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Original Research Article

Cyto-Histopathological Correlation of Thyroid Nodules with Emphasis on Bethesda System for Reporting Thyroid Cytopathology

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Abstract

Background: Bethesda system of reporting thyroid cytology helps in uniform reporting and clear communication among doctors for further management. This also helps in clear cytopathological and histopathological correlation. *Aims and Objectives:* This study was undertaken to classify thyroid lesions under Bethesda category and to correlate it histopathologically. *Material and Methods:* A total of 110 patients were studied in a prospective study of one year duration from January to December 2019 at a tertiary care hospital care hospital of eastern U.P. and the results were correlated cytologically and histopathologically. *Results:* Based on the Bethesda system, out of 110 lesions of thyroid, 79% were of Category II, least cases were of Category V and Category VI. While no cases were under atypia of undetermined significance. Out of these 52 cases were further compared on histopathology and correlated. *Conclusion:* Review of thyroid lesion by Bethesda system embarks better and uniform categorization which facilitates and simplifies further management of patients and also reduces unnecessary surgical procedure in benign cases.

Keyword: Bethesda; FNAC; Cyto-Histopathological correlation.

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Introduction

In general adult population, prevalence of clinically palpable thyroid nodules is 4–10% out of which 0.2–1.2% is among children.[1] Most common among these is goitre, prevalence of which is 40 million in India, out of 2 billion global cases.[2] FNAC is a well-established, relatively simple and cost-effective method for evaluation of thyroid patients. It has reduced the rate of unnecessary surgery among patients with benign nodule and triages the patients, with malignancy, for appropriate surgical procedure. Before the implementation of FNAC, 14% of surgically resected nodules were found to be malignant. This rate surpassed 50% after use of pre-operative FNAC.[3,4]

The aim of this study was to access the diagnostic utility of Bethesda system of reporting thyroid cytology and to find out the accuracy of FNAC by correlating the results histopathology, wherever possible.

Material and Methods

A retrospective study of one-year duration was carried out in the department of pathology, Heritage institute of medical sciences, Varanasi, U.P., from January 2019 to December 2019. Total 110 cases with thyroid lesions referred to cytology laboratory were considered for study. USG was done in all the cases to study gland morphology. FNAC was performed and slides stained with may-gurnwald geimsa, Papanicolaou and haematoxylin and eosin. Results of FNAC were compared to histopathology in 52 cases. Chi-square test was used to compare possible correlation between FNAC and histopathology of thyroid lesions. Permission was taken from ethical review committee and consent was obtained from patients on a set Performa.

Inclusion Criteria

The patients having thyroid lesions, irrespective of age and sex; required for cytological study were included in the study.

Exclusion Criteria

Clinical and USG report showing normal study, parathyroid lesions and cervical lymph nodes were excluded.

Results

FNAC was performed in 110 patients out of which majority 70% were females. Most of the patients were in 21–40 years age, group (54%), while least were in 61–80 years age (45%) (Table 1).

Table 1: Age range of patients with thyroid lesions

Age in groups	No. of patients	Percentage
0–20	27	24.5
21–40	59	53.63
41–60	19	17.27
61–80	05	04.5
Total	110	100.0

The duration of symptoms was between 10 days to 1 year with the most common presentation being mild-line neck swelling causing difficulty in swallowing. The most common diagnosis made by FNAC was colloid nodular goitre (35.4%) and least common were Dequarvain thyroiditis (0.9%) and hurthle cell neoplasm (0.9%) (Table 2).

Table 2: Distribution of Thyroid lesions by FNAC

Type of lesion	Percentage	Number of cases
Colloid Nodular Goitre	35.4	39
Colloid Nodular Goitre with Cystic Changes	25.45	28
Hashimotos Thyroiditis	7.27	08
Lymphocytic Thyroiditis	4.54	05
Dequarvain Thyroiditis	0.9	01
Hyperplastic Thyroid Nodule	12.7	14
Follicular Neoplasm	8.18	09
Hurthle Cell Neoplasm	0.90	01
Papillary Carcinoma	4.54	05
Total	100.00	110

Age incidence of these lesions varied from 11-80 years. Most common age group affected with colloid goitre was 21–40 years with incidence of 54%. Maximum incidence of colloid goitre with cystic changes was noted in 21–40 years with incidence of 64.2%. Most cases of other benign lesions were also noted in younger age group as compared to incidence of papillary carcinoma showing maximum incidence of 60% in 41–60 years age group (Table 3).

