

To Assess the Accuracy of Fine Needle Aspiration Cytology (FNAC) for Diagnosis of Malignancy in Solitary Thyroid Nodule at Civil Hospital Karachi

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ABSTRACT

Objective: To assess the accuracy of fine needle aspiration cytology (FNAC) for the diagnosis of malignancy in solitary thyroid nodule.

Study Design: Observational / Descriptive study

Place and Duration of Study: This study was conducted in the department of otolaryngology and Head and Neck Surgery at Civil Hospital Karachi from January 2007 to July 2008.

Materials and Methods: This study comprises of 70 cases in one and half years. We have included all cases of solitary nodule of either sex more than 10 years and excluded those patients who were exposed to radiation or underwent any sort of neck surgery previously. All Patients with solitary thyroid nodule were investigated with routine hematological and biochemical tests, thyroid profile, thyroid Scan, ultrasound neck and FNAC in outpatient department. At admission all risks/benefits of surgical procedures were explained to patients. Postoperative histopathological report of specimen was compared with preoperative fine needle aspiration cytology.

Results: In our 70 cases study 59 patients were diagnosed with benign and 11 with malignant disease. Sensitivity, specificity, accuracy was also recorded which were 72.72%, 99.20% and 94.20% respectively. Papillary carcinoma was found most common tumor in 63.63%.

Conclusion: FNAC is valuable investigation for the preoperative assessment of solitary thyroid nodule and also has high diagnostic accuracy in its evaluation.

Key Words: Solitary thyroid nodule, FNAC, Papillary carcinoma

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INTRODUCTION

Thyroid nodules are common in clinical practice. The importance of STN lies in increasing risk of malignancy in various studies from 5% to 20%.¹ STN were seen in both sexes, but four to six times more commonly in females.² Papillary carcinoma is more common histological type of thyroid cancers followed by Follicular, Medullary, Anaplastic, non-Hodgkin lymphoma and unclassified tumors in order of frequency.³ Number of investigations including thyroid function test, thyroid ultrasound and thyroid scan are being used to distinguish between benign and malignant STN but none of them is found to be very sensitive, and specific.⁴ Fine-Needle Aspiration biopsy is considered to be the "gold standard" in evaluation of STN.⁵ If this

unnecessary surgery in thyroid lesion⁶. FNAC also provide knowledge of cancer cell type which aid in the planning of surgical procedure.⁷ FNAC can easily be performed and accepted by patients and has low cost benefit ratio. If the sample is not diagnostic it can easily be repeated.⁸ FNAC is also very safe and highly accurate in evaluation of thyroid nodule in childhood.⁹ Now a days, FNAC has been adopted as initial test for diagnosing thyroid nodules and has reduced the use of imaging studies and has substantially decreased the cost of thyroid nodule management.¹⁰ The main purpose of this study is to know the accuracy of FNAC in evaluating solitary thyroid nodule so the surgical procedure can be planned accordingly.

MATERIALS AND METHODS

This is a descriptive study and conducted in the department of otolaryngology and Head and Neck Surgery at Civil Hospital Karachi from January 2007 to July 2008. In the one and half year 70 patients were admitted with STN. We have included all cases of solitary nodule of either sex more than 10 years and

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is performed with perfection can obviate a lot of

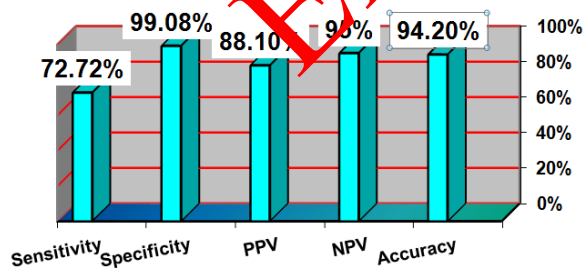
excluded those patients who exposed to radiation or any sort of neck surgery previously. Thyroid profile, thyroid Scan, ultra sound neck and FNAC was carried out in outpatient department. At admission risk/benefit were explained to the patient and informed written consent was taken regarding whole management. Postoperative histopathological report of specimen was compared with preoperative cytology.

Data analysis was done using SP10.0 version. No inferential test will be applied as it is a descriptive study. Sensitivity, specificity, probability value (PPV), non-probability value (NPV) and accuracy have been calculated for FNAC in diagnosis of solitary thyroid nodule as malignant or benign by taking histopathology as a gold standard.

