



Comparative reporting of thyroid cytology using Bethesda system with that of conventional system

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Abstract

Background: Recent Bethesda System (2017) for reporting of thyroid lesion (TBSRTC) in cytopathology (FNAC) has attempted standardize the diagnostic approach. A uniform reporting system for thyroid FNA will facilitate effective communication among health care providers which helps in reducing the number of unnecessary thyroidectomies.

Aims and Objectives: To evaluate the cases according to Bethesda system and compare the result with conventional system.

Material and Methods: A retrospective study on FNAC thyroid was performed in M.G.M Medical College and M.Y. Hospital which included 500 cases which were reported from May 2013 to May 2018. For cytomorphological analysis of smears with Papanicolaou stain were reviewed and cases were categorized into six Bethesda categories.

Results: Females were more than males with a ratio of 7:1, age ranged between 20 years to 70 years. 26 cases (5.2%) categorized as nondiagnostic/unsatisfactory samples, 396 (79.2%) as benign, and 28 (5.6%) as atypia of undetermined significance/atypical follicular lesion of undetermined significance (AUS/AFLUS), 8(1.6%) as follicular neoplasm/suspected follicular neoplasm (FN/SFN), 7 (1.4%) as suspicious for malignancy, and 35 cases (7%) as malignant. Reporting thyroid cytopathology per Bethesda system increases sensitivity, specificity, accuracy of thyroid cytopathology, increases understanding of reporting system by clinician, improves management plans, and reducing

Conclusion: Bethesda system of reporting can effectively determine which patients needed surgery/follow-up FNAC.TBSRTC may be used as national standardized terminology for thyroid reporting .The clinicians should be encouraged to embrace this procedure in the initial management of such patients.

Keywords: Fine needle aspiration cytology, Conventional System, thyroid lesion, Bethesda system.

Introduction

FNAC from thyroid lesion is an important procedure in the management of different thyroid conditions^[1-4]. It is a minimally invasive, cost effective so it can performed as an outpatient

technique, which is helpful in differentiating between benign and malignant lesion. There by reducing unnecessary surgeries^[1,2]. It tells about the risk of malignancy, and gives the idea about the management of thyroid lesions as per

TBSRTC^[5]. Recent Bethesda System (2017) for reporting of thyroid lesion (TBSRTC) in

cytopathology has been divided in to six categories seen in Table 1-

Table 1: TBSRTC in cytopathology

Diagnostic Category	Risk of Malignancy	Usual Management
1. Non-diagnostic or unsatisfactory (ND/UNS); a. Fluid only (cyst). b. Acellular specimen c. Others (clotting artifact, obscuring blood, etc.)		Repeat FNA under ultrasound guidance
2. Benign; a. Adenomatoid nodule. b. Colloid nodule etc.) c. Lymphocytic (Hashimoto) thyroiditis. d. Granulomatous (subacute) thyroiditis. e. Others	0 – 3%	Follow-up clinically
3. Follicular lesion of undetermined significance or Atypia of undetermined significance or (AUS/FLUS)	5 – 15%	Repeat FNAC
4. Suspicious of follicular Neoplasm or follicular neoplasm (FN/SFN). Specify if Hurtle cell (oncocytic) type.	15- 30%	Surgical lobectomy
5. Suspicious for malignancy (SFM) including; a. Papillary carcinoma b. Medullary carcinoma c. Metastatic carcinoma d. Lymphoma e. Others	60 – 75%	Surgical lobectomy or Near-total thyroidectomy
6. Malignant, including; a. Papillary thyroid carcinoma. b. Medullary thyroid carcinoma. a. Poorly differentiated carcinoma b. Undifferentiated (anaplastic) carcinoma c. Carcinoma with mixed features (specify). d. Squamous cell carcinoma. e. Non-Hodgkin lymphoma. f. Metastatic carcinoma. g. Others.	97 – 99%	Near total thyroidectomy

Different methods have been used all over the world for reporting thyroid FNAC, ranging from two to six or more categories. Two category systems differentiates benign and malignant categories only. Other category systems are more difficult like; inconclusive, equivocal, atypical, indeterminate, uncertain, suspicious of malignancy, possible malignant, and probable malignant^[6] Clinicians find more difficulty in the interpretation of these reports and making plans for management^[7-10]. The main purpose of this study is to standardize reporting of thyroid cytopathology as per Bethesda system for reporting thyroid cytopathology (TBSRTC). This system is composed of six categories including:

The non-diagnostic, the benign, the atypia of undetermined significance/atypical follicular lesion of undetermined significance (AUS/AFLUS), the follicular/ Hürthlecell neoplasm/suspicious of follicular neoplasm (FN/SFN), the suspicious of malignancy (SFM), and the malignant^[11,12].

