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Diagnostic utility of Bethesda system of reporting thyroid cytopathology with histopathological correlation

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Abstract

Background: The Bethesda system of reporting thyroid cytopathology is a standardised system, improving communication between cytopathologists and clinicians, leading to more consistent management approaches. The aim of the research work was to study the utility of Bethesda system in reporting thyroid cytology with histopathological correlation of all the cases undergoing surgical resection.

Methods: We studied all the thyroid cytology cases received between January 2018 to January 2019, and classified them according to the Bethesda system. Histopathological correlation was done for all the cases which underwent surgical resection with evaluation of cyto-histological discrepancies.

Results: Out of 92 cases studied, 68 (73.9%) were benign lesions, 08 (8.7%) were malignant, 06 (6.5%) were Unsatisfactory/Nondiagnostic, 07 (7.6%) were Follicular neoplasm/Suspicious for neoplasm, 2 (2.2%) were suspicious for malignancy, and 1(1.1%) case was reported as Atypia of undetermined significance.

Out of the 49 cases available for histopathological follow-up, cyto-histological discrepancies were noted in 5 cases (10.2%).

Conclusions: Reviewing the thyroid FNAs (fine needle aspirates) using Bethesda system allowed a more specific cytological diagnosis with better interlaboratory agreement. As evidenced by its high sensitivity and specificity, Bethesda system has proven to be a very effective guide for the clinical management of thyroid nodules.

Keywords: Bethesda, cytology, thyroid

Introduction

Fine needle aspiration (FNA) of the thyroid gland has proven to be an important and widely accepted, cost-effective, simple, safe, and accurate method for triaging patients with thyroid nodules. Fine needle aspirations provide information that guides the management of patients with thyroid nodules by identifying patients who require surgical resection and patients who require no further interventions^[1].

Thyroid cytopathology practice requires communication and collaboration among pathologists and primary clinicians, endocrinologists, radiologists, and surgeons, as well as correlation with surgical pathology interpretations. Therefore, consistent diagnostic terminology is imperative. While there are minimal difficulties in diagnosing most benign and overtly malignant lesions, diagnostic challenges arise when aspirate samples are quantitatively or qualitatively suboptimal to reliably exclude a neoplastic process. The management of these types of lesions has been further complicated by the historic lack of universal terminology. Multiple organizations have proposed diagnostic guidelines for reporting thyroid FNA cytology results, including the Papanicolaou Society of Cytopathology Task Force and American Thyroid Association, although none have been necessarily universally accepted^[2, 3].

The Bethesda System describes 6 diagnostic categories of lesions which have individual implied risks of malignancy that influence management paradigms. The present study was done to interpret the thyroid FNAC as per Bethesda system and to evaluate its efficacy by taking histologic findings as standard.

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Materials & Methods

All the cases of thyroid lesions received in the Cytology section of the Department of pathology, Vishwabharti Medical College, Kurnool, A.P. for a period of 1 years. during the period of January 2018 to January 2019 (one year of retrospective study).

In all the patients with thyroid lesions, clinical history, physical findings and probable diagnosis were noted. FNAC was performed by a pathologist either by conventional method of palpation or with sonological guidance using a 22 gauge needle. Direct smears were prepared and were either air dried and stained with Wright's stain or fixed in alcohol and stained with 'haematoxylin and eosin' & Pap.

49 Thyroid specimens received were fixed in 10% formalin for 12 to 24hrs after recording the gross morphological features. The specimens were routinely processed, embedded in paraffin wax and sections were cut at 3 to 6µm thickness. Sections were stained routinely with H and E stain.

Inclusion criteria

Patients of all age groups and both sex, with palpable thyroid nodules who had come for FNAC.

Exclusion criteria

- Patients with skin infection at the site of aspiration,
- Patients with haemorrhagic diathesis,
- Critically ill or anxious patients,
- Non-cooperative patients.

Results

Total number of cases studied on FNAC were 92. Out of 92 cases, 68 (73.9%) were benign lesions, 08 (8.7%) were malignant, 06 (6.5%) were Unsatisfactory/Nondiagnostic, 07 (7.6%) were Follicular neoplasm/Suspicious for neoplasm, 2 (2.2%) were suspicious for malignancy, and 1 (1.1%) case was reported as Atypia of undetermined significance.

The maximum number of cases were in the age group of 21-40years. Out of the total 92 cases, 71 cases were females (77.2%) and 21 cases were males (22.8%).

Table 1: Cytological diagnosis as per the Bethesda system.

Cytological diagnosis	No. of cases	%
Unsatisfactory	06	6.5
Benign follicular lesion	68	73.9
Atypia of follicular lesion of undermined significance	01	1.1
Follicular neoplasm /suspicious for follicular neoplasm	07	7.6
Suspicious for malignancy	02	2.2
Malignant tumour	08	8.7
Total	92	100

Total number of benign follicular lesions were 68, out of which 38 were nodular goitre, 16 were Hashimoto thyroiditis, 10 were nodular goitre with secondary hyperplasia, 02 were primary hyperplasia and 02 were granulomatous thyroiditis.

Out of the 08 malignant cases reported on cytology, 05 cases (62.5%) were papillary carcinoma, 02 cases (25%) were medullary carcinoma and 1 case (12.5%) was reported as anaplastic carcinoma.

