

Original Research Article

Hits and misses in diagnosis of thyroid lesions – Cytohistological correlation

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Abstract

Background: Fine needle aspiration of thyroid neoplasm is cost effective procedure to differentiate between benign and malignant lesions in most of the cases.

Aim: To evaluate the accuracy of FNAC in diagnosis of different thyroid lesions, particularly differentiation of malignant and non malignant lesions.

Materials and methods: Study comprised of 220 cases of thyroid FNAC's which were followed by excision biopsy. Their FNAC's diagnosis was compared with histopathological diagnosis.

Results: Among 220 cases of FNAC's 151 was diagnosed as benign (68.63%), 58 cases as malignant (26.36%) and 11 case as follicular neoplasms (5.0%). Colloid goitre represented the majority of benign cases while papillary carcinoma was the most frequent malignant lesion. Cytological findings were compared with their corresponding histopathological findings.

Conclusion: Benign and malignant thyroid lesions can be differentiate accurately by FNAC however certain pitfalls should be kept in mind.

Key words

Papillary carcinoma thyroid, Follicular neoplasm, Colloid goitre, Histopathology.

Introduction

Fine needle aspiration cytology (FNAC) of thyroid gland is considered as first line diagnostic test for the evaluation of thyroid lesions with the main purpose of confirming benign lesions and thereby, reducing unnecessary surgery [1]. As a result, the incidence of malignancy at thyroidectomy has increased from 5-10 % to 30-50 % in the recent years [2]. FNAC is simple, convenient, rapid, cost effective and safe method. One of the major advantages that FNAC in thyroid lesions has gained popularity is that it can be done as an out-patient procedure. It plays an important role in pre-operative screening in the diagnosis of thyroid lesions and is a valuable tool in the management [3, 4]. Although there is a large body of world literature claiming the accuracy and usefulness of thyroid cytology, there is also evidence showing possible limitations and pitfalls of this procedure [5, 6].

Thyroid nodules are common clinical findings and have a reported prevalence of approximately 4-7 % of adult population. The vast majority of these nodules are benign. Fewer patients have undergone thyroidectomy for benign disease as a result of FNAC, with resultant decreased health care costs [7, 8].

The main limitation of FNAC is the differentiation of benign from malignant follicular neoplasms. FNAC specimens of follicular neoplasms and Hurthle cells are commonly interpreted as indeterminate or suspicious. This has resulted in low FNAC accuracy rates of approximately 40 % for follicular carcinomas. Diagnosis of follicular carcinoma also requires the identification of capsular and/or vascular invasion, which is not a possibility with FNAC techniques. Cytopathologists should be aware of these potential limitations and pitfalls of FNAC interpretation.

The aim of this study was to evaluate the results of FNAC of thyroid lesions and correlate it with histopathology. We scrutinized the cases

showing any discrepancy in cytohistological findings with the aim of highlighting the possible cause of errors and misses in the diagnosis of thyroid lesions.

Materials and methods

This study was done during the period of one year from 2015 to 2016. FNAC was performed on 220 patients with thyroid enlargement. Aspirations were done without any ultrasonographic guidance in this study. The procedure was done by pathologists in all the cases. Prior to aspiration, a physical examination was carried out to note the mobility of the thyroid during deglutition and the presence of any enlarged cervical lymph node. The patients were made to lie supine with their necks stretched up. A 23 gauge needle attached to a Franzen's handle was used, either without or with aspiration by a 10ml disposable syringe. Two to three passes were made in each case. In the case of cystic nodules, the cyst contents were aspirated, centrifuged and slides made from the sediment for cytological analysis. The slides were stained with hematoxylin and eosin (H&E) and May – Grunwald - Giemsa (MGG). Stained smears were studied under light microscopy. No major complications like penetration into the trachea, laryngeal nerve palsy or hematoma were recorded. Only slight pain was reported by some patients.

Out of 220 selected patients, all 220 patients were followed by excision biopsy such as total, subtotal and hemithyroidectomy. Histopathological examination of these specimens was done. After noting the detailed gross examination, 3-10 tissue bits were selected from representative areas for routine paraffin sections, which were stained by H & E. The cytological results were correlated with histopathological examination.

Results

We selected 220 cases, 50 cases (22.7%) were males and 170 cases (77.3%) were females, with female to male ratio of 3.4:1. The age ranged

from 5-70 years, with mean age of 40.57 years.

The majority of the aspirates were blood mixed. In 20 Patients aspiration yielded either brown or dark brown fluid, amount varying from 0.5ml to 15 ml. The serous fluid was aspirated in 4 patients. Satisfactory cell samples were obtained in all cases.

