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ROLE OF FNAC IN THE DIAGNOSIS OF THYROID MALIGNANCY AND ITS COMPARISON WITH HISTOPATHOLOGY

Objective:

To find out the accuracy of FNAC and its comparison with histopathology in diagnosing thyroid malignancy.

Materials and Methods:

This prospective study was conducted in 56 patients attending the ENT and Head & Neck Surgery, Out Patient Department, Shree Birendra Hospital, Chhauni, Kathmandu, Nepal from August 2010 to June 2012. Clinically diagnosed thyroid swelling patients were subjected to FNAC. Based on clinical findings and FNAC, patient underwent appropriate surgery, then the FNAC finding was compared and correlated with the final HPE report.

Results:

The majority of cases were in their third decade (30.36%), with female predominance, female to male ratio was 6:1. The maximum number of cases was diagnosed to have colloid goitre (60.71%) by FNAC, followed by papillary carcinoma thyroid (30.36%) and benign proliferative thyroid disease (5.36%). However, histopathology confirmed the predominant cases to be of papillary carcinoma thyroid (48.21%) followed by colloid goitre (32.14%). The overall prevalence of malignancy was 62.5% by HPE and 37.5% by FNAC. Accuracy score was 82.14% in the prediction of neoplasia.

Conclusion:

FNAC is a simple preoperative test commonly done in diagnosing thyroid swelling. In cases of clinically suspicious malignancy of thyroid, FNAC is suggested before definitive surgery so as to plan adequate surgery at the first sitting itself. When compared to the final HPE report, sensitivity of FNAC was 62.96% while specificity was 100%; accuracy was noted to be 82.14%. Predictive value of a positive test and negative tests was 100% and 74.35% respectively.

Keywords: Fine needle aspiration cytology (FNAC), Histopathological examination (HPE), Papillary carcinoma thyroid (PCT).

INTRODUCTION:

Thyroid swelling is a common incidental finding worldwide. It is quite common in Nepal and is one of the common reasons for medical consultation in ENT-HNS OPD, Birendra Hospital, especially amongst female patients. Cases of PCT is the common amongst thyroid swelling in our hospital and type of surgery is determined mainly on the basis of FNAC finding along with correlation of clinical examination. Hence, finding of FNAC has a pivotal role in the decision-making in case of thyroid swelling. When diagnosed accurately, proper treatment is possible with overall good prognosis. Fine Needle Aspiration Cytology (FNAC) is now accepted as a minimally invasive, cost effective tool in the diagnosis of thyroid swelling. Moreover, to identify the type of malignancy for adequate surgery FNAC is very important.¹ The distinction of the benign and malignant thyroid nodules is fundamental, as malignancy necessitates surgery, while strict patient follow-up is necessary in the case of a benign mass. FNAC is considered to be the "gold standard" in the selection of patients for surgery.² Thyroid swelling is common in our setup. Moreover, PCT are observed to have increased steadily. Very little work has been reported in literature in our country. In this study, FNAC of thyroid swelling as one of the most important preoperative diagnostic test has been correlated with postoperative pathological finding. Thus, the aims and objectives of the study were to compare the finding of the FNAC with final HPE and assess the accuracy of FNAC to diagnose thyroid malignancy.

MATERIALS AND METHODS:

It was a prospective study done at Shree Birendra Hospital, Chauni, Kathmandu, Nepal from August 2010 to June 2012 with 56 patients of all age and sex. Patients presenting to ENT-HNS OPD with thyroid swelling were included in the study. Those patients who could be managed medically and those declining surgery were excluded. The main outcome measures were to correlate FNAC with that of postoperative HPE. Patients were informed about the study and consent was taken. Confidentiality of their identity was assured. Counseling of the possibility of complication of the surgery such as hoarseness was also explained. The principal investigator thoroughly examined all the cases by history, residence, food habit, family history, drug intake, thyroid hormonal status, onset of swelling, growth rate, duration, history of head and neck irradiation, examination of size and consistency of swelling, mobility on swallowing, and other swellings. Then, complete ENT-HNS examination was performed. Thyroid Function Test (TFT) that included T₃, T₄, and TSH by Enzyme Linked Immunosorbent Assay (ELISA) was done to see the thyroid

status. USG of the neck was performed. Then patients were sent for FNAC to Pathology Department. After correlating the FNAC reports with clinical and USG findings, patients needing surgery were identified and counseled. Malignant cases were taken up for surgery within two weeks after complete general anesthetic check-up. Depending on FNAC finding, appropriate surgery was performed and specimen was sent in 10% buffered formal saline to Pathology Department. Postoperatively, flexible nasopharyngolaryngoscopy (NPL) examination was done to check the status of recurrent laryngeal nerve. The MS Excel spreadsheet was used to analyze the data.

RESULTS:

The majority of the patients were in the age group of 21-50 years. The highest incidence was found in 31-40 years (30.36%) followed by 21-30 years (25%) as shown in table 1. Female to Male ratio was 6:1.

Tab. 1: Age distribution of the study population

Demographic Parameters	No. of Cases	Percentage
Age Group (years)		
10-20	4	7.14
21-30	14	25.00
31-40	17	30.36
41-50	11	19.64
51-60	6	10.71
61-70	3	5.36
71-80	1	1.79
Total	56	100

In the majority of the cases, FNAC diagnosis was colloid goiter (60.71%) followed by PCT (30.36%) and benign proliferative thyroid lesion (5.35%). After surgery HPE confirmed PCT (48.21%) out-numbering colloid goitre (32.14%). One case was proved to be medullary carcinoma by HPE which was found to be PCT by FNAC as shown in table 2.

Tab. 2: Thyroid swelling by FNAC and HPE

Diagnosis of Thyroid Swelling		No. of Cases	Percentage
Papillary Carcinoma Thyroid (PCT)	FNAC	17	30.36
	HPE	27	48.21
Colloid Goitre	FNAC	34	60.71
	HPE	18	32.14
Multinodular Goitre	FNAC	2	3.57
	HPE	2	3.57
Follicular Adenoma	FNAC	0	0.00
	HPE	3	5.36
Hashimoto's Thyroiditis	FNAC	0	0.00
	HPE	3	5.36
Benign Proliferative Thyroid Disease	FNAC	3	5.36
	HPE	0	0.00
Thyroglossal Cyst	FNAC	0	0.00
	HPE	1	1.79
Graves Disease	FNAC	0	0.00
	HPE	1	1.79
Medullary Carcinoma	FNAC	0	0.00
	HPE	1	1.79
Total	FNAC	56	100
	HPE	56	100

The prevalence of PCT in this study was only 30.36% by FNAC which was increased to 48.21% by HPE. Similarly, among females, malignancy increased from 29.17% to 47.92% by FNAC and HPE respectively. In males, HPE proved 62.5% malignancy whereas it was just 37.5% by FNAC. Overall malignancy was 69.64% which was just 30.35% by FNAC.

Tab. 3: Sex Distribution of Prevalence of Malignancy as per FNAC and HPE

Sex		Benign	Malignant	Total	Benign (%)	Malignant (%)
Female	FNAC	34	14	48	70.83	29.17
	HPE	25	23		52.08	47.92
Male	FNAC	5	3	8	62.50	37.50
	HPE	3	5		37.50	62.50
Total	FNAC	39	17	56	69.64	30.36
	HPE	28	28		50.00	50.00

'True-positive' (TP) and 'True-negative' (TN) cases are those which are diagnosed correctly as malignant and benign respectively. 'False-positive' (FP) cases consist of those cases which are benign but wrongly diagnosed as malignant. 'False-negative' (FN) refers to those cases which are malignant but are diagnosed as benign. Based on study findings, the usefulness of FNAC in case of thyroid swelling can be measured. Sensitivity of FNAC was 62.96% while specificity was 100%; accuracy was noted to be 82.14%. Predictive value of a positive test and negative tests was 100 % and 74.35% respectively.

Tab. 4: Correlation of FNAC and HPE in detecting malignant nature of thyroid swelling

FNAC Diagnosis	HPE Diagnosis		
	Malignant	Benign	Total
Positive	17 (TP)	0 (FP)	17
Negative	10 (FN)	29 (TN)	39
Total	27	29	56

DISCUSSION:

In our study, the majority of the cases (60.71%) were colloid goitre, followed by PCT (30.36%) as per FNAC. Diagnostic accuracy was 82.14% with a predictive value for negative test of 74.35%. Because

of these reasons, FNAC results of this study though in the range cited in other studies but not as high as in some.¹ Saddique et al, in a prospective study at Karachi with 60 patients found accuracy of FNAC 96.6% with 75% sensitivity and 95.83% specificity in the diagnosis of malignancy in solitary and dominant thyroid nodule.³ FNAC of the thyroid nodule is reported to have sensitivity ranges from 65-98% and specificity of 72-100%.⁴ Nagda et al also found FNAC to be more specific, 96.1% in detecting thyroid malignancy whereas sensitivity was 88.9%.⁵ Morgan et al, with 253 patients found sensitivity of FNAC 55% and specificity 73.3% in detecting thyroid malignancy.⁶ Naseem et al at Karachi with 381 patients in a retrospective study reported prevalence of malignancy to be 29%.⁷ Contrast to our study, where malignancy was detected less by FNAC. False negative result could be due to small tumor with associated degenerative or inflammatory changes in adjacent thyroid tissue.⁸ Tariq et al, conducted prospective study with 50 patients and FNAC diagnosed 7 cases to be malignant whereas HP confirmed it to be 8. FNAC showed 2 PCT and HPE confirmed it to be 3.⁹ Musani et al, in 2008 enrolled 105 patients in a prospective analytical study where HPE confirmed the malignancy to be 12.4% which was only 8.6% detected by FNAC.¹⁰ In our study also, FNAC detected less number of malignancies. Criteria determining adequacy of thyroid FNAC vary in different studies. In some, patients with cysts are excluded from the overall calculation of sensitivity and specificity and not in others. In our study, we had taken all the cases of thyroid swelling. Moreover, onsite assessment of specimen adequacy at the time of aspiration and the feasibility of re-aspiration, when needed if available, the accuracy of FNAC could have been improved.

CONCLUSIONS:

FNAC is simple, available, inexpensive, safe, and virtually painless OPD procedure in diagnosis of thyroid malignancy. However, to enhance its sensitivity rather than conventional method like palpation, ultrasound-guided FNAC would yield better detection. Since PCT was the most common diagnosis as confirmed by HPE, for optimum surgery its detection by FNAC would have been better to plan the appropriate surgery. Hence, to further enhance detection of malignancy by USG-guided FNAC, second FNAC in suspicious lesion is suggested in our setup where thyroid scan is not available. Further study has to be carried out to find out the reasons for increasing PCT in our setup.

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