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Original Research Article

Bethesda reporting of thyroid FNACS with T3, T4, TSH correlation in a medical college of North Karnataka

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ABSTRACT

Introduction: Fine needle aspiration cytology (FNAC) is a safe, cost effective and accurate means of evaluating thyroid lesions. Using The Bethesda system of reporting thyroid cytopathology (TBSRTC), cytopathologist can communicate thyroid FNA interpretations to the referring physician which is clinically useful.

Aim: To describe the cytomorphological features of FNAC and correlate with thyroid hormone status in patients presented with diffuse swelling/solitary nodule of thyroid.

Materials and Methods: A total of 50 cases of thyroid FNA s studied for 10 months duration from Dec 2019 to Sept 2020 in the Department of pathology, KBNIMS, Gulbarga. The lesions were evaluated cytologically, categorised according to the Bethesda system for reporting thyroid cytopathology and correlated with Thyroid hormone profile.

Results: Out of 50 cases of thyroid FNAs studied, Females were most commonly affected and most common age group affected was middle aged individuals (31-40yrs). Bethesda Category 2 benign lesions were most commonly present in our study. Benign follicular nodule was more common among non neoplastic lesions. Most of the benign and malignant lesions were euthyroid and hypothyroidism is seen in hashimoto thyroiditis in most cases.

Conclusion: FNAC is a simple and cost effective diagnostic modality for thyroid lesions with high specificity and accuracy. cytological analysis in conjunction with thyroid hormone profile, helps clinicians determine the course of therapy in effective management of patients with thyroid lesions.

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1. Introduction

Fine needle aspiration cytology (FNAC) is now generally accepted by endocrinologists and surgeons as a safe, cost effective and accurate means of evaluating thyroid lesions. Widespread use of FNA has reduced number of patients requiring surgery by more than 50%. It has increased the yield of malignancy at thyroidectomy by 2-3 times and has decreased the overall cost of managing thyroid patients by more than 25%.¹

The Bethesda system of reporting thyroid cytopathology established a uniform, tiered reporting system for thyroid specimens. Using The Bethesda system of reporting

thyroid cytopathology (TBSRTC), cytopathologist can communicate thyroid FNA interpretations to the referring physician which is clinically useful.²

Thyroid gland is an endocrine organ. Histologically, it is composed of 20-40 dispersed follicles, lined by cuboidal to low columnar epithelium. Hypothalamus secretes Thyrotropin releasing hormone which stimulates release of TSH (Thyrotropin) from anterior pituitary. It stimulates thyroid growth and thyroid hormone synthesis.³

The thyroid is an important gland involved in the metabolism, growth, development, and maintenance of the internal environment.^{4,5} Thyroid dysfunction is very commonly encountered in clinical practice. TSH is considered the most important indicator for the evaluation of thyroid function.⁶ The reference range of Free T4 is 9-30

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pmol/L, and Free T3 range is 3.5 to 6.5pmol/L and reference range of TSH concentration is 0.2 to 4.2 mU/L.⁷

In the present study, Bethesda reporting was emphasised and Category III, IV, V, VI lesions were asked by physicians to correlate with thyroid profile for better management of the patients. T3, T4, TSH levels are assessed and clinically categorized as Euthyroid, Hypothyroid and Hyperthyroid.

2. Objectives

1. To assess hormone levels- (T3,T4,TSH) of thyroid lesions and correlate the cytological findings.
2. To categorise thyroid FNAs based on Bethesda system of reporting thyroid cytopathology.

3. Materials and Methods

It was a retrospective analysis of 50 cases of thyroid FNA s of 10 months duration from Dec 2019 to Sept 2020 in the Department of pathology, KBNIMS, Gulbarga. All the patients who presented with thyroid diffuse swelling /nodule, were assessed for T3, T4, TSH hormone levels. FNAC was done with 23 gauge needle following standard procedure under aseptic precautions. From the aspirates, one dry & one wet smears were made and stained with Giemsa, H&E, and PAP stains. Smears were evaluated by General pathologist and categorised according to The Bethesda system of reporting thyroid cytopathology. The Thyroid Function Test profile (T3,T4,TSH) was performed using Cobas E411 Electro Chemiluminescence immunometric assay method.(Roche diagnostics).Data was evaluated for thyroid lesions

4. Results

The study was carried out in 50 patients who presented with palpable thyroid lesions of which, 38 were females and 12male [Table 1] for a period of 10 months duration. The age group in the study ranged from 20 years to 60 years. Most of the patients belonged to the age group ranged from 31-40 years.

5. Discussion

Fine-needle aspiration (FNA) is the first line investigation for thyroid lesions and provide useful diagnostic information for clinical management. It is helpful in categorisation of thyroid lesions following TBSRTC and minimise the need for surgery.

In our study, most of the lesions were observed in females, correlating with studies by CK Sang et al, Gupta R et al., and Rupam et al., have similar findings.^{8,9} Most lesions from our study were Benign of Bethesda category-II showing similar findings as Shukla et al¹⁰ and Benign follicular nodule is the most common lesion comprising of colloid goitre, diagnosed based on presence of thin colloid

& bare nuclei with few follicular cells. Nodular goitre showing thin colloid, hyperplastic follicular epithelial cells and bare nuclei, Adenomatous nodule, showing clusters and singly scattered follicular epithelial cells in the background of thin colloid correlating with incidence of category II thyroid lesions by Mahar et al, Suman poudel et al and Sood et al.^{11,12} Cytologically, hurthle cells & granulomas (Figure 1) were demonstrated in hashimoto thyroiditis, some of the cases showed multinucleate giant cells.

3 cases were categorised as Non diagnostic, 2 cases were categorised as Atypia of undetermined significance showing clusters of follicular cells, in microfollicles or three-dimensional groups and with scant colloid and extensive but mild atypia, 3 cases were categorised as Follicular neoplasm showing high cellularity, hurthle cells (Figure 2), cell clusters in micro follicles and solid pattern are seen in some cases and devoid of colloid. Benign hurthle cells with eccentric nucleus and abundant eosinophilic cytoplasm surrounded by lymphocyte impingement was noted in Lymphocytic or Hashimoto's thyroiditis.(Figure 3).

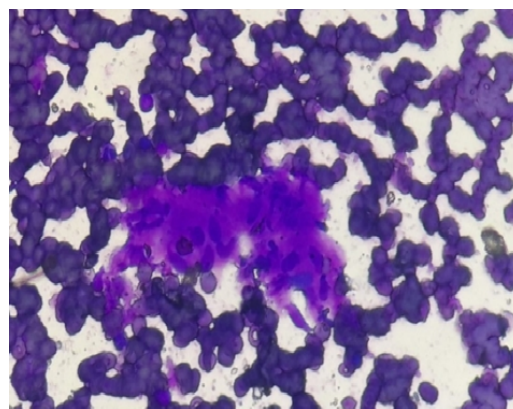


Fig. 1: Granuloma in Hashimoto's thyroiditis (Field's 40X, HP)

Table 1: Age & Sex Distribution of Thyroid Lesions

Age	Male	Female
20-30	4	7
31-40	6	8
41-50	1	9
51-60	5	10
Total no. of cases= 50	16	34

One case was suspicious for malignancy showing sparsely cellular, mild-to-moderate nuclear enlargement with mild nuclear atypia, nuclear grooving was evident, Intranuclear pseudo inclusions (INCIs) are very few and psammoma bodies are absent.

Neoplastic lesions were very few (3) in number, 2 cases comprising Papillary thyroid carcinoma was most common malignant lesion in our study showing same

Table 2: Distribution of thyroid lesions

Bethesda category of thyroid lesions	No. of Cases
Category-I : Non diagnostic/unsatisfactory	3
Category-II : Benign	33
Category- III : Atypia of undetermined significance	2
Category-IV : Follicular neoplasm/ suspicious for follicular neoplasm	3
Category-V : Suspicious for malignancy	1
Category- VI: Malignant	3

(Table 2) FNAC revealed 3cases in Category I, 33 cases in benign i.e Category II, 3 cases each in Category IV and VI, 2 cases in Category III and one case in Category V.

Table 3: Bethesda correlation with thyroid function test

Bethesda category	Euthyroid	Hypothyroidism	Hyperthyroidism
Category I Non diagnostic	3	-	-
Category II Benign- Follicular nodule Hashimoto's Granulomatous	9	24	-
Category III Atypia of undetermined significance	-	2	-
Category IV Follicular Neoplasm	1	-	2
Category V Suspicious for malignancy	1	-	-
Category VI Malignancy	1	2	-

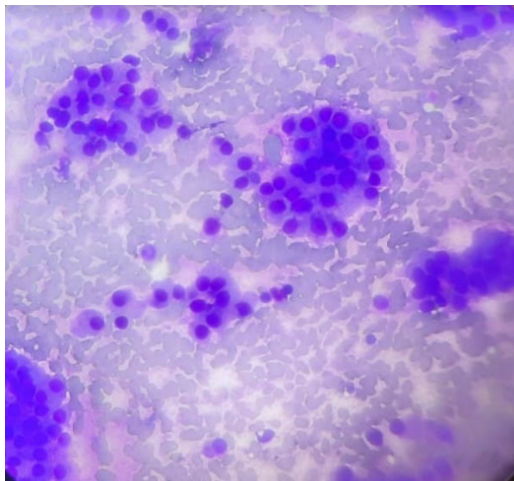


Fig. 2: Follicular neoplasm showing hurthle cells (H & E, 10X, IP)

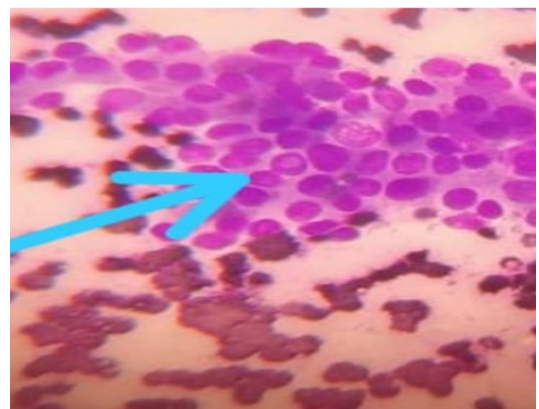


Fig. 4: Papillary carcinoma of thyroid showing intra cytoplasmic inclusion (Field's, 40X, HP)

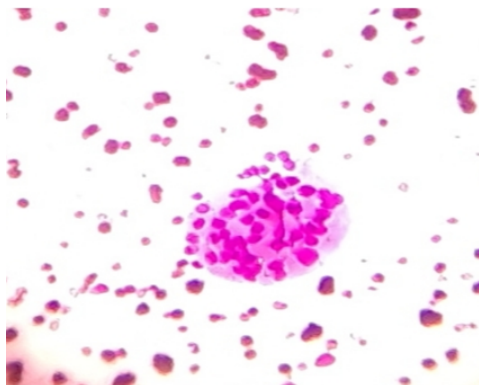


Fig. 3: Hashimoto's thyroiditis showing lymphocyte impingement (Field's, 40X, HP)

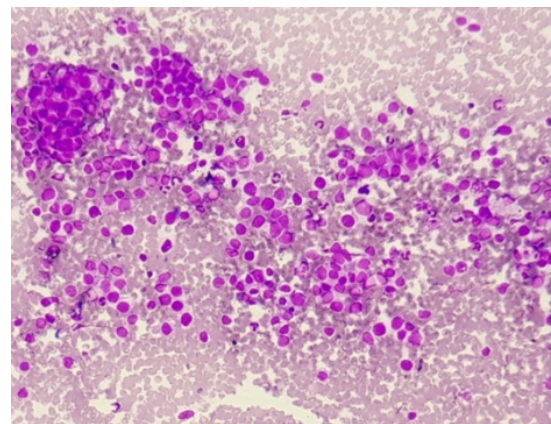


Fig. 5: Lymphoma in the background of Hashimoto's thyroiditis (Field's, 10X, IP)

