

Original Article

Fine needle aspiration cytology of thyroid swellings: Experience in a tertiary care hospital of Nepal

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Abstract:

Introduction: Fine Needle Aspiration Cytology (FNAC) being a minimally invasive technique, is particularly suitable in the sensitive neck area. FNAC can obviate the need for surgery if the lesion is shown to be non neoplastic or if it confirms suspected recurrent tumor. A preoperative cytological diagnosis of a primary neoplasm of thyroid may allow more rational planning of surgery.

Method: This descriptive observational study was carried out at the Department of ENT- Head & Neck Surgery, Gandaki Medical College and Charak Hospital, Pokhara, Nepal, from August 2010 to November 2011. A total of 154 consecutive FNAC of thyroid swellings was included.

Results: Out of 154 patients female were 142 (92%) and men were 12 (8%). In this series of 154 thyroid swellings on FNAC one hundred and thirty six (88%) were non neoplastic and eighteen (12%) neoplastic. Among non neoplastic thyroid swelling, adenoma was the most common sixty two (40%), followed by colloid cyst, Hashimoto thypoiditis, subacute thyroiditis, adenoma, cystic lesion, Graves's disease, thyroglossal cyst and lymphocytic thyroiditis. Among neoplastic thyroid swelling papillary carcinoma was the commonest nine (5.8%) followed by follicular neoplasm six (3.9%).

Conclusion: It is concluded from the present study that female in our region were more affected, non-neoplastic lesions of the thyroid were more common (colloid goiter being the commonest) than neoplastic lesions (papillary carcinoma being the commonest).

Key words: Thyroid gland; FNAC

Introduction:

Fine needle aspiration cytology (FNAC) is simple, less expensive, readily available and reliable, time saving, easy to perform,

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effective and almost accurate diagnostic technique for investigation of thyroid swellings. The prevalence of thyroid swellings ranges from 4% to 10% in the general adult population and from 0.2% to 1.2% in children¹. The majority of clinically diagnosed thyroid swellings is non-neoplastic; only 5%–30% are malignant and require surgical intervention². Laboratory investigations other than FNAC have limited role to find out the nature of thyroid swelling. Isotope scan can demonstrate the functioning capacity of the nodule but cannot predict the cytopathological character. Ultrasonographic scanning is

capable of differentiating solid from cystic lesions but cannot distinguish neoplastic from nonneoplastic one. FNAC of the thyroid is gaining popularity among the pathologists and clinician. It is the initial investigation in the management of thyroid disease in our center. However, this study is aimed at evaluating our experience of FNAC in thyroid swellings.

Methods:

A Cross sectional study was done in the Department of ENT- Head & Neck Surgery, Gandaki Medical College and Charak hospital, Pokhara, Nepal, from August 2010 to November 2011. All patients were evaluated by thorough clinical examination followed by routine investigations, thyroid function tests and FNAC. Apparatus used included 10 ml disposable plastic syringe 22–25 gauge, 0.6–1.0 mm external diameter disposable needle 3.98 cm and 8.8 cm long with or without stylet, antiseptic sponges, sterile gauze pads, microscopic glass slides.

All FNACs were carried out by the pathologists. A 23-gauge needle was connected to a 10-ml syringe mounted on a syringe holder. Multiple needle passes were made within the lesion 3-4 times at varying angles and depths and with constant negative pressure (never emerging outside the skin). Before final withdrawal, the negative pressure was released prior to the needle emerging from the skin. The cytological material was transferred onto glass slides. The aspirated material then smeared on 2-4 slides, fixed in 95% ethanol and stained by papanicoloau and May -Grunwald Giemsa stains and was evaluated by the pathologist for cytology. The data analysis was performed using SPSS version 17.

Results:

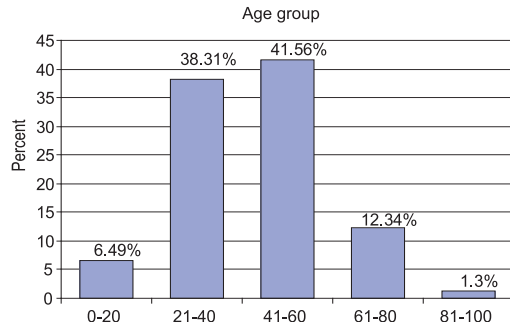


Figure 1: Age distribution of thyroid swelling.

Patient with age group 0-20; 21-40; 41–60 and 61–80 and above 80 years were 6.49% ; 38.31% ; 41.56% ; 12.34% and 1.30% respectively. Most of the patients were between the age 41-60 years.

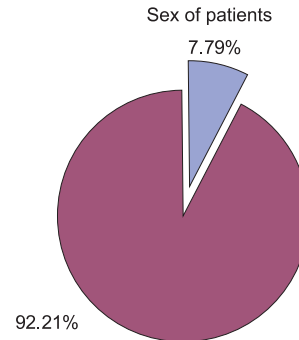


Figure 2: Sex distribution of thyroid swelling.

Female were higher in frequency (n=142; 92%) than men (n=12; 8%).

FNAC shows one hundred and thirty six (88%) non neoplastic and eighteen (12%) neoplastic.

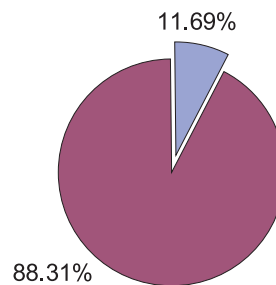


Figure 3: FNAC diagnosis of thyroid swelling (n = 154).

Table-I
FNAC diagnosis of non neoplastic thyroid swelling (n=136).

	Diagnosis	Frequency	Percentage,%
Non-neoplastic	1. Colloid Goiter	62	40.3
	2. Nodular Goiter	8	5.2
	3. Colloid Cyst	22	14.3
	4. Cystic Lesion	6	3.9
	5. Thyroglossal cyst	1	.6
	6. Sub-acute Thyroiditis	12	7.8
	7. Hashimoto Thyroiditis	17	11.0
	8. Lymphocytic Thyroiditis	1	.6
	9. Grave's Disease	4	2.6

Among non neoplastic thyroid swelling, colloid goiter was the commonest, sixty two (40%), followed by colloid cyst twenty two (14), Hashimoto thyroiditis seventeen (11%), sub-acute thyroiditis twelve (7.8%), nodular goiter which was eight (5.2%), cystic lesion six (4%), Grave's disease four (2.6%), and one case of thyroglossal cyst and lymphocytic thyroiditis each.

Table-II
FNAC diagnosis of neoplastic thyroid swelling (n=18).

	Diagnosis	Frequency	Percentage,%
Neoplastic:	1. Papillary Carcinoma	9	5.8
	2. Suspicious of malignancy	2	1.3
	3. Follicular Neoplasm	6	3.9
	4. Metastatic Carcinoma to Thyroid	1	.6

Among neoplastic thyroid swelling papillary carcinoma was the commonest: nine (5.8%) followed by follicular neoplasm six (3.9%), suspicious of malignancy two (1.3%) and metastatic carcinoma to thyroid was one case (0.6%).

Discussion:

Fine needle aspiration cytology is regarded as the gold standard initial investigation in the diagnosis of thyroid swellings³. The technique is safe simple and quick with a low complication rate and helps to select people preoperatively for surgery⁴. Carcinoma of the thyroid is the most common malignancy of endocrine system comprises 0.6% and 1.6% of all cases of malignant neoplasm in men and women respectively.

In the present study, the age of patients ranged from 7 to 88 years with a mean of 43.95 and SD±15.70 years. This age range and mean incidence is slightly lower as compared with previous studies^{5,6}. We found that majority of patients in our study (42%) were in their fourth to sixth decade of life while in the study by Dorairajan and Jayashree 44% were in the third decade of life⁷.

In the study by Md. Shafiqul Islam, most of the patients were between 21 to 40 years age group (60%). Mean age 37.70, (SD±10.05) years. Lower limit of age was 18 years and the highest age was 60 years. Twenty six (28.88%) male and sixty four (71.12%) female. Representing Male:Female ratio 1:2.46⁸. Comparing this to the present study female were higher in frequency (n=142 ; 92%) than men (n=12 ; 8%) and the male: female ratio was 1:12.

Table-III*Comparison of results of present study with previous studies:*

	Shafiqul Islam et al ⁸	MA Tabaqchali et al ^{9fs}	Muhammad Alam et al ¹⁰	Muhammad Dr. Tariq et al ¹¹	Our study
Non neoplastic	79%	60%	78%	52%	88%
Neoplastic	21%	40%	15%	48%	12%

Table-IV*Comparison of Incidence of types of thyroid swelling by FNAC:*

FNAC Diagnosis:	MA Tabaqchali ⁹	Shafiqul Islam ⁸	Dr. Muhammad Tariq ¹¹	Our study
Colloid goitre with colloid cyst	54%	21%	46%	54%
Thyroiditis	2.9%	3.33%	4%	19.4%
Papillary carcinoma	7.5%	15.5%	4%	5.8%
Follicular neoplasm	3.8%	3.33%	42%	3.9%
Suspicious of malignancy	0.4%	1.11%	0%	1.3%

Among thyroiditis Hashimoto thyroiditis was most common seventeen (11%) followed by sub-acute thyroiditis twelve (7.8%). FNAC contributes significantly to the pre-operative investigation in patients with thyroid swelling but despite its well recognized value there are limitations to the technique. The first such drawback of FNAC is the high inadequate sample rate^{12, 13}. The second major limitation of thyroid cytology is its inability to distinguish a follicular adenoma from follicular carcinoma¹³⁻¹⁶. This diagnosis requires detailed histological examination for vascular or capsular invasion and cannot be reliably made on routine FNAC specimens¹⁷⁻²⁰. Hence, follicular neoplasm (lesion) is given as a diagnosis in FNAC.

It is concluded from the present study that female in our region were more affected, non-neoplastic lesions of the thyroid were more common (colloid goiter being the commonest) than neoplastic lesions (papillary carcinoma being the commonest). FNAC is a valuable adjunct to the careful physical examination and evaluation of patients with thyroid

swelling, which enables clinician to obtain a diagnosis in a high percentage of cases with minimal expenditure of time and money often to avoid unnecessary surgery. It is safe, easy, fast, accurate and cost effective.

References:

1. Ridgway EC. Clinical evaluation of solitary thyroid nodules, in *The Thyroid: A Fundamental and Clinical Text*; 1986; 1377–1385, Lippincott GB, Philadelphia, Pa, USA.
2. Bakhos R, Selvaggi SM, DeJong S, Gordon DL, Pitale SU, Herrmann M et al. Fine needle aspiration of the thyroid: rate and causes of cytopathologic discordance. *Diagn Cytopathol* 2000; 23: 233–37.
3. Cap Ryska JA, Rehorkova P, Hovorkova E. Sensitivity and specificity of the fine needle aspiration biopsy of the thyroid: clinical point of view. *Clin Endocrinol* 1999; 51: 509-15.
4. Grant CS, Hay ID, Gough IR, McCarthy PM, Goellner JR. Long term follow-up

- of patients with benign thyroid FNA cytologic diagnosis. *Surgery* 1998; 106: 980-86.
5. Agrawal S. Diagnostic accuracy and role of fine needle aspiration cytology in management of thyroid nodules. *J Surg Oncol* 1995; 58(3): 168-72.
 6. Morgan JL, Serpell JW, Cheng MSP. Fine-needle aspiration cytology of thyroid nodules: how useful is it? *ANZ J Surg* 2003; 73(7): 480-83.
 7. Dorairajan N, Jayashree N. Solitary nodule of the thyroid and the role of fine needle aspiration cytology in diagnosis. *J Indian Med Assoc* 1996; 94(2): 50-52.
 8. Shafiqul IM, Belayat HS, Nasima A, Kazi SS, Mohammad A. Comparative study of FNAC and histopathology in the diagnosis of thyroid swelling. *Bangladesh J Otorhinolaryngol* 2010; 16(1): 35-43.
 9. Tabaqchali MA, Hanson JM, Johnson SJ, Wadehrat V, Lennard TWJ, Proud G. Thyroid aspiration cytology in Newcastle: a six year cytology/histology correlation study. *Ann R Coll Surg Engl* 2000; 82(3): 149-55.
 10. Muhammad A, Hikmatullah Q, Qutbe AJ. Accuracy of FNAC as a diagnostic modality in the management of solitary thyroid nodule. *J Med Sci* 2010; 18(2): 94-96.
 11. Muhammad T, Muhammad ZI, Muhammad ZA, Muhammad ACH, Rao SK, Shulamila I. FNAC of thyroid nodule; Diagnostic accuracy of fine needle aspiration cytology (FNAC). *Professional Med J* 2010; 17(4): 589-97.
 12. Burch HB, Burman KD, Reed HI, Buckner L, Raber T, Ownbey J. Fine needle aspiration of thyroid nodules. Determinants of insufficiency rate and malignancy yield at thyroidectomy. *Acta Cytol* 1996; 40: 1176-83.
 13. Gharib H, Goellner JR. Fine-needle aspiration biopsy of the thyroid: an appraisal. *Ann Intern Med* 1993; 118: 282-89.
 14. Franklyn JA, Sheppard MC. Aspiration cytology of thyroid. *BMJ* 1987; 295: 510-11.
 15. Lowhagen T, Willems J, Lundell G, Sundblad R, Granberg P. Aspiration biopsy cytology in diagnosis of thyroid cancer. *World J Surg* 1981; 5: 61-73.
 16. Sayer HM, Krukowski ZH, Williams VMM, Matheson NA. Fine needle aspiration cytology in isolated thyroid swellings: a prospective two year evaluation. *BMJ* 1985; 290: 1490-92.
 17. Anderson JB, Webb AJ. Fine-needle aspiration biopsy and the diagnosis of thyroid cancer. *Br J Surg* 1987; 74: 292-96.
 18. Leonard N, Melcher DH. To operate or not to operate? The value of fine needle aspiration cytology in the assessment of thyroid swellings. *J Clin Pathol* 1997; 50: 941-43.
 19. Gardner HA, Ducatman BS, Wang HH. Predictive value of fine-needle aspiration of the thyroid in the classification of follicular lesions. *Cancer* 1993; 71: 2598-03.
 20. Miller JM, Kini SR, Hamburger JI. The diagnosis of malignant follicular neoplasms of the thyroid by needle biopsy. *Cancer* 1985; 55: 2812-17.