Section: Pathology

Original Research Article

CYTOMORPHOLOGICAL SPECTRUM OF THYROID LESIONS IN A TERTIARY CARE HOSPITAL OF NORTHEAST INDIA

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ABSTRACT

Background: Thyroid lesions constitute a common clinical problem and encompass a broad spectrum of non-neoplastic and neoplastic conditions. Fine Needle Aspiration Cytology (FNAC) has emerged as a simple, rapid, and cost-effective diagnostic modality for the evaluation of thyroid swellings. The present study was undertaken to assess the cytomorphological spectrum of thyroid lesions and to analyze their distribution according to the Bethesda System for Reporting Thyroid Cytopathology in patients attending a tertiary care centre. **Materials and Methods:** An institution-based cross-sectional study was conducted at a tertiary care centre for a period of one year. Patients of all ages and both sexes presenting with palpable thyroid swellings underwent FNAC. Air-dried smears were stained with May Grunwald Giemsa and reported according to the Bethesda System for Reporting Thyroid Cytopathology. Midline swellings other than thyroid were excluded. **Results:** A total of 115 patients underwent Fine Needle Aspiration Cytology during the study period, with a marked female predominance (male: female ratio 1:5.4). The age of the patients ranged from 12 to 80 years. Anterior neck swelling was the most common presenting complaint. Based on the Bethesda System for Reporting Thyroid Cytopathology, the majority of cases (75.6%) belonged to Category II (Benign). Malignant lesions accounted for four cases, of which were three were papillary carcinoma and one anaplastic carcinoma. **Conclusion:** Fine Needle Aspiration Cytology is minimally invasive with low complication and has a high sensitivity and specificity in most of thyroid lesions. Application of the Bethesda System for Reporting Thyroid Cytopathology aided in standardized reporting and appropriate clinical management of thyroid swellings.

INTRODUCTION

Thyroid disease is the most common endocrine disorder. Thyroid swellings can be benign or malignant and can affect any age group. Normally thyroid is not palpable but in thyroid disease there will be swelling of thyroid gland and it becomes palpable. It causes pressure symptoms on trachea and oesophagus and cosmetic deformity also. Most common cause of thyroid swelling is deficiency of iodine.[1]Fine Needle Aspiration Cytology (FNAC) is the present day's worldwide accepted diagnostic tool as it is a cost effective, minimally invasive, low complication, non-operative method and has a high sensitivity and specificity in most of thyroid lesions.[2]The primary objective of initial evaluation is to distinguish the majority of benign nodules from those that are cancer and require removal to limit morbidity and mortality. FNA provides information that guides the management of patients with thyroid nodules by identifying patients who require surgical resection and patients who require no further intervention.[3] Fine Success of thyroid FNAC depends on skilled aspiration, skilled cytological interpretation and rational analysis of cytological and clinical data.[4]To achieve standardization of

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diagnostic terminology, morphologic criteria, and risk of malignancy for reporting of thyroid FNA, in 2007, the National Cancer Institute (NCI) organized the NCI Thyroid Fine Needle Aspiration State of the Science Conference which proposed a 6-tier system and named it The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC).[5]

The 2023 revision reaffirms that every thyroid FNA report should begin with 1 of 6 diagnostic categories, the names of which remain unchanged since they were first introduced:1. Nondiagnostic or Unsatisfactory; 2. Benign; 3. Atypia of Undetermined Significance (AUS) 4.Follicular Neoplasm;5.Suspicious for Malignancy; and 6. Malignant.[6]

Aims and Objectives

1. To evaluate cytological spectrum of thyroid swellings according to Bethesda System of Reporting Thyroid Cytopathology.
2. To correlate with age and sex.

MATERIALS AND METHODS

The institution-based cross-sectional study was conducted at Kokrajhar Medical College and Hospital, Kokrajhar, Assam over a period of one year from May 2025 to April 2026. Ethical clearance was obtained from the Institutional Ethics Committee vide approval No.KMCH/IEC/2025/17. The study included patients attending the outpatient departments as well as admitted patients who presented with palpable thyroid swellings. Detailed clinical history along with general and local examination findings were recorded in all cases, and informed written consent was obtained prior to the procedure. FNAC was performed using the needling technique, and smears were prepared from each aspirate and air dried. Air dried smears were then stained with May Grunwald Giemsa (MGG) stain and observed under microscope. Diagnosis was given according to Bethesda system of reporting Thyroid Cytopathology.

Inclusion Criteria

1. All the FNAC smears of thyroid swellings during the study period.
2. Patients of all age groups and both sexes were included.

