

The Bethesda System of Reporting Thyroid Cytology – A Prospective Study in a Tertiary Care Centre

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Abstract

Original Research Article

Introduction: Thyroid enlargement necessitates proper evaluation for appropriate management. Fine needle aspiration cytology is considered to be rapid reliable diagnostic method with proper sampling. Needless thyroidectomies can be avoided with six tiered Bethesda system of reporting thyroid cytopathology (BSRTC) because of its well narrated guidelines on patient management. **Objectives:** The study is undertaken to categorize the thyroid lesions by using BSRTC for appropriate management. **Methodology:** Cases who presented with thyroid enlargement were subjected for Fine Needle Aspiration Cytology after recording complete clinical data and examination findings. Based on complete microscopic analysis, the lesions were categorized based on BSRTC and their frequency was analyzed in the study. **Results:** Of 138 cases, majority of the patients were in age group of 31-40 years. 126 were females and 12 were males. The thyroid lesions were categorized as per BSRTC, of which, 4 were Unsatisfactory (category I), 121 were benign (category II), 5 were AUS / FLUS (category III), 4 were FN / SFFN (category IV), 2 were suspicious for malignancy (category V) and 2 were malignant (category VI). Maximum number of cases was in category II. **Conclusion:** BSRTC categorization of thyroid lesions significantly reduces the number of thyroidectomies by its proper guidelines on patient management unlike other diagnostic tools. Standard reporting format in cytology of thyroid lesions is mandatory for proper patient management.

Keywords: Bethesda system of reporting thyroid cytopathology, Fine needle aspiration cytology, Thyroid lesions.

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INTRODUCTION

Thyroid gland enlargement is more common in females accounting for 4 – 7 % [1]. The wide spectrum of thyroid lesions ranges from goiter to malignant neoplasms [2]. The approximate distributions of these thyroid lesions are goiters, cysts and thyroiditis in 80% of cases, benign follicular neoplasms in 10- 15% and thyroid carcinoma in 5% [2].

Fine Needle Aspiration Cytology (FNAC) is the gold standard method to avoid unnecessary surgeries in patients presenting with thyroid enlargement thereby it helps to avoid post thyroidectomy complications particularly hypoparathyroidism and recurrent laryngeal nerve injury [3]. FNAC is done by aspiration of cells from palpable swelling using syringe and needle. It is a cost effective, reliable, outpatient procedure that can be readily repeated [4,5].

Historically, non-standardized terminology for thyroid FNA created much confusion among

pathologists and clinicians which led to variable practices and management [6]. So to address terminology and to avoid confusions related to thyroid FNA, Andrea Abati organized the National Cancer Institute (NCI) hosted the “NCI Thyroid FNA State of the Science Conference” which took place on October 22 and 23, 2007, in Bethesda [7]. The 6 tiered Bethesda System for Reporting Thyroid Cytology (BSRTC) is the current reporting format followed with proper management guidelines.

The present study aims to evaluate the thyroid lesions as per BSRTC reporting system.

MATERIALS AND METHODS

This was a prospective study done in the Department of Pathology, Sri Venkateshwara Medical College Hospital and Research Centre, Ariyur, Puducherry, during the period from November 2016 to May 2018, comprised of 138 patients who presented with history of thyroid enlargement and were referred from the Departments of ENT, Surgery and Medicine.

Inclusion criteria

- Patients presenting with thyroid swelling.
- Both male and female patients.

Exclusion criteria

- Patients who refuse FNAC
- Patients with bleeding diathesis

All the patients were asked for complete clinical history and were examined. After explaining the procedure clearly to the patient, aspiration was done in Rose's position from the thyroid by to and fro movements using a 23-gauge needle with syringe. Then the aspirated material was spread over clean labelled slides and smeared immediately. Both dry and wet smears were made. Then the smears were stained with Hematoxylin and Eosin, Papanicolaou stain and Giemsa stain, mounted and viewed under light microscopy and categorized as per BSRTC.

SPSS (19 version) was used for analyzing the findings.

Evaluation of cytological features as per BSRTC norms as follows [7]**Category I - Non-diagnostic or Unsatisfactory**

Cyst fluid only, acellular specimen, others (obscuring blood, clotting artifact, etc.) Adequacy criteria is presence of at least well preserved 6 groups with minimum of 10 thyroid follicular cells in each groups on a single slide. Exceptions to these numeric criteria are colloid nodule, solid atypical nodules or inflammation [8]. Implied risk of malignancy is 5 – 10% and the recommended management is repeat FNA with ultrasound guidance.

Category II - Benign

Adenomatous nodule, colloid nodule, lymphocytic thyroiditis, granulomatous thyroiditis. Adequate cellularity with monolayered evenly placed nuclei and thick or thin colloid. Risk of malignancy is 0

– 3% [9]. Recommended management is clinical and sonologic follow-up.

Category III - Atypia of Undetermined Significance (AUS) or Follicular Lesion of Undetermined Significance (FLUS)

Samples that is insufficient to qualify for categories 5 or 6 with atypia with or without nuclear pseudo-inclusions / grooves / exclusive microfollicles / crowded three dimensional clusters / exclusive hurthle cell aspirate. Risk of malignancy is 10-30 % and narrates repeat FNAC or lobectomy [10, 11].

Category IV - Follicular Neoplasm or Suspicious for a Follicular Neoplasm

Exclusive microfollicular pattern with nuclear crowding and overlapping is the criteria and the purpose of this category is to triage the patient for diagnostic lobectomy to differentiate follicular adenoma from follicular carcinoma. Estimated risk of malignancy is 25 – 40% [11,12].

Category V - Suspicious for Malignancy

Some Papillary carcinomas that are sparsely cellular, patchy nuclear changes, cystic degeneration pattern should be best categorized in this group to avoid histopathological discrepancies particularly follicular variant of PC. Since chances of malignancy ranges 50 – 75%, recommended management for this category is lobectomy or near total thyroidectomy. This same principle applies to all other thyroid malignancies [11, 13].

Category VI - Malignant

This category is used when the cytomorphic features are conclusive for malignancy. Risk of malignancy is 97-99% and the management protocol is near-total thyroidectomy or lobectomy [11].

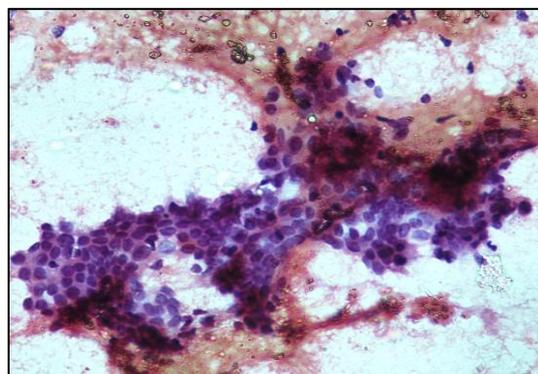
Microscopy

Fig-1: Hashimoto's thyroiditis on fnac (40x) (h&e)

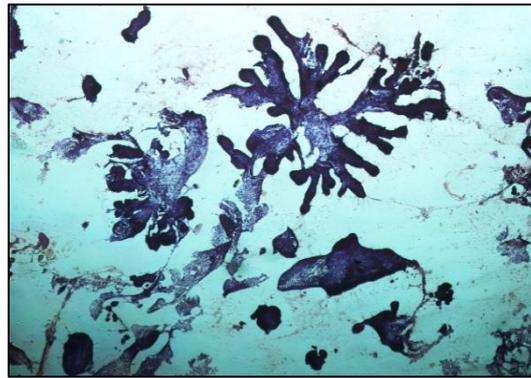


Fig-2: Papillary carcinoma on fnac (4x) (h&e)

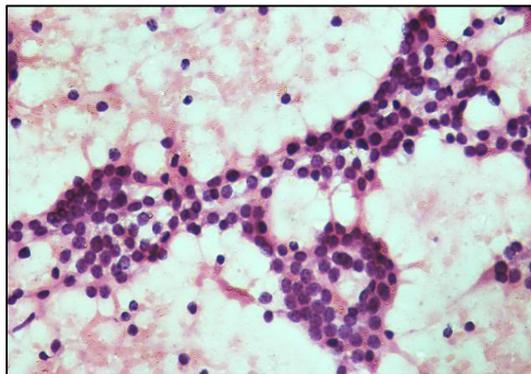


Fig-3: Follicular neoplasm on fnac (40x) (h&e)

RESULTS

Age group of patients with thyroid enlargement ranged from 10 years to 80 years with mean age group of 39.5 years and standard deviation

was 15.3. Majority of the cases were in the age group of 31- 40 years.