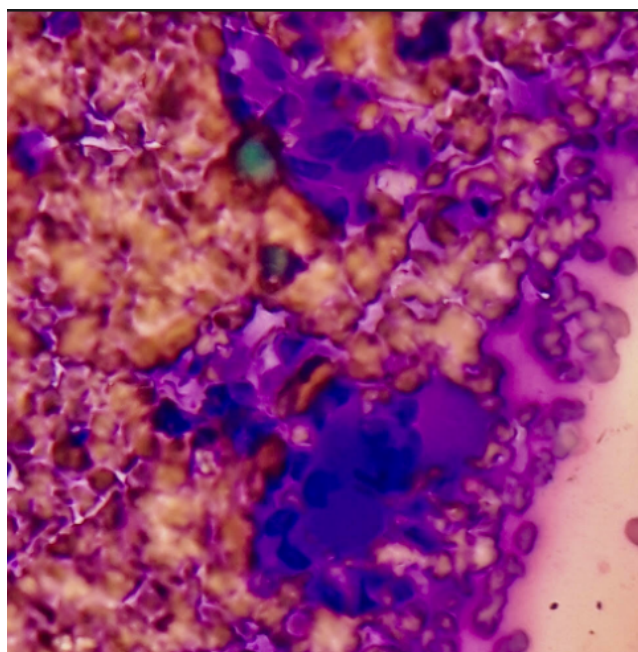


Fig. 6: Hurthle cell with clinging of lymphocytes (Field's 40X, HP)

findings in a study conducted by Sinna et al,¹³ Cells forming aggregates and sheets with scanty colloid. Optically clear pale nuclei, intra nuclear cytoplasmic inclusions and nuclear grooving was seen in papillary carcinoma of thyroid (Figure 4). One case was reported as lymphoma in the background of Hashimoto's thyroiditis (Figure 5) as studied by Usha et al¹⁴ showing mixed population of dispersed pleomorphic large lymphoid cells and few benign follicular epithelial cells with hurthle cell change in the background of lymphoid globules. The closest differential diagnosis includes anaplastic carcinoma of the thyroid gland that show cell clustering and nuclear molding and absence of lymphoglandular bodies.^{15,16}

Estimation of thyroid hormonal status helps the clinician in proper management of such patients. Most of the thyroid lesions that are of Bethesda category II in our study are i.e; Benign Follicular nodule and they are Euthyroid status showing similar findings as stated by Junu et al.¹⁷ Hashimoto's thyroiditis presents as painless thyromegaly in middle aged woman. In most of the cases, it progresses over a period of time to subclinical and then clinically overt hypothyroidism. However, in some cases, it may be preceded by a transient hyperthyroid state (hashitoxicosis) due to destruction of follicles and subsequent rise in the free T3 and T4 along with fall in TSH and diminished radioactive iodine uptake.¹⁸

Hypothyroidism was seen in cases of lymphocytic thyroiditis, correlating with study by Minnu Prasannan et al.¹⁹ and benign follicular nodule. Cases of colloid goitre was showing euthyroid status. Hypothyroidism at

the time of diagnosis is documented in 30-40% of patients due to replacement of the thyroid parenchyma by the lymphomatous process or due to underlying Hashimoto's Thyroiditis.¹⁶

Patients are unable to undergo all diagnostic tests owing to economical and social reasons. The loss to follow up of patients referred from surrounding areas as well as the fact that most of the lesions do not require surgical intervention, also limits the number of cases wherein histopathological correlation is available. Our cases has underwent a thyroid scan or antibody panel analysis. However, in spite of the limited resources we had a high satisfactory rate of smears and FNAC proved to be a sensitive and specific diagnostic modality.

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7. Conflict of Interest

The authors declare they have no conflict of interest.

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