



Study on Sensitivity and Specificity in Thyroid Lesions on Fine Needle Aspiration Cytology: a Hospital Based Study

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ABSTRACT

Thyroid gland enlargement is a common presentation in the general population and in the FNAC OPD, but all thyroid enlargements do not require surgery. the aim of this study was to evaluate the reliability of FNAC in thyroid disease in picking up malignant and benign lesions. Among 65 patients, fifteen cases were male (23.07%) and fifty cases were female (76.92%). The FNAC is very useful and readily available tool for evaluating thyroid nodules with high sensitivity and specificity in picking up benign lesion and excluding the malignant disease. This is very helpful in patient counselling and defining the extent of surgery.

KEYWORDS : Thyroid, FNAC and Cytology.

Introduction:

Neck swelling is a common clinical presentation all over the world. Thyroid gland enlargement is a common presentation in the general population and in the FNAC OPD, but all thyroid enlargements do not require surgery.¹ Thyroid nodules are common but thyroid cancer is uncommon.² FNAC is a very useful modality to decide on the patients requiring surgery from those who need not be operated.³ Introduction of FNAC in the field of thyroid diagnostic tests has reduced thyroid surgeries considerably.⁴ The main requirement for thyroid FNAC is to differentiate neoplastic from non neoplastic lesions and get a definite diagnosis of the enlargement.⁵ FNAC is usually the first line of investigation followed by ultrasound examination, thyroid function tests and antibody levels.⁶ FNAC is widely accepted as the most cost-effective diagnostic procedure in the assessment of thyroid nodules and also helps to select patients preoperatively for surgery.⁷ FNAC is safe, inexpensive and less invasive diagnostic modality with cost-effective by avoiding the un-necessary operation. FNAC has high sensitivity in picking up malignancy in thyroid.⁸

Most studies show accuracy rate exceeding 80%.⁹⁻¹¹ Its limitation includes false negative, false positive, indeterminate or suspicious results.¹² The false negative is defined as the patients in which FNAC shows benign pathology but histopathology reveals malignancy¹³, while false positive indicates malignancy

in FNAC but histopathology shows benign pathology. False positive result ranges 0–8%.¹⁴ Hence, the aim of this study was to evaluate the reliability of FNAC in thyroid disease in picking up malignant and benign lesions.

Material and Methods:

Patients presented with thyroid swelling to the OPD of Srinivas Institute of Medical Science and Research Centre, Mangalore, India were included in the present study over a period of one year from January 2014 to November 2014. A total of 65 patients with thyroid nodules were enrolled after fulfilling these criteria and were sent for FNAC. The patients in whom malignancy was suspected, CT scan was performed to see the extent of tumour, its spread in surrounding structure and neck nodes. Surgery of all these patients was done and the specimen sent for histopathology.

Results and Discussion:

Among 65 patients, fifteen cases were male (23.07%) and fifty cases were female (76.92%) with male to female ratio of 1:3.3 shown in Table-1. In FNAC most common lesion was benign nodule 84.61% and 15.4% cases were malignant. According to histopathology results, the

benign nodules were 81.5% and malignant cases were 18.5%. Summary of FNAC and Histopathology given in table-3.

Table-1: Gender distribution of the patients

Genders	No of Cases	%
Male	15	23.07
Female	50	76.92
Total	65	100

Table-2: Nature of thyroid nodules in FNAC and histopathology

Thyroid nodules	FNAC	%	Histopathology	%
Benign	55	84.61	53	81.5
Malignant	10	15.4	12	18.5

Fig-1: Pie chart shows the Sensitivity and specificity:

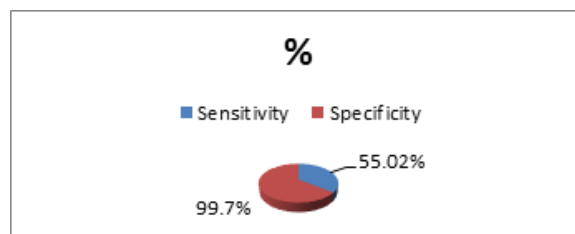


Table-3: Summary of FNAC and Histopathology

FNAC Findings	Histopathology Findings	
	Malignancy Present	Malignancy Absent
Malignancy Positive	8(12.3%) (True Positive)	2(3.1%) (False Positive)
Malignancy Negative	4(6.15%) (False Negative)	51(78.5%) (True Negative)

