



CYTOPATHOLOGICAL DIAGNOSIS OF THYROID LESIONS ACCORDING TO BETHESDA CLASSIFICATION.

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ABSTRACT

Introduction: Fine needle aspiration cytology (FNAC), is an initial investigation in evaluation of thyroid lesions. Due to lack of standardized system for reporting thyroid cytology in 2007, "The Bethesda System for Reporting Thyroid Cytopathology(TBSRTC)" was introduced. It is a six tier system. **Aim:** To classify thyroid FNACs based on "The Bethesda system for reporting thyroid cytopathology." **Objectives:** To analyse thyroid cytology through TBSRTC and analyse the distribution of lesions in various categories. **Materials and methods:** This was a one-year prospective study between May 2019 and May 2020. Needle aspiration was done in 130 patients presenting with thyroid swelling. **Observation and Results:** Present study shows distribution of lesions according to TBSRTC:- Inadequate and with cystic lesions-2.31%, benign-81.54%, Atypia of Undetermined Significance/Follicular Lesion of Undetermined Significance-1.54%, Follicular Neoplasm /Suspicious for a Follicular Neoplasm-5.38%, Suspicious for Malignancy-6.92%, and Malignant-2.31%. **Conclusion:** Fine needle aspiration cytology is a simple, easy, OPD based, cost effective and accurate initial diagnostic test for the evaluation of patients with thyroid swellings.

KEYWORDS : The Bethesda system, Thyroid, FNAC

INTRODUCTION

Fine needle aspiration cytology (FNAC) is considered one of the initial diagnostic investigation and readily available screening test in the evaluation of thyroid lesions. To overcome the lack of standardized system for reporting thyroid lesions in cytology, in year 2007, the National Cancer Institute (NCI) in Bethesda, came up with a uniform nomenclature in the interpretation of the thyroid fine needle aspirates, known as "The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC)". This atlas describes six diagnostic categories of lesions. Non diagnostic/Unsatisfactory is category I, Benign is category II, Atypical Follicular Lesion of Undetermined Significance(AFLUS) is categorised as category III, Suspicious for Follicular Neoplasm comes under category IV, Suspicious for malignancy is classified as category V and Malignant lesions come under category VI. It reduces unnecessary surgery for patients with benign nodules and appropriately triages patients with malignant nodules for timely clinical intervention.¹

AIM

To analyse thyroid cytology through The Bethesda System for reporting thyroid cytopathology and to analyse the distribution of lesions under various diagnostic categories and subtypes.

MATERIALS AND METHOD

This study was carried out in a tertiary care hospital. This was a prospective study between 2019 to 2020. The study was approved by institution ethics committee. FNAC was performed after obtaining written consent in all the 130 patients. After eliciting detailed clinical history, the site is cleansed with spirit and fine needle aspiration was done using 21 to 23 gauge needle and 10ml syringe. One to two "to and fro" movement were given and the aspirated material was smeared onto glass slides. Smears were fixed in 95% ethyl alcohol and stained with Haematoxylin and Eosin stains. In cases where fluid was aspirated on FNA, the fluid was centrifuged and smears were prepared from the sediment followed by the above staining methods. Criteria for adequacy in smear was minimum of six groups of well-visualized (i.e., well-stained, undistorted, and unobstructed) follicular cells, with at least ten cells per group, preferably on a single slide.

OBSERVATION AND RESULTS

Total number of cases studied were 130.

Age: Out of 130 patients studied age of patients ranged between 9 years and 85 years. Major proportion of the patients (28.46%) belonged to age group of 41-50 years.

Sex: Out of the 130 patients with thyroid lesions 119 were females and 11 were males. Female to male ratio was 10:1. The youngest patient was 9 years old female child and the eldest was 85 year old female.

Adequacy rate : Out of 130 FNACs, three aspirates were inadequate for cytological evaluation, hence they were labeled as unsatisfactory

smears. They were categorized into category I of The Bethesda system. The unsatisfactory smears had less than six clusters of follicular cells containing less than ten cells per cluster in a single smear.² The adequacy rate in our institution was 97.7%.

Distribution of lesions: The Fine needle aspiration smears which were adequate for evaluation were categorized into non neoplastic and neoplastic lesions. The non neoplastic lesions included colloid goitre, colloid goitre with cystic degeneration, hyperplastic nodule, and Hashimoto's thyroiditis and thyroglossal cyst they come under category II of The Bethesda system. The non neoplastic lesions constituted the major proportion 81.53%. The neoplastic lesions comprise of "Atypia of undetermined significance", "Follicular neoplasm or suspicious for follicular neoplasm and follicular neoplasm suspicious of Hurthle cell type", "suspicious of papillary carcinoma", and "malignancy"

The Bethesda system of reporting thyroid cytopathology:

categories Among 130 cases, non neoplastic category II lesions were the major proportion constituting 81.53%, category I unsatisfactory smears were 2.30%, category III were 1.53%, category IV with 5.38%, category V with 6.92% and category VI had 2.30% of cases each.³

TABLE-1 DISTRIBUTION OF PATIENTS ACCORDING TO THE BETHESDA SYSTEM (N=130)

Categories	Number	Percent (%)
Category I	3	2.31%
Category II	106	81.54%
Category III	2	1.54%
Category IV	7	5.38%
Category V	9	6.92%
Category VI	3	2.31%
TOTAL	130	100

TABLE-2 DISTRIBUTION OF PATIENTS ACCORDING TO CATEGORY II (N=106)

Categories	Number	Percent (%)
Colloid goitre	67	63.21%
Colloid goitre with cystic degeneration	36	33.96%
Hashimotos' Thyroiditis	2	1.89%
Thyroglossal cyst	1	0.94%
TOTAL	106	100%

Colloid goitre/ colloid goitre with degeneration Among Colloid goitre patients, majority of them belonged to the age group of 41-50 years. Microscopic features:

Smears showed scant to moderate cellularity. Smears had follicular cells arranged in microfollicles and monolayered sheets. Follicular cells had regular round nuclei with fragile gray blue cytoplasm. Occasionally many bare nuclei and Hurthle cells were seen.

