Original Article

Diagnostic Value of Fine Needle Aspiration Cytology in the Diagnosis of Solitary Thyroid Nodule

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ABSTRACT

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

Study Design: Interventional study

Place and Duration of Study: This study was carried out in the Department of General Surgery, Nishtar Medical College, Multan from January 2010 to July 2010.

Material and methods:- 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 60 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.

Key Words:-FNAC, cost-effectiveness, thyroid nodules.

INTRODUCTION

Nodular thyroid disease is common and the incidence increases with age[1]. The prevalence rate is about 5% of the population[2]. Solitary thyroid nodule is a common presentation of thyroid swelling[3] and is more common in females. On scintiscanning, it may be cold, warm or hot. However, 75% of solitary nodules 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].

Fine needle aspiration cytology (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. FNAC has been practiced over 80 years to diagnose infection and malignancy. FNAC is safe, simple, cost effective, time saving technique, requiring no anaesthesia, 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 differentiate between benign and malignant nodules. So it helps in the operative planning of definite procedure based on cytology. Its only limitation is that it cannot differentiate between follicular adenoma and follicular carcinoma as this distinction is only made on histological criteria of capsular and vascular invasion. FNAC can also serve its therapeutic purpose in cystic nodules. This study will be done to evaluate the accuracy of the FNAC in the diagnosis of solitary thyroid nodule.

Thyroid diseases are quite common in southeast Punjab. Nearly all the disorders result in some swelling of the Thyroid gland and non-specific term "Goitre" embraces them all. In clinical practice, working classification is based on the biochemical status of the gland, physical characteristics of the gland and whether the gland is benign or malignant.

On physical examination, the swelling may be diffuse, multinodular or there may be a clinically discrete nodule. This discrete nodule is a common presentation of goitre and is more common in females. On scintiscanning, it may be cold, warm or hot. However, 80% of discrete nodules are cold[10]. This nodule may be adenomatous (hypertrophic or colloid), adenoma, localized area of Hashimoto's thyroiditis or carcinoma or may be cystic, in only 5-20% of the cases, the nodule is malignant[11].

This study was carried out to evaluate the usefulness of FNAC in diagnosing solitary thyroid nodule.

MATERIALS AND METHODS

This Interventional study was carried out in the Department of General Surgery, Nishtar Hospital, Multan from January 2010 to July 2010. A total of 100 patients were included in the study.

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 No.1: Site of lump

Site of lump	No. of patients	%age
Right lobe	75	75.0
Left lobe	25	25.0

Table No.2: Results of ultrasound

USG report	No. of patients	%age
Solid	75	75.0
Cystic	25	25.0

Table No.3: FNAC diagnosis

Cytology diagnosis	No. of patients	%age
hyroid cyst (Goitre with cystic degeneration)	10	10.0
Colloid nodule	50	50.0
Follicular neoplasm	15	15.0
Atypical cells	20	20.0
Papillary carcinoma	05	05.0

Table No.4: Surgical treatment (n=75)

Type of surgery	No. of patients	%age
Lobectomy	08	10.7
Lobectomy+ Isthmustectomy	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 population[12].

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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 cases[13]. 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 diameter[14].

Thyroid nodule occurs early in endemic areas[15]. 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 sex[16]. 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 lobe[10]. 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 nodules[17]. 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 radiation[17]. 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 malignancy[19]. There are no definite criteria to discriminate benign and malignant lesions[20]. USG is useful in the follow-up of malignant tumours and benign nodules on LT4 therapy[21]. This incidence of carcinoma (27%) corresponds to the international figures by various authors[22].

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% respectively[24]. Anderson and Web in 1987, reported sensitively and specificity of 99.4% and 93.7% respectively[25]. 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 nodules[27]. 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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