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BETHESDA SYSTEM FOR REPORTING THYROID CYTOPATHOLOGY: A STUDY OF 224 CASES

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ABSTRACT FNAC is considered the gold standard diagnostic test for the diagnosis of thyroid nodule. But it suffers as a modality because of variability in its diagnostic terminology. To address this, the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) was introduced for unifying the terminology and morphologic criteria along with the corresponding risk of malignancy.

AIM to classify thyroid lesions according to the Bethesda system for reporting thyroid cytopathology and comparing the consistency of result with the literature.

Materials and methods After taking approval from institutional ethical committee and informed consent, the study was conducted over 2 years in which 224 FNAC of thyroid lesions were classified according to Bethesda system.

Results Out of total 224 cases studied 9 cases (4.02%) were classified as Unsatisfactory, 199 cases (88.84%) as Benign, 1 case (0.45%) as Atypia of Undetermined Significance, 8 cases (3.57%) as Follicular/ Hurthle cell neoplasm, 2 cases (0.89%) as suspicious for malignancy and 5 cases (2.23%) as Malignant.

Conclusion Reporting thyroid FNA with TBSRTC provides more specific cytological diagnosis. It improves perceptions of diagnostic terminology between cytopathologist and clinicians and leads to more consistent management approach.

KEYWORDS : FNAC, Bethesda system , Thyroid

INTRODUCTION

The diagnosis of thyroid lesions using aspiration cytology was first reported by Martin and Ellis in 1930[1]. Fine needle aspiration cytology (FNAC), being reliable, minimally invasive, cost effective, and having high sensitivity and specificity, has been applied routinely as a useful and indispensable method to diagnose thyroid lesions.[2] The application of thyroid FNA has been documented with the reduction of unnecessary thyroid surgeries in patients with benign thyroid nodules and it has resulted in four fold increase in the resection of malignant nodules in comparison to that which was seen in the pre FNA era.[3] However, despite its widespread use, thyroid FNA currently suffers from a reporting confusion: multiplicity of category names, descriptive reports without categories and variable surgical pathological terminology.[4] This confusion in diagnostic terminology and clinician perception of its inconsistency was addressed in 2007 by the National Cancer Institute (NCI) Thyroid FNA of the Science Conference wherein the terminology and morphologic criteria for reporting thyroid FNA were concluded thus forming the framework for The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC). The System improves the clarity of communication among cytopathologists and other health care providers, predicts the cancer risk and reduces unnecessary surgery for patients with benign nodules and appropriately triages patients with malignant nodules for timely clinical intervention[5]. This study was carried out to study the cytology of palpable thyroid lesions, to minimize surgical intervention, and to elucidate the usefulness of Bethesda system in reporting thyroid lesions.

AIMS AND OBJECTIVES

Aim of this study was to classify thyroid lesions according to the Bethesda system for reporting thyroid cytopathology and comparing the consistency of result with the literature.

MATERIALS AND METHODS

All patients diagnosed clinically as having thyroid swelling and who were referred for FNAC to cytology section, were included in the present study.

Exclusion criteria:

1. Patients presenting with non palpable thyroid lesions.
2. Patients presenting with congenital anomalies of thyroid.

A detailed clinical history was obtained and thorough clinical examination was done prior to procuring sample for cytological study. Written informed consent of the patient was obtained and proper information regarding the procedure was given to the patient FNAC was performed either palpation guided or under ultrasound(US) guidance. Smears thus prepared are stained by Papanicolaou stain.

We categorized our results into 6 diagnostic categories according to The Bethesda System for Reporting Thyroid cytopathology which includes nondiagnostic/unsatisfactory, Benign, Atypia of undetermined significance (AUS), Follicular neoplasm (FN) / Hurthle cell neoplasm (HCN), suspicious for malignancy (SFM) and malignant.

During the course of study, some patients were subjected to repeat aspiration after certain interval. In such cases, diagnosis of subsequent aspiration were considered and categorized according to TBSRTC. Aspirates with insufficient cellularity or poor quality smear due to delayed or inadequate fixation even after repeated aspiration were considered "unsatisfactory"

OBSERVATION AND RESULTS

A total of 224 patients presented with thyroid swellings were subjected to fine needle aspiration cytology. Age of the patient in the present study varies from 8-90 years and it shows that thyroid lesions are more common in age group of 31-40 years. The mean age of patients was 38.98 +16.09 years (Table1). Thyroid lesions are more common in females. There were 198 (88.39%) females, while 26(11.61%) males in our study. The male to female ratio was 1:7.6. (Table 2) Thus there was a female preponderance in all the diagnostic categories of TBSRTC.

