

Histocytological Correlation Study of Thyroid Gland Lesions

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Abstract: Background: There is some “grey zone” in thyroid cytology where the diagnostic efficacy declines sharply rendering it difficult to categorize the lesions results in discrepancy. Objective: The aim of the present study is to determine the sensitivity, specificity, and accuracy of FNAC in the diagnosis of thyroid lesions and to correlate cytological findings with histopathology. Material and Method: A Prospective study of FNAC of thyroid lesions was carried out along with its histopathological correlation starting from 1st October 2013 to 30th September 2015 at the P.D.U. Medical College and Hospital, Rajkot, Gujarat (India). Out of 886 thyroid lesions aspirated in cytology, we studied 80 cases followed by histopathological examination. Results: The sensitivity, the specificity, accuracy, false positive rate, false negative rate of FNAC for the diagnosis of solitary thyroid nodules were 92.85%, 98.48%, 97.5%, 1.56%, 7.14%. Conclusion: The fine needle aspiration cytology is a simple, safe, cost effective, time saving, and minimally invasive procedure with a high diagnostic yield accuracy, sensitivity and specificity.

Keywords: sensitivity, specificity, May-Grunwald-Giemsa(MGG), thyroiditis, Papillary ca

1. Introduction

Fine needle aspiration cytology (FNAC) is a simple, safe, cost effective, minimally invasive and outpatient procedure that provides specific diagnosis rapidly. It is also used as the initial screening test for diagnosis of thyroid nodules¹

FNAC has allowed a dramatic decrease in unnecessary surgeries with thyroid nodular disease, enhancing the percentage of malignant operated nodule over 50%². The prevalence of thyroid nodules ranges from 4% to 10% in the general adult population and from 0.2% to 1.2% in children³. The majority of clinically diagnosed thyroid nodules are non-neoplastic; only 5 to 30 %, are malignant and require surgical intervention.⁴

2. Materials and Methods

A prospective study of FNAC of thyroid gland lesions was carried out along with its histopathological correlation at Department of Pathology, PDU Medical College and Hospital, Rajkot, Gujarat (India) during the 1st October 2013 to 30th September 2015. Total 886 cases of thyroid lesion aspirates were done and out of these, we studied 80 cases followed by histopathological correlation. The FNAC was performed using a 21-23 gauge needle attached to a 10 ml disposable syringe. Aspirates were smeared on clean slides and stained by H & E (Hematoxylin and Eosin) and May-Grunwald-Giemsa(MGG) stains. For histopathology, the excised surgical specimens were fixed in 10 % formalin, then routinely processed and stained by Hematoxyline and Eosin (H&E) stain.

We compared findings of FNAC and histopathology and calculate the sensitivity, specificity, and diagnostic accuracy of FNAC for diagnosing neoplastic and non-neoplastic lesions.

3. Result

In FNAC 66 (82.5%) cases were non-neoplastic and 14 (17.5%) cases were neoplastic [TABLE-1]. Histopathological examination revealed that 65(81.25%) were non-neoplastic lesions and 15(18.75%) cases were neoplastic [TABLE-2]. Among these lesions 4(5.0%) were cystic lesions, 8(10.0%) were thyroiditis, 48(60%) were colloid goiter, 5(6.25%) hyperplastic thyroid lesions and 15(18.75%) were neoplastic lesions. [TABLE-3]. Histocytology correlation is shown in [TABLE-6], [Figure-3]. Sensitivity of FNAC was 92.85%, specificity was 98.48% and diagnostic accuracy was 97.5%. [TABLE-7]

4. Discussion

FNAC is usually the first line of investigation, and other investigations like ultrasound examination, thyroid function test, thyroidscan and antibody levels are done subsequently with an aim to select patients who require surgery and those that can be managed conservatively.⁵ In our study thyroid lesions found to be common between the age group of 31-40 years. [TABLE-4], [FIGURE-1]] Female were higher in frequency (n=71, 88.75%) than male (n=09, 11.25%). [TABLE-5], [FIGURE-2]