Cytohystological findings

In our study, the non neoplastic lesions were common than the neoplastic lesions.

Colloid goitre

A total of 130 cases were diagnosed to have colloid goitre by FNAC. Histopathological study confirmed the cytodiagnosis in 116 cases. Rest of the 14 cases shows follicular adenoma in 8 cases, Hashimoto's thyroiditis in 2 and colloid goitre with hashimoto's thyroiditis in 4.

Hashimoto's thyroiditis

In out of 220 cases cytological diagnosis of hashimoto's thyroiditis was made in 16 cases. Histopathological examination confirmed the FNAC findings in 12 cases. Histopathological diagnosis in 4 cases of which on shows colloid goitre, two shows follicular adenoma and one was papillary carcinoma with Hashimoto's thyroiditis.

Lymphocytic thyroiditis

Four cases of lymphocytic thyroiditis were diagnosed cytologically. Histopathological examination confirmed the cytological findings in 3 cases. Histopathological diagnosis differed in one case which shows hashimoto's thyroiditis.

Thyroglossal cyst

There was only one case of Thyroglossal cyst which was reported in aged 5 years who present with midline neck swelling moving with deglutition. Fluid was aspirated and smears showed scanty cellularity with the presence of squamous cell, anucleate squames and foamy macrophage. The histopathological study confirmed the cytodiagnosis of Thyroglossal cyst.

Follicular neoplasm

Out of 220 cases, cytological diagnosis of follicular adenoma was made in 11 cases. 8 cases were confirmed by histopathology. Histopathological diagnosis differed in 3 cases of which one came out to be hashimoto's 3 cases of which one came out to be hashimoto's and other two cases as colloid goitre.

Papillary carcinoma

Fifty eight cases of papillary carcinoma were diagnosed. Four cases had cystic changes and aspiration was repeated. Histopathological diagnosis remained the same in all 58 cases with an accuracy of 100%, as papillary thyroid carcinoma is readily identified using FNAC because of its unique cytological feature (**Figure – 1**). Diagnosis is correct for papillary thyroid carcinoma in approximately 90- 100% of FNAC specimens when correlated with the histology of the final surgical specimen (**Figure – 2, 3**). The present study showed 72.7% sensitivity, 100% specificity, 100% positive predictive value and 96.65% negative predictive value for neoplastic lesions while for malignant lesions, it was 98.34%, 100%, 100% and 99.38% respectively.

Cytological findings of 220 cases are shown in **Table - 1**. Cytohistological correlation is shown in **Table - 2**.

Figure – 1: Smear showing papillary processes in papillary carcinoma thyroid.

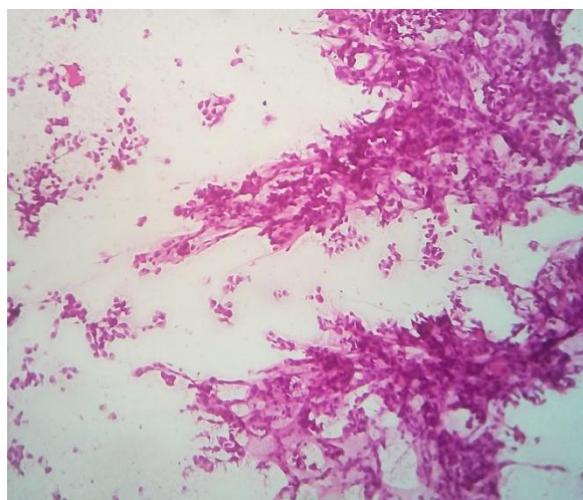


Figure – 2: Gross of papillary carcinoma showing tiny papillae.



Figure – 3: Section showing optical clearing in papillary carcinoma thyroid.

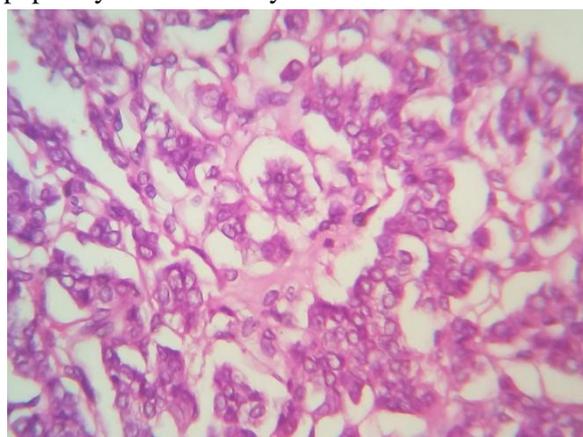


Table - 1: Cytological Results of 220 cases.

