

STUDY OF MORPHOLOGY FINDINGS IN PATIENTS WITH THYROID LESIONS BY FINE NEEDLE ASPIRATION CYTOLOGY

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Abstract

Background: Thyroid word originated from “Thyreos”, a Greek word meaning shield. Thyroid gland diseases are common particularly in India where iodine intake through diet is low. Neck swelling is a common clinical presentation in thyroid diseases all over the world. Most of the thyroid nodules are benign, asymptomatic and smaller, they do not require surgical excision. In India, there are 216000 new cases of thyroid malignancies per year and the role of properly evaluating thyroid lesions is significant. Fine Needle Aspiration Cytology (FNAC) is a well-established used in the primary diagnosis of thyroid swellings. It reduces the rate of unnecessary thyroid surgery for patients with benign nodules. The main aim and objectives of this research is to study of morphology findings in patients with thyroid lesions by fine needle aspiration cytology and to describe the various morphological features of thyroid lesions by fine needle aspiration cytology. **Materials and Methods:** This study that took place from January 2021 to March 2024 in all patients with palpable thyroid lesions who were referred from the ENT and Surgery OPD to the Department of Pathology at C.U. Shah medical college and hospital, Surendranagar for cytological examination. **Result:** The thyroid lesions were more seen in females (90.8%) than male (9.2%). Female to males ratio is 9.9:1. Out of 131cases, 1 cases (0.76%) was unsatisfactory for reporting, 100 cases (76.33%) were benign, 8 cases (6.11%) were categorized under AUS. 13 cases (9.92%) were reported as Follicular Neoplasm (FN), 3 case (2.3%) were reported as suspicious of malignancy and 6 case (4.58%) were reported as malignant. **Conclusion:** The Bethesda system of reporting thyroid cytology can be used as a first line of pathological investigation, which can help in identifying patients who will require non-invasive or invasive management. This helps in uniformity and better understanding between the Pathologists and the surgeon for development of management plans.

INTRODUCTION

Thyroid word originated from “Thyreos”, a Greek word meaning shield.^[1] Thyroid gland diseases are common particularly in India where iodine intake through diet is low.^[2] Neck swelling is a common clinical presentation in thyroid diseases all over the world. Most of the thyroid nodules are benign, asymptomatic and smaller, they do not require surgical excision.^[3] In India, there are 2,16,000 new cases of thyroid malignancies per year and the role of properly evaluating thyroid lesions is significant.^[4] Fine Needle Aspiration Cytology (FNAC) is a well-established used in the primary diagnosis of thyroid

swellings. It is minimally invasive, safe outpatient procedure without anaesthesia and major complications, cost effective method of investigation for thyroid lesions. The thyroid FNAC greatly helps in the evaluation of inflammatory, infectious and neoplastic conditions. It helps especially to distinguish non-neoplastic from neoplastic swellings. It reduces the rate of unnecessary thyroid surgery for patients with benign nodules.^[5-10] Thyroid cancer is the most common endocrine malignancy. Thyroid cancers most commonly present as a solitary thyroid nodule. It includes a strong recommendation for evaluation of all thyroid nodules >1 cm and palpable nodules.^[11] Cases of palpable thyroid swellings in

India is about 12.2%.^[12] India being an endemic area for goiter due to iodine deficiency, it is important to differentiate benign thyroid lesions from malignant. Many studies have demonstrated that fine-needle aspiration cytology (FNAC) is a valid procedure for evaluation of thyroid nodules in adults. The role of FNAC is increasing in recent years in management and risk assessment of thyroid swelling. Cytological evaluation of thyroid swellings is a rapid, easy and inexpensive diagnostic procedure, which is common used as a Screening tool. It helps in the patients for surgical or conservative management. In the past used for reporting cytopathology of thyroid, swellings have varied significantly from one laboratory to another, creating confusion in many cases. To solve this issue and for communication and uniformity of reporting NCI proposed the six tiered “The Bethesda System for Reporting Thyroid Cytopathology” (TBSRTC). Each report begins with 6 general diagnostic. The Bethesda System for Reporting Thyroid Cytopathology (TBS) is an international reporting system for thyroid cytology. Uniform terminology aimed to standardize the reporting of thyroid fine needle aspiration (FNA) cytology. FNA is gold standard for the preoperative evaluation of thyroid lesions. Six categories with different benign to malignancy each assigned management approach. In Bethesda system there are six categories include category I (nondiagnostic/unsatisfactory), category II (benign), category III (atypia of undermined significance) (AUS), Category IV follicular neoplasm (FN), Category V (suspicious for malignancy) and Category VI (malignant).

