IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 10, Issue 3 Ser. V (May – June 2021), PP 08-11
www.iosrjournals.org

Fine Needle Aspiration Cytology of Thyroid Swellings And Its Correlation With Histopathology

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Abstract:
Background: *Thyroid swellings are a major clinical problem in the general population and majority of them are benign. The initial screening procedures or triple assessment in thyroid includes, 1. Clinical history and examination, 2. Ultrasonography, 3. Fine Needle Aspiration Cytology.*
Materials and Methods: *This study was carried out in Department of ENT, LLRM Medical College Meerut, Uttar Pradesh by correlating the results of FNAC with that of Histopathological Examination of thyroid swellings. An observational study was conducted among patients having thyroid swelling coming in out-patient department of LLRM Medical College and Hospital, Meerut. A total of patients were evaluated by FNAC preoperatively and by histopathology after surgery. These cases were compared and efficiency of FNAC was checked by determining the sensitivity, specificity, positive predictive value and negative predictive value.*
Results: *The sensitivity of FNAC in detecting all the benign and malignant type of thyroid lesions was found to be in the range of 90–100%, whereas the specificity was almost 100% . The positive predictive value was 100% for all the lesions detected by FNAC except for follicular carcinoma which was 50% and negative predictive value was found to be in the range of 97%- 100% for all the lesions detected by FNAC.*
Conclusion: *Fine needle aspiration cytology is found to be a simple, cost effective, rapid to perform procedure with high degree of accuracy and is recommended as the first line investigation for the diagnosis of thyroid lesions. But it can give false negative result. So, final diagnosis should be made on the basis of histopathological examination.*
Key Word: *FNAC; HISTOPATHOLOGY; THYROID SWELLINGS*

Date of Submission: 02-06-2021 Date of acceptance: 15-06-2021

I. INTRODUCTION

Thyroid gland diseases shows a great geographical variation across the world. The incidence being higher in endemic areas [1]. Age greatly influences the incidence of goiter[2]. Incidence of disease is higher among females [3]. The presence of thyroid swelling can cause concern to both patients and surgeon as for the diagnosis and treatment is concerned.

The disorders of thyroid gland can be due to many causes like inflammatory, neoplastic, Diagnosis and management of thyroid swelling depends upon different invasive and non-invasive investigation like ultrasound, FNAC, thyroid nuclear scan.

FNAC is a simple, cost effective, technically easy to perform, and safe procedure with excellent patient compliance [4]. The use of FNAC in the diagnosis of thyroid lesions was first reported by Martin and Ellis in 1930 [5,6].

The major pitfall of this procedure is that fine needle aspiration cytology cannot differentiate between follicular adenoma and follicular carcinoma [7,8]

Hence, aim of this study is To determine the accuracy of FNAC in terms of sensitivity, specificity, positive predictive value and negative predictive value in comparison with histopathology in the diagnosis of a thyroid swelling

II. MATERIAL AND METHODS

This was a comparative cross-sectional study and carried out at the Departments of otorhinolaryngology and Pathology, L.L.R.M. Medical college, Meerut. It was conducted on 50 patients of thyroid swelling in 1 year. A non-probability purposive sampling technique was used for these patients. The study was ethically approved by the ethical committee of the institute.

Inclusion Criteria:

1. Patients having visible thyroid swelling.
2. Patients in Euthyroid state.

3. Patients who will give informed and written consent.

Exclusion Criteria:
1. Patients with any co-morbid conditions.
2. Patients who does not give informed and written consent.

All patients presenting with solitary thyroid nodules in the OPD and fulfilling the inclusion criteria were included in this study. Informed consent from all the study participants was taken. A pre-designed proforma was used to record relevant information (patient data, clinical findings and investigation reports) from patients.

History of present illness with respect to symptoms and duration was recorded. Detailed general examination was done to look for signs of thyroid hormone imbalance and local examination of thyroid swelling was done to note the site, size, shape, extent, number, consistency, margins, its mobility with deglutition and tenderness.

All routine investigations and serum T3, T4, and TSH levels were performed by Radioimmunoassay(RIA), (normal range of T3, 2.5–5.8pmol/L, T4, 11.5–23.0pmol/L, and TSH, 0.2–4.0mIU/L). Consent from all the patients were taken prior to performing fine needle aspiration cytology. The procedure was explained to the patient. The skin over the area was cleaned thoroughly with iodine and spirit. Aspirate was obtained using a 23 gauge disposable needle and 10 ml disposable syringe attached to it. At least 5-6 passes should be made to obtain an adequate sample. After obtaining the sample Smears were fixed in 95% alcohol solution and papanicolaou staining done.

Then, all the patients were subjected to Surgery and the thyroid specimen excised during thyroidectomy was send further for Histopathological examination. Finally, the histopathology reports were correlated with the findings of FNAC. Histopathology was taken as gold standard.

Statistical Analysis: The collected data was compiled and analysed using Epi Info software version 7.2.3.1. A 2×2 table was used to calculate sensitivity, specificity, positive predictive value, negative predictive value, and accuracy.

III. RESULT

As mentioned a detailed clinical history was taken followed by FNAC and histopathological examination.
A total of 50 patients were included in the study.
Table 1: shows the distribution of patients according to Age groups and gender.

Table-1: Shows distribution of Age groups and gender.

