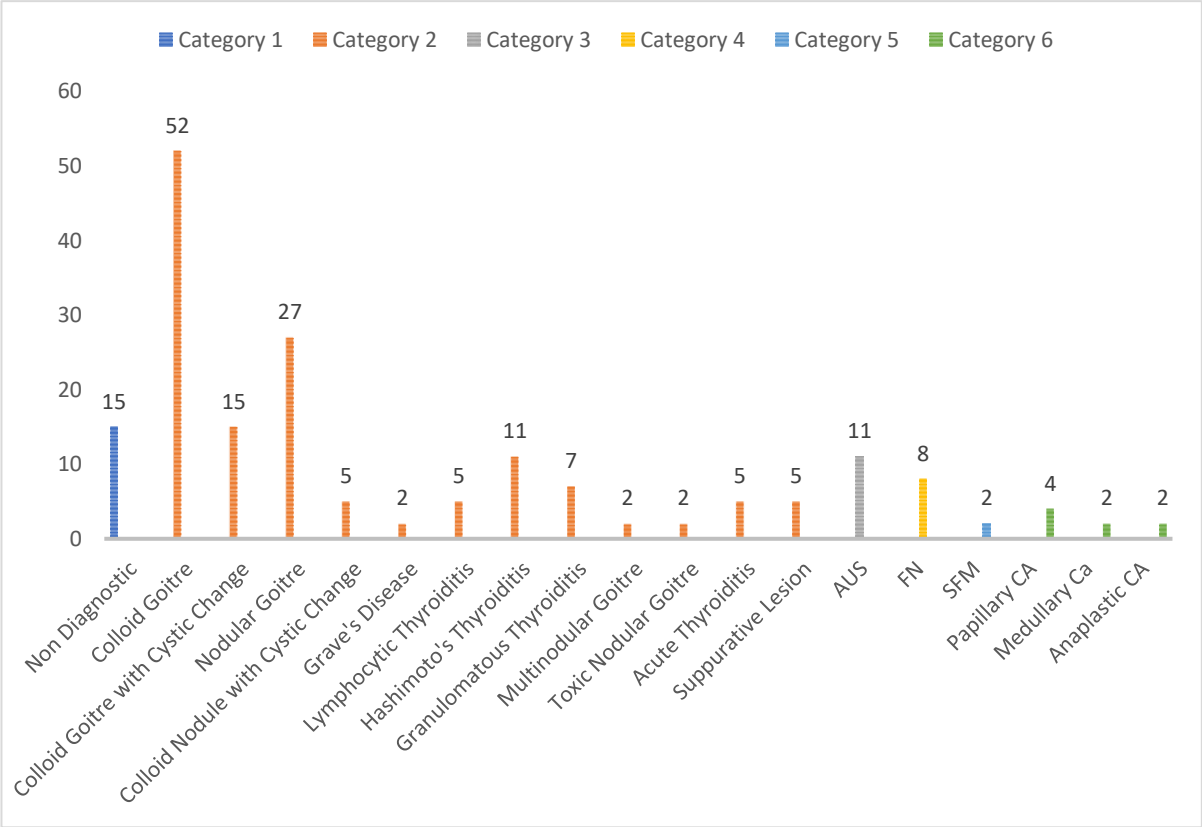

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Table 2: Distribution of cases as per TBSRTC:

SL NO.	Cytological Category	Subcategory	Number of Cases	Total Number Of Cases In Each Category(%)
1	Non-Diagnostic/unsatisfactory (ND/UNS)	Cyst Fluid Only Virtually acellular Specimen Other (Obscuring blood, Clotting Artifacts, etc)	10 4 1	15(8.2)
2	Benign	Consistent with benign follicular nodule (includes adenomatoid nodule, colloid nodule, etc.) Consistent with lymphocytic (Hashimoto) thyroiditis in the proper clinical context Consistent with granulomatous (subacute) thyroiditis Other	108 18 7 5	138(75.8)
3	Atypia of undetermined significance/ follicular lesion of undetermined significance (AUS/FLUS)			11(6.0)
4	Follicular neoplasm/suspicious for a follicular neoplasm (FN/SFN)			8(4.3)
5	Suspicious for malignancy (SFM)	Suspicious for papillary carcinoma Suspicious for medullary carcinoma Suspicious for metastatic carcinoma Suspicious for lymphoma Other	2 0 0 0 0	2(1.0)
6	Malignant	Papillary thyroid carcinoma Poorly differentiated carcinoma Medullary thyroid carcinoma Undifferentiated (anaplastic) carcinoma Squamous cell carcinoma Carcinoma with mixed features Metastatic carcinoma Non-Hodgkin lymphoma Other	4 0 2 2 0 0 0 0 0	8(4.3)
	Total		182	