Aims and Objectives

Aim:

Study of morphology findings in patients with thyroid lesions by fine needle aspiration cytology.

Objectives:

To describe the various morphological features of thyroid lesions by fine needle aspiration cytology.

MATERIALS AND METHODS

This study that took place from January 2021 to March 2024 in the Department of Pathology at C.U. Shah medical college and hospital, Surendranagar.

All patients with palpable thyroid lesions who were referred from the ENT and Surgery OPD to the Department of Pathology at C.U. Shah medical college and hospital, Surendranagar for cytological examination. Before obtaining a sample for cytological analysis, a comprehensive clinical examination was performed and detailed clinical history and consent were taken from each patient.

The FNA procedure were performed using 22G or 23G needle, with the use of syringe for aspiration, utilizing imaging guidance wherever necessary. For Giemsa staining slides were air-dried. For Hematoxylin and Eosin (H&E) and Papanicolaou (PAP) Staining slides were immediately fixed in methanol. FNA were reported using The Bethesda

System for Reporting Thyroid Cytopathology (TBSRTC), and the cancer risk according to the guidelines was communicated to the surgeon for further management.

RESULTS

The present study “Study of morphology findings in patients with thyroid lesions by fine needle aspiration cytology” was undertaken in the Department of Pathology C.U. Shah medical college Surendranagar, Tertiary care Hospital from January 2021 to March 2024. FNAC was performed on 131 cases for cytological evaluation.

In present study the age of presentation ranged from 11 to 80 years. Age of the youngest patient in this study was 11 year with cytological diagnosis of colloid goitre with cystic changes. The oldest patient was of 80 year with cytological diagnosis of colloid nodule. Out of 131 cases, maximum 36 cases (27.49%) were seen in the age group between 31 years to 40 years.

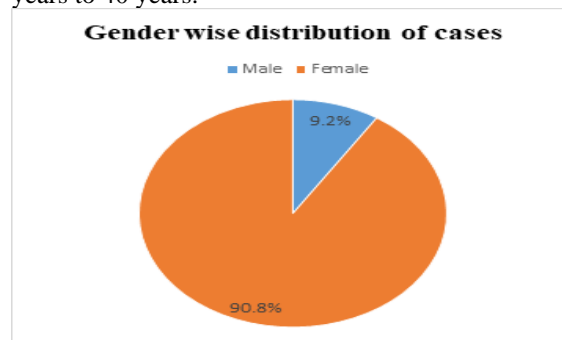


Figure 1: Gender wise distribution of cases

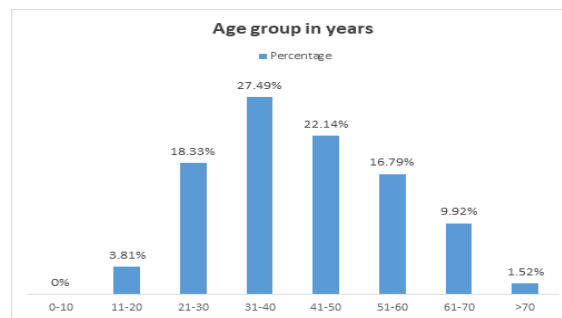


Figure 2: Age wise distribution of cases



Figure 3: H&E 20X: Colloid Goitre: Cluster of Follicular cells on a background of colloid material

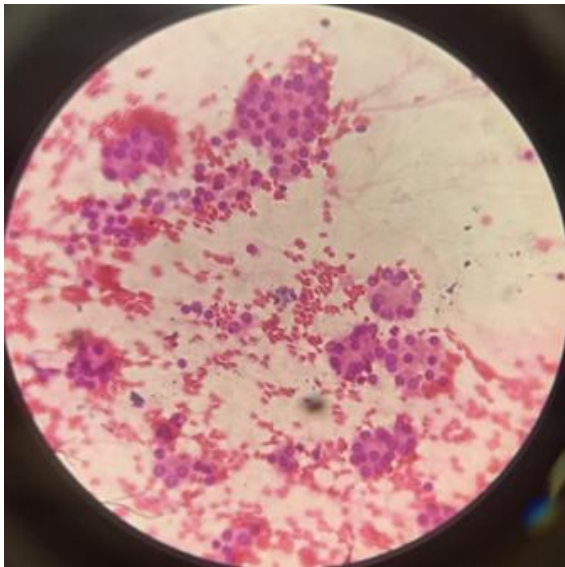


Figure 4: H&E 40X: Follicular neoplasm: Follicular cells are arranged in microfollicular and macrofollicular pattern with scant colloid

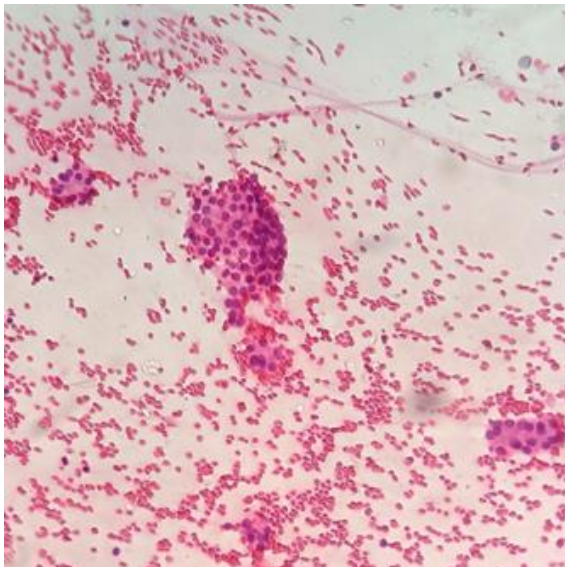


Figure 5: H&E 20X: Follicular neoplasm: Follicular cells are arranged in micro follicular and macro follicular pattern with scant colloid and hemorrhagic background

In present study, the thyroid lesions were more seen in females (90.8%) than male (9.2%). Female to males ratio is 9.9:1.

In present study, we have studied various morphological features of thyroid lesions and classified them according to the Bethesda system for thyroid cytopathology (2023). Out of 131 cases, 1 cases (0.76%) was unsatisfactory for reporting, 100

cases (76.33%) were benign, 8 cases (6.11%) were categorized under AUS. 13 cases (9.92%) were reported as Follicular Neoplasm (FN), 3 case (2.3%) were reported as suspicious of malignancy and 6 case (4.58%) were reported as malignant.

[Figure 2] shows highest case 36(27.49) distribution of age group is between 31 years to 40 years.

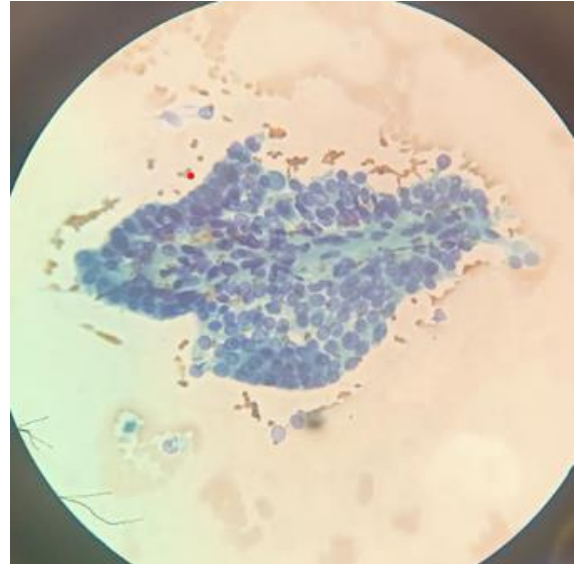


Figure 6: PAP 40X: Suspicious for malignancy: Cellular smear showing Follicular cells with enlarged nuclei, nuclear grooves and intranuclear pseudo inclusion.

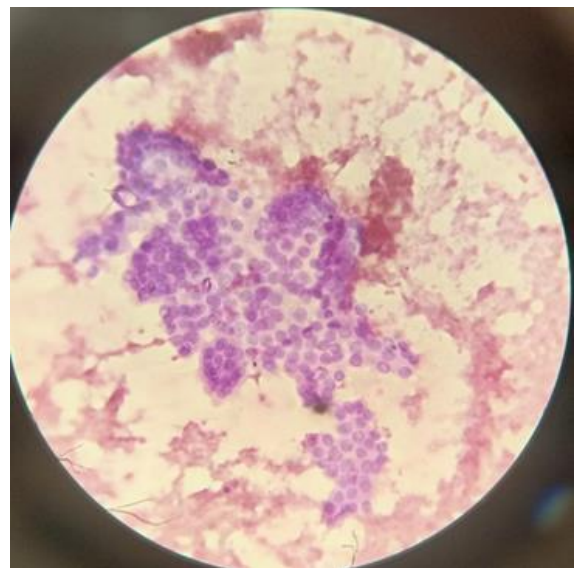


Figure 7: H&E 40X: Papillary carcinoma: Hypercellular smear showing Follicular cells arranged in papillae with enlarged nuclei, nuclear grooves and intranuclear pseudo inclusions