Exclusion Criteria

1. Midline swellings other than thyroid were excluded.

RESULTS

A total of 115 patients underwent Fine Needle Aspiration Cytology (FNAC) during the study period. Among them, 97 were females and 18 were males, with a male-to-female ratio of 1:5.4, indicating a marked female predominance. The age of the patients ranged from 12 to 80 years at the time of presentation. The age-wise distribution of cases is depicted in Table 1. Clinically, the majority of patients presented with anterior neck swelling, while a few also complained of associated pain. All cases were categorized according to the Bethesda System for Reporting Thyroid Cytopathology as shown in Table 2. Most cases (75.6%) were classified under Category II (Benign), which included colloid goitre/nodule, adenomatoid nodule, lymphocytic thyroiditis, and subacute thyroiditis.. Smears that did not fulfil the adequacy criteria of a minimum of six clusters of well-visualized thyroid follicular cells, or those obscured by excessive hemorrhagic background compromising cytological interpretation, were categorized as inadequate/non-diagnostic. Out of the total 115 cases, 4 cases were non diagnostic/unsatisfactory even after doing repeat aspiration

On cytomorphological examination, smears from cases of colloid goitre showed sheets of benign follicular epithelial cells, abundant colloid, and scattered macrophages in varying proportions. Cases diagnosed as lymphocytic thyroiditis predominantly revealed follicular epithelial cell clusters infiltrated by lymphocytes, along with occasional oncocytic cells. There were four cases of malignant lesions; three were papillary carcinoma and a single case of anaplastic carcinoma.

Table1: Age wise distribution of cases (n=115)

Age group	Numbers	Percentage (%)
0-10	Nil	Nil
11-20	08	7.0
21-30	26	22.6
31-40	20	17.3
41-50	31	26.9
51-60	20	17.3
61-70	07	6.0
71-80	03	2.6
81-90	Nil	Nil

Table 2: Distribution of cases according to Bethesda category (n=115)

Bethesda classification	Category	No. of patients	Percentage (%)
Non-diagnostic or unsatisfactory	Category 1	04	3.5
Benign	Category 2	87	75.6
Atypia of undetermined significance	Category 3	03	2.6

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Follicular neoplasm	Category 4	11	9.5
Suspicious for malignancy	Category 5	06	5.2
Malignancy	Category 6	04	3.5
Total		115	

Table 3: Subtyping of benign lesions (Cat 2) of our study (n=115)

Cat 2	No. of cases	Percentage (%)
Colloid nodule	34	29.4
Adenomatoid nodule	38	32.9
Lymphocytic thyroiditis	11	9.4
Subacute thyroiditis	04	3.5

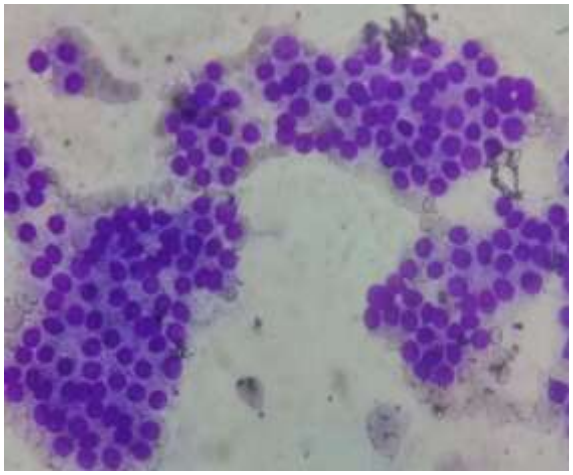

Figure 1: Showing adenomatoid nodule (40X view, MGG stain)

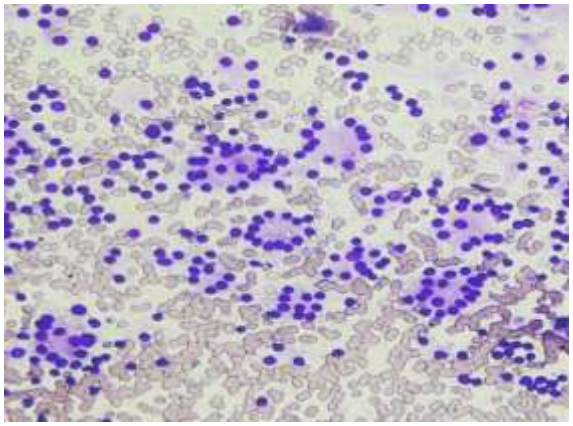

Figure 2: Showing repetitive microfollicular pattern in follicular neoplasm(40X view, MGG stain)

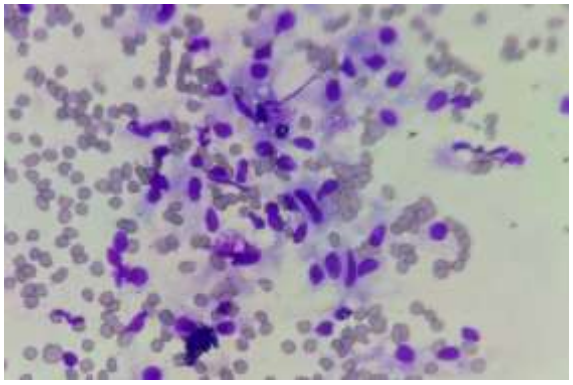

Figure 3: Showing subacute thyroiditis with scattered epithelioid histiocytes (40X view, MGG stain)