Background showed abundant colloid which appeared green to pink with Papanicolaou stain and blue violet with MGG stain. Colloid showed pavement like appearance.⁴ Cases with fluid aspirate from cysts showing cyst macrophages and hemosiderin laden macrophages were reported as colloid goitre with cystic degeneration.

Hashimoto's thyroiditis : Two cases of hashimoto's thyroiditis was diagnosed in cytology in our study. Microscopic features: Smears showed moderate cellularity. Follicular cells were arranged in microfollicles and monolayered sheets. Many lymphoid cells were seen impinging on the follicular cells. Polymorphic population of lymphoid cells were seen in the background including plasma cells. Hurthle cells were seen singly scattered or arranged in clusters. Hurthle cells have distinct cell border, abundant finely granular cytoplasm and large nuclei . Some hurthle cells showed nuclear atypia and prominent nucleoli.⁴

Thyroglossal cyst: There was one case of thyroglossal cyst. Fluid was aspirated and smears showed scanty cellularity with the presence of squamous cells and macrophages.

Neoplastic lesions of the thyroid gland: Neoplastic lesions of thyroid according to the Bethesda system comprises of lesions from category III to category VI.

Category III: Atypia of undetermined significance In our study there were two cases in this category.

Category IV: "Follicular neoplasm/ Hurthle cell neoplasm, suspicious for follicular neoplasm/ Hurthle cell neoplasm": There were seven cases in this category. The patients of this category had a wide range of age, from 49 years to 75 years. Microscopy features : Smears had moderate to marked cellularity. Smears had many uniform sized microfollicle clusters in a background of scant colloid. Follicular cells had large round nuclei with inconspicuous nucleoli and scant amount of cytoplasm. Nuclear overlapping and syncytial aggregates were occasionally seen.

Category V: Suspicious for malignancy: In present study there were nine cases in this category. Microscopic features : Smears had moderate to high cellularity. Follicular cells arranged in macrofollicles predominantly, admixed among the benign looking follicular cells with some follicular cells having nuclear enlargement and mild nuclear palor.

Category VI: Malignant: In present study there were three cases in this category. Microscopic features: Smears studied were highly cellular. They showed many papillae with or without fibrovascular cores formed by follicular cells. Papillae had anatomical bordering. Follicular cells had large nuclei with irregular nuclear membrane, powdery chromatin. Nuclear overlapping and crowding were noted. Some nuclei showed intranuclear cytoplasmic inclusions and longitudinal grooves.⁵

DISCUSSION

In this study thyroid fine needle aspirations were categorized according to the Bethesda system, a six tier category. The study period was from July 2019 to June 2020. During the study period, a total of 130 cases of thyroid fine needle aspirations were collected and categorized according to "The Bethesda System for Reporting Thyroid Cytopathology".

The salient features of the present study include :

- A total of 130 cases were studied, out of which 119 patients were females and 11 were males.
- Age group of these patients ranged from 9 years to 85 years with a mean age of 44 years. Majority of the patients were in the age group of 41- 50 years.
- An adequacy rate of 97.7% was obtained in the study.
- Out of 130 cases, 106 cases were non neoplastic, 21 cases were neoplastic, and 3 cases were unsatisfactory for evaluation, 2 cases were in category of atypia of undetermined significance.
- The benign category (category II) had the maximum number of cases(106 cases), out of which colloid goiter was the predominant diagnosis(67 cases). In **Theoharis et al⁶** , **Mittal, et al⁷** studies showed benign category 72.91%, 78.9% cases. In this majority of them were nodular goiter, followed by lymphocytic thyroiditis and colloid nodules.
- Category IV had 7 cases, Category V had 9 cases, Category VI had

3 cases of Papillary carcinoma.

CONCLUSION:

Fine needle aspiration cytology is a simple, easy, OPD based, cost effective and accurate initial diagnostic test for the evaluation of patients with thyroid swellings. TBSTRC reduces inter-observer variability in reporting thyroid FNAs and provides good communication between the surgeon and pathologist. As a screening test before surgery, FNAC still needs to be followed as a routine procedure for successful patient management.⁸ Adequacy rate of the present study is 97.7%. Category I and II in the non neoplastic category of the Bethesda system have more accurate categorization index. Similarly category V and VI had precision in the diagnosis. This indicates that there are clearcut distinctions between the two ends of the spectrum of non neoplastic and neoplastic lesions. Category IV lesions fall under grey zone and there is need of further clarity for diagnostic categorization in this grey zone. It could be further refined by applying more advanced immunocytochemical and molecular genetic analysis to these patients falling in the grey zone. Further studies involving larger sample size and histopathological correlation with specialized techniques is the need of the hour for patients with thyroid swelling.⁹

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