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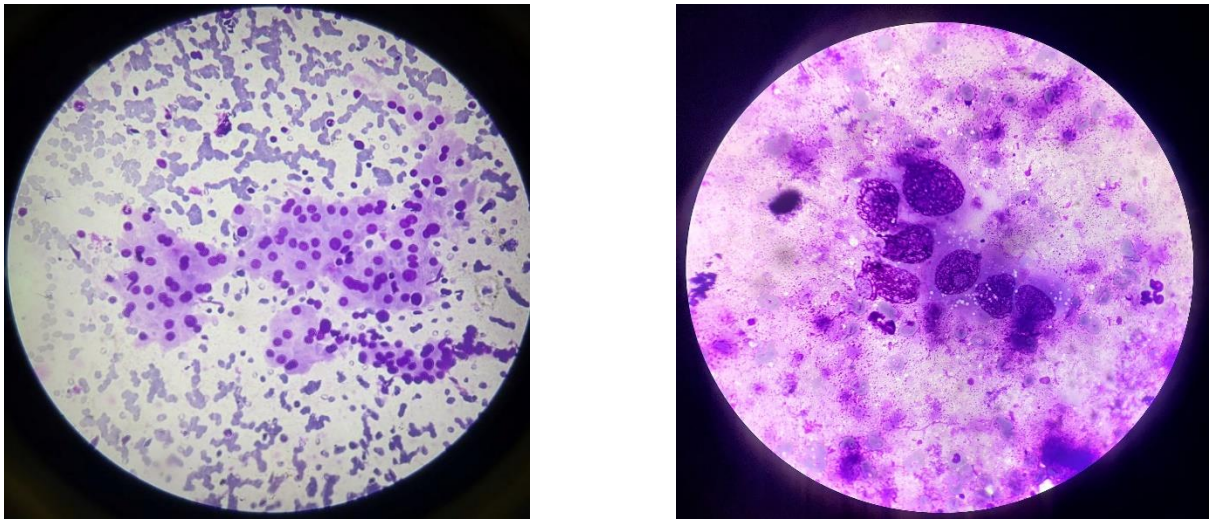
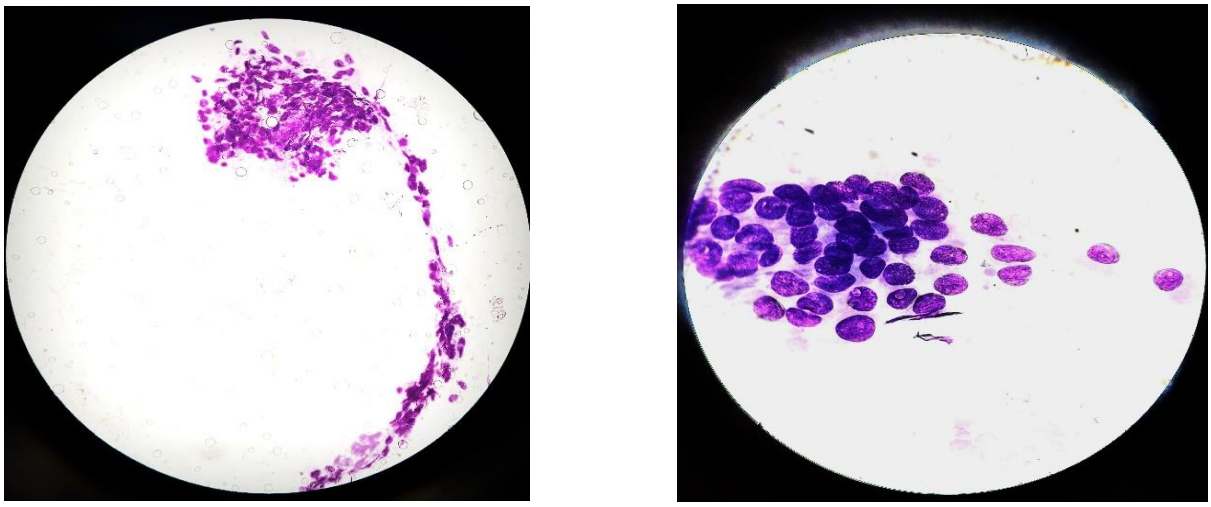