RESULTS

In our 70 cases study 12 were males and 58 were females. Female to male ratio was 4.8:1. Age range for patients was observed between 12 to 70 years. Mean patient age was 36.6 years. Along with thyroid profile, thyroid ultrasound, thyroid scan, fine needle aspiration cytology was also performed in all the cases where 61 patients (87.14%) were reported with benign disease, 8 patients (11.4%) with malignant and 1 patient with suspicious cytology. Sensitivity, specificity, positive predictive value (PPV), Negative predictive Value (NPV) and accuracy of FNAC was also recorded which is shown in Graph. Histopathological results revealed that 59 patients (84.28%) were having benign nodular disease and only 11 patients (15.71%) with malignant disease.

In this study malignancy was noticed in 2 male patients and 9 female patients. Of the 2 males, 1 patient was having medullary carcinoma and other with papillary carcinoma. Among 9 females patients 6 patients had presented with papillary, 2 had follicular and 1 patient had hurthle cell carcinoma. None of patients presented with anaplastic carcinoma in this series.



Results of FNAC by Graphic presentation

Table No.1; Results of FNAC

S. #	Type of lesion	No of Patients	Percentage
1	Benign	61	87.14
2	Malignant	08	11.4
3	Suspicious	01	1.42

Table No.2: Results of histopathology

S. No	Types of lesion	No of patients	Percentage
1	Benign	59	84.28
2	Malignant	11	15.71

DISCUSSION

The management of solitary thyroid nodule is always challenging and remains controversial. Fine needle aspiration cytology is widely accepted as the most accurate, sensitive, specific and cost-effective diagnostic procedure in the assessment of thyroid nodule and help to select the patients preoperatively for surgery^{11, 12}. The sensitivity of thyroid FNAC ranges from 65% to 99% and its specificity from 72% to 100%. In this study, sensitivity for cytological diagnosis of FNAC is 72.72%, specificity 99.08% positive predictive value 88.1%, negative predictive value 95% and diagnostic accuracy 94.2%. Which is in contrast of Lumachi *et al* study¹³. In contrary to our results, Morgan *et al* study showed overall sensitivity of FNAC detecting thyroid neoplasia was 55.0%, specificity 73.7% and accuracy 67.2%¹⁴. By Comparison to a local study Bukhari MH *et al*, reported sensitivity of FNAC as 90%, specificity 87.5%, and accuracy 87%, while positive predictive value (PPV) was 93% and negative predictive value (NPV) was 79.5%¹⁵. Our study testifies the results of study done at Aga Khan university by Afroze N *et al*, where they have reported sensitivity 61.9%, specificity 99.31 and accuracy index of 94.5%¹⁶.

False negative FNAC results occurred in 3 (4.2%) of our patients. This is also consistent with reports in the literature that suggest a false negative rate of 2% to 7%¹⁷.

False positive cytology results were found in only 1(1.4%) patients in this series. This finding is consistent with other recent reports that cited an incident of false positive FNA cytology results ranging from 0% to 9%^{18, 19}.

On histopathology we found 69 patients (84.28%) were having benign nodular disease and only 11 patients (15.71%) had malignant disease. Almost similar results are reported in an international study comparing 606 patients, showing a definitive histology of 82.5% benign nodules and 17.5% carcinomas¹⁶. Our study contradict to a local study, Ahmed M *et al* where malignancy was seen in only 4.4% of patients.²⁰

Frequency of malignancy is also calculated in this study where we noticed papillary carcinoma in 7 patients (63.6%), follicular carcinoma in 2 patients (18.8%), medullary carcinoma in 1 patient (9%) and huthle cell carcinoma in 1 patient (9%). Similar results were reported by Virk MA *et al*, where papillary carcinoma was seen in 62.5% cases.

Fine needle aspiration cytology performed as a routine diagnostic procedure in patient with head and neck

masses has advantage of indicating the nature of disease to surgeon prior to surgery. A definite plan for surgery can be formulated. Similarly it avoids unnecessary operation such as in anaplastic carcinoma and lymphoma of thyroid where chemotherapy and radiotherapy are the treatment of choice.²¹

CONCLUSION

We can conclude that in the initial management of solitary thyroid nodule fine needle aspiration cytology is extremely safe, inexpensive and relatively accurate procedure. This unique investigation can be done along with other diagnostic modalities but its cost-effectiveness, accuracy and safety increases its worth and it has become widely accepted nowadays. In our study, sensitivity of fine needle aspiration cytology came out to be 72.7%, specificity 99.08%, and diagnostic accuracy was found to be 94.2%. Other studies in literatures also support the accuracy of FNAC in solitary thyroid nodule up to certain extent in preoperative patients and also helps to plain extend to thyroid surgery.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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