DIAGNOSTIC ACCURACY OF FINE NEEDLE ASPIRATION CYTOLOGY IN THE DIAGNOSIS OF MALIGNANT SOLITARY THYROID NODULE

Javaid Iqbal, Omer Bin Abdul Aziz*, Naveed Ahmad, Muhammad Tariq***, Zahid Anwar******

2 mountain Medical Battalion Kotli Pakistan, *5 Mountain Medical Battalion Forward Kahuta Pakistan, **Combined Military Hospital Sakardu/National University of Medical Sciences (NUMS) Pakistan, *** Combined Military Hospital Kohat/National University of Medical Sciences (NUMS) Pakistan, ****Combined Military Hospital Kharian/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: Objective of this study was to evaluate diagnostic accuracy of fine needle aspiration cytology in diagnosing solitary thyroid nodule keeping histopathology as gold standard.

Study Design: Cross sectional study.

Place and Duration of Study: Combined Military Hospital, Multan from 27 Aug 2010 to 26 Feb 2011.

Material and Methods: Three hundred and forty nine patients were included in the study through non-probability convenient sampling. In outdoor visit, after taking detailed history, general physical examination was done. Patients fulfilling the inclusion criteria were admitted in ward. The procedure of FNA was explained in detail to the patient and Informed consent was taken.

Results: Out of 349 patients, all underwent FNAC whereas 321 underwent surgery. FNAC showed 113/321 (35.20%) patients to have malignancy, however after surgery 109 / 321 (32.08%) patients were found to have malignancy on histopathology. Eighteen patients were diagnosed as papillary CA on FNAC all confirmed on histopathology. Follicular carcinoma was diagnosed in 35 patients on FNAC. However, only 32 were actually found to have the disease on histopathology.

Conclusion: Role of FNAC is quite conclusive for the diagnosing malignancy and proposing surgery in most of cases of cold nodules due to its potential for malignancy. FNAC can be relied upon due to good sensitivity (92.56%), specificity (95.81%), Accuracy (94.49%), Positive predictive value 93.83% and Negative predictive value of 94.93%.

Keywords: FNAC, Solitary thyroid nodules, Sensitivity, Specificity.

INTRODUCTION

FNAC represents a safe, cost effective and a reliable method of providing a tissue diagnosis. Since imaging modalities cannot discriminate benign from malignant nodules, FNAC becomes the procedure of choice because of less invasiveness, cost effectiveness and high yield in the evaluation of solitary thyroid nodule. In addition, it has the ability to distinguish different types of carcinoma. Nodular thyroid disease is common and incidence increases with age[1]. Prevalence rate in female population of USA is about 5%[2]. Solitary thyroid nodule (STN) is a common presentation of thyroid swelling[3] and is more common in females. On scinti-scanning, it may be cold, warm or hot. However, 75% of STN are cold[4]. This nodule may be adenomatous (hypertrophic or colloid), adenoma, localized area of Hashimoto's thyroiditis, cystic or in only 5% of the cases, the nodule is malignant[5,6].

FNAC is now recommended as the procedure of choice for evaluating all thyroid nodules. FNAC is not new. This technique was first used for cytological diagnosis of thyroid tumor in America in 1926. It has been practiced over 80 years to diagnose infection and malignancy. This is safe, simple, cost effective, time saving technique, requiring no anesthesia, no danger of tumor dissemination and has excellent patient compliance[7,8]. FNAC has a high level of accuracy[9]. It is considered as the only preoperative diagnostic test that can often

Correspondence: Dr Javaid Iqbal, 2-Mountain Medical Battalion, Kotli Pakistan (*Email:drjavaidniazi@yahoo.com)*

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differentiate between benign and malignant nodules. So it helps in the operative planning of definite procedure based on cytology. But it cannot differentiate between follicular adenoma and carcinoma since this distinction is only made on capsular and vascular invasion. FNAC can also be therapeutic in cysts. This study was done to evaluate the diagnostic accuracy of the FNAC in the diagnosis of STN. The rationale of this study was to find out the diagnostic accuracy of FNAC in cold thyroid nodules so that surgery could be performed in only selected patients and to observe the effecacy of various surgical methods employed in such patients. The study was done on patients having solitary thyroid nodule admitted in Surgical Unit of CMH Multan.

Table-1: FNAC Diagnosis In 349 patients with solitary thyroid nodule.

	No of patients	Percentage
Thyroid Cyst (Goitre with cystic degeneration)	35	10%
Colloid nodule	174	50%
Follicular neoplasm	35	10%
Atypical cells	87	25%
Papillary carcinoma	18	5%

Table-2: FNAC versus histopathology according to tissue diagnosis in 321 patients who underwent surgery.

