

Role of Fine Needle Aspiration Cytology in Diagnosis of Solitary Thyroid Nodule

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ABSTRACT

Aim: To evaluate usefulness of the FNAC in diagnosing solitary thyroid nodule.

Methods: This Interventional study was carried out in the Department of General Surgery, Multan Medical & Dental College/Ibn-e-Siena Hospital & Research Institute, Multan, from July 2010 to December 2013. A total of 100 patients were included in the study.

Results: Majority of the patients i.e., 40(66.7%) patients were between the 21-40 years. Of the iagnostic60 patients, 10(16.7%) patients were male while 50(83.3%) patients were female. Thirty five (58.3%) patients belonged to district Multan while 10(16.7%) patients were residents of district Muzaffargarh. Mild pain was noted in 6(10%) patients 3(5%) patients had change in voice and 3 (5%) patients had palpitation. Thirty patients (50%) presented within one year of the start of their disease. Right lobe of the thyroid gland harboured swelling in 45 patients (75%). Only 3 patients (5%) were diagnosed as papillary carcinoma.

Conclusion: Cold thyroid nodule is a common problem and has gained much significance due to its potential for malignancy.

Keywords: FNAC, cost-effectiveness, thyroid nodules.

INTRODUCTION

Fine needle aspiration cytology (FNAC) is now accepted as a cost-effective, minimally invasive, low-complication non-operative diagnosis for most of the thyroid lesions and is highly successful in triaging patients with solitary thyroid nodule (STN) into operative and non-operative groups. The location of the target lesion, careful searching for malignant cells and repeat FNAC are the key to successful diagnosis to plan a proper surgical management in thyroid mass^{1,2,3,4,5}. Thyroid nodules that should be considered for FNAC include any firm, palpable, solitary nodule or nodule associated with worrisome clinical features. FNAC should also be performed on nodules with suspicious ultrasonographic features; dominant or atypical nodules in multinodular goiter; complex or recurrent cystic nodules; or any nodule associated with palpable or ultrasonographically abnormal cervical lymph nodes; it should be performed on any abnormal-appearing or palpable cervical lymph nodes⁶. The distinction of the benign and malignant thyroid nodules is fundamental, as malignancy necessitates surgery, while strict patient follow-up is necessary in the case of a benign mass. FNAC is considered to be the "gold standard" in the selection of patients for surgery⁷. Any solitary or dominant thyroid nodule larger than 1 cm should

have cytology done as smaller nodules carry a very low risk of morbidity. FNAC is the most cost-effective invasive pre-operative investigation, whose simplicity and safety justify its use for "selective" surgery and is considered the "gold standard" in the management of thyroid nodules⁸. FNAC is usually performed without local anesthesia and the patient does not require any previous preparation. In medical centers with longstanding experience, diagnostic (adequate) biopsies obtained from solid nodules range from 90–97%⁹. It has been reported that, although FNA is guided by palpation (conventional or non-ultrasonographic palpation-guided FNA) in 87% of cases in North America and Europe, the US-FNA is becoming increasingly popular. During this procedure, US guidance is used instead of palpation, which seems to enhance the value of the FNA diagnostic accuracy¹⁰. Clinically significant complications after FNA have hardly ever been reported¹¹. This study was carried out to evaluate the usefulness of FNAC in diagnosing solitary thyroid nodule.

MATERIAL AND METHODS

This Interventional study was carried out in the Department of General Surgery, Multan Medical & Dental College/Ibn-e-Siena Hospital & Research Institute, Multan, from July 2010 to December 2013. A total of 100 patients were included in the study.

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RESULTS

Out of 100 patients, 60(60%) patients were between the 21-40 years, 20(20%) patients in the age group 0-20 years and 20(20%) were in the age group 41-60 years. Of the 100 patients, 15(15%) patients were male while 85(85%) patients were female. Most of the patients belonged to Multan. All the 60 patients (100%) presented with swelling in front of neck. Fifty patients (50%) presented within one year of the start of their disease. Results are shown in following tables.

Table I: Site of lump

Site of lump	n	%age
Right lobe	75	75
Left lobe	25	25

Table II: Results of ultrasound

USG report	n	%age
Solid	75	75
Cystic	25	25

Table-III: FNAC diagnosis

Cytology diagnosis	n	%age
thyroid cyst (Goitre with cystic degeneration)	10	10
Colloid nodule	50	50
Follicular neoplasm	15	15
Atypical cells	20	20
Papillary carcinoma	05	5

Table-IV: Surgical treatment (n=75)

Type of surgery	n	%age
Lobectomy	08	10.7
Lobectomy + Isthmectomy	40	53.3
STT	15	20.0
Near total thyroidectomy	12	16.0

DISCUSSION

Thyroid diseases are quite common in South East Punjab and present as a swelling in front of neck, which may be due to goitre, inflammation, cyst or malignancy. Thyroid nodules are fairly common surgical problems and the prevalence rate is about 5% of the population¹².

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Cold thyroid nodule has gained much importance because of increased potential for malignancy. The incidence of malignancy in cold nodules varies from 5 - 20% of the cases¹³. Because most of the clinically solitary thyroid nodules are cold,

most cold nodules are benign and most malignancies are cold, they create a major surgical problem.

It has been demonstrated that up-to 44% of the clinically solitary nodules are, in fact, multinodular on ultrasonography and isotope scanning⁶⁴. In the present study, 20 patients out of 60 (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 7 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 diameter¹⁴.

Thyroid nodule occurs early in endemic areas¹⁵. In the present study, the peak incidence was between 20 -40 years of age. The nodules are more likely to be malignant at the extremes of age and in male sex¹⁶. In the present study, 4 of the 6 patients were the below the age of 30 years while 2 patient were above 50 years. Of the 7 male patients in this study, 2 had malignant nodule.

Out of 6 patients, having malignancy 2 patient (33.33%) had follicular carcinoma while 4 patients (66.66%) had papillary carcinoma, 2 patients were 55 years of age while 4 patients having papillary carcinoma were below the age of 30 years showing high incidence of papillary carcinoma in younger age group.

Right lobe of the thyroid gland is involved more often. In one study, right lobe was involved two times more than the left lobe¹⁰. In present study, 43 patients (86%) had nodules in right lobe while 7 patients (14%) had nodules in the left lobe.

Thyroid scan was extensively used in the past to divide the thyroid nodules into hot, warm and cold. The hot and warm nodules are rarely malignant while the cold nodules have 5-20% chances of malignancy. Thyroid scan is unable to distinguish benign nodules from malignant nodules¹⁷. In the present study, only 6 out of 50 cold nodules (12%) were malignant.

USG has the advantage of differentiating cystic from solid lesions and also the fact that it is non-invasive and free from radiation¹⁷. In one study, USG divided the cold lesions into solid, cystic or mixed with an accuracy of more than 90%¹⁸. In the present study, USG detected 15 lesions out of 50 (18%) as cystic. Eight of these 15 patients (55.55%) were subjected to surgery and the nodules were proved cystic and benign.

This ability of USG is limited by the fact that cystic lesions carry a significant risk of malignancy¹⁹. There are no definite criteria to discriminate benign and malignant lesions²⁰. USG is useful in the follow-up of malignant tumours and benign nodules on LT4 therapy²¹. This incidence of carcinoma (27%)

corresponds to the international figures by various authors²².

In one study, diagnostic specificity of FNAC was 97.5% and diagnostic sensitivity and accuracy were 50% and 37.5% respectively. There were 1.4% false negative results while false positive results were found in 25%²³. Cusick et al analyzed 283 patients undergoing FNAC and had specificity of 58% while sensitivity and accuracy of 76% and 69% respectively²⁴. Anderson and Web in 1987, reported sensitivity and specificity of 99.4% and 93.7% respectively²⁵. The overall accuracy was 98.4%. They reported 6.3% false negative and 0.6% false positive results.

In present study, the diagnostic specificity has been calculated to be 90%. The diagnostic sensitivity and accuracy were 100% and 92 % respectively. False positive results were 8% and no false negative results were seen. This shows thyroid scan and USG only identify as group of patients with greater chances of malignancy while FNAC identifies cold nodule with definite or suspected malignancy with considerably high sensitivity. Because of its simplicity, excellent patient compliance and good histopathology correlation, the major use of FNAC is to reduce surgery and thus decrease morbidity in patients with benign nodules. The aim is satisfied if yield of malignancy goes up after investigations.

FNAC should be performed if thyroid nodules are clinically suspicious to be malignant (e.g. solid, rapidly growing)²⁶. FNAC is now the gold standard and is widely used in the management of thyroid nodules²⁷. It is cheap, minimally invasive and can be done under either palpation or ultrasound guidance. Its use has reduced the number of thyroidectomies by about 50%²⁸ and reduces the overall cost of medical care in these patients by 25%²⁹. When properly done, FNAC should have a false negative rate of < 5% and false positive rate of about 1%³⁰. Ultrasound guidance dramatically reduces sampling error and significantly improves sensitivity, specificity, as well as overall diagnostic accuracy^{31,32}. FNAC cannot distinguish between follicular adenoma and follicular carcinoma.

CONCLUSION

FNAC represents a safe, cost effective and a reliable method of providing a tissue diagnosis and has become the first-choice investigations in the evaluation of solitary thyroid nodule, pre-operative diagnosis can be followed by better treatment strategy.

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