Table 3: Age distribution of thyroid lesion diagnosed on FNAC

Type of case	0–20 years	21–40 years	41–60 years	61–80 years	Total cases
Colloid Nodular Goitre	10	21	05	03	39
Colloid Nodular Goitre with cystic changes	05	18	03	02	28
Hashimotos Thyroiditis	01	04	03	09	08
Lymphocytic Thyroiditis	01	02	02	00	05
Dequarvain Thyroiditis	00	01	00	00	01
Hyperplastic Thyroiditis	10	03	01	00	14
Follicular Neoplasm	00	07	02	00	09
Hurthle Cell Neoplasm	00	01	00	00	01
Papillary Carcinoma	00	02	03	00	05

These lesions were further categorized by Bethesda system into VI categories, as shown into table 4. Most lesions were in Category II (79%) while no cases were given under Category III. (Table 4) Out of the 110 cases diagnosed on cytopathology, 52 cases were received for histopathological correlation. (Table 5).

Table 4: Diagnostic categorization of thyroid lesion (Bethesda System)

Categorization	Number of cases	Percentage
I. Non-Diagnostic	8	7.27
II. Benign	87	79.00
III. Atypia of undetermined significance	Nil	Nil
IV. Suspicious for Neoplasm	10	9.09
V. Suspicious for Malignancy	01	0.90
VI. Malignant	04	3.63
Total	110	100.00

Table 5: Correlation of Cytological and Histopathological Diagnosis

Lesion	Cytological Diagnosis	Histopathological Diagnosis
Colloid Goitre	20	18
Colloid Goitre with Cystic Changes	14	16
Lymphocytic Thyroiditis	2	2
Dequarvain Thyroiditis	1	1
Follicular Neoplasm	9	9
(Follicular Adenoma) 7		
(Follicular Carcinoma) 2		
Papillary Carcinoma	5	5
Hurthle Cell Neoplasm	1	1
Total	52	52

Out of 20 cases were given as colloid goitre on FNAC, 18 showed cystic changes with colloid goitre while 14 cases showed cystic changes, 16 showed colloid goitre with cystic changes on histopathology.

Cases of lymphocytic thyroiditis, Dequarvain thyroiditis and Hurthle cell neoplasm were confirmed histologically. Out of 9 cases given as follicular neoplasm, 7 showed follicular adenoma and showed follicular carcinoma on histopathological examination. 5 cases of papillary carcinoma were confirmed on histopathology (Figs. 1 to 5). The sensitivity of FNAC was 90% and specificity was 93.75%.

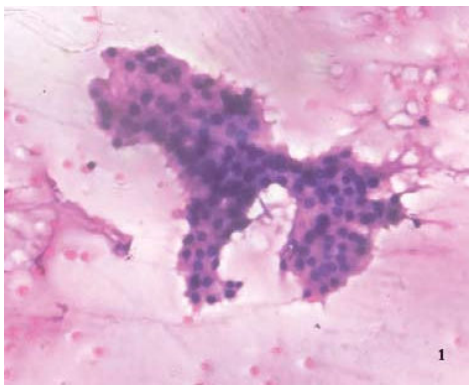

Fig. 1: FNAC of colloid nodule (Geimsa stain, 40x).

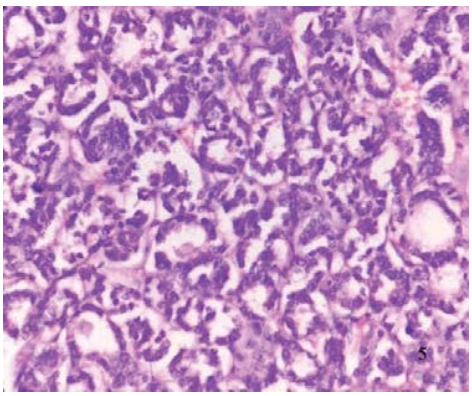

Fig. 2: FNAC of Hurthle cell neoplasm (Geimsa stain, 40x).

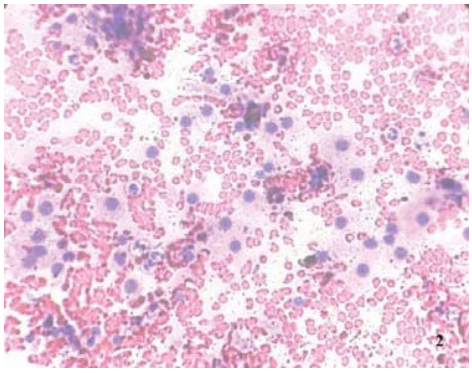

Fig. 3: FNAC of papillary carcinoma (Geimsa stain, 10x).

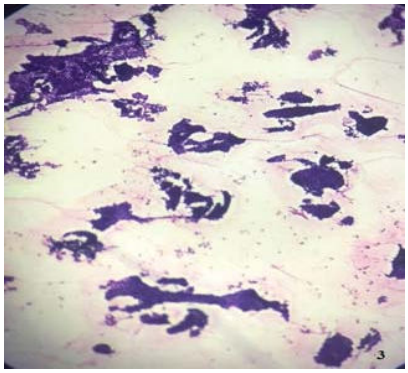

Fig. 4: FNAC of papillary carcinoma (Geimsa stain, 40x).

Fig. 5: Histopathology of follicular adenoma (H&E stain, 40x).

Discussion

In this study, the thyroid lesions diagnosed on FNAC were categorized on Bethesda system and were histopathologically correlated.

Our study showed the age range from 11–80 years, with mean age of 34.5 years. This was comparable to the studies by Ramteke DJ et al.,[1] Chaudhari et al.,[6] Karim et al.,[5] Jeelani et al.[6] and Patel MM et al.[7] This study showed that thyroid lesion was more prevalent among females. Benign thyroid lesions were prevalent than malignant in our study. Maximum cases were noted of colloid nodular goitre with or without cystic changes. These are similar to the studies by Ramteke DJ et al.,[1] Abdulkader et al.,[8] Karim et al.[5] and Jeelani et al.[6] The colloid goitre was most common during 21–

40 years age group to studies published by Karim et al.[5] Rajesh S.P. et al.,[9] Jeelani et al.,[6] and Ramteke DJ et al.[1] These lesions were further grouped by Bethesda system and maximum cases were under Category II, following benign features, while least cases were of Category V and Category VI. No cases were diagnosed under Atypia of undetermined significance probably due to strict diagnostic criteria and to avoid ambiguity by cytopathologist. These were similar to the findings of Nandekar et al.,[2] Mondal et al.,[10] Jo et al.,[11] yarsa et al.,[12] Jeelani et al.,[6] Patel MM et al.[7] and Karim et al.[5]

In the present study, 52 cases were further reviewed for histopathology and cyto-histological correlation was made. The findings correlated well in these lesions diagnosed as follicular neoplasm were further diagnosed as follicular carcinoma on basis of histopathology. These findings were similar to studies by Karim et al.[5] Patel MM et al.,[7] Mondal et al.[10] and Gary et al.[13]

Conclusion

FNAC of thyroid lesion is most cost-effective screening tool for planning further management. Many a times malignant neoplasm can be diagnosed pre-operatively and further categorization and surgical intervention can be done accordingly. By correlating FNAC with clinical investigation, unnecessary surgery can be avoided.

References

1. Ramteke D.J and Mulay Prabha S. Cytohistological correlation of thyroid lesions. International journal of research in medical sciences 2017;5(4):1425–29
2. Mandekar SS, Dixit M, Malukani K, et al. Evaluation of thyroid lesions by fine needle aspiration cytology according to Bethesda system and its histopathologicalcorrelation. International journal of applied and basic medical research 2018;8:76–82.
3. Chaudhari S, Hatwal D, Bhat P, et al. Cytological evaluation of thyroid lesions and its correlation with histopathology: A prospectivestudy. International journal of scientific study 2015;3(8):132–35.
4. Cibas SE and Ali Z Syed. The Bethesda system for reporting thyroid cytopathology. American journal of clinical pathology 2009;132:658–65.
5. Karim MI, Nachev R, Fuklev N, et al. A study on evaluation of solitary nodular thyroid lesions by FNAC and its histopathological Correlation. Bangladesh Journal of Medical Science 2019;18:789–95.
6. Tazeen Jeelani, Danish Rafiq, Wajahat–un Nazir, et al. Histopathological and cytological correlation of thyroid nodules with emphasis on bethesda system for reporting thyroid cytology: A 7 year study. International Journal of Contemporary Medical Research 2018;5(1):28–31.
7. Patel MM, Patel MI, Gamit BG, et al. Reporting of thyroid fine needle aspiration cytology with the use of the Bethesda System (TBS) of 150 cases. Int J Res Med Sci 2018;6:3586–90.
8. Abdulkader A, Zeinab S, Hussainy Akbar S, et al. Histopathological patterns of thyroid disease in Al-Mandinah region of Saudi Arabia. Asian Pac J Cancer 2014;15(14):5565–70
9. Rajesh SP, Rashmi KP, Andola SK, et al. Efficacy of Fine needle aspiration cytology in Diagnosis of lesions of thyroid and histopathological correlation. J Pub Health Med Res 2013;1(1)18–23.
10. Mondal SK, Sinha S, Basak B, et al. The Bethesda system for reporting thyroid fine needle aspirates: A cytologic study with histologic follow-up. J Cytology/Indian Acad Cytologists. 2013 Apr;30(2):94.
11. Jo VY, Stelow EB, Dustin SM, et al. Malignancy risk of fine needle aspiration of thyroid lesions according to the Bethesda System for reporting thyroid cytopathology. Am J clin Pathol 2010;134:450–56.
12. Yassa L, Cibas ES, Benson CB, et al. Long-term assessment of a multidisciplinary approach to thyroid nodule diagnostic evaluation. Cancer 2007;111:508–16
13. Garg S, Naik LP, Kothari KS, et al. Evaluation of thyroid nodules classified as Bethesda category III on FNAC. J Cytol 2017;34:5–9.