International Journal of Biotechnology and Clinical Medicine ISSN 2583-4665
Vol.2, No.2, April - June 2023, pp. 50~54

THYROID LESIONS: FNAC AND HISTOPATHOLOGICAL EVALUATION

S Seebu, S Alphones and G Jayalakshmi*
[1]Department of Microbiology, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry 605502, India.

Article Info

Article history:

Received May 8th, 2023
Revised May 29th, 2023
Accepted June 15th, 2023

Keyword:

Benign tumor
Follicular neoplasms
Cytomorphology
Lesions
Diagnosis

ABSTRACT

To compare the histological diagnosis with the cytomorphology of thyroid lesions as determined by fine needle aspiration cytology. Determine the aspiration cytology's precision, sensitivity, and specificity. Out of 80 instances, 50 HPE-positive smears were examined, and of them, 82% were non-neoplastic, and 18% were malignant: neoplasms. Females predominated in the 30-39 year age group, and non-neoplastic lesions were frequent (M: F- 1:5). Nodular goiter made up most of them, making up 60%, followed by thyroiditis, which made up 22%. In the age range of 20 to 29, neoplastic lesions were prevalent, with a little female preponderance. Follicular neoplasms made up 5 percent of the group. Histopathological correlation was 100% among non-neoplastic lesions, 100% among benign neoplasms, and 88% among malignant neoplasms. The diagnostic test's precision, sensitivity, specificity, predictive values, and false-positive and false-negative rates in the current series follow institutional norms.

Corresponding Author:

Dr. G. Jayalakshmi,
Department of Pathology,
Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry
605502, India.
Email: jayalakshmi.2k15@gmail.com

How to Cite:

Seebu S et al. Thyroid lesions: fnac and histopathological evaluation. IJBTCM. 2023; Volume 2 (Issue 2): Page 50-54.

1. INTRODUCTION

In this region of the nation, thyroid swelling is a prevalent ailment. This illness can afflict people of any age and is present in both sexes, with a pronounced female preponderance. A syringe and fine needle are used in the diagnostic procedure known as "fine needle aspiration cytology" to remove cells and tissue fluid from tissue masses for evaluation [1]. The target lesion's location, meticulous examination for malignant cells, and repeat FNAC are essential to correctly diagnosing and designing an effective surgical therapy strategy for thyroid masses [2,3]. It is superior to a thyroid ultrasound, radionucleotide, or clinical assessment done separately. In pathology, fine needle aspiration occupies a special role as a diagnostic technique. Pathologists have effectively and continuously used aspiration cytology since it was introduced in 1920 by Martin and Ellis at the current Memorial Sloan Kettering cancer center in New York, United States [4].

In cases of a solitary thyroid nodule, fine needle aspiration cytology is useful to rule out any neoplastic/malignant lesion. It confirms clinically obvious thyroid malignancy, guiding surgical planning to ensure that the primary operation will be appropriate, i.e., neither

excessive nor inadequate, requiring a second procedure. In metastatic disease, it helps to identify metastatic tumors in the thyroid. Credit for introducing and developing the fine needle aspiration cytology is due largely to the Scandinavian workers, including Soderstrom, Persson, Nilsson, Ljumberg, Heimann, Einhorn, and Lowhagen [5,6]. They have repeatedly shown that fine needle aspiration biopsy permits reliable differentiation between benign and malignant thyroid enlargements. This has been confirmed in other European and North American centers.. In 1926, Martin and Ellis initiated a system of tumor diagnosis using a syringe with the 18-gauge needle at the Memorial Hospital, New York, USA.8 9 In the year 1940. This technique was modified using thin needles, 22 gauge and higher, with an external diameter of 0.6mm or less by Lopez Cadozo in the Netherlands and Soderstorm in Sweden8.In 1950, Franzen and Zajicek in Sweden widely used this technique and popularized it [7,8].

2. MATERIALS & METHODS

The procedure was explained to the patient in his language to make them comfortable, avoid anxiety and gain the patient's confidence. The smears were read and subsequently compared with histopathology in the cases that underwent surgery (Table 1). The senior pathologist did the interpretation and not the aspirator.

Table 1. Distribution of cases of thyroiditis.

Age (years)	Thyroiditis	
	Male	Female
<19	-	-
20-29	-	1
30-39	-	6
40-49	-	3
50-59	-	0
60-69	-	1
Total	0	11
Total	Male + Female = 11	

.

