

The Value of Fine Needle Aspiration Cytology in the Assessment of Thyroid Swellings with Histologic Correlation

Tekam V¹, Roy N², Singh P³, Rathee V⁴

¹Associate Professor, Department of General Surgery, Gandhi Medical College and Hamidia Hospital, Bhopal, Madhya Pradesh

²Resident, Gandhi Medical College and Hamidia Hospital, Bhopal, Madhya Pradesh

³Assistant Professor, Gandhi Medical College and Hamidia Hospital, Bhopal, Madhya Pradesh

⁴Resident, Gandhi Medical College and Hamidia Hospital, Bhopal, Madhya Pradesh

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Corresponding author: Dr Vishu Rathee

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Abstract

Introduction: Thyroid gland diseases are common and after diabetes mellitus, it is the most common gland to cause endocrine disorder. FNAC is most accepted, accurate diagnostic procedure which is easy, quick, cost effective, cosmetically good and used regularly for diagnosis of any thyroid swelling. In this study, much importance is given on the correlation between FNAC and histopathology.

Methods: The study comprised of 50 patients who presented with the history of swelling of thyroid which were referred from anywhere. The present study was undertaken to analyze the role of FNAC in the cytomorphological features of various thyroid lesions with histopathological correlation wherever the surgery was done and to determine its diagnostic accuracy.

Results: In this study it was observed that FNAC and histopathology have most correlation in detecting colloid goitre in 17 cases and least in detecting hyperplastic nodular goitre.

Conclusions: The present study suggests that FNAC gives good positive correlation with histopathology with high sensitivity and specificity. The use of FNAC helps in early detection and proper managements of thyroid neoplasm. False negative and false positivity can be reduced by repeat aspiration, correct sampling from the lesions with meticulous examination and reporting. Hence FNAC is a well established first line diagnostic test and effective screening tool which aid in the diagnosis and management of patients with thyroid lesions.

Keywords: FNAC, Histopathology, thyroid swelling, correlation

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Introduction

Thyroid word originated from a Greek word - thyreos “that means — SHEILD” [1]. Thyroid gland is the most common gland to cause endocrine disorder. The term —”goitre” (from Latin word gutter = the throat) is used to describe

generalized enlargement of thyroid gland [2]. Disorders of thyroid gland presents as either an alteration of hormone secretion or enlargement (increase in size) of the thyroid gland.

Thyroid enlargement is the most common sign that are indicated for thyroid disease, it may be diffuse, generalized or localized. The sporadic goiter is due to dyshormonogenesis or impaired utilization of trapped iodine. When more than 10% of population shows enlargement of thyroid gland it is called endemic goiter [3].

Prevalence of thyroid nodule ranges from 0.2% to 1.2% [4] in children and from 4-10% [5] in adults. Now a days due to common use of ultra-sonography in the clinical practice the incidence of thyroid nodule has risen to 14 - 50% [6]. Benign lesions of thyroid are more common. Malignant lesion are actually less than 5% [7].

FNAC is the first line investigation for patient with thyroid swelling along with ultrasound, thyroid function test and thyroid scan [8].

FNAC is the study of cells obtained by fine needle aspiration under vacuum. Cells with little tissue fluid are also sufficient to make a morphological diagnosis. The major limitation of FNAC is inability to differentiate between follicular adenoma and carcinoma [9].

In this study, much importance is given on the correlation between FNAC and histopathology

Methods

The present study was undertaken to analyze the role of FNAC in the cytomorphological features of various thyroid lesions with histopathological correlation wherever the surgery was done and to determine its diagnostic accuracy.

The study was undertaken in the Department of General Surgery, Bhopal, MP during the period from August 2020 to September 2021. The study comprised of 50 patients who presented with the history of swelling

of thyroid which were referred from anywhere.

Procedure

All the patients were clinically examined in detail according to the proforma and a careful palpation of the thyroid gland was done to judge precisely the location for aspiration.

After brief explanation about the procedure to the patient, aspiration was done with the patient in supine or sitting position with extended neck, so as to make the thyroid swelling appear prominent. Under aseptic precautions 21 gauge needle with syringe was inserted into the lesion and to and fro movements performed quickly.

Under negative pressure, the material was collected and spread over a clean labelled slides and smears were prepared.

Few smears were wet fixed in 95% ethyl alcohol and stained with Haematoxylin and Eosin (H & E) and some were air dried and stained with Leishman. Whenever fluid was obtained all the contents were aspirated and centrifuged, smears were made from the sediment and stained by the stains as described above. Stained smears were studied under light microscopy.

When the surgery was done, the received specimens were fixed with 10% formalin and detailed gross examination was done and sections were taken from the representative areas for paraffin sections and stained by H & E. The sections were studied under light microscopy.

Results

The present study deals with the Fine needle aspiration (FNAC) of the thyroid lesions and determination of the diagnostic accuracy of the aspiration cytology with histopathological correlation. During the period of this study from August 2020 to September 2021. 70 FNAC were performed out of which 50 cases were biopsied

subsequently and subjected to histopathological study. In this study, it was observed that FNAC and histopathology

have most correlation in detecting colloid goitre in 17 cases and least in detecting hyperplastic nodular goitre.