Material and Methods

A retrospective study of already diagnosed cases of thyroid in FNAC was performed in M.G.M Medical College and M.Y. Hospital which included 500 cases which were reported from May 2016 to May 2018. The data was retrieved from the records, maintained in the department includes

age, sex, clinical findings, radiological findings For cytomorphological analysis of smears with Papanicolaou stain were reviewed and cases were categorized into six Bethesda categories.

Statistical Evaluation

The agreement between two pathologists is assessed with Cohen Kappa statistics, Kappa value is found 76% shows the degree of agreement between two pathologists is good.

Results

Females were more than males with a ratio of 7:1, age ranged between 20 years to 70 years.

Figure 1: Sex distribution

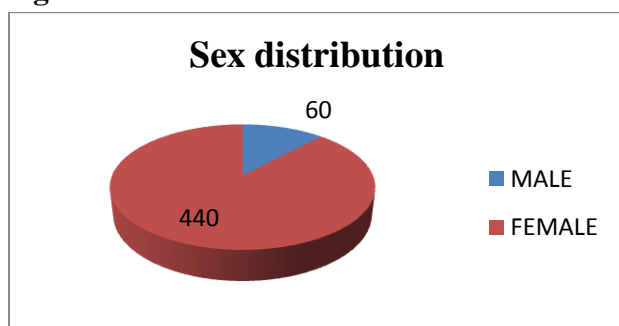


Table 2: Age distribution

Age	No. of cases
20-30 year	113
31 -40 year	103
41 – 50 year	109
51 – 60 year	97
61 – 70 year	78

Table 3: Cytopathological findings according to Bethesda System

Categories	Name	No. of cases
Category 1	Undiagnosed/ Unsatisfactory	26(5.2%)
Category 2	Benign	396(79.2%)
Category 3	Atypia of Undetermined significance/Atypical follicular lesion of undetermined significance	28(5.6%)
Category 4	Follicular neoplasm/ Suspicious of follicular neoplasm	8(1.6%)
Category 5	Suspicious of malignancy	7(1.4%)
Category 6	Malignancy	35(7%)

Table 4: Comparison of conventional and TBSRTC (BETHESDA) System

Diagnosis on conventional	Diagnosis on TBSRTC						Total
	Non Diagnostic /Unsatisfactory	Benign	Atypia of Undetermined significance /Follicular lesion of undetermined significance	Follicular neoplasm/ suspicious for follicular neoplasm	Suspicious of malignancy	Malignancy	
Inadequate	18	0	0	0	0	0	18
Benign	08	396	1	1	0	0	406
Equivocal	0	0	22	0	7	0	29
Follicular Neoplasm	0	0	0	7	0	0	7
Malignancy	0	0	5	0	0	35	40
Total	26	396	28	8	7	35	500

Malignancy was found in 35 patients in both Bethesda and conventional method, benign lesion

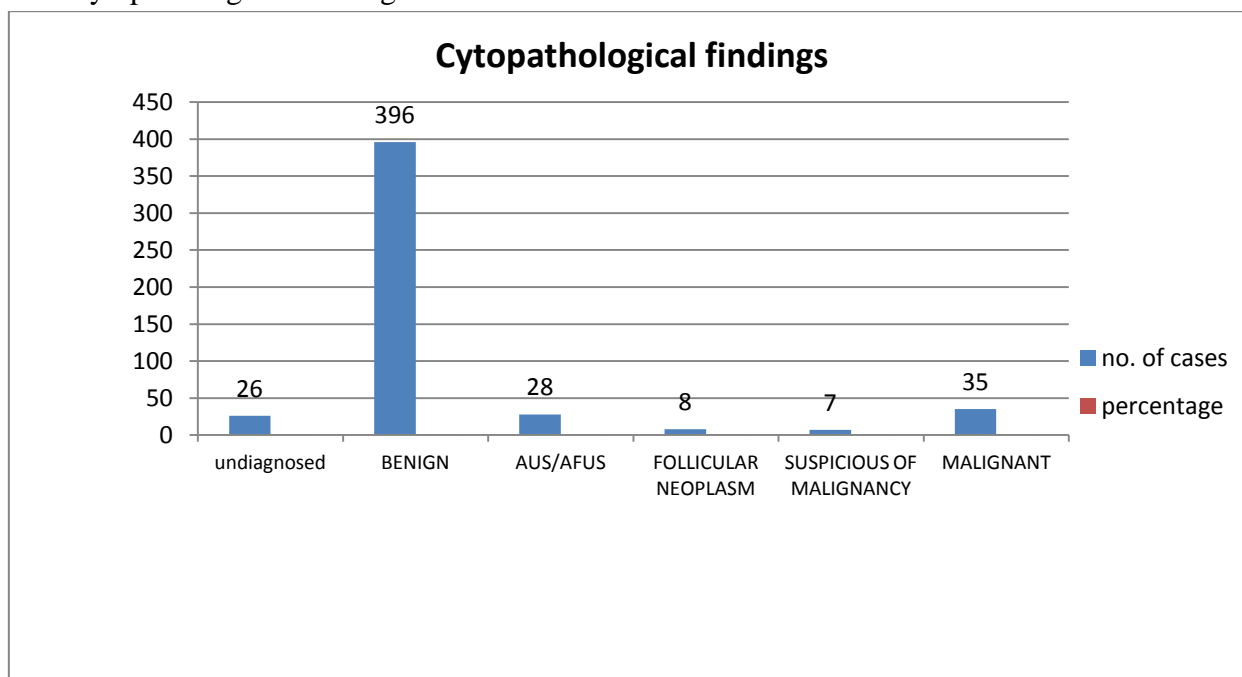
was found in 396 patients in both conventional and Bethesda system

Table 5: Diagnostic Accuracy

	TBSRTC	CONVENTIONAL	ACCURACY(%)
Benign	396	406	97.5
Malignant	35	40	87.5

Maximum accuracy found in benign lesion

Figure 2: Cytopathological Finding



26 cases (5.2%) categorized as non diagnostic/unsatisfactory samples, 396 (79.2%) as benign, and 28(5.6%) as atypia of undetermined significance/atypical follicular lesion of undetermined significance (AUS/AFLUS), 8 (1.6%) as follicular neoplasm/suspected follicular neoplasm (FN/SFN), 7 (1.4%) as suspicious for malignancy, and 35cases (7%) as malignant. Reporting thyroid cytopathology per Bethesda system increases sensitivity, specificity, accuracy of thyroid cytopathology, increases understanding of reporting system by clinician, improves management plans.

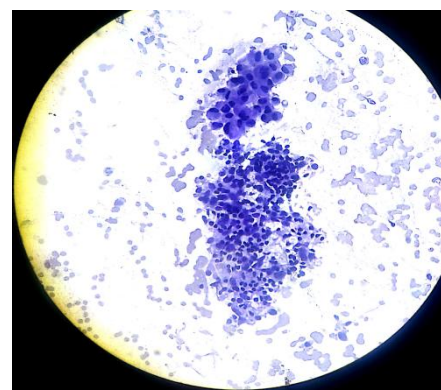


Figure 4: Clusters of few follicular cells and few oxyphilic cells and collection of lymphocytes (Hashimoto thyroiditis)

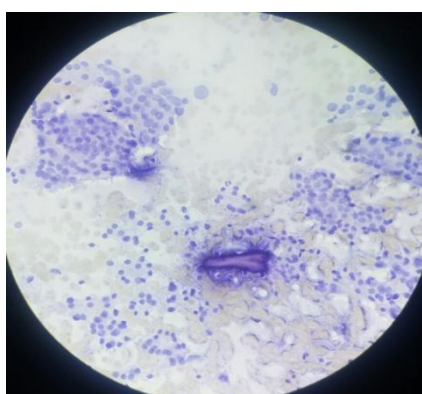


Figure 3: Clusters of follicular epithelial cells with bland nuclei and adequate cytoplasm (suspicious follicular neoplasm)