2.1. REQUIREMENTS OF FNAC

The patient lies supine with the neck hyperextended by placing a pillow under the shoulder. During the procedure, the patient is asked to keep still and refrain from swallowing and speaking.

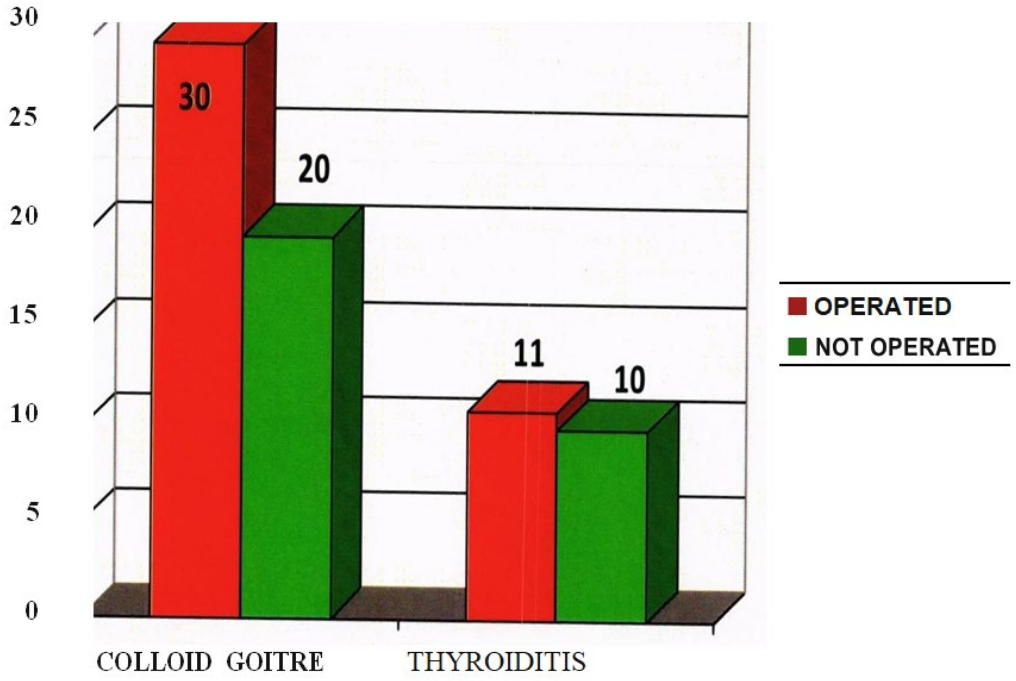

Figure 1. Surgical intervention was avoided in 30 cases (NG-20, THYROIDITIS-10) where FNAC predicted a benign etiology.

A low epithelial-to-lymphoid ratio, infiltration of degenerating follicular epithelial cells by lymphoid cells, and Hurthle cell change with considerable nuclear atypia were among the common cytologic features in Hashimoto's thyroiditis. In contrast, smears from florid Lymphocytic thyroiditis showed abundant lymphoid cells, comprising lymphocytes, centroblast, and germinal center cells, tending to form germinal centers with little hypertrophic epithelium [9,10]. A false negative diagnosis is a cytologic diagnosis of a non-neoplasm that proved to be a neoplasm. In the series summarized in the table, false negative rates ranged from 1.3% to 25% (Figure 1). In the present series, the false negative rate was 2%, which is in accordance. A false positive diagnosis is a cytologic diagnosis of a neoplasm that proved to be a non-neoplasm on histopathology [11,12]. The false positive rates in published series by various workers are tabulated in Table 2, ranging from 0% to 17%. In the present study, the false positive rate was 0%.

Table 2: Comparison of results with those of other studies.

Year	Sensitivity (%)	Specificity (Ofo)	False positive (%)	False negative (%)
1979	87.5	100	0	2.2
1984	61.9	95.2	3.4	6.7
1985	99.3	98.2	7.1	0.3
1986	100	89.5	3.3	0
1987	71.4	100	0.7	3.4
19)1	87.5	100	10	0

1998	74.3	96.1	3.9	25.7
2000	91.8	75.5	Unknown	Unknown
2000	93	96	8	4
2000	93	96	11.7	7
2001	91	83	17	Unknown
2002	78.4	98.2	1.8	21.5
2003	80	95	4	4
2005	79	98.5	Unknown	Unknown
2023	88	100	0	2

3. CONCLUSIONS

Fine needle aspiration cytology is the least traumatic, least intrusive, and least expensive method for identifying thyroid lesions and formulating a treatment plan. The number of cases where surgery was avoided best illustrates the beneficial effects of FNAC on the management of thyroid illness. Surgery was mostly postponed in cases of thyroiditis and colloid goiter. As a result, FNAC can be utilized as a first modality in assessing palpable thyroid nodules and aid in separating lesions that need surgical intervention from those that can be treated non-superlatively.

