

Frequency of Agreement between Ultrasound and FNAC In Differentiating Benign and Malignant Thyroid Neoplasm

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ABSTRACT

Aim: To determine the agreement between ultrasound and FNAC in differentiating benign and malignant thyroid neoplasm.

Study design: Cross sectional survey.

Duration: The study was conducted from 01-08-2012 to 01-02-2013.

Settings: Radiology Department, Services Institute of Medical Sciences, Lahore.

Methods: A total of 120 patients with clinical suspicion of thyroid neoplasm of either gender, age ranging from 20 to 65 years and with palpable thyroid nodules having clinical suspicion of thyroid neoplasia were included in the study.

Results: Majority of the patients between 31-40 years of age, i.e. 37(30.83%), 34(28.33%) were between 20-30 years, 29(24.17%) between 41-50 years, and only 20(16.67%) were between 51-65 years, mean and 39.83±4.23 years, 72(60%) male and 48(40%) female, frequency of agreement between ultrasound and FNAC in differentiating benign and malignant thyroid neoplasm revealed 80%(n=96) agreement.

Conclusion: The results of the study reveal that Ultrasound findings regarding differentiating benign and malignant thyroid neoplasm are in agreement with FNAC.

Keywords: Thyroid neoplasm, diagnosis, ultrasound, FNAC, agreement

INTRODUCTION

Thyroid is one of the ductless endocrine gland, which is located immediately below the larynx lateral and anterior to the trachea. The normal adult gland has a weight of 25–40 gm¹. Thyroid is a seat of various pathologies, neoplasia is one of them. It can be a benign tumor such as thyroid adenoma, or it can be a malignant neoplasm such as papillary, follicular, medullary or anaplastic thyroid cancer. Most patients are 25 to 65 years of age when first diagnosed; women are more affected than men².

Thyroid neoplasm is uncommon, it accounts about 0.5% of all cancers in men and 1.5% of all cancers in women. In Pakistan thyroid cancer is responsible for 1.2% cases of all malignant tumors.³ Papillary carcinoma is most common thyroid malignancy, accounts for 60%-70% of all thyroid malignancies. Anaplastic carcinoma represents 15-20%, medullary carcinoma represents 5% and follicular carcinoma represents 2-5% of all thyroid malignancies⁴.

Exposure to ionizing radiations, changing level of iodine nutrition and increased pathological diagnosis of clinically unimportant thyroid neoplasia is the cause of world wide increase in incidence of thyroid carcinoma over the past six decades⁵.

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The role of USG in evaluation of thyroid neoplasia is becoming increasingly important due to the availability of high-frequency (7.5 to 15 MHZ) probes, which permit visualization of more subtle anatomical and pathological details. Ultrasonography is commonly the first imaging modality after clinical examination. It is easily tolerated by patients without radiation and is inexpensive⁶.

Ultrasonographic features of thyroid nodules are helpful in distinguishing benign and malignant neoplasms. Features like calcifications, lymph node metastases and echogenicity of nodule are more helpful. Other features such as halo around nodule, margins, internal contents, and vascularity, are less specific but may be useful ancillary signs. None of these features is individually pathognomonic of malignancy. However, in combination, these features lead to a diagnosis⁷.

Fine-needle aspiration cytology (FNAC) is used for evaluating thyroid neoplasia. It has a sensitivity rate of about 95%, i.e., false negative results represent up to 5% of cases⁸.

According to the study conducted by Yunas and Ahmed⁹ the cases who showed agreement between ultrasonound and FNAC was found in 82.05% in differentiating benign and malignant thyroid neoplasm.

This study is designed to find out agreement between ultrasound and FNAC in differentiating benign and malignant neoplasms by non invasive

technique. One such study is conducted in our population until now, so this study will help to find out the accurate and confirmed diagnosis in differentiating benign and malignant thyroid neoplasm with ultrasound and FNAC in the management of thyroid malignancy and improve the survival rate.

MATERIAL AND METHODS

A total of 120 patients with clinical suspicion of thyroid neoplasm presenting to new radiology department, Services Hospital Lahore with referral from indoor and outdoor units of Services Hospital were entered in the study. Patients of either gender, age ranging from 20 to 65 years and with palpable thyroid nodules having clinical suspicion of thyroid neoplasia were included in the study while patients whose cytopathological report is inconclusive and having history of previous thyroid surgery and having co-existing other malignancy were excluded from the study.

Written informed consent was taken from all the patients. Demographic characters like age, sex and address were recorded. Ultrasound examination was done, using high resolution linear probe (11.2MHz) by the researcher herself. Color Doppler ultrasonography was used as and when required. Ultrasound findings were noted in self designed proforma (attached) and ultrasound diagnosis was made.

Ultrasound guided FNAC was done. Specimens were sent to pathological department for cytopathological reporting. The findings of these reports were entered in the proforma.

The collected data was entered into SPSS version 14 and analyzed descriptively. Mean and standard deviation was calculated for quantitative variables i.e. age. Frequency and percentage were calculated for gender, and agreement between ultrasound and FNAC. Kappa statistics were used to see the strength of agreement between USG and FNAC in differentiating being a malignant thyroid nodular.

RESULTS

A total of 120 cases fulfilling the inclusion/exclusion criteria were enrolled to determine the agreement between ultrasound and FNAC in differentiating benign and malignant thyroid neoplasm. Age distribution of the patients was done which shows majority of the patients between 31-40 years of age, i.e. 37(30.83%), 34(28.33%) were between 20-30 years, 29(24.17%) between 41-50 years, and only 20(16.67%) were between 51-65 years, mean and 39.83±4.23 years (Table 1).

Gender distribution of the patients show 72(60%) male and 48(40%) female (Table 2)

Frequency of agreement between Ultrasound and FNAC ratio was calculated which reveals true positive i.e., 96 for both Ultrasound and FNAC and true negative for both i.e., 10 Kappa statistics were computed as 0.4582 (observed as proportion of maximum possible), which shows a significantly agreement (Table.3)

Table 1: Age distribution (n=120)

Age(in years)	n	%
20-30	34	28.33
31-40	37	30.83
41-50	29	24.17
51-65	20	16.67

Mean ± SD: 39.83±4.23

Table 2: Gender distribution (n=120)

Gender	n	%
Male	72	60
Female	48	40

Table 3: Frequency of agreement between ultrasound and FNAC in differentiating benign and malignant thyroid neoplasm (n=120)

FNAC	Ultrasound	
	Yes	No
Yes	96	6
No	8	10

Kappa statistics= 0.4582

(observed as proportion of maximum possible)

DISCUSSION

The problem of the solitary thyroid nodule (STN) provides significant surgical work because nodular disease especially STNs of the thyroid are common while the incidence of malignancy is low. Difficulty in management and the assessment of results have been due, in part at least, to the lack of an accurate pre-operative diagnosis and if the need for and precision of thyroid surgery is to be improved, diagnosis at the time of operation is clearly essential.

The local data is lacking until now, so this study may help to find out the accurate and confirmed diagnosis in differentiating benign and malignant thyroid neoplasm with ultrasound and FNAC in the management of thyroid malignancy and improve the survival rate.

Several studies have been performed to establish the ability of US to differentiate benign from malignant thyroid nodules and their results compared with FNA, thyroid ultrasound has the advantage of being a non invasive procedure and giving immediate information¹⁰.

Ultrasound is superior to computed tomography scanning in evaluating the presence of abnormal

cervical lymph nodes. Cervical lymph nodes can be involved in 20%–50% of patients with differentiated thyroid cancer; more specifically, in those individuals with papillary thyroid cancer.¹¹⁻¹² Preoperative ultrasound can identify suspicious cervical lymphadenopathy in 20%–31% of cases of thyroid cancer, thereby potentially altering the extent of and overall surgical approach in these patients^{13,14}. This imaging modality allows for the early detection of nonpalpable cervical lymph node metastasis prior to thyroidectomy in patients with FNA-proven or suspected thyroid cancer that otherwise might have been missed intraoperatively, thereby minimizing the risk for persistent disease^{13,14}. