



FINE NEEDLE ASPIRATION CYTOLOGY: ROLE IN THYROID LESIONS

Pathology

Dr. Pravin Pawane	Associate Professor, Department of Pathology, Maharaja Agrasen Medical College, Agroha (Hisar)
Dr. Sarvek Bajaj*	Assistant Professor, Department of Pathology, Maharaja Agrasen Medical College, Agroha (Hisar) *Corresponding Author
Dr. Karandeep Singh	Professor, Department of Pathology, Maharaja Agrasen Medical College, Agroha (Hisar)

ABSTRACT

BACKGROUND: Fine-needle aspiration cytology (FNAC) is the preliminary investigation of choice in the diagnosis of thyroid lesions. It is a widely accepted, rapid, easy to perform and safe procedure with a good degree of accuracy and excellent patient compliance.

AIM: To evaluate the frequency of various pathological conditions detected on FNAC in patients presenting with thyroid swellings.

PATIENTS AND METHODS: This was a retrospective study conducted on 62 patients in the year 2020. All patients with thyroid lesions were subjected to FNAC in Department of Pathology, Maharaja Agrasen Medical College, Agroha. Cases with inadequate sampling were excluded.

RESULTS: The study population was dominated by females, represented by 55 (88.7%) patients with an age range of 17-76 years. Most cases were non-neoplastic, representing 59 (95.2%), whereas 1 (1.6%) case was neoplastic and 2 (3.2%) cases were inconclusive. Colloid goiter was the commonest diagnosis followed by Lymphocytic thyroiditis, then adenomatoid goiter, Hashimoto and Granulomatous thyroiditis.

CONCLUSION: FNAC is rapid, simple, safe, and cost-effective diagnostic modality in the investigation of thyroid disease. The study highlights that FNAC should be treated as a first-line diagnostic test for thyroid swellings for investigating the nature of lesion and to guide the management.

KEYWORDS

Thyroid cyst, cystic nodule, papillary carcinoma, frequency thyroid lesions.

INTRODUCTION

Fine-needle aspiration cytology (FNAC) of the thyroid gland is a widely accepted, rapid, easy to perform, safe, cost-effective, and accurate method for screening patients with thyroid swellings.¹⁻³ It is becoming a vital tool for diagnosing lesions of thyroid with a decent amount of accuracy especially at the hands of an experienced pathologist. It aids in the decision making part of the management process prior to any other procedure. FNAC is an OPD procedure used in the primary diagnosis of thyroid swellings. It can also act as a therapeutic modality, for instance in cases of cysts, aspiration relieves the pressure symptoms. It is not always possible to reach a specific diagnosis due to variable sampling, but at least the information regarding the nature of the lesion can be conveyed to the clinicians which helps them in further management. Pathologies like colloid goiter, thyroiditis and hyperplasia as well as neoplastic processes can be evaluated and diagnosed with reasonable accuracy by looking at the cytological features.³

OBJECTIVES:

The objective of this descriptive study was to evaluate the frequency of various pathological conditions detected on FNAC in patients presenting with thyroid swellings in the Department of Pathology, Maharaja Agrasen Medical College, Agroha.

MATERIALS

This is a retrospective and descriptive study of a total of 62 cases of thyroid swelling referred to cytology unit, Department of Pathology, Maharaja Agrasen Medical College who underwent FNAC for diagnosis.

PLACE AND TYPE OF STUDY

The study has been conducted in the Department of Pathology, Maharaja Agrasen Medical College, Agroha (Hisar).

Duration of study: 2020 (1 year study)

METHODS

The present study titled 'Fine needle aspiration cytology: Role in thyroid lesions.' was carried out in the Department of Pathology, in our institute, Maharaja Agrasen Medical College, Agroha in 2020-2021 period (1 year study).

All reported cases involving thyroid region were retrieved from the cytopathology records of the Department of Pathology.

The slides were stained with Haematoxylin and Eosin, Field's and

Giemsa stains at the time of procedure. Frequency of various lesions was determined.

INCLUSION CRITERIA: All the cases of thyroid lesions with adequate sampling and sufficient features to reach a confirmatory diagnosis were included.

EXCLUSION CRITERIA: Cases with inadequate sampling were excluded.