Of the 138 cases, majority of the cases were females accounting for 91.3%.

Table-1: Frequency and percentage of BSRTC categories of thyroid lesions

Cytological diagnosis	No of cases	Percentage (%)
I – Unsatisfactory	4	2.9
II – Benign	121	87.7
III - Atypia of undetermined Significance	5	3.7
IV - Follicular neoplasm or Suspicious for follicular neoplasm	4	2.9
V - Suspicious for malignancy	2	1.4
VI – Malignant	2	1.4

The total thyroid aspirations in the present study were 138 cases. Among these, majority of the cases belongs to category II with 121 cases (87.7%) followed by category I with 4 cases (2.9%), category III

with 5 cases (3.7%) category IV with 4 cases (2.9%), category V with 2 cases (1.4%) and category VI with 2 cases diagnosed as Papillary carcinoma (1.4%).

Table-2: Frequency and percentage of benign conditions as per Bethesda system

Benign conditions	No of cases	Percentage (%)
Simple colloid goiter	24	19.8
Nodular colloid goiter	46	38.0
Adenomatous goiter	11	9.1
Hashimoto thyroiditis	40	33.1

DISCUSSION

The preoperative evaluation of thyroid enlargement imparts a major role in proper management of the patient. Among the various diagnostic tools such as thyroid function test and ultrasound of neck, fine needle aspiration cytology of thyroid is considered to be a simple, safe and inexpensive technique that can be done as outpatient procedure with good reliability and can be readily repeated if necessary.

Diagnostic categories for thyroid lesions are defined differently in different institutions which caused confusions among clinicians regarding treatment plan. So to bring uniformity, new 6 categories are recommended by Bethesda system as a standardized reporting format. The guidelines regarding risk of

malignancy and treatment plan are very clear for these categories in BSRTC.

Age distribution

In the present study, mean age at presentation was 39.5 years which correlates well with the study conducted by Mehrotra D *et al.* [14] where the mean age at presentation was 37.2 years.

Sex distribution

In the present study 126 were females and 12 were males. The results are similar to Silverman JF *et al.* [15] study in which 270 were females and 25 were males.

Categorization of thyroid lesions as per BSRTC

Table-3: Comparison of percentage of distribution of BSRTC categories of present study with other studies

BSRTC category	Present study	P Mehra <i>et al.</i> [16]	Jo V Y <i>et al.</i> [8]	Yang <i>et al.</i> [17]
I	3.6	7.2	18.6	10.4
II	86.2	80	59.0	64.6
III	3.6	4.9	3.4	3.2
IV	2.9	2.2	9.7	11.6
V	2.2	3.6	2.3	2.6
VI	1.4	2.2	7.0	7.6

In the present study percentage of benign thyroid lesion was more as in the other studies.

Benign thyroid lesions on cytology

In the present study out of 121 benign cases, 46 were nodular colloid goiter, 24 were simple colloid goiter, 11 were adenomatous goiter, 40 were Hashimoto thyroiditis. Similar results were found by Silverman JF *et al.* [15] in their study on 295 cases in which nodular colloid goiter were 156, colloid cyst was 19, follicular hyperplasia was 5 and Hashimoto thyroiditis was 3.

CONCLUSION

FNAC of thyroid lesions is a prime, simple, economical, safe and rapid outpatient procedure. The precise recommendations of BSRTC system in categorizing the thyroid lesions and handling of patients are deprived in other preoperative evaluating tools.

The systematized diagnosis, forecasting the risk of malignancy and clear-cut instructions in patient management by standardized BSRTC categorization of thyroid lesions play a most crucial role in selecting the patients for surgical intervention. Hence the BSRTC reporting format should be followed for better understanding of nature of lesions and to avoid needless surgeries.

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