

ACCURACY OF FNAC IN THE DIAGNOSIS OF THYROID MALIGNANCY IN SOLITARY THYROID NODULE

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ABSTRACT

Objectives: The Aim of this study was to demonstrate efficacy of fine needle aspiration cytology (FNAC) in detection of malignancy in patient with solitary thyroid nodule.

Material and Methods: This prospective cross sectional study was conducted in ENT Unit A unit of Khyber Teaching Hospital, Peshawar from Jan. 2007 to Dec.2011, on 136 patients recruited in this study who presented with solitary thyroid nodules to our out patient department. Fine needle aspiration technique was performed on all these patients. Availing the FNAC reports surgery was performed in the indicated cases. The histopathology reports were then compared with the preoperative FNAC reports. Accuracy and sensitivity were analysed using SPSS version 12.

Results: This study included 136 patients consisting 102 (75%) female and 34 (25%) males with 3:1 female to male ratio. Majority of the patients were in the age group 40-60 years. Preoperative FNAC performed in all patients showed that the result was non neoplastic in 106 (77.94%) cases positive malignant disease was present in 14 (10.29%) cases, in 8 (5.88%) cases the diagnosis was not confirmed/ suspicious on FNAC reports (2 i.e. 1.47% of them on biopsy proved having malignancy), in (5.88%) 8 cases the aspirate was inadequate for diagnosis. Post thyroidectomy histopathology reports of these patients demonstrated malignancy in 16 cases (11.76%) and in the remaining 120 (88.24%) the histology was consistent with benign disease. The sensitivity of FNAC was in this series was 98.26%, specificity 96.20% and accuracy was 94.11%.

Conclusion: Our results are comparable to the recent published results showing that FNAC by expert hands is safe, cost effective and reliable investigation for diagnosis of thyroid malignancy preoperatively and helps in appropriate early management of patients.

Key Words: Thyroid nodule, malignancy, FNAC, sensitivity.

INTRODUCTION

Thyroid swelling is a common clinical presentation throughout the world. Mostly thyroid swellings are multinodular, but a good percentage is solitary thyroid nodule and around 70% are clinically isolated. The importance of solitary thyroid nodule lies in the significant risk of malignancy compared with other thyroid swelling. Incidence of malignancy within a clinically apparent solitary thyroid nodule in a euthyroid patient is approximately 10%. In males 31% of nodules are malignant as compared with 21% in female. If imaging investigations shows the nodule to be truly solitary, then the likelihood of it being malignant increases to about 20%.¹ Discrete thyroid swellings are two to four times more common in women than men, but a discrete swelling in a male is much more likely to be malignant than in female.²

Median age at diagnosis of thyroid cancer is between 40 and 50 year. The risk is higher in the very young and elderly. FNAC is now accepted as the safe and cost effective first line procedure to be performed

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in evaluation of neck masses and thyroid nodule after physical examination, determination of the thyroid functions and thyroid ultrasound^{3,4}. The cytological results of FNAC for thyroid malignancy fall into 5 following categories

TH 1- inadequate for diagnosis

TH 2- Benign disease (Hashimoto`s thyroiditis, colloid nodule)

TH 3- Suspicious for neoplasm

TH 4- Suspicious for malignancy

TH 5- Positive for malignancy

One of the commonest reason for failure is submission of inadequate material for diagnosis⁴. There are also limitation of where FNAC results are inconclusive or suspicious.⁵

A sample is considered to be adequate for FNAC if a minimum of⁶ clusters of benign follicular cells in at least 2 slides are present⁶. FNAC smears are categorized as inadequate if it has less than 6 fragments of group of follicular cells⁷.

Currently FNAC is shown to be the investigation of choice in thyroid, breast and lymph node swellings and it is shown to be safe, simple and cost effective.^{8,9,10,11}

The aim of this study was to determine the accuracy of FNAC in the detection of thyroid malignancy in ENT Deptt, KTH.

PATIENT AND METHODS

A prospective study of 136 patients having solitary thyroid nodules of either sex, were included in the study. Patients with MNG and any major disorders (not fit for surgical procedure) were excluded. FNAC was done on the first visit of the patient and after determination of the thyroid function and obtaining thyroid ultrasound; they were enrolled for surgery subsequently.

FNAC was performed using a 22-23 G needle and slides were prepared and examined by expert cytopathologists. A proforma was designed to include demographic data, signs, symptoms, confirmatory diagnosis, final treatment and post operative results. In patient with non neoplastic disease hemithyroidectomy was performed while patients with malignant disease on FNAC were subject to near total thyroidectomy. Post thyroidectomy reports were then compared with preoperative FNAC results. The data collected was compiled and analyzed statically on computer based SPSS version¹².

RESULTS

A total of 136 patients were included in the study. Of these 102(75%) were females and 34(25%) males patients, thus male to female ratio was 1:3 Most of the patients 108(79.4%) were in the age group. 41-60 year. FNA was performed in all 136cases. The reports showed neoplasia in 14(10.29%) cases, Non neoplasia in 106(77.94%) cases, non conclusive/suspicious in 8(5.88%) cases while in 8(5.88%) cases FNA aspirates were inadequate to determine a diagnosis.

