Original Research Article

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Analysis of pattern of thyroid disorders in a tertiary care hospital and evaluating the accuracy of preoperative fine needle aspiration with postoperative histopathological examination

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ABSTRACT

Background: Thyroid swelling is a common disease in India. It is very important to differentiate malignant thyroid swellings from benign swellings for definitive planning of appropriate surgery and relevant patient counselling. The present study is undertaken to analyse the pattern of thyroid disease in patients coming to Department of General Surgery and to evaluate the accuracy of thyroid FNA and its correlation with histopathological examination following thyroid surgery, thereby its role in the preoperative diagnosis of thyroid swellings.

Methods: A total of 114 thyroid patients were evaluated for a period of one year. The demographic data, clinical features were documented. FNAC was done in 77 patients and results were correlated with 47post operative histopathology reports and diagnostic accuracy of preoperative Fine needle aspiration cytology (FNAC) was evaluated.

Results: Age of the patients ranged from 14-70 years. Females were higher than males. Most patients presented with Multinodular goitre and most were in euthyroid state. Sensitivity of FNA was found to be 67% and Specificity was found to be 100%: Accuracy was found to be 93.6% in present study. Positive predictive value was found to be 100%. Negative predictive value (NPV) was found to be 92.7%.

Conclusions: Fine needle aspiration cytology has essential role in the evaluation of thyroid patients. We wish to stress the importance of doing multiple aspirations at different sites and usage of USG guidance for representative areas of suspected pathology. The diagnostic accuracy can be improved when combined with advanced imaging techniques.

Keywords: Postoperative histopathology, Preoperative FNAC, Thyroid

INTRODUCTION

Thyroid swelling is a common disease in India. It is very important to differentiate malignant thyroid swellings from benign swellings for definitive planning of appropriate surgery and relevant patient counselling. The prevalence of thyroid swelling ranges from 4% to 10% in the general adult population and from 0.2% to 1.2% in children. Most clinically diagnosed thyroid swelling are

non-neoplastic; only 5% to 30% are malignant and require surgical intervention. In India, thyroid cancer comprises of 1% of all head and neck cancers.

Aim and objective

The present study was undertaken to analyse the pattern of thyroid disease in patients coming to Department of General Surgery and to evaluate the accuracy of thyroid FNA and its correlation with histopathological examination following thyroid surgery, thereby its role in the preoperative diagnosis of thyroid swellings.

METHODS

A total of 114 patients were evaluated with complaints related to thyroid pathologies for a period of one year. The demographic data, clinical features were documented and categorized into three groups per symptoms and biochemical profile as being euthyroid as per symptoms, hyperthyroid and hypothyroid. Ultrasound of the neck and Fine needle aspiration cytology of the swelling was done on OPD basis for all consenting patients presenting with goiter. Out of 114 patients, 47 Patients underwent thyroid surgery after complete preoperative evaluation and thyroidectomy specimens were collected in 10% formalin and sent for histopathological examination. The cytology reports were compared with the postoperative histopathological diagnosis.

RESULTS

Age of the patients ranged from 14-70 years with a mean age of 37.8 years (Figure 1).

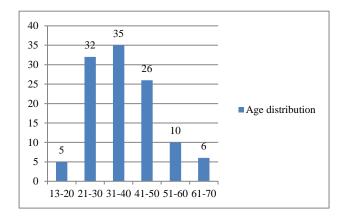


Figure 1: Age distribution.

Females (n=107) were higher in frequency than males (n=7) with a Sex ratio of 15:1 (Figure 2).

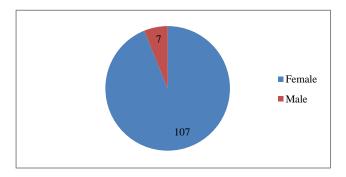


Figure 2: Sex ratio.

95% of the patients presented with swelling in front of the neck out of which the most common clinical presentation was Multinodular goitre (n=64) (Figure 3). 28 patients presented with solitary nodule and 22 patients presented with diffuse goitre. Out of 114 patients, 74 patients were in euthyroid state, 13 were in hyperthyroid state, 27 in hypothyroid state (Figure 4).

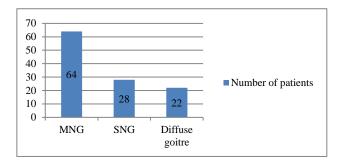


Figure 3: Clinical presentation.

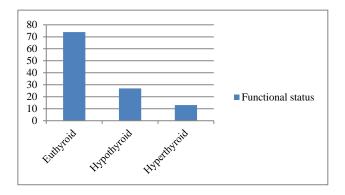


Figure 4: Functional status.

77 patients underwent FNAC, 6 were inadequate smears (Table 1).

Table 1: FNAC findings.

	Diagnosis	FNAC
		(n=77)
Non- neoplastic	nodular colloid goitre	29
	hashimoto's thyroiditis	12
	lymphocytic thyroiditis	2
	Nodular hyperplasia	7
	Adenomatoid hyperplasia	1
	Thyroidtitis with nodular	3
	hyperplasia	
	Thyroiditis with nodular	4
	colloid goitre	
	Thyroiditis with	1
	adenomatous hyperplasia	
	Adenomatous hyperplasia	3
	with nodular colloid goitre	
Neoplastic	Follicular neoplasm	2
	Papillary carcinoma	5
	Medullary carcinoma	1
	Undifferentiated carcinoma	1
	Inadequate smears	6

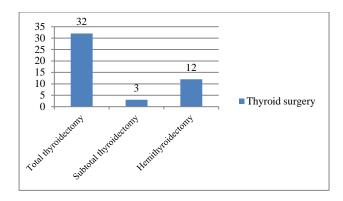


Figure 5: Thyroid surgery.

