

Observational Prospective Assessment of the Cyto-Histopathological Correlation in Thyroid Lesions

Rituraj¹, Akhalesh Kumar², Pradeep Kumar Singh³

¹Tutor, Department of Pathology, Government Medical College, Bettiah, West Champaran, Bihar, India.

²Tutor, Department of Pathology, Government Medical College, Bettiah, West Champaran, Bihar, India.

³Associate Professor & HOD, Department of Pathology, Government Medical College, Bettiah, West Champaran, Bihar, India.

Received: 04-01-2022 / Revised: 13-02-2022 / Accepted: 10-03-2022

Corresponding author: Dr. Akhalesh Kumar

Conflict of interest: Nil

Abstract

Aim: To correlate cytological and histopathological finding in thyroid lesions.

Material & Methods: This was an observational Prospective study was conducted in the Department of pathology, Government Medical College, Bettiah, Bihar, India, over a period of one year

Results: Total number of cytological diagnoses was 150. In the present study among 150 patients, nodular / colloid goiter was most common lesions accounting for 81 cases (54%) followed by Multinodolar goiter which were 31 cases (20.7%).

Conclusion: By comparing the result of FNAC and histopathology, FNAC had higher accuracy, sensitivity of 80% and specificity 100% in the diagnosis of neoplastic thyroid lesions. FNAC is safe, inexpensive and less invasive diagnostic method with excellent patient compliance. FNAC can be used in the management of thyroid swelling to avoid unnecessary surgery on conditions like thyroiditis. FNAC with the help of imaging techniques is helpful in diagnosis of neoplastic lesion.

Keywords: Thyroid, Histopathological Correlation, FNAC, Sensitivity, Specificity, Diagnostic accuracy

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Thyroid gland is one the important organs, which play a wide and vital physiological role in the body. The thyroid hormones affect all body organs and are responsible for maintenance of homeostasis and the body integrity. [1] Thyroid diseases are quite common. The incidence of thyroid diseases depends mainly depending upon iron deficiency status. [2] Thyroid nodules are a common clinical findings ranging

from 4-7% of the population. [3-4] Thyroid lesions may be developmental, inflammatory, hyperplastic and neoplastic. Diseases of thyroid gland comprise from localized nodule to causing systemic disease including a tumor mass. [5]

Thyroid lesions are common among all endocrine disorders. In clinical practice, a majority are benign but in a significant

percentage they are underlying malignant. [6-7] It is difficult to overall diagnose based only on clinical evaluation. Therefore, it is essential that a correct diagnosis is made as early as possible. [8]

Among head and neck lesions thyroid lesions are most common with a prevalence rate ranging from 4-7%. [9] The majority of clinically diagnosed thyroid lesions are non-neoplastic; only 5-30%, are malignant and require surgical intervention. [10]

FNAC is a minimally invasive procedure which is safe, simple, and cost effective reliable and produces a quick result. [11] FNAC has allowed a dramatic decrease in unnecessary surgeries without thyroid nodular disease, enhancing the percentage of malignant operated nodules over 50%. [12] Hence, this study aims to correlate cytological and histopathological finding in thyroid lesions.

Material & Methods:

This was an observational Prospective study was conducted in the Department of pathology, Government Medical College, Bettiah, Bihar, India, over a period of one year.

Methodology

All the patients reported to our hospital during the study period with thyroid lesions irrespective of age and sex was included in present study. All the patients were clinically examined in detail according to the proforma and a careful palpation of the thyroid was done to guide precisely the location for doing aspiration. Details of the procedure were explained to the patients. Aspiration was done with the patient lying comfortably in a supine position and the neck was extended with a pillow under the shoulder so as to make the thyroid swelling appear prominent.

FNAC was performed under all aseptic precaution, with help of 23 gauge needle and disposable 5ml/10ml syringes. Whenever needed USG guided FNAC was

done. Smears was prepared, fixed in 95% ethyl alcohol and Stained with hematoxylin & eosin stains FNAC smears were carefully studied and categorized into non neoplastic and neoplastic lesions.

Statistical analysis:

Statistical analysis was done using SPSS version 21.

Results:

The present study deals with the fine needle aspiration cytology of thyroid lesions and determination of diagnostic accuracy of aspiration cytology. A total of 150 patients with thyroid lesions were subjected to fine needle aspiration cytology during a period of 1 year.