Table 1: Distribution of cases according to Bethesda system

Category	Number of cases	Percentage
I) Non diagnostic	1	0.76
II) Benign	100	76.33
III) AUS	8	6.11
IV) FN	13	9.92
V) SM	3	2.3
VI) M	6	4.58

Table 2: Sex wise distribution of cases

S. No.	Authors	Female : male ratio
1	Vinay Kumar R et al, ^[6]	7:01
2	Sunita Bamanikar et al, ^[7]	8.6:1
3	Present study	9.9:1

Table 3: Category wise distribution of cases and comparison with other studies

Name of study	CAT I (%)	CAT II (%)	CAT III (%)	CAT IV (%)	CAT V (%)	CAT VI (%)
Bhat et al, ^[8]	6.6	82	2	2.5	1.6	5.1
Dhamecha et al, ^[9]	10	82	1.25	5.75	0.25	0.75
Jo et al, ^[10]	18.6	59	3.4	9.7	2.3	7
Present study	0.76	76.33	6.11	9.92	2.3	4.58

DISCUSSION

Fine needle aspiration cytology is a highly effective screening and diagnostic procedure in the evaluation of thyroid lesions. It is simple safe, less time consuming, minimally invasive, outdoor procedure and cost effective. FNAC is use as a first priority investigation in patients with thyroid swelling. The procedure was performed on an OPD basis without anesthesia and no complications.

In our study, out of total 131 cases, 119 patients were females and 12 patients were males.

[Table 2] shows Female: Male ratio in our study was 9.9:1. It was comparable to most of the studies. It was closest to Sunita Bamanikar et al,^[7] in which the Female: Male ratio was 8.6:1.

It is a well-known fact that thyroid diseases affect females more commonly than males.

Category -I applies to specimens that are non-diagnostic overly thick smears, owing to obscuring blood, air drying of alcohol-fixed smears, or an inadequate number of Follicular cells. For a thyroid FNA specimen to be satisfactory for evaluation, at least 6 groups of benign Follicular cells are required, each group composed of at least 10 cells. Any specimen that contains abundant colloid is considered adequate, even if 6 groups of Follicular cells are not identified.

Our study had 0.76% cases in Non-diagnostic category and Bhat et al,^[8] Dhamecha et al,^[9] Jo et al,^[10] study shows respectively 6.6%, 10% and 18.6%.

The benefit of thyroid FNA derives in large part from the ability to make a reliably benign interpretation that avoids unnecessary surgery.

In our study benign category (Category II) had 76.33% cases, Bhat et al. 82% cases and Dhamecha et al. 82% cases. Benign lesions were closely linked to benign lesions in Bhat et al,^[8] and Dhamecha et al.^[9]

Some thyroid FNAs are not easily classified into the benign, suspicious, or malignant categories. Such cases represent a minority of thyroid FNAs and in the Bethesda System are reported as “atypia of undetermined significance”.

Our study had 6.11% cases in atypia of undetermined significance category III and Bhat et al,^[8] Dhamecha et al,^[9] Jo et al,^[10] study shows respectively 2%, 1.25% and 3.4%.

Our study had 9.92% cases in Follicular neoplasm category IV and Bhat et al,^[8] Dhamecha et al,^[9] Jo et al,^[10] study shows respectively 2.5%, 5.75% and 9.7%. Which shows Jo et al,^[10] study almost similar (9.7%) cases.

Our study had 2.3% cases in suspicious of malignant lesion category V and Bhat et al,^[8] Dhamecha et al,^[9] Jo et al,^[10] study shows respectively 1.6%, 0.25% and 2.3%. Which shows Jo et al,^[10] study almost similar (2.3%) cases.

Our study had 4.58% cases in malignant lesion category VI and Bhat et al,^[8] Dhamecha et al,^[9] Jo et al,^[10] study shows respectively 5.1%, 0.75% and 7%. Which shows Bhat et al,^[8] study near similar (5.1%) cases.

CONCLUSION

FNAC is an extremely useful screening procedure for the management of thyroid lesions with a high degree of accuracy. It is minimally invasive, safe outpatient procedure without anesthesia and major complications, cost effective method of investigation for thyroid lesions. FNA procedure can be repeated due to patient acceptance. The six diagnostic categories in the Bethesda system for reporting thyroid cytopathology are ensure a uniform reporting system for thyroid FNA. Bethesda system of reporting for thyroid facilitates effective communication among cytopathologists, endocrinologist, surgeons, radiologist and other health care providers. This helps in uniformity and better understanding between the cytopathologists and the treating surgeon leading to a rational development of management plans. Hence, it can be used as a first line of pathological investigation, which can help in identifying patients who will require non-invasive or invasive management.

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