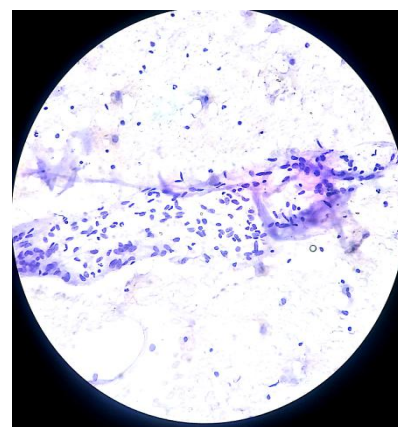


Figure 5: Granuloma comprising epithelioid, lymphocytes, fibroblasts and clusters of follicular epithelial cells features are of granulomatous thyroiditis

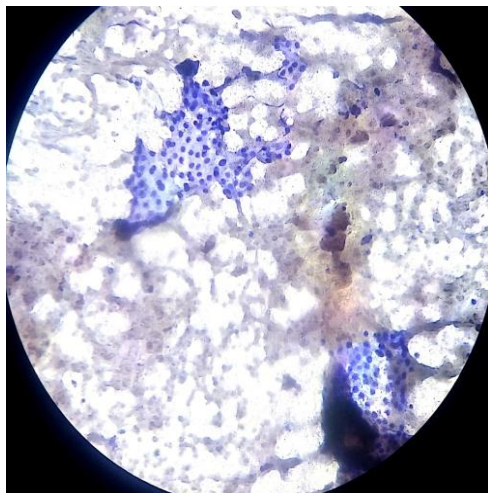


Figure 6: Clusters of follicular epithelial cells against colloidal background

Discussion

On comparing results of benign and malignant categories in this study with other international studies there were no great differences in rate of benign and malignant conditions in most of these studies. The great differences were in cases intermediate between benign and malignant condition and in their reporting by cytopathologist and management by clinicians. Studies by Heydar Ali Esmaili et al^[14], and Jogai et al^[15], showed benign thyroid lesions constituting 64.3%, and 33.1% of studied cases, while malignant cases

7.8% and 19.5% respectively. The results of studies by Mehrali Rahimi et al^[16], Santosh Kumar Mondal et al^[17] were high for benign conditions 90.3%, and 80%, low for malignant 9%, and 6% respectively. In the studies by Richa Sharma et al^[18]. Bethesda System for Reporting Thyroid Cytopathology is a comprehensive system for cytopathological diagnosis of thyroid nodule(s) and with strict diagnostic criteria for each category, predicting risk of malignancy and guidelines for planning of further management. In the present study, the number of benign cases reported by TBSRTC system were 396 (79.2%), while malignant cases were 35(7%), and remaining other categories were 13.8% collectively, in our study we found that the accuracy in malignant finding is 87.5% while in benign finding 97.5% . Bethesda System for Reporting Thyroid Cytopathology is a comprehensive system for cytopathological diagnosis of thyroid nodule(s) and with strict diagnostic criteria for each category, predicting risk of malignancy and guidelines for planning of further management.

Table 6: Few similar studies using TBSRTC showing category wise distribution of cases of all the FNAC

	Present study	Her-Juing Wu	Theoharis	Bongiovanni
Category 1	26(5.2%)	278(20.1%)	357(11.1%)	3271(12.9%)
Category 2	396(79.2%)	539(39.0%)	2368(73.8%)	15104(59.3%)
Category 3	28(5.6%)	376(27.2%)	95(3.0%)	2441(9.6%)
Category 4	8(1.6%)	116(8.4%)	176(5.5%)	2571(10.1%)
Category 5	7(1.4%)	36(2.6%)	43(1.4%)	680(2.7%)
Category 6	35(7%)	37(2.7%)	168(5.2%)	1378(5.4%)
Total FNACs	500(100%)	1382(100%)	3207(100%)	25,445(100%)

Conclusion

Bethesda system of reporting can effectively determine which patients needed surgery/follow-up FNAC. TBSRTC may be used as national standardized terminology for thyroid reporting. The clinicians should be encouraged to embrace this procedure in the initial management of such patients.

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