Table 1: Showing FNAC and Histopathology correlation in neoplastic lesion.

FNAC and Histopathology correlation in neoplastic lesions				
Count				
		Histopathology neoplastic		Total
		positive	negative	
FNAC_neoplastic	Positive	6	2	8
	negative	2	36	38
Total		8	38	46

Table 2: Showing FNAC and Histopathology correlation in non-neoplastic lesion

Histopathology and FNAC Correlation in non- neoplastic lesion												
			FNAC								Total	
			Benign	Colloid goitre	Colloid goitre with cystic changes	Diffuse nodular goitre	Hyperplastic thyroid nodule	Multi nodular goitre	Thyroid cyst	Thyroid nodule		Thyroiditis
Histopathology	Colloid goitre	Count	0	13	2	1	0	1	0	0	0	17
		% within FNAC	0.0%	76.5%	66.7%	100.0 %	0.0%	14.3%	0.0%	0.0%	0.0%	44.7%
	Hyperplastic nodular goitre	Count	1	1	0	0	1	3	0	3	0	9
		% within FNAC	100%	5.9%	0.0%	0.0%	100%	42.9%	0.0%	100%	0.0%	23.7%
	Lymphocytic thyroiditis	Count	0	0	0	0	0	0	0	0	1	1
		% within FNAC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	2.6%

	Multinodular goitre	Count	0	2	0	0	0	2	0	0	0	4
		% within FNAC	0.0%	11.8%	0.0%	0.0%	0.0%	28.6%	0.0%	0.0%	0.0%	10.5%
	Nodular hyperplasia with chronic thyroiditis	Count	0	0	0	0	0	1	0	0	0	1
		% within FNAC	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	0.0%	2.6%
	Nodular hyperplasia with cystic degeneration	Count	0	1	0	0	0	0	0	0	0	1
		% within FNAC	0.0%	5.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%
	Thyroid cyst with cystic degeneration	Count	0	0	0	0	0	0	2	0	0	2
		% within FNAC	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%	0.0%	0.0%	5.3%
	Thyroiditis	Count	0	0	1	0	0	0	0	0	2	3
		% within FNAC	0.0%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	66.7%	7.9%
Total	Count	1	17	3	1	1	7	2	3	3	38	

	% within FNAC	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
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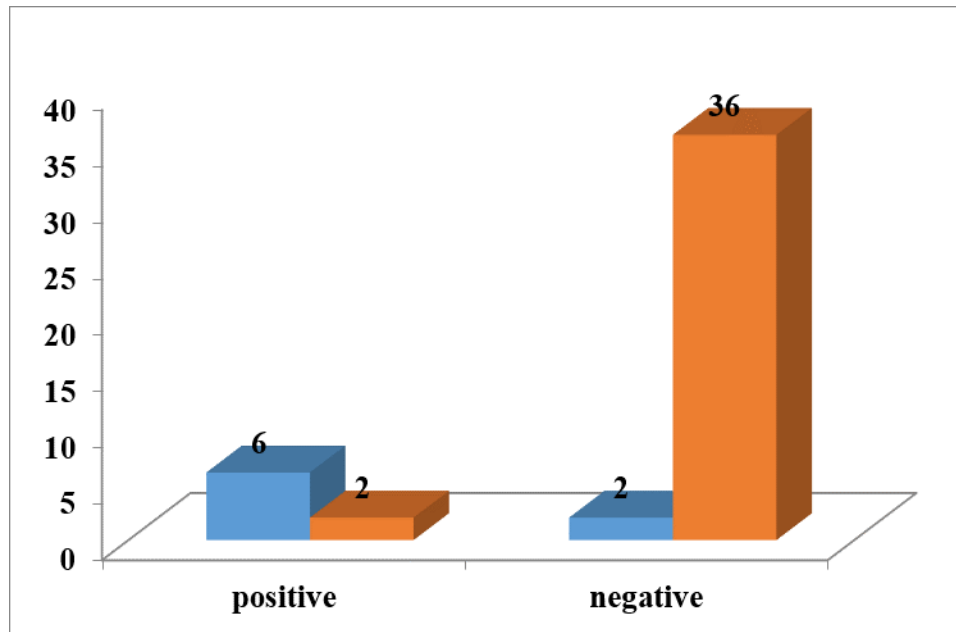


Figure 1: Bar diagram showing correlation between FNAC and histopathology in neoplastic lesion.

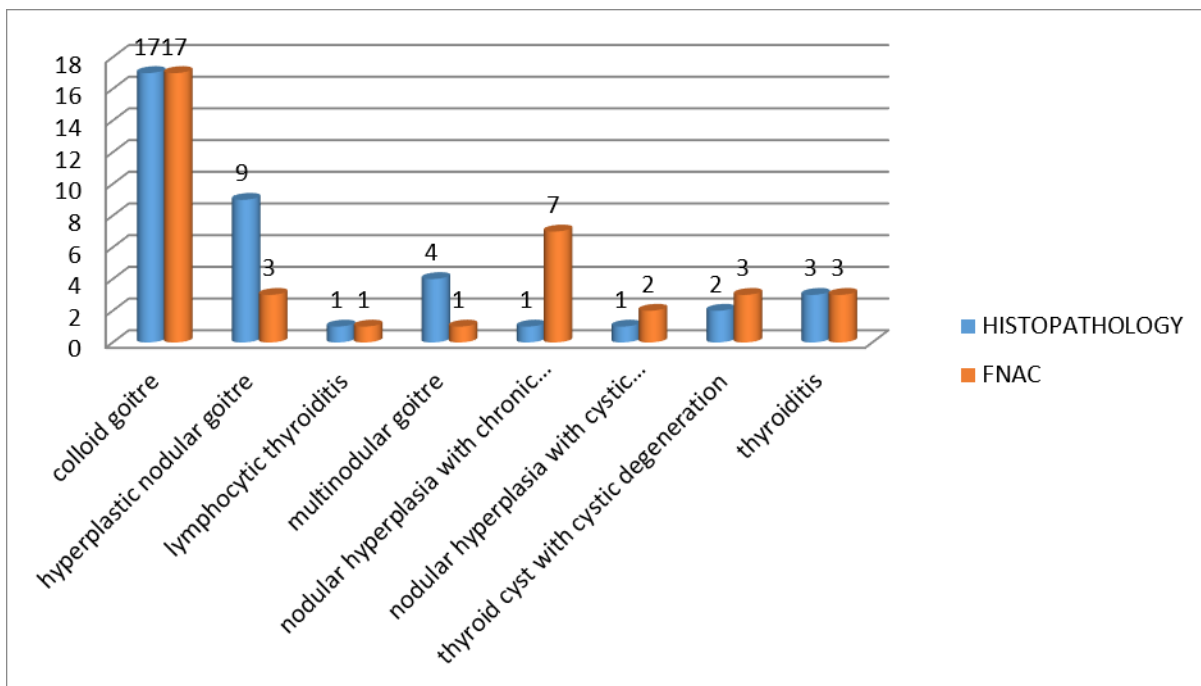


Figure 2: Bar diagram showing correlation between FNAC and histopathology in non – neoplastic lesion.

Discussion

FNAC of thyroid lesions has been shown to be safe, simple, cost effective and accurate method for the management of palpable thyroid lesions. It helps to categorize Non-neoplastic from Neoplastic thyroid lesions. Its use has decreased the number of surgeries performed. The combination of clinical examination and FNAC remains the mainstay in selecting patients for thyroid surgery.

The sensitivity, specificity and accuracy of FNAC for benign lesion detection have eclipsed the diagnostic utility of other diagnostic methods and this procedure has assumed a dominant role in determining the managements of patients with thyroid nodules

It is a minimally invasive technique done by disposable 10 cc syringe, with no complications [10]. The syringe used in the present study, is cost effective than other expensive methods. Fundamentals to the success are gathering of accurate and complete clinical history technical competence in obtaining the aspirate preparation of initial smears and their evaluation.

Accuracy of FNAC enables to proceed with surgery or not. It bridges the gap between clinical evaluation and final surgical pathological diagnosis in majority of cases. It helps the clinician to obtain a diagnosis in high percentage of cases with minimal expenditure of time and money and often to avoid unnecessary surgery.

In ambiguous cases we recommend repeat aspirations to get adequate material to rule out malignancy. Cystic change can occur in both Non neoplastic and Neoplastic lesions. As in other studies we have also encountered cystic change in malignant (Papillary carcinoma) conditions. In cystic nodules fluid should be aspirated completely

and FNA should be done from the residual mass.

If there is no palpable mass, patient should be followed up with USG examination and USG guided FNAC should be done wherever necessary. However, delay in diagnosis due to false negative needle aspirations may be minimized by clinical follow up and repeat aspiration to obtain adequate aspirates and a proper cytologic diagnosis.

The diagnostic accuracy can be improved when combined with advanced imaging techniques and immunologic analysis. The present study suggests that FNAC gives good positive correlation with histopathology with high sensitivity and specificity. The use of FNAC helps in early detection and proper managements of thyroid neoplasm.

False negative and false positivity can be reduced by repeat aspiration, correct sampling from the lesions with meticulous examination and reporting. Hence FNAC is a well established first line diagnostic test and effective screening tool which aid in the diagnosis and management of patients with thyroid lesions.

In the study by Silverman JF *et al*, there were 228 non neoplastic and 80 neoplastic lesions with a ratio of 1:2.9 [11] (1986).

In the present study of 50 cases, 41 were non-neoplastic and 9 neoplastic lesions with a ratio of 1:10.1 which is consistent with the study of Silverman JF *et al*.

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