Majority of the patients referred for FNAC thyroid were females constituting 123 (82%) of the total 150 patients, and 27 male cases (18%). Male to female ratio was 1:3.21.

Fine needle aspiration cytology: In the present study, non-neoplastic lesions were more commonly encountered than the neoplastic lesions, cytological evaluation of the lesions was performed based on standard criteria reported in the literature.

Cytologic diagnosis was classified as:

Non-neoplastic category:

Smears with large quantity of colloid and several groups (generally six or more) of normal appearing follicular cells with or without the presence of histiocytes. The benign lesions include colloid nodule, nodule goiter, thyroiditis and thyroid cysts.

Neoplastic category:

It includes both benign and malignant neoplasms. The aspirations which contained groups of cells with malignant features were considered diagnostic of primary thyroid cancer (papillary, medullary or anaplastic subtypes) or disease metastatic to thyroid. Histopathologic evaluation was advised because the criteria of malignancy in these

lesions are based on evidence of capsular or vascular invasion.

Insufficient/inadequate category:

Smears showing a minimum of six clusters of well-preserved follicular cells with each group containing at least 10 cells were considered adequate. Aspirates considered in sufficient had only blood or cyst fluid or scattered thyroid cells fewer than above mentioned number without colloid.

Total number of cytological diagnosis was 150. Amongst them 89.3% were non-neoplastic and 9.3% were neoplastic. [Table 1]

In the present study among 150 patients, nodular / colloid goiter was most common lesions accounting for 81 cases (54%) followed by Multinodolar goiter which were 31 cases (20.7%). [Figure 1]

In the present study following neoplastic lesions of thyroid were found - follicular adenoma, follicular carcinoma, papillary carcinoma, medullary carcinoma, undifferentiated (anaplastic) thyroid carcinoma [Table 2]

In present study the cytology – histopathology concordance rate for Non-neoplastic lesions and neoplastic lesions was - Non-neoplastic lesions-82.9% and neoplastic lesions – 80.4% [Table 3]

Table 1: Cytological diagnosis

Cytological diagnosis-	Number(n)	Percentages (%)
Non-Neoplastic	134	89.3
Neoplastic	14	9.33
Inadequate	02	1.33
Total	150	100

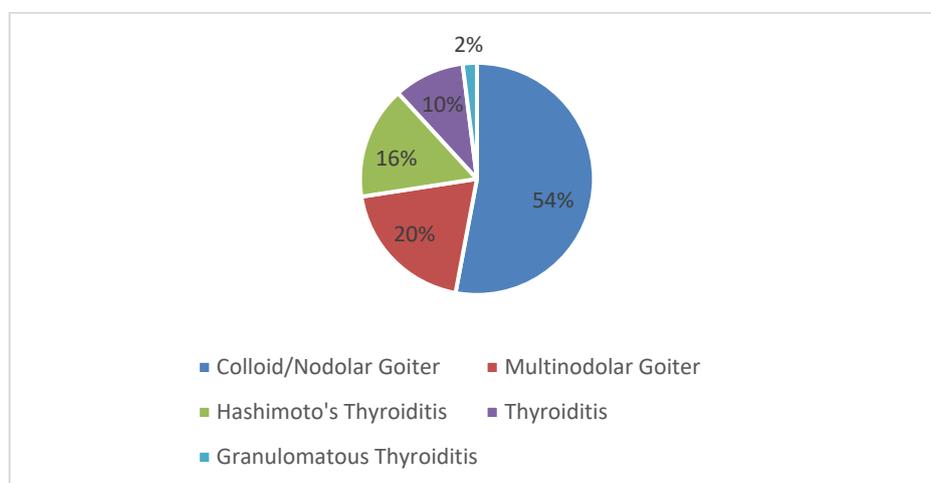


Figure 1: Non-Neoplastic lesions on cytology

Table 2: Neoplastic Lesion on histopathology

Histopathological Diagnosis	Number	Percent (%)
Follicular adenoma	3	30
Follicular carcinoma	2	20
Papillary carcinoma	2	20
Medullary carcinoma	1	10
Undifferentiated (anaplastic) thyroid carcinoma	2	20
Total	10	100