Histology reported 120 (88.24%) non neoplastic and 16 (11.76%) neoplastic cases. FNA reports were then compared with definitive histological reports. After excluding the inadequate and indeterminate FNAC samples were combined to calculate accuracy, specificity and sensitivity. (Tables 1 and 2 respectively).

For diagnosis of thyroid nodule neoplasia, FNAC had a sensitivity of 98.26%, specificity of 96.20%, a negative predictive value of 100% and accuracy of 94.11%.

DISCUSSION

Fine needle aspiration cytology (FNAC) was first described in mid nineteenth century, but it become popular investigation only in 1950's and now FNAC constitutes the first line investigation for patients presenting with head and neck masses. FNAC is safe, reliable, having low complications, it is the accurate and cost effective screening test for thyroid and other neck masses. FNAC along with thyroid function tests, thyroid antibody levels and ultrasound of neck is regarded as the gold standard initial investigation in the manage-

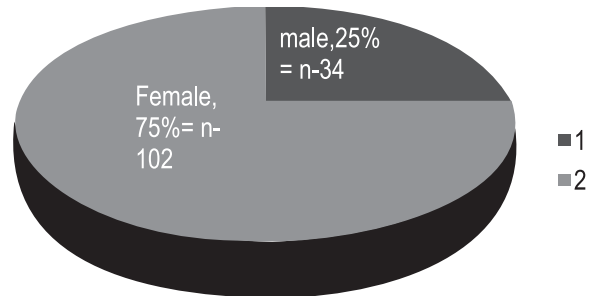


Figure 1: Showing patients sex distribution (n=136)

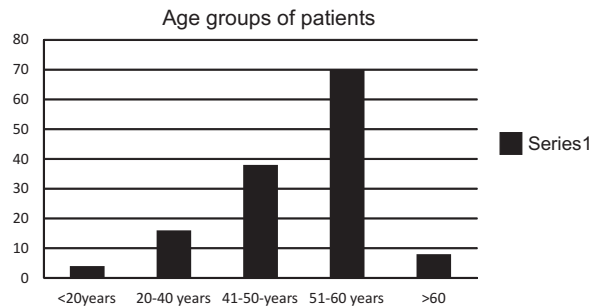


Figure 2: Showing patients age groups distribution (n=136)

Table 1: FNAC Reports (n=136)

FNAC Results	Patients No.	Percentage
Non Neoplastic	106	77.94%
Neoplastic	14	10.29 %
Non-conclusive/suspicious	08	5.88%
Inadequate	08	5.88%
Total	136	100%

Table 2: Histopathology Reports (n=136)

Histopathology results	Patients No.	Percentage
Neoplastic	16	11.76%
Non Neoplastic	120	88.24%
Total	136	100%

ment of thyroid swelling.⁴ FNAC results are obtained easily and in many cases diagnosis can be achieved immediately.

FNAC primarily relies upon assessment of cytonuclear morphological features therefore benign disease can be easily distinguished from malignant. Due to the presence of typical cytological features medullary and papillary carcinoma of thyroid are easily diagnosed on FNAC. Firm diagnosis of lymphoma and anaplastic carcinoma can not be made on the bases of FNAC and open biopsy is usually required³.

The distinction between follicular adenoma and carcinoma is not possible by FNAC as the cytonuclear

morphology is similar in both these conditions. The diagnosis of follicular carcinoma is only made by observing capsular or vascular invasion which can not be determined by FNAC⁵. FNAC has shown similar or higher sensitivity and accuracy levels than frozen section examination.^{12,13,14}

In this study of 136 patients 102 (75%) were female and 34(25%) male, female to male ratio was 3:1 (fig 1)almost the same results are coded by Baloch et al, and Boyed et al.^{12,13}

Majority 70(51.47%) of the patient were in the age group of 50-60 years followed by 38(27.94%) in the age group of 40-50 years (Fig 2). These findings are comparable to most of the studies in literature.^{14,15}

Preoperative FNAC performed in all 136 patients showed benign lesion in 106 (77.94%) cases while in 14 (10.29%) cases malignant FNA results was obtained, in 8(5.88%) cases the results were no conclusive/suspicious, while in 8(5.88%)cases FNA Aspirate were inadequate for diagnosis. Inadequate aspirate have been mentioned in literature in 9-13% cases by Garaway et al. and Can et al.^{15,16,17}

FNAC correctly diagnosed 14(10.29%) malignant and 106(77.94%) nodules giving a specificity of 96.11% for malignant nodules. The two other (1.47%) cases which were proved malignant on histopathology were reported suspicious on FNAC. These figures corresponds well with statistics cited by Raab et al. and Caplin et al. giving a range from 75- 96.7%^{18,19}.

The specificity and Accuracy of FNAC in detecting malignancy also ranged from 52-96% and 65-95% as cited by other studies. The positive predictive and negative predictive values of our study are also comparable with published data^{18,19,20}.

FNAC was found to be highly efficient investigative procedure. In 14(10.29%) patients preoperative diagnosis of malignancy enabled the surgeon to perform a near total thyroidectomy while majority of patients with benign lesions were saved from primary radical surgery.

CONCLUSION

FNAC is a safe, quick and cost effective diagnostic technique. The most significant advantage of FNAC is its high degree of accuracy. Diagnosis is procured immediately and early management of patients reduces patient's anxiety resource consumption. FNAC helps in the selection of most appropriate treatment option.

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