47 patients underwent thyroid surgeries. Total thyroidectomy was done in 32 patients, subtotal thyroidectomy in 3 patients and hemithyroidectomy in 12 patients (Figure 5).

Neck dissection was done in two patients. Postoperative histopathology reports of 47 patients were compared with their preoperative FNA findings (Table 2).

The accuracy of FNAC in the diagnosis of thyroid swelling cytologically was evaluated by using the predictive value theory (Table 3).

Table 2: Variation of diagnosis between FNAC and Histopathology in thyroid swelling (n=47).

	Diagnosis	Pre op FNAC	Post op HPE
Non-neoplastic	nodular colloid goitre	19	8
	hashimoto's thyroiditis	7	6
	thyroiditis with nodular hyperplasia	2	5
	Nodular hyperplasia	6	8
	Adenomatoid hyperplasia	1	2
	Thyroiditis with nodular colloid goitre	3	5
	Thyroiditis with adenomatous hyperplasia	1	1
	Adenomatous hyperplasia with nodular colloid goitre	3	1
	Inadequate smears	1	-
Neoplastic	Follicular neoplasm	2	-
	Follicular adenoma	-	2
	Papillary carcinoma	5	5
	Papillary microcarcinoma	-	3
	Medullary carcinoma	1	1

Table 3: Accuracy of diagnostic test of FNAC in thyroid swelling.

Test (FNAC)	Malignant in histopathology	Benign in histopathology
Positive	True positive 6	False positive 0
Negative	False negative 3	True negative 38

Sensitivity shows the portion of the patients having malignant thyroid disease and positive cytological diagnosis on FNAC, which is found to be 67%. Specificity shows the portion of the patients with non-malignant thyroid disease and positive cytological diagnosis, which was found to be 100%. Accuracy is the portion of the correct results, true positive and true negative in relation to all cases studied is found to be 93.6% in present study.

Positive predictive value (PPV) is the probability of having malignant thyroid disease following a positive FNAC finding and is found to be 100%. Negative predictive value (NPV) is the probability of not having

malignant thyroid disease following a negative FNAC finding and is found to be 92.7%.

DISCUSSION

In the present study of 114 cases, majority of cases were seen in the age group of 21-40 years and the youngest patient in this study was a 14-year-old girl with colloid goitre and the oldest patient was a man of 70 years, a case of nodular hyperplasia. Females were higher in frequency (94%) than male (6%). The most common presentation was multinodular goitre (56%) and most of the patients presented in Euthyroid status (65%). In this study, FNAC showed 12% neoplastic cases.

Among neoplastic thyroid swelling papillary carcinoma was the most common, followed by follicular neoplasm. FNAC was able to identify 5 cases of papillary carcinoma and 1 case of medullary carcinoma preoperatively. In this study, among non-neoplastic thyroid swelling (88%) nodular colloid goitre was common, followed by hashimoto's thyroiditis and nodular hyperplasia.

While comparing **FNAC** with histopathological examination (HPE) in the present study, it was found that 42% cases of nodular colloid goitre was diagnosed as colloid goitre in HPE; All thyroiditis and nodular hyperplasia were diagnosed exactly. Out of 8 cases of papillary carcinoma, only 5 cases were diagnosed preoperatively. The remaining 3 cases were papillary microcarcinoma on HPE and were previously diagnosed as nodular colloid goitre. Post operatively 2 patients were under follow-up and one patient underwent completion thyroidectomy. FNAC diagnosed 2 cases of follicular neoplasm and were follicular adenomas on HPE. Cytohistological concordance was obtained in 31 cases out of 47 cases (66%).

FNAC is a well-recognized preoperative investigation in patients with thyroid swelling but there are limitations to the technique.³⁻⁵ The reported pitfalls are related to specimen adequacy, sampling techniques, the skill of the aspirator performing the aspirations, the experience of the cytopathologic interpreting the aspirate and overlapping cytological features between benign and malignant follicular neoplasms and inadequate, indeterminate FNA. One major limitation of thyroid cytology is its inability to distinguish between follicular adenoma from follicular carcinoma.⁵⁻⁸

This diagnosis requires detail histological examination for vascular or capsular invasion and cannot be reliably made on routine FNAC specimens. 9-12 hence, follicular neoplasm (lesion) is given as diagnosis in FNAC. 13

In most of the studies, mistakes were because of confusion between nodular colloid or hyperplastic nodular goitre and Hashimoto's thyroiditis. Also, presence of multiple pathologies in the same gland may result in geographic misses and lead to improper diagnosis. A negative FNAC report should not modify the clinical diagnosis and proposed line of management, but a decision can be made viewing in conjunction with the clinical picture and the biochemical parameters.

CONCLUSION

Fine needle aspiration cytology has essential role in the evaluation of euthyroid patients with goiter. We wish to stress the importance of doing multiple aspirations at different sites to identify occult neoplasms and usage of USG guidance for representative areas of suspected pathology, because thyroid is affected by many lesions at a time. The diagnostic accuracy can be improved when

combined with advanced imaging techniques, immunologic analysis.

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