Table 3: Cyto-Histopathological correlation of neoplastic and non-neoplastic thyroid lesions

Histological diagnosis	No. of patients	Cytological Diagnosis			
		Correlated		Non-Correlated	
		No. of patients	(%)	No. of patients	(%)
Non-Neoplastic lesions	72	58	82.9	03	2.31
Follicular neoplasms	08	07	10	-	-
Medullary carcinoma	01	02	2.86	-	-
Papillary carcinoma	01	02	2.86	-	-
Anaplastic carcinoma	02	01	1.43	01	1.29
Total	84	70	100	04	3.6

Discussion:

Thyroid FNAC was initially started by Martin and Ellis in 1930. It is usually the first line of investigation and a minimally invasive diagnostic procedure whose essential role is to diagnose and distinguish benign from malignant lesions. A total of 60 cases of thyroid lesions who underwent FNAC with subsequent histopathological examination were included in the study and all the lesions were analyzed with their history, FNAC findings and histopathology. [13]

Age of the patients ranged from 15-65 years and majority of the patients were in the 21-40 years age group. It is in concordance with the study done by Kumar et al. [14]

Palpable thyroid nodules are present in approximately 4-7% of adults. [3-4] and are more common in females with an F: M ratio of 4.2:1. [15-16] Thyroid carcinoma accounts for less than 1% of all carcinomas and responsible for 0.5% of all cancer related death. [17] Early diagnosis of such cases is thus important for aiming at higher life expectancy. Majority of the clinically diagnosed palpable thyroid nodules are non-neoplastic. [18]

The diagnostic error was most commonly due to inadequate specimens and cystic

lesions. One must be careful in committing a false negative diagnostic error in cystic lesions that contain macrophages and scanty material, since these features do not exclude malignancy. Repeat FNAC or thyroidectomy is advised for persistent nodules. [19-20] Cystic thyroid lesions pose diagnostic difficulties. Cystic change and/or hemorrhage in neoplasms is seen in up to 25% of primary papillary carcinomas, In 20% of follicular neoplasms and in 26% of follicular carcinomas. [21]

Hyang Mi Ko et al, [22] has reported the predictive value of a cytologic diagnosis as 100% for papillary carcinoma. In present study no false positive case (0%) was diagnosed. This is in agreement with other studies which reported false positive error rates between (0-9%) [23]

Conclusion:

By comparing the result of FNAC and histopathology, FNAC had higher accuracy, sensitivity of 80% and specificity 100% in the diagnosis of neoplastic thyroid lesions. FNAC is safe, inexpensive and less invasive diagnostic method with excellent patient compliance. FNAC can be used in the management of thyroid swelling to avoid unnecessary surgery on conditions like thyroiditis.

FNAC with the help of imaging techniques is helpful in diagnosis of neoplastic lesion.

FNAC is a safe, simple, highly accurate, economical method for evaluation of palpable thyroid lesions. There is almost perfect cyto-histopathological concordance and the results are consistent with those available in the literature. FNAC helps in avoiding unnecessary surgeries in patients diagnosed to have a benign pathology based on cytology. Thus FNAC serves as a useful screening test to triage thyroid lesions before surgery.

References:

1. Mousavi SJ, Mikaili P, Mehdioghli R. Demographic and histopathological study of thyroidopathies led to thyroid surgeries in Urmia Imam Hospital, Northwestern Iran. *Ann Biol Res.* 2011;2(5):38–43.
2. Vanderpump MP. The epidemiology of thyroid disease. *Br Med Bull.* 2011;99(1):39–51. doi:10.1093/bmb/ldr030.
3. Gita J, Orell SR, Sterrett GF. Fine needle aspiration cytology. In: 5th edn.. vol. 2012. Philadelphia: Churchill Livingstone;. p. 118–55.
4. Gharib H. Fine-Needle Aspiration Biopsy of the Thyroid: An Appraisal. *Ann Intern Med.* 1993;118(4):282–9. doi:10.7326/0003-4819-118-4-199302150-00007.
5. Ananthakrishnan N, Rao KM, Narasimhan R, Smilet SV, Jagadish S. The Single Thyroid Nodule: A South Indian Profile of 503 Patients with Special Reference to Incidence of Malignancy. *Indian J Surg.* 1993;55(10):487–92.
6. Sakorafas GH. Thyroid nodules; interpretation and importance of fineneedle aspiration (FNA) for the clinician - practical considerations. *Surg Oncol.* 2010;19(4):e130–9.
7. Htwe TT, Hamdi MM, Swethadri GK, Wong JO, Soe MM, Abdullah MS. Incidence of thyroid malignancy among goitrous thyroid lesions from the Sarawak General Hospital. *Singapore Med J.* 2000;50(7):724–8.
8. Bagga PK, Mahajan NC. Fine needle aspiration cytology of thyroid swellings: how useful and accurate is it? *Indian J Cancer.* 2010;47(4):437–42.
9. Agrawal R, Saxena M, Kumar P. A Study of Fine Needle Aspiration Cytology of Thyroid Lesions with Histopathological Correlation. *Indian Journal of Pathology and Oncology.* 2015;2(4):277-283
10. Bakhos R, Selvaggi SM, DeJong S, Gordon DL, Pitale SU, Herrmann M and Wojcik EM. Fine-needle aspiration of the thyroid: Rate and causes of cytohistopathologic discordance. *Diagn. Cytopathol.* 2000;23(4): 233–237
11. Gamit MJ, Talwelkar SR, Dhruva GA. Histocytological Correlation Study of Thyroid Gland Lesions. *International Journal of Science and Research.* Nov 2015;4(11):777-780.
12. Yassa L, Cibas ES, Benson CB, Frates MC, Doubilet PM, Gawande AA et al. Long-term assessment of a multidisciplinary approach to thyroid nodule diagnostic evaluation. *Cancer Cytopathology.* 2007 Dec 25;111(6):508-16.
13. Shakuntala Sunil Aramani^{1*} and Gururajaprasad. C. A Cytohistopathological Correlation of Thyroid Lesions with Critical Evaluation Of Discordant Cases: An Experience At A Tertiary Care Hospital. *Annals of Pathology and Laboratory Medicine, Vol. 4, Issue 3, May-June, 2017.*
14. Demir, H. ., & Bozyel, E. . (2022). Investigation of the Relationship between Mindful Eating Behavior and Anthropometric Measurements of Individuals Applying to a Nutrition And Diet Policlinic. *Journal of Medical Research and Health Sciences,*

- 5(1), 1636–1646. <https://doi.org/10.52845/JMRHS/2022-5-1-1>
15. Kumar SK, Seetharamaiah T, Rampure D, Ramakrishna C, Devi RY. Thyroid nodule: Cytohistological correlation. *Scholar J Appl Med Sci.* 2013;1(6):745-747
 16. Gupta M et al. Correlation of fine needle cytology with histopathology in the diagnosis of solitary thyroid nodule. *J Thyroid Res.* 2010;10:1–5.
 17. Chandanwale S, Singh N, Kumar H, Pradhan P, Gore C, Rajpal M, et al. Clinicopathological correlation of thyroid nodule. *Int J Pharm Biomed Sci.* 2012;3(3):97–102.
 18. Roman SA. Endocrine tumours: Evaluation of the thyroid nodule. *Curr Opin Oncol.* 2003;15:66–70.
 19. Cibas ES, Ali SZ. The Bethesda System for Reporting Thyroid Cytopathology. *Am J Clin Pathol.* 2009;132(5):658–65. doi:10.1309/ajcpplwmi3jv4la.
 20. Hsu CH, Boey J, Diagnostic pitfalls in the fine needle aspiration of thyroid nodules. A study of 555 cases in Chinese patients. *Acta Cytologica.* 1986Dec;31(6): 699-704.
 21. Goellner JR, Gharib H, Grant CS, Johnson DA. Fine needle aspiration cytology of the thyroid, 1980 to 1986. *Acta Cytologica.* 1986Dec;31(5): 587-90
 22. Tilak V, Dhaded AV, Jam R. Fine needle aspiration cytology of head and neck masses. *Indian J Pathol Microbiol.* 2002 Jan; 45(1):23-9.
 23. Ko H, Jhu IK, Yang SH, Lee JH, Nam JH, Juhng SW, et al. Clinicopathologic analysis of fine needle aspiration cytology of the thyroid. A review of 1,613 cases and correlation with histopathologic diagnoses. *Acta Cytol.* 2003;47(5):727–32.