[FIG 2] A: *Hashimoto's Thyroiditis showing follicular cells impinged by lymphocytes (MGG, x400)***B:** *Anaplastic thyroid carcinoma showing atypical cell cluster and Intranuclear cytoplasmic inclusion (MGG, x1000)*



[Fig 3] A: *True Papillary Fragments with a vascular Core with oval pale nuclei (MGG x400)* **B:** *Large, Oval, pale nuclei with Intracytoplasmic Inclusion (MGG x1000)*

DISCUSSION

Theoharis et al reported a one-year study of Thyroid FNA demonstrating the use of TBSRTC in guiding patient management based on specific risks for malignancy associated with specific diagnostic categories. Their findings show that this classification scheme is an ideal approach to document FNAs for the thyroid , thereby provides standard guideline in patient Management.(7)

The Bethesda System was used to analyse the outcomes of patients who were referred for surgery in publication by Crowe et al. They discovered that the TBSRTC's implementation greatly decreased reporting ambiguity, which in turn decreased the proportion of patients who were referred for surgery. (8) Thyroid FNA aims to prevent unnecessary surgical procedures due to the minimal risk of cancer associated with thyroid nodules, despite their high prevalence. Implementation of TBSRTC resulted in significant reduction in this rate. Benign category was maximum in our study similar to the other studies .The findings of the research conducted by Mondal et al.(10) ,Jo et al.(11) Pattanashetti et al. (6) And Thewjitcharoen Y et al (9) were concordant with the findings of our current study.

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[Table 3] provides a comparison of the collected results. According to the six-tier Bethesda system, it was observed that the distribution of cases in our study was different from the studies described earlier, with a lower percentage of cases falling into the benign category than Mondal et al. and Pattanashetti et al but higher than Jo et al. and Thewjitcharoen et al. and a higher percentage falling into the non-diagnostic and Mondal et al(10) and Pattanashetti et al.(6)In the current study, the majority of the patients were in the third decade, which is similar to the studies conducted by other investigators(12) (13).This study found that women were more affected than men, which is in concordance with other previous studies of identical type. (14) (15) (16).Limitation of this study is the lack of histological correlation with the cytological findings. In a few cases, the clinical history, biochemical data, and radiological investigations were unavailable, which made it a little challenging to classify those aspirates.

[Table 3]: Comparison along with other studies

Diagnostic Criteria	Present Study	Mondal et al.	Jo et al.	Pattanashetti et al. (6)	Thewjitcharoen Y et al.(9)
Non-Diagnostic	8.2	1.2	18.6	5.2	21.1
Benign	75.8	87.5	59.0	83.8	66.6
Atypia of Undetermined Significance	6.0	1.0	3.4	0	4.7
Follicular Neoplasm	4.3	4.2	9.7	5.2	2.4
Suspicious for Malignancy	1.0	1.4	2.3	0.5	1.8
Malignant	4.3	7.0	7.0	5.2	3.3

CONCLUSION

Fine-needle aspiration (FNA) is an important diagnostic tool to evaluate patients with thyroid nodules. It is a simple, minimally invasive, cost-effective, time-saving, and reliable preoperative outpatient diagnostic procedure for thyroid nodules. Successful FNAC depends on various elements, including an experienced aspirator, low sample error, accurate cytological interpretation, and rational analysis of clinical and cytological data for each patient. Although reporting terminologies has historically been variable and ambiguous, results of a FNA according to The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) provides a standard and systematic guideline for managing these nodules. Its standardized nomenclature improved thyroid FNAC reporting by providing clarity in communication and interlaboratory agreement among cytopathologists and clinicians, potentially leading to more uniform management approaches for the patient.

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