Prehand information of nature of disease alters the treatment options greatly. In thyroid, benign nodules require partial thyroidectomy or lobectomy, where as malignant disease demand extensive surgery, i.e., total thyroidectomy, neck dissection followed by radio iodine ablation and lifetime dependency on thyroxine supplement. In thyroid disease, this benefit of prehand knowledge of pathology is granted by FNAC which is a well establish technique for pre-operative assessment of thyroid nodules.¹⁵ The FNAC is cost-effective, less

traumatic, less invasive, and easily performed procedure.¹⁶ FNAC is a useful tool in the diagnosis in thyroid nodules if a suspicion of cancer exists. It has reduced the need of imaging and surgery and increased the yield of cancer in patients who come for surgery.¹⁷

Incidence of thyroid nodule is more common in female as is evident in this study with male to female ratio of 1:3.3.. This observation was also made in a study by Hand *et al* in which male female ratio was 1:6.35.¹⁸ Russel *et al* showed male to female ratio 1:32. Mahar *et al* found 78% of thyroid nodules in females.⁸

The most common type of thyroid nodule was benign nodules. Mahar conducted study on 125 cases, and he found that 63 (50.4%) cases were benign lesion.⁸ Another study also showed that 83.33% cases were benign lesions.¹⁷

Histopathology revealed 53 cases were benign nodules and 12 cases were malignant nodules. Four (6.15%) cases were false negative. Different studies show ranges from 1.5–11.5%.^{19–21} Ashcraft and Van Herle noted that false negative result varied in reported series from 2–50%.²² False positive result in our study was 2 (3.1%). Other studies show range from 0–8%.^{19,21} Campbell and Pillsbury reported 1.2% false positive results.²³

In our study sensitivity was 55.02% and specificity was 99.7%. Humburger concluded sensitivity around 65.53% and specificity 72–100%.¹⁴ The study of Naggada *et al* reported 88.9% sensitivity and 96% specificity of FNAC in thyroid masses.¹³ The FNAC is a sensitive and specific method of evaluating thyroid nodules for malignancy.²⁴ Safirullah also reported high accuracy rate of FNAC (94.2% sensitivity and 94% specificity) in cases of diagnosis of malignant thyroid diseases and propose that its routine use can make the management of thyroid swelling cost-effective by avoiding unnecessary surgeries.¹⁶

CONCLUSION:

These findings suggest that the wide range of lesions, both benign and malignant, can be diagnosed by FNAC thus restricting surgery to cases only requiring further histopathological evaluation. The FNAC is very useful and readily available tool for evaluating thyroid nodules with high sensitivity and specificity in picking up benign lesion and excluding the malignant disease. This is very helpful in patient counselling and defining the extent of surgery.

REFERENCE :