In the present study, out of 224 cases, maximum i.e. 199 cases

(88.84%) were benign and only 1 case (0.45%) was of Atypia of undetermined significance (AUS). In the remaining categories, 9 cases (4.02%) were unsatisfactory, 8 cases (3.57%) were Follicular/ Hurthle cell neoplasm, 2 cases(0.89%) were suspicious for malignancy and 5 cases (2.23%) belonged to the Malignant category (Table3).

The distribution of cases in subcategories of Bethesda classification out of 199 benign cases, 143 cases (71.86%) were Benign follicular nodule, 55 cases (27.64%) of Hashimoto's / lymphocytic thyroiditis, followed by 1 case (0.5%) of Granulomatous thyroiditis. Amongst 8 cases of Follicular / Hurthle cell neoplasm, there were 7 cases (87.5%) of Follicular neoplasm and 1 case (12.5%) of Hurthle cell neoplasm. In the suspicious category, there were 2 cases (100%) of suspicious of papillary carcinoma. In the malignant category, 4 cases (80%) were papillary thyroid carcinoma, while 1 case (20%) was of medullary thyroid carcinoma.(Table 4)

TABLE 1: DISTRIBUTION OF CASES ACCORDING TO AGE AND BETHESDA DIAGNOSTIC CATEGORIES

Age (years)	Bethesda diagnostic categories [No.(%)]						Total
	US	Benign	AUS	FN/HCN	SFM	Malignant	
1-10	0	3	0	0	0	0	3(1.34)
11-20	2	19	0	1	0	0	22(9.82)
21-30	1	51	0	1	0	0	53(23.66)
31-40	2	58	1	2	0	1	64(28.57)
41-50	2	27	0	3	0	1	33(14.73)
51-60	0	18	0	1	0	3	22(9.82)
61-70	1	19	0	0	2	0	22(9.82)
71-80	1	3	0	0	0	0	4(1.79)
81-90	0	1	0	0	0	0	1(0.45)
Total	9	199	1	8	2	5	224(100)

TABLE 2: DISTRIBUTION OF CASES AS PER GENDER AND BETHESDA DIAGNOSTIC CATEGORIES

Age (years)	Bethesda diagnostic categories [No.(%)]						Total
	US	Benign	AUS	FN/HCN	SFM	Malignant	
Male	1 (11.11)	23 (11.56)	0	2 (25)	0	0	26 (11.61)
Female	8 (88.89)	176 (88.44)	1 (100)	6 (75)	2 (100)	5 (100)	198 (88.39)
Total	9	199	1	8	2	5	224

TABLE 3: DISTRIBUTION OF CASES ACCORDING TO BETHESDA DIAGNOSTIC CATEGORIES

Bethesda diagnostic categories	Number of cases	%
Unsatisfactory	9	4.02
Benign	199	88.84
Atypia of undetermined significance (AUS)	1	0.45
Follicular/Hurthle cell neoplasm	8	3.57
Suspicious for malignancy	2	0..89
Malignant	5	2.23
Total	224	100

TABLE 4: DISTRIBUTION OF CASES ACCORDING TO SUB-CATEGORIES OF BETHESDA DIAGNOSTIC CATEGORIES

Bethesda diagnostic categories	Number of cases	%
Unsatisfactory	9	4.02
Benign	199	88.84
Benign follicular nodule (BFN)	143	71.86
Hashimoto's/ lymphocytic thyroiditis	55	27.64
Granulomatous thyroiditis	1	0.5
Atypia of undetermined significance (AUS)	1	0.45
Follicular/Hurthle cell neoplasm	8	3.57
Follicular neoplasm	7	87.5
Hurthle cell neoplasm	1	12.5
Suspicious for malignancy	2	0.89
Suspicious for papillary carcinoma	2	100
Malignant	5	2.23
Papillary thyroid carcinoma	4	80
Medullary thyroid carcinoma	1	20