In our study, a high diagnostic efficacy of FNAC in diagnosing both non-neoplastic and neoplastic lesions was achieved. FNAC showed a sensitivity of 92.85%, specificity of 98.48% and diagnostic accuracy of 97.5%. These results were comparable to previously reported results. [TABLE-8]⁶⁻¹⁰

5. Conclusion

The fine needle aspiration cytology is a simple, safe, cost effective, time saving, and minimally invasive procedure which can be used as an outpatient procedure or as a part of a screening programme for the diagnosis of thyroid lesion with

a high diagnostic yield accuracy, sensitivity and specificity. FNAC is recommended as the first line investigation for the diagnosis of solitary thyroid nodule, especially in developing countries with limited resources, as it helps in differentiating lesions that require surgery from those that can be managed otherwise. But FNAC has its limitations so final diagnosis and treatment pattern should be based upon histopathology.

Table 1: Cytological Diagnosis of Thyroid Lesions

Cytological Diagnosis	No. of Cases	Percentage %
Non-Neoplastic Lesions	66	82.5
Neoplastic Lesions	14	17.5
Total	80	100

Table 2: Histological Diagnosis of Thyroid Lesions

Histological Diagnosis	No. of Cases	Percentage %
Non-Neoplastic Lesions	65	81.25
Neoplastic Lesions	15	18.75
Total	80	100

Table 3: Histological Diagnosis:

Histological Diagnosis	No. of cases	Percentage %
Cystic lesion	4	5.0
Thyroiditis	8	10
Colloid goiter	48	60
Hyperplastic thyroid lesion	5	6.25
Neoplastic lesions	15	18.75
Follicular adenoma	6	7.5
Follicular carcinoma	2	2.5
Papillary carcinoma	5	6.25
Medullary carcinoma	1	1.25
Anaplastic carcinoma	1	1.25
Total	80	100%

Table 4: Age Wise Distribution of Thyroid Lesions

Age Range (yrs)	No. of cases	Percentage
Up to 10	0	0
11 – 20	06	7.5
21 – 30	20	25.0
31 – 40	22	27.5
41 – 50	13	16.25
51 – 60	11	13.75
61 – 70	06	7.5
71 – 80	02	2.5
Total	80	100%

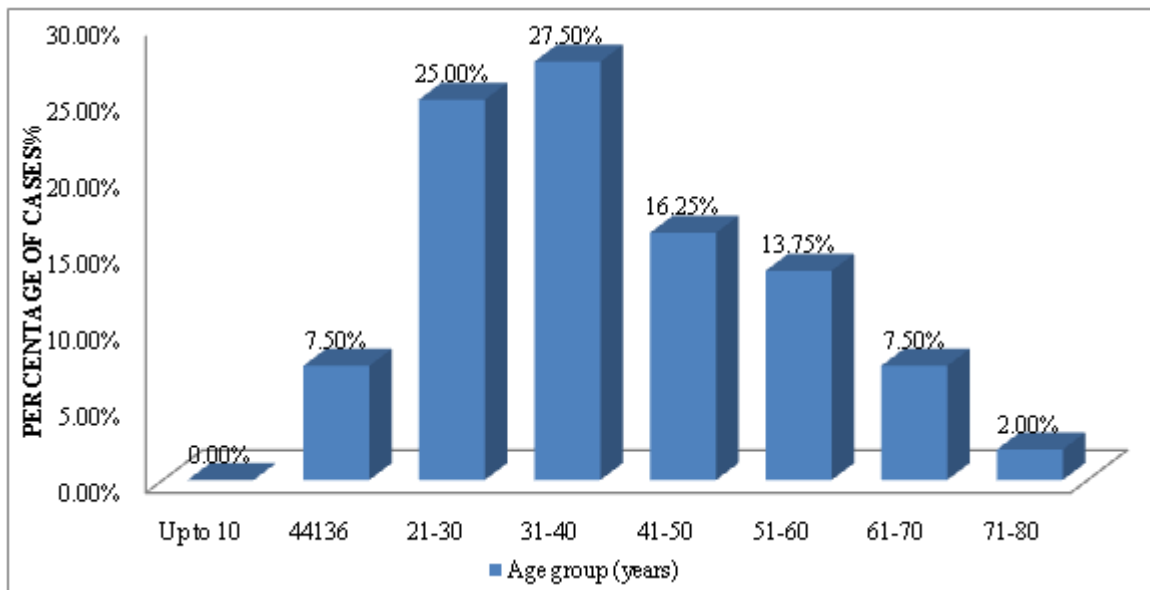


Figure 1: Age Wise Distribution of Thyroid Lesions

Table 5: Sex Wise Distribution of Thyroid Lesion

Sex	No. of cases	Percentage
Females	71	88.75%

Males	09	11.25%
Total	80	100%

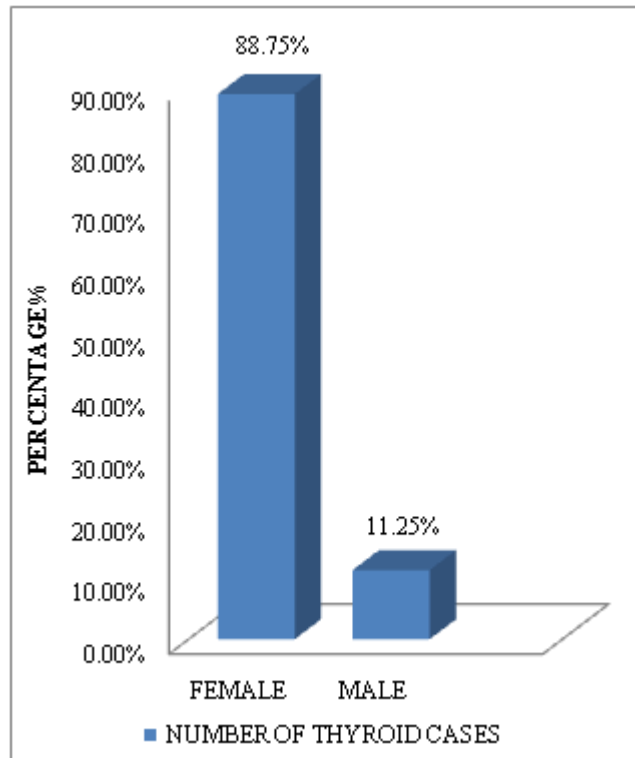


Figure 2: Sex Wise Distribution of Thyroid Lesion

Table 6: Cyto-Histopathological correlation of thyroid lesion of present study

Cytological diagnosis and no. of cases		Histopathological diagnosis										Sensitivity %	Specificity %
Diagnosis	No.	Cystic lesion	Lymphocytic thyroiditis	Hashimoto's thyroiditis	Colloid goiter	Hyper-plastic thy. Lesion	Follicular adenoma	Follicular ca	Papillary ca	Medullary ca	Anaplastic ca		
Cystic lesion	5	4							1			100	80
Lymphocytic thyroiditis	5		3	2								100	60
Hashimoto's thyroiditis	3			3								60	100
Colloid goite	49				46	2	1					95.83	93.87
Hyperplastic thy. Lesion	4				1	3						60	75
Follicular neoplasm	8				1		5	2				87.5	87.5
Papillary ca	4								4			80	100
Medullary ca	1									1		100	100
Anaplastic ca	1										1	100	100
Total	80	4	3	5	48	5	6	2	5	1	1		

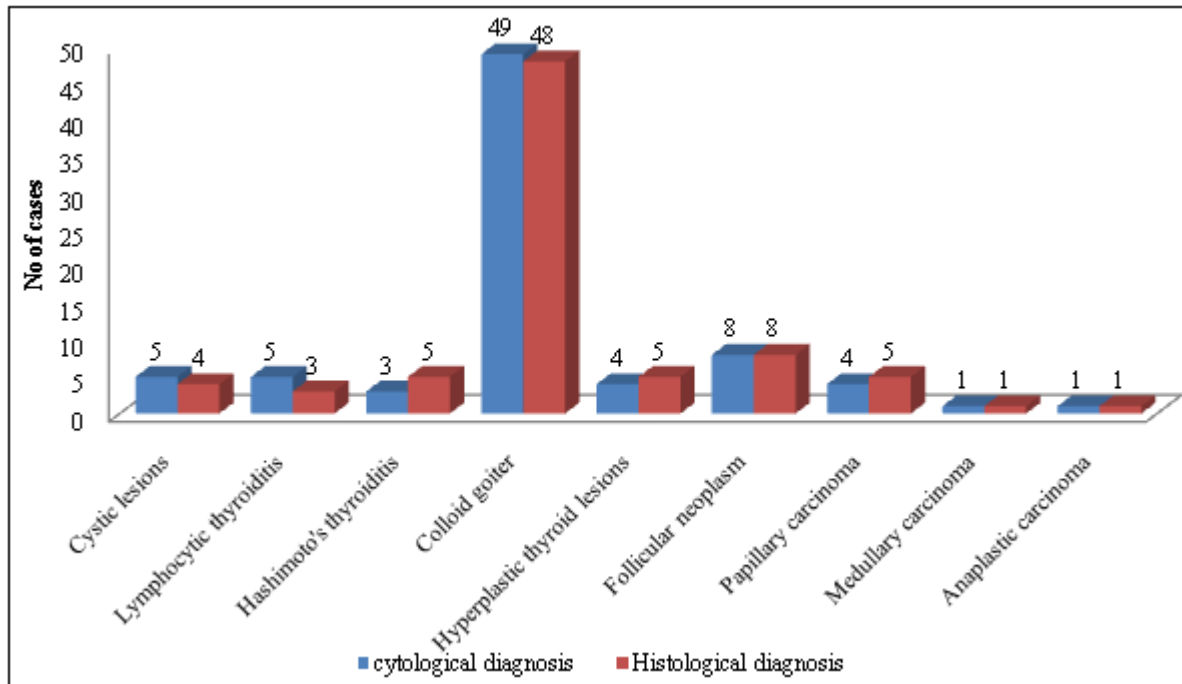


Figure 3: Cyto-Histopathological correlation of thyroid lesion of present study

Table 7: Diagnostic Efficacy of Thyroid Lesion of Present Study

Cytological diagnosis	Histopathological diagnosis		Total
	Neoplastic	Non-neoplastic	
Neoplastic	13 (a)	01 (b)	14 (a+b)
Non neoplastic	01 (c)	65 (d)	66 (c+d)
Total	14 (a+c)	66 (b+d)	80(a+b+c+d)

Sensitivity = $a / (a+c) \times 100 = 13/14 \times 100 = 92.85\%$
 Specificity = $d / (b+d) \times 100 = 65/66 \times 100 = 98.48\%$
 Accuracy = $(a+d) / (a+b+c+d) \times 100 = 97.5\%$
 Percentage of false positive = $b / (b+d) \times 100 = 1/66 \times 100 = 1.56\%$
 Percentage of false negative = $c / (a+c) \times 100 = 1/14 \times 100 = 7.14\%$

Table 8: Comparison of diagnostic value for malignant lesion

Studies	Year	Sensitivity %	Specificity %	Accuracy %
Handa et al ⁶	2008	97	100	98.48
Gupta et al ⁷	2010	80	86.6	84
Pinky pandey et al ⁸	2012	57.14	90	80.28
Parikh et al ⁹	2012	71.43	100	90.24
Rupam et al ⁵	2014	82.14	86.8	83.60
Present Study	2015	92.85	98.48	97.5

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