RESULTS:

The study included 62 patients with thyroid swellings. There were 7 male (11.3%) and 55 female (88.7%) patients with an age range of 17-76 years. Majority of the cases (15; 4 males and 11 females) belonged to 31-40 yrs age group followed by 21-30 yrs (14; all females) and 51-60 yrs (14; 1 male and 13 females) age groups. This was followed by 41-50 yrs age group (12; 1 male). Least number of cases were from the age group of 11-20 yrs (03; all females) (Table 1)

Table 1: Age-wise And Gender-wise Distribution Of The Cases

Age group	No. of cases	Gender	
		Males	Females
11-20 years	03	00	3
21-30 years	14	00	14
31-40 years	15	4	11
41-50 years	12	1	11
51-60 years	14	1	13
61-70 years	03	1	2
71-80 years	01	0	01
TOTAL	62	07	55

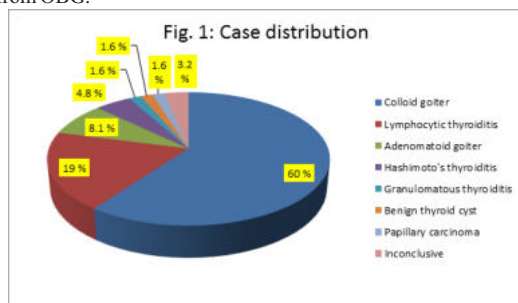
Colloid goiter was the commonest diagnosis with 37 cases (60%) followed by Lymphocytic thyroiditis -12 (19%). Other pathologies were Adenomatoid goiter 05 (8.1%), Hashimoto 03 (4.8%) followed by Granulomatous thyroiditis, Benign thyroid cyst and Papillary carcinoma which were 01 case (1.6%) each while 02 cases were inconclusive. Out of a total of 62 cases, 22 cases showed cystic change in which 19 (86%) were with colloid goiter and one case (4.5%) each of lymphocytic thyroiditis, benign thyroid cyst and Papillary carcinoma. (Table 2 and Fig. 1).

Table 2: Case Distribution Of Various Pathological Entities Encountered.

Diagnosis	No. of cases	With cystic change
Colloid goiter	37 (60%)	19 (86%)
Lymphocytic thyroiditis	12 (19%)	1 (4.5%)

Adenomatoid goiter	05 (8.1%)	-
Hashimoto	03 (4.8%)	-
Granulomatous	01 (1.6%)	-
Benign thyroid cyst	01 (1.6%)	1 (4.5%)
Papillary carcinoma	01 (1.6%)	1 (4.5%)
Inconclusive	02 (3.2%)	-
Follicular neoplasm	00	-
TOTAL	62	22

Majority of the cases which were 45 were referred from ENT followed by 08 cases from medicine, 07 from surgery, 01 from neurosurgery and 01 from OBG.



DISCUSSION

In present study, there was a female predominance giving a female-to-male ratio of 7.86:1. The age of patients ranged from 17 to 76 years, with median of 40 years. As in other literature, the benign cases represented the majority of cases (95.2%). The cytological features noted in various entities were as follows:

COLLOID GOITER

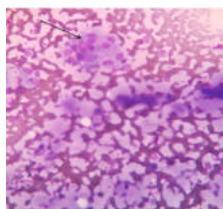


Figure 2: Colloid goiter- Follicular cells (arrow) arranged in clusters in a background of colloid.

These lesions exhibit variable cellularity ranging from barely adequate to extremely cellular, the latter raising the possibility of a neoplastic proliferation. Colloid is usually abundant (Figure 2) and many foamy macrophages are present including siderophages. From a few to many groups of benign epithelial cells may be seen, sometimes as large sheets of cells and intact thyroid follicles noted (Figure 2). These cells are fragile and bare epithelial cell nuclei are seen scattered throughout the background. Occasionally, these may be mistaken for lymphocytes and the lesion misdiagnosed as Hashimoto's thyroiditis or even lymphoma. Enlarged and abnormal oncocytic cells are often seen Hurthle cells (HC) or Askanazy cells which, if numerous, may mimic a HC neoplasm.³⁻⁶

LYMPHOCYTIC THYROIDITIS show features, namely large numbers of lymphocytes and plasma cells in addition to benign thyroid epithelial cells.³⁻⁶ (Figure 3)

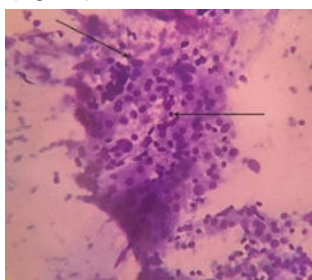


Fig. 3: Sheet of follicular cells admixed with infiltrating lymphocytes (arrows).

ADENOMATOID GOITER: This is an unexplained overgrowth of thyroid tissue. Most adenomas are harmless, but some produce thyroid hormone. This leads to an overactive thyroid (hyperthyroidism). Adenomatous goiter has an accompanying tumor formation due to the overgrowth of the cells of the thyroid tissue. The tumor formation may be single or multiple.⁷

HASHIMOTO'S DISEASE: Alongwith lymphocytes and plasma cells, Hashimoto's thyroiditis also show Hurthle cells (HC), (Figure 4), multinucleated and epithelioid histiocytes. Lymphoid follicle centre cells may also be noted.³⁻⁶

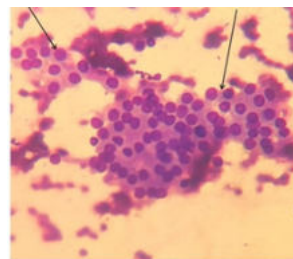


Figure 4: Cells showing oncocytic/Hurthle cell change (finely granular cytoplasm, large hyperchromatic nuclei); marked by arrows]

GRANULOMATOUS/ DE QUERVAIN'S THYROIDITIS is diagnosed by the presence of large multinucleated giant histiocytes, debris, inflammatory cells including lymphocytes and abundant colloid (Figure 5).³⁻⁶

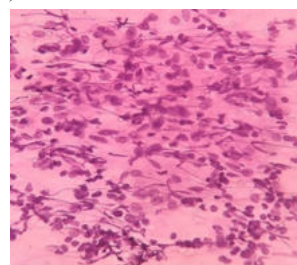


Figure 5: Epithelioid cell granulomas along with lymphocytes

BENIGN THYROID CYST: The fluid aspirated from a thyroid cyst is often quite cellular but may not contain epithelial cells. There are usually numerous foamy macrophages (Figure 6), many containing haemosiderin (siderophages), altered blood, colloid and small groups of benign thyroid epithelial cells. A drop of unstained cyst fluid examined under polarized light will show cholesterol crystals if there has been longstanding haemorrhage into the cyst. It must be borne in mind, however, that papillary carcinoma of the thyroid may present as a cystic lesion and the presence of psammoma bodies (calcific concretions) in otherwise unremarkable cyst fluid is a feature that should cause concern.⁴⁻⁶

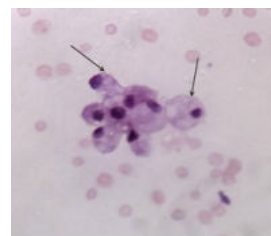


Figure 6: Cyst macrophages (arrows) from a case of benign thyroid cyst

PAPILLARY CARCINOMA: These tumours may occasionally present as cystic masses. Aspirates from papillary carcinomas are cellular and contain colloid, many foamy macrophages, siderophages and papillary clusters of epithelial cells. These cells exhibit large pale nuclei, often with grooves and intranuclear inclusions. The epithelial cells are often seen arranged around fibrovascular cores (Figure 7). Psammoma bodies, sometimes showing a laminated structure, are a particular feature of this neoplasm.⁴⁻⁶

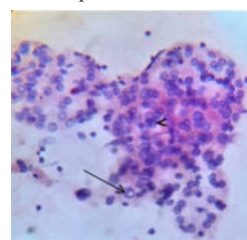


Figure 7: Black arrow marks an intranuclear cytoplasmic inclusion. Black arrowhead marks a tumor cell showing nuclear grooving.

CONCLUSION

FNAC is a quick, safe, and cost-effective diagnostic modality in the investigation of thyroid disease. The study highlights that FNAC should be treated as a first-line diagnostic test for thyroid swellings for investigating the nature of lesion and to guide the management. It is a minimally invasive, safe, easily performed OPD procedure. The clinicians should be encouraged to use FNAC as the initial modality in the evaluation of thyroid lesions. It is concluded that colloid goiter is the commonest condition in patients presenting with thyroid swellings followed by lymphocytic thyroiditis in our setup. FNAC is an easy and suitable tool for the assessment of patients and is a good test for both screening and follow-up.

REFERENCES:

1. Einhorn J, Franzen S. Thin-needle biopsy in the diagnosis of thyroid disease. *Acta Radiol* 1962;58:321-36
2. Lowhagen T, Grunberg P, Lundel G, et al. Aspiration biopsy cytology (ABC) in nodules of the thyroid gland suspected to be malignant. *Surg Clin N Am* 1979;59:3-18
3. McKee G. The role of fine needle aspiration cytology in the diagnosis of thyroid lesions. *Journal of the Royal Society of Medicine*. 1998;91(33_suppl):28-32.
4. McKee G. Thyroid. In: *Cytopathology*, Vol 86. London: Mosby-Wolfe, 1997:111
5. Orell SR, Sterrett GF, Walters MNI, Whitaker D, eds. Thyroid. In: *Manual and Atlas of Fine Needle Aspiration Cytology*, 2nd edn. London: Churchill-Livingstone, 1992
6. Bibbo E. Thyroid. In: *Comprehensive Cytopathology*, 2nd edn. Philadelphia: WB Saunders, 1997:673-701
7. Fukata S. Adenomatous goiter- concept, etiology, treatment]. *Nihon Rinsho*. 2007 Nov;65(11):2106-11. Japanese. PMID: 18018578