PHOTOMICROGRAPH

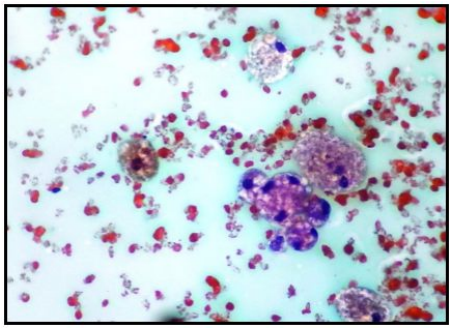

Photo 1: Colloid goiter with cystic change-Cyst macrophages in the background of thin colloid. (Pap, 40X)

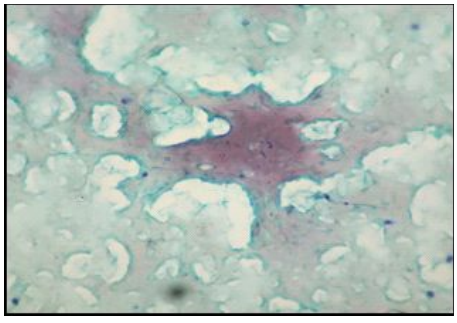

Photo 2: Colloid goiter- background show abundant colloid (Pap, 40X)

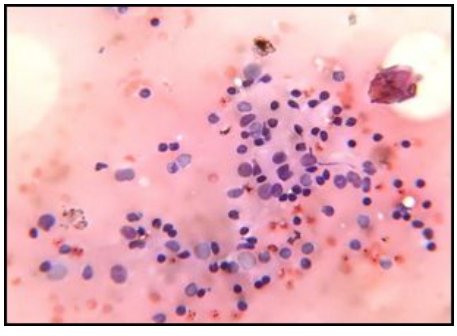

Photo 3: Hashimotos thyroiditis. Lymphocytes impinging around thyroid follicular cells. (Pap 40X)

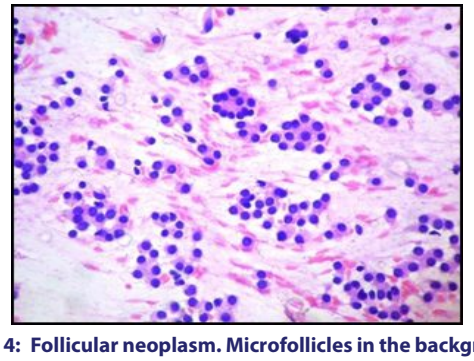

Photo 4: Follicular neoplasm. Microfollicles in the background of scant colloid. (Pap,40X)

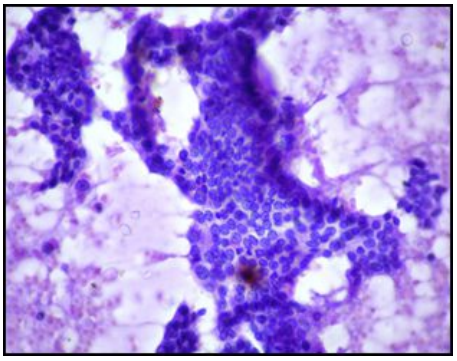

Photo 5: Papillary thyroid carcinoma- nuclear folding and nuclear grooves (arrow) (Pap 40X).

DISCUSSION

Cancer of the thyroid gland accounts for 1% of all cancers and is responsible for 0.5% of cancer-related deaths. Early diagnosis still maintains its importance for higher life expectancy due to the low malignant potential of thyroid nodules, and slow progressing characteristics of thyroid gland cancers.[6]

In our present study total 224 cases of palpable lesions of thyroid were studied. Age range of the patients affected was from 8-90 years with mean age of patients was 38.98 ± 16.09. This finding was in accordance with the studies by authors like Garg S et al[7] and Park et al[8] who found most patients range from age group of 5-80 and 14-86 respectively. Garg S et al[7] found the mean age of 37.69. Lohiya V et al[9] found the mean age of 39.8±16.7 which was closest to our study.There was female preponderance as 198 patients (88.39%) were females and 26 patients (11.61%) were males. Female to male ratio in our study was 7.6:1. This was in concordance with the studies of authors like Garg S at al[7], Kukar et al[10] and Park et al[8] who reported female to male ratio as 6.35:1, 8.4:1 and 3.8:1 respectively.