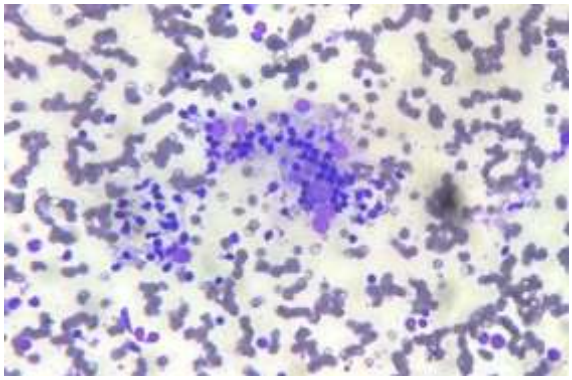

Figure 4: Showing lymphocytic thyroiditis (40X view, MGG stain)

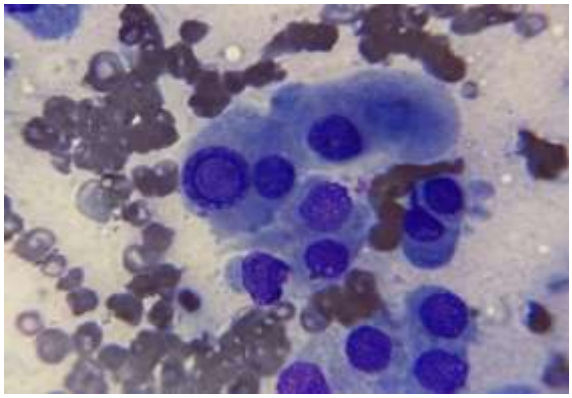

Figure 5: Showing papillary thyroid carcinoma with pseudo inclusion bodies. (40X view, MGG stain)

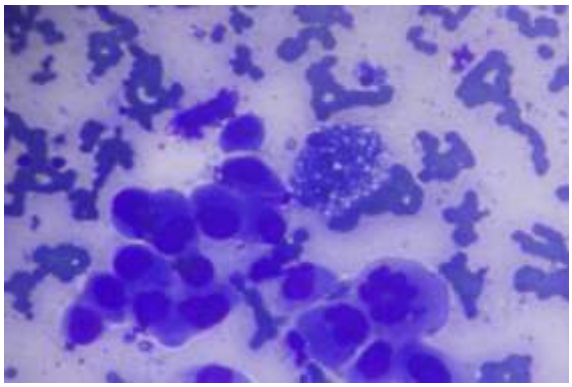

Figure 6: Show anaplastic thyroid carcinoma (40X view, MGG stain)

DISCUSSION

Fine Needle Aspiration Cytology (FNAC) is widely accepted as the first-line diagnostic modality for

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evaluating thyroid lesions due to its cost-effectiveness,low complication rate, and non-surgical approach. It demonstrates high sensitivity and specificity in the diagnosis of most thyroid disorders.

In the present study, the age range is of 11-80 years with mean age of 41.6 years. Most number of cases are in 41-50 age group. Other studies like Pattanasetti et al,[7]are concordant with our study. In the present study, females are more than males with male: female ratio of 1:5.4. Other studies conducted by Bhagwat MK et al,[8]Anand B et al,[5] and N DA et al,[2]are concordant with our study. The most common clinical presentation, in our study, across nearly all age groups was a swelling in the anterior aspect of the neck that moved with deglutition, findings comparable to those reported by Kashyap et al,[9] and Mangashetty S S et al.[10]

Among the cases according to Bethesda system, category 2- benign, 75.6 % was the most common according to our study similar to other studies conducted by Anand B et al,[5]Bhartiya R et al,[3] and Pattanashetti M et al,[7]as shown in Table 3.

Table 3: Showing comparative results of different studies

Bethesda system	category	Anand B et al	Bhartiya R et al	Pattanashetti M et al	Our study
Non-diagnostic or unsatisfactory	Category 1	13.8%	5.8%	5.20%	3.5%
Benign	Category 2	75.9%	84%	83%	75.6%
Atypia of undetermined significance	Category 3	1.2%	1.24%	Nil	2.6 %
Follicular neoplasm	Category 4	3.7%	2.94%	5.20%	9.5%
Suspicious for malignancy	Category 5	2.6%	2.52%	0.57%	5.2 %
Malignancy	Category 6	2.8%	3.36%	5.20%	3.5 %

In the present study, among the benign lesions (Bethesda Category II) is the most common. Other studies conducted by Bhartiya R et al,[3]Pattanashetti M,[7] and Singh DRK et al,[11]are concordant with our study. Only four cases were reported as malignant lesions, papillary carcinoma is the most common which is concordant with the studies by Kartha DPP et al,[12] and Hassan-Kadle MA et al.[13]

CONCLUSION

The present study highlights the diverse cytomorphological spectrum of thyroid lesions encountered at a tertiary care centre, with benign lesions accounting for the majority of cases. Fine Needle Aspiration Cytology proved to be a reliable, safe, economical diagnostic technique with high diagnostic accuracy, making it an indispensable tool in distinguishing non-neoplastic from neoplastic lesions. Early and accurate cytological assessment aids clinicians in appropriate patient management and facilitates timely treatment in suspicious or malignant cases.

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Competing Interests: None

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