Age group	Male	Female	Total
10-20	-	2 (4%)	2 (4%)
21-30	-	13 (26%)	13 (26%)
31-40	-	21 (42%)	21 (42%)
41-50	2 (4%)	8 (16%)	10(20%)
51-60	1 (2%)	3 (6%)	4 (8%)
Total	3 (6%)	47 (94%)	50 (100%)

Table 2: Shows that the 68% patients presented with painless swelling and cosmesis whereas 20% presented with cancer phobia and 12% with pressure symptoms.

Table 2 : Presenting Symptoms of Thyroid Swellings

Presenting complain	Frequency	Percentage
Painless swelling and cosmesis	34	68%
Swelling and cancer phobia	10	20%
Swelling and pressure symptoms	6	12%
	50	100%

TABLE 3: shows that according to FNAC 84% patients had benign thyroid disease, 14% patients had malignant swelling and one patient had inadequate cytology. Whereas, histopathological examination shows 88% had benign and 12% had malignant swellings.

Table 3 : FNAC and Histopathlogical Diagnosis of Thyroid Swellings

FNAC Diagnosis		Frequency	Percentage
Benign (n=42)	Colloid goiter	16	38.09%
	Thyroiditis	5	11.90%
	Adenomatous goiter	11	26.19%
	Follicular adenoma	10	23.80%

Malignant (n=7)	Papillary carcinoma	5	71.42%
	Follicular carcinoma	2	28.57%
	Anaplastic carcinoma	0	0
	Medullary carcinoma	0	0
Inadequate cytology (n=50)		1	2%
HPE diagnosis		Frequency	Percentage
Benign (n=44)	Colloid goiter	17	38.63%
	Thyroiditis	5	11.36%
	Adenomatous goiter	11	25%
	Follicular adenoma	11	25%
Malignant (n=6)	Papillary carcinoma	5	83.33%
	Follicular carcinoma	1	16.66%
	Anaplastic carcinoma	0	0
	Medullary carcinoma	0	0

Graph 1 : Histopathological Correlation Of FNAC With Respect To Thyroid Swellings

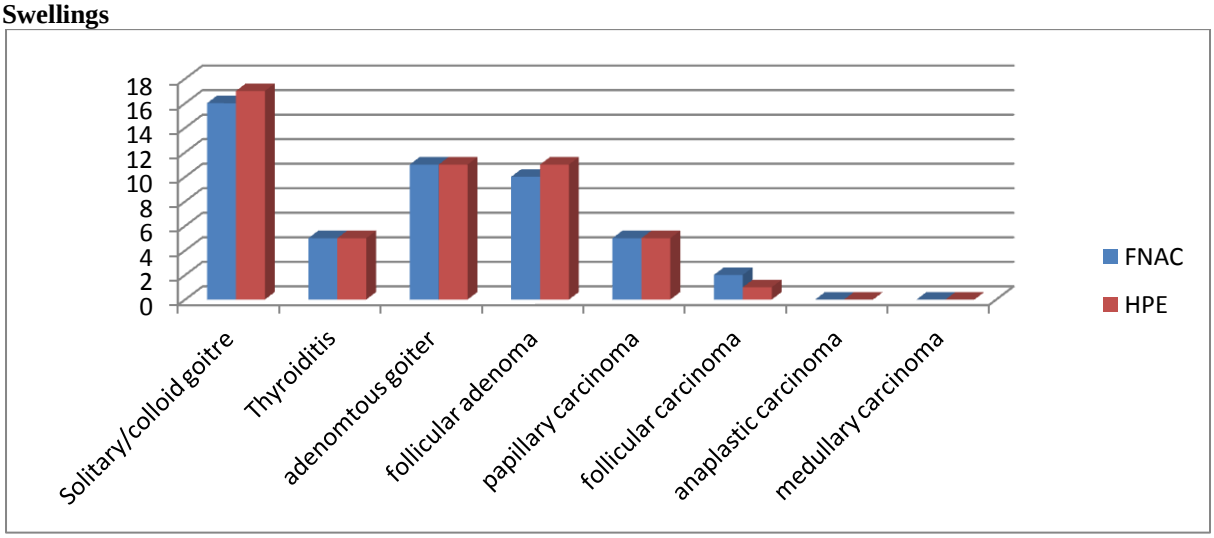

Table 4: Shows sensitivity, specificity, Positive Predictive Value, Negative Predictive Value of FNAC in comparison with HPE for different types of thyroid swellings.

Table 4: Validity of FNAC in comparison with HPE.

DIAGNOSIS	Sensitivity	Specificity	PPV	NPV
Colloid goiter	94.12%	100%	100%	97.05%
Thyroiditis	100%	100%	100%	100%
Adenomatous goiter	100%	100%	100%	100%
Follicular adenoma	90.91%	100%	100%	97.5%
Papillary carcinoma	100%	100%	100%	100%
Follicular carcinoma	100%	97.96%	50%	100%
Anaplastic carcinoma	-	-	-	-
Medullary carcinoma	-	-	-	-

IV. CONCLUSION:

Initial screening tests available for thyroid lesions include FNAC, Ultrasonography, thyroid antibody levels, and radio nucleotide scan. This study concludes that FNAC is the most commonly used initial diagnostic procedure with high degree of accuracy. But it can give false negative result. So, final diagnosis should be based on histopathological examination.

Conflict of interest: None.
Source of funding: None.

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Farheen Khan, et. al. "Fine Needle Aspiration Cytology of Thyroid Swellings And Its Correlation With Histopathology." *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 10(3), 2021, pp. 08-11.