TABLE 5: COMPARISON OF FNAC DIAGNOSIS BASED ON BETHESDA CLASSIFICATION IN VARIOUS STUDIES

Authors	Year	Bethesda diagnostics categories					
		US (%)	Benign (%)	AUS (%)	FN/HCN (%)	SFM (%)	Malignant (%)
Theoharis CG et al[11]	2009	11.1	73.8	3.0	5.5	1.3	5.2
Jo VY et al[12]	2010	18.6	59	3.4	9.7	2.3	7.0
Mufti ST et al[5]	2012	11.60	77.60	0.80	4	2.40	3.60
Basak B et al[13]	2013	1.2	87.5	1.0	4.2	1.4	4.7
Bhagat V et al[14]	2014	5.63	87.5	0	3.12	0.63	3.12
Present Study		4.02	88.84	0.45	3.57	0.89	2.23

In our present study, the percentage of cases in each category of TBSRTC was in accordance with Bhagat V et al[14] and Basak B et al[13]. However, the findings show slight variation in other studies of Theoharis CG et al[11], Jo VY et al[12] and Mufti ST et[5] al as shown in the table 5.

Individual cytodiagnostic categories of TSBRTC

1. Unsatisfactory

In the present study, of the 224 FNA samples, 9 cases i.e. 4.02% were unsatisfactory. This finding was similar to the findings of Bhagat V et al[14] who reported 5.63% of cases as unsatisfactory.

2. Benign

In our study, majority of the lesions i.e.199 of the 224 cases (88.84%) were found to be benign. This was in agreement with the findings of all the studies mentioned in table 5 i.e Theoharis CG et al[11], Jo VY et al[12], Mufti ST et al[5], Basak B et al[13] and Bhagat V et al[14], showing maximum cases in the benign category. However, our finding was more similar with the findings of Basak B et al[13] and Bhagat V et al.[14] Both the studies, mentioned 87.5% cases in the benign category.

Our study shows colloid goiter as the commonest lesion accounting for total 143 cases (71.86%) in the benign category; this finding was in accordance with the finding of Gulia S[15] et al who reported colloid goiter in 74.29% of cases.

The reason for the number of cases in the benign category being higher can be attributed to the fact that, our institute, despite being a tertiary care centre, not only caters to the needs of patients on a referral basis, but also patients come here directly without referral. So a large population, representative of the general population, is encountered in our institute. Therefore, the proportion of benign cases that is a lot higher in the general population is reflected proportionately in our study.

3. Atypia of undetermined significance (AUS)

We found, only 1 case total 224 cases i.e. 0.45% in Bethesda category 3 i.e. atypia of undermined significance. This finding was in accordance with Mufti ST et al[5] and Basak B et al[13] who reported 0.80% and 1% of cases in this category respectively. The less number of cases diagnosed as AUS in the present study could be explained by the strict adherence to diagnostic criteria and the cytopathologist's efforts in our practice setting to avoid ambiguity and keep the use of AUS to a minimum.

4. Follicular / Hurthle cell neoplasm

Because of the inability of FNAC to distinguish Follicular and Hurthle cell adenomas from their malignant counterparts, the role of thyroid FNAC shifts from being a diagnostic test to a screening test for this category. Of the 224 cases, 8 cases i.e. 3.57% were classified as Follicular/ Hurthle cell neoplasm in the present study which included 1 case of Hurthle cell neoplasm. This finding was in accordance with that of Mufti ST et al[5], Basak B et al[13] and Bhagat V et al[14] who reported 4%, 4.2% and 3.12% cases in this category respectively.

5. Suspicious For Malignancy

In our study 2 cases (0.89%) were suspicious for malignancy. Theoharis et al[11] and Bhagat V et al[14] also found 1.3% and 0.63% of cases in the same category.

6. Malignant

In our study 5 of 224 cases i.e. 2.23%, were classified as malignant. Of the 5 cases, 4 (80%) cases were of papillary carcinoma and 1(20%) was of medullary carcinoma. Thus among the malignant neoplasm, the commonest was papillary carcinoma. This finding was similar with the finding of Mufti ST et al[5] and Bhagat V et al[14] who reported 3.60% and 3.12% of cases in this category, respectively. Hirachand S et al[16] also reported papillary carcinoma as the commonest malignant neoplasm.

Thus the present study supports the Bethesda System for reporting thyroid cytopathology and the results are quite comparable with other studies conducted worldwide.

7. Conclusion

The Bethesda system is very useful for a standardized system of reporting thyroid cytopathology It results in better understanding of cytology reports by clinicians and helps in proper management approach especially in selecting cases which may require surgical intervention.

8. References

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