Cytology diagnosis	FNAC	Histopathology
Thyroid Cyst (Goitre with cystic degeneration)	35	32
Colloid nodule	173	180
Follicular neoplasm	35	32
Atypical cells	60	59
Papillary carcinoma	18	18

MATERIAL AND METHODS

This study was carried out at CMH Multan from 27 Aug 2010 to 26 Feb 2011. A total of 349 patients were included in the study. Patients of both genders, more than 15 years of age, with solitary thyroid nodule on physical examination were included in the study. Patients with diffuse goiter, Multinodular goiter and thyrotoxicosis were excluded from the study. After permission from the hospital ethical committee, informed consent was taken from all the patients. A proforma was made to record patient data and the findings. In outdoor visit, after taking detailed history, thorough general physical examination was done. Patients fulfilling the inclusion criteria were registered in OPD and base line investigations were done. The procedure of FNAC was explained in detail to the patient. All cases underwent FNAC at Surgical OPD of CMH Multan by the same surgical team. FNAC reports were compared with histopathological diagnosis. Data was recorded on the proforma.

The data was analyzed by SPSS version 17. Mean & standard deviation were calculated for quantitative variables like age and gender. Frequency and percentages were calculated for gender and malignant solitary thyroid nodule on FNAC and biopsy. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC were calculated keeping histopathological diagnosis as gold standard.

RESULTS

Majority of the patients i.e. 233 (66.7%) patients were between the 21-40 years. Of the 349 patients, 59 (16.7%) patients were male while 290 (83.3%) patients were female ratio was 1:5 in this study. All of 349 patients presented with swelling in front of neck. Mild pain was reported by 35 (10%) patients (on visual analogue score), 18 (5%)

patients had change in voice and 18 (5%) patients had palpitation. Right lobe of the thyroid gland harbored swelling in 261 patients (75%) while swelling was present in left lobe in 88 patients (25%). Out of 349 patients, 261 patients having solitary thyroid nodule had solid consistency while in 88 patients (25%), nodules were cystic in nature. Only 18 patients (5%) were diagnosed with papillary carcinoma, while 35 patients had follicular neoplasia as shown in table-1. Table-2 compares FNAC results with the gold standard histopathology results. 321 patients were subjected to surgery in this study. Lobectomy was done in 35 patients (10%). 117 patients (33.3%) had undergoing lobectomy+ isthmusectomy, while 59 patients (17%) had subtotal thyroidectomy. Near total thyroidectomy was performed in 52 patients (15%). Wound infection was seen in only 17 patients (5%) which was treated with antibiotics and dressing. There was no keloid formation or recurrence of carcinoma till the completion of study. The sensitivity of FNAC was found to be 91.66% where as the specificity was 98.148%. accuracy remained 94.06%. The positive predictive value was 96.49% and negative predictive value was 95.49%.

DISCUSSION

It has been demonstrated that up-to 44% of the clinically solitary nodules are, in fact, multinodular on ultrasonography and isotope scanning. In the present study, 117 patients out of 349 (33.5%) having solitary nodules on physical examination were found to have multiple nodules on USG while thyroid isotope scan could detect multiple nodules in 48 patients (14%) due to the limited resolving capacity of the thyroid isotope scan. The isotope scan can resolve nodule, which is at least one cm in diameter. The nodules are more likely to be malignant at the extremes of age and in male sex[10]. Out of 53 patients, having malignancy 35 patient (66.66%) had follicular carcinoma while 18 patients (33.33%) had papillary carcinoma. Two patients were 55 years of age while 18 patients having papillary carcinoma were below the age of 30 years showing high incidence of papillary carcinoma in younger age group. The hot and warm nodules are rarely malignant while the cold nodules have 5-20% chances of malignancy[11]. In the present study, only 52 out of cold nodules (15%) were malignant. In a study by Kaplan et al[12], USG divided the cold lesions into solid, cystic of mixed with accuracy of more than 90%. In a study by Johnstone et al, specificity of FNAC was 97.5% and sensitivity and accuracy were 50% and 37.5% respectively[13]. Sadler et al documented in 283 patients undergoing FNAC, the specificity and sensitivity of 76% and 69% respectively[14]. Anderson and Web in 1987, reported sensitivity and specificity of 99.4% and 93.7% respectively[15]. The overall accuracy was 98.4%. In current study, the specificity has been calculated to be 90%. Because of its simplicity, excellent patient compliance and good histopathology correlation, the primary advantage of FNAC is to reduce frequency of surgery thus, decreasing morbidity in patients with benign nodules. FNAC is now the gold standard and is widely used in the management of thyroid nodules[16,17]. It is cheap, minimally invasive and can be done under either palpation or ultrasound guidance. Its use has reduced the number of thyroid ectomies by about 50%[18] and reduces the overall cost of medical care in these patients by 25% and false positive rate of about 1%[12].

CONCLUSION

Solitary nodules at extreme of ages especially in males are more likely to be malignant. The routine use of thyroid isotope scanning and ultrasonography are of limited value since these investigations can not discriminate between benign and malignant nodules. FNAC represents a safe, cost effective and a reliable method of providing a tissue diagnosis specially in malignant cases accurately. it is therefore, a safe, reproducible, accurate and low cost diagnostic modality.

CONFLICT OF INTEREST

The authors of this study reported no conflict of interest.

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