Table 2: Thyroid lesions for which surgical resections done

Cytological diagnosis	Total no. of cases	Histopathological follow up available	% of follow up cases
Unsatisfactory	06	03	50
Benign follicular lesion	68	36	52.9
Atypia of follicular lesion of undermined significance	01	01	100
Follicular neoplasm /suspicious for follicular neoplasm	07	03	42.8
Suspicious for malignancy	02	01	50
Malignant tumour	08	05	62.5
Total	92	49	53.2

Table 3: Comparison of Cytological & Histopathological diagnosis

Cytological diagnosis	Cytology diagnosis	Histopathological diagnosis	Analysis of discrepancy
Unsatisfactory	03	0	Present
Benign follicular lesion	36	40	Absent
Atypia of follicular lesion of undermined significance	01	0	Present
Follicular neoplasm /suspicious for follicular neoplasm	03	04	Absent
Suspicious for malignancy	01	0	Present
Malignant tumour	05	05	Absent

Out of the 49 cases available for histopathological follow-up, cyto-histological discrepancies were noted in 5 cases (10.2%).

Table 4: Analysis of discrepancy

Number of cases showing discrepancy	Cytological diagnosis	Histopathological diagnosis
03	Unsatisfactory (Cyst fluid only)	MNG with cystic change
01	Atypia of undetermined significance	MNG with Adenomatoid Hyperplasia
01	Suspicious of malignancy	Follicular carcinoma

Discussion

FNAC is the first line diagnostic test for evaluating thyroid nodules. FNAC can effectively triage patients with neoplastic thyroid nodules as to who require surgery and who do not. However, due to the lack of a standardized system of reporting, pathologists have been using different terminologies and diagnostic criteria, thereby creating confusion among referring clinicians in the interpretation of the cytopathology report, ultimately hindering a definitive clinical management. Reviewing the thyroid FNAs with the

Bethesda system allowed a more specific cytological diagnosis^[4].

In this study, an attempt was made to report the thyroid FNAs as per the Bethesda system and also to assess the efficacy by comparing with the histopathological diagnosis wherever possible.

We compared the results obtained in the present study with the studies of Yang *et al*, Yassa *et al* and Nayar and Ivanovic^[5-7].

Table 5: Comparison of percentage of distribution of fine needle aspiration diagnoses among published studies.

Diagnostic category	Present study	Yassa <i>et al.</i> ^[8]	Yang <i>et al.</i> ^[9]	Nayar & Ivanovic ^[10]	Reddy <i>et al.</i> ^[14]
Nondiagnostic/unsatisfactory	6.5	7	10.4	5	3.7
Benign	73.9	66	64.6	64	89.25
Aus/follicular lesion of undetermined significance	1.1	4	3.2	18	0.002
Suspicious for follicular neoplasm	7.6	9	11.6	6	2
Suspicious for malignancy	2.2	5	2.6	2	0.6
Malignant	8.7	5	7.6	5	4.1

The percentage of ND/UNS cases in the present study was in close comparison to that of Yassa, Nayar & Ivanovic and Prushtham study. Highest number of cases were under the benign category, and a similar observation was seen in all the above studies. The number of cases under AFLUS and SFM categories were closely correlated with Purushotham study, while much lower in our study than rest other studies. This can be attributed to the fact that in our institute, usually an ultrasound guided FNAC is performed for small nodules in order to obtain material from the exact pathological site. The percentage of malignant cases in the present study was 8.7% which was comparable to that of Yassa *et al*, Yang *et al*, Nayar and Ivanovic^[6, 7, 9].

In the present study, the age of presentation ranged from 11years to 78years. The median age in years in the present study was 44.6 which was similar to that obtained by Afroze *et al.*^[8] The M:F ratio was 1:3.38 in the present study which was in close comparison with that of Safirullah *et al.*^[9]

In the present study, surgical follow up was available in 53.2% of cases, of which cyto-histological discrepancy was noted in 10.2%. Closely correlated with study conducted by Yang *et al.* The cyto-histological discrepancy in their study was 15.3%^[5]. Though the percentage of discrepancy was less in the present study, the available surgical follow-up cases were also proportionately less.

Female to male ratio for papillary carcinoma was 2:1 which was comparable with the study done by Srikande and Phadke^[10]. The cytological features which were observed in papillary carcinoma were compared with those observed in a study done by Tseng *et al.* The percentage of cases which showed papillary structures, monolayered sheets and moderate cytoplasm were comparable with those observed in the study by Tseng *et al.*^[11]

FNAC is a highly sensitive and specific method of evaluating thyroid nodules for malignancy.

Conclusion

Bethesda system of reporting thyroid cytopathology is beneficial for clinical follow up and surgical management. It helps to reduce the rate of unnecessary thyroid surgery for benign thyroid lesion and helps to plan the surgical management in malignant thyroid lesion.

The Bethesda system is a very useful standardised system of reporting thyroid cytopathology, improving communication between cytopathologists and clinicians, and interlaboratory agreement, leading to more consistent management approaches. As evidenced by its high sensitivity and specificity, Bethesda system has proven to be an effective guide for clinical management of thyroid nodules.

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