.

FUNDING

Nil

ETHICAL APPROVAL

Nil

COMPETING INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Voong KR. Clinical commentary: Atypia in lung and mediastinal lymph node fine-needle aspiration. Diagn Cytopathol 2022;50:172–5. https://doi.org/https://doi.org/10.1002/dc.24892.

[2] Felix FA, de Sena ACVP, de Arruda JAA, Tavares TS, Rocha AL, Rodrigues-Fernandes CI, et al. Fine-needle aspiration cytology for the diagnosis of plasma cell neoplasms in the head and neck region: A systematic analysis of the literature. Diagn Cytopathol 2023;51:198–210. https://doi.org/https://doi.org/10.1002/dc.25095.

[3] Feng Y, Cheng X, Wu S, Mani Saravanan K, Liu W. Hybrid drug-screening strategy identifies potential SARS-CoV-2 cell-entry inhibitors targeting human transmembrane serine protease. Struct Chem 2022. https://doi.org/10.1007/s11224-022-01960-w.

[4] Polk JB, Campbell J, Drilon AE, Keating P, Cambrosio A. Organizing precision medicine: A case study of Memorial Sloan Kettering Cancer Center's engagement in/with genomics. Soc Sci Med 2023;324:115789. https://doi.org/https://doi.org/10.1016/j.socscimed.2023.115789.

[5] Dimitriadis G, Mitrou P, Lambadiari V, Boutati E, Maratou E, Panagiotakos DB, et al. Insulin Action in Adipose Tissue and Muscle in Hypothyroidism. J Clin Endocrinol Metab 2006;91:4930–7. https://doi.org/10.1210/jc.2006-0478.

[6] Doan P, Nguyen P, Murugesan A, Subramanian K, Mani SK, Kalimuthu V, et al. Targeting orphan g protein-coupled receptor 17 with t0 ligand impairs glioblastoma growth. Cancers (Basel) 2021;13. https://doi.org/10.3390/cancers13153773.

[7] Nam S, Chong Y, Jung CK, Kwak T-Y, Lee JY, Park J, et al. Introduction to digital pathology and computer-aided pathology. Jptm 2020;54:125–34. https://doi.org/10.4132/jptm.2019.12.31.

[8] Le HTT, Murugesan A, Ramesh T, Yli-Harja O, Konda Mani S, Kandhavelu M. Molecular interaction of HIC, an agonist of P2Y1 receptor, and its role in prostate cancer apoptosis. Int J Biol Macromol

2021;189:142–50. https://doi.org/10.1016/j.ijbiomac.2021.08.103.
[9] Papanicolaou GN, Traut HF. The Diagnostic Value of Vaginal Smears in Carcinoma of the Uterus**This study has been aided by the Commonwealth Fund. Presented before the New York Obstetrical Society, March 11, 1941. Am J Obstet Gynecol 1941;42:193–206. https://doi.org/https://doi.org/10.1016/S0002-9378(16)40621-6.
[10] Arafah M, Rashid S, Tulbah AM, Akhtar M. Carcinomas of the Uterine Cervix: Comprehensive Review With An Update on Pathogenesis, Nomenclature of Precursor and Invasive Lesions, and Differential Diagnostic Considerations. Adv Anat Pathol 2021;28 3:150–70.
[11] Srinidhi CL, Ciga O, Martel AL. Deep neural network models for computational histopathology: A survey. Med Image Anal 2021;67:101813. https://doi.org/https://doi.org/10.1016/j.media.2020.101813.
[12] Bharathkumar N, Sunil A, Meera P, Aksah S, Kannan M, Saravanan KM, et al. CRISPR/Cas-Based Modifications for Therapeutic Applications: A Review. Mol Biotechnol 2021;64:355–72. https://doi.org/10.1007/s12033-021-00422-8.