1. Guhamallick M, Sengupta S, Bhattacharya NK, Basu N, Roy S, Ghosh AK, Chowdhury M. Cytodiagnosis of thyroid lesions-usefulness and pitfalls: A Study of 288 cases. *J Cytol* 2008; 25: 6-9.
2. Musani MA, Khan FA, Malik S, Khambaty Y. Fine needle aspiration cytology: sensitivity and specificity in thyroid lesions. *J Ayub Med Coll Abbottabad* 2011; 23(1): 34-6.
3. Handa U, Garg S, Mohan H, Nagarkar N. Role of fine needle aspiration cytology in diagnosis and management of thyroid lesions: A study on 434 patients. *Journal of Cytology* 2008; 25:13–17.
4. Esmaili HA, Taghipour H. "Fine-Needle Aspiration in the Diagnosis of Thyroid Diseases: An Appraisal in Our Institution," *ISRN Pathology*, vol. 2012, Article ID 912728, 4 pages, 2012. doi:10.5402/2012/912728.
5. Gabalec F, Čáp J, Ryska A, Vasatko T and Ceeová V. Benign fine needle aspiration cytology of thyroid nodule: to repeat or not to repeat? *European Journal of Endocrinology* 2009; 16: 933-37.
6. La Rosa GL, Belfiore A, Giuffrida D, Sicurella C, Ippolito O, Russo G, et al. Evaluation of the fine needle aspiration biopsy in the preoperative selection of cold thyroid nodules. *Cancer* 1991; 67: 2137-41.
7. Bajaj Y, Thompson A. Fine needle aspiration cytology in diagnosis and management of thyroid disease. *J Layrngol Oto* 2006;120:467–9.
8. Mahar SA, Husain A, Islam N. Fine needle aspiration cytology of thyroid nodule: diagnostic accuracy and pitfalls. *J Ayub Med Coll Abbottabad* 2006;18(4):26–9.
9. Gharib H. Diffuse nontoxic and multinodular goiter. *Curr Ther Endocrinol Metab* 1994;5:99–101.
10. Bugis SP, Young JKE, Archibald SD, Chen VS. Diagnostic accuracy of fine needle aspiration cytology verses frozen section in solitary thyroid nodules. *Am J Surg* 1986;152(4):411–6.
11. Boyd LA, Earnardt RC, Dunn JT, Frierson HF, Hanks JB. Preoperative evaluation and predictive value of fine needle aspiration and frozen section of thyroid nodules. *J Am Coll Surg* 1998;187(5):494–502.
12. Baloch MN, Ali S, Ansari MA, Maher M. Contribution of Fine needle aspiration cytology in the diagnosis of malignant Thyroid nodules. *Pak J Surg* 2008;24(1):19–21.
13. Naggada HA, Musa AB, Gali BM, Khalil MIA. Fine needle aspiration cytology of thyroid

- nodules. A Nigerian tertiary hospital experience. *Internet J Cardiovasc Res* 2006;5.
14. Humburger JI. Diagnosis of thyroid nodules by fine needle aspiration biopsy: use and abuse. *J Clin Endocrinol Metab* 1994;79:335–9.
15. Tabaqchali MA, Hanson JM, Johnson SJ, Wadehra V, Lennard TW, Proud G. Thyroid aspiration cytology in Newcastle: s sox year cytology/histology correlation study. *Ann R Coll Surg Engl* 2000;82(3):149–55.
16. Safirullah, Mumtaz N, Khan A. Role of Fine Needle Aspiration Cytology (FNAC) in the diagnosis of thyroid. *J Postgrad Med Inst* 2004;18(2):196–201.
17. Ramsden J, Watkinson JC. Thyroid cancers. *Scott-Brown's Otorhinolaryngology, Head and Neck Sugery*. 7th edition, vol 2, Hodder Arnold, 2008:2663–701.
18. Handa U, Garg S, Mohan H, Nagarkar N. Role of fine needle aspiration cytology in diagnosis and management of thyroid lesions: A study on 434 patients. *J Cytol [serial online]* 2008 [cited 2009];25:13–7.
19. Caruso D, Mazzaferri EL. Fine needle aspiration biopsy in the management of thyroid nodules. *Endocrinologist* 1991;1:194–202.
20. Gharib H, Goellner JR. Fine needle aspiration biopsy of the thyroid: An appraisal. *Ann Intern Med* 1993;118:282–9.
21. Guidelines of the Papnicolou Society of Cytopathology for the examination of fine needle aspiration specimens from thyroid nodules. *Mod Pathol* 1996;9(6):710–5.
22. Ashcraft MW, Van Herle AJ. Management of thyroid nodules II: scanning techniques, thyroid suppressive therapy and fine needle aspiration. *Head Neck Surg* 1981;3:297–322.
23. Cambell JP, Pillsbury HC 3rd. Management of the Thyroid nodule. *Head Neck* 1989;11(5):414–25.
24. Grant CS, Hay ID, Gough IR, Mc Carthy PM, Goellner JR. Long term follow-up of patients with benign thyroid FNA Cytologic diagnosis. *Surgery* 1998;106:980–6.