FNAC diagnosis	No. of cases	%
Colloid goitre	130	59.09
Hashimoto's thyroiditis	16	7.27
Lymphocytic thyroiditis	4	1.83
Thyroglossal duct cyst	1	0.45
Follicular neoplasm	11	5.0
Papillary carcinoma	58	26.36
Total	220	100

Table - 2: Cytohistopathological correlation of Thyroid lesions.

	Histopathological diagnosis			Cytological diagnosis			Total
	Colloid Goitre	Hashimoto's Thyroiditis	Lymphocytic Thyroiditis	Thyroglossal Duct cyst	Follicular Neoplasm	Papillary Carcinoma	
Colloid Goitre	116	1	-	-	2	-	119
Hashimoto's thyroiditis	2	12	1	-	1	-	16
Lymphocytic thyroiditis	-	-	3	-	-	-	3
Follicular neoplasm	8	2	-	-	8	-	18
Papillary carcinoma	-	-	-	-	-	58	58
Colloid goitre with hashimoto's	4	-	-	-	-	-	4
Papillary carcinoma with hashimoto's	-	1	-	-	-	-	1
Thyroglossal duct cyst	-	-	-	1	-	-	1
Total	130	16	4	1	11	58	220

Discussion

Fine needle aspiration cytology has become the diagnostic tool of choice for the initial evaluation of solitary thyroid nodule because of its accuracy, safety and cost effectiveness. A satisfactory specimen should contain at least 5 or 6 groups of 10-15 well preserved cells. Nature of

the disease, experience and understanding of certain limitations determine its diagnostic utility.

Accuracy of FNAC is closely related to the histologic type of thyroid carcinoma that is being evaluated. Papillary thyroid carcinoma is readily

identified using FNAC because of its unique cytologic features. Diagnosis is correct for papillary thyroid carcinoma in approximately 90-100 % of FNAC specimens when correlated with the histology of the final surgical specimen.

A total of 220 selected of FNAC cases were selected for the study which were followed by excision biopsy. A retrospective study by Keh, et al. of 61 patents found 75.4% of solitary thyroid nodules to have a neoplastic pathology and 34.4% to be malignant [9].

A study by Kaliszewski, et al. indicated that FNAC rarely produces false negative results in patients with solitary malignant thyroid tumors, while in contrast, the results in patients with multiple malignant thyroid tumors are often false negative. Compared with the thyroid cancer nodules, the prediction rate for those with cancer in single nodules was three times higher [10].

A study by Arul and Masilamani indicated that in cases of solitary thyroid nodules, fine needle aspiration cytology reports using the Bethesda system for reporting. Thyroid cytopathology correlate well with histopathologic diagnosis of these nodules, having a sensitivity, a specificity an accuracy, a positive predictive value and a negative predictive value of 94.4%, 97.6%, 95.8%, 98.1%, and 93.2% respectively [11].

Thyroid enlargement is a common occurrence in most regions of the world. The cytohistological concordance rate in our study in colloid goitre came out to be 97.45% (115 out of 118 cases). Various studies have shown concordance between cytology and histology to vary between 80 and 100% [12-17].

In the present study 161 cases (73.18%) were non neoplastic and 59 (26.82%) were neoplastic lesions with non neoplastic to neoplastic ratio of 2.8:1. Many authors have studied the cytology of thyroid lesions ranging from 0.46:1 to 12.5:1. Ratio when compared to other studies, it was comparable to studies by Frable and Frable [23]

but non neoplastic lesions were very much low when compared to Altavilla, et al. study. [18-24].

Conclusion

FNAC has become the diagnostic tool of choice for initial evaluation of solitary thyroid nodule to differentiate a malignant lesion from benign one with accuracy as high as 97%. However certain pitfalls of FNA should be kept in mind while reporting. Cystic lesions of thyroid should undergo surgical excision or close follow up as these can harbor papillary carcinoma of thyroid, which can be missed as FNAC smears may not be representative. The commonest reason for false positive diagnosis is the occurrence of nuclear features characteristic of papillary carcinoma of thyroid in other thyroid lesions like nodular goitre, hashimoto's thyroiditis, follicular neoplasms etc. However, occurrence of these features in benign lesions is very less as compared to papillary carcinoma thyroid and a pathologist should be aware of this fact. Nevertheless, as FNAC is considered a screening procedure, particular attention should be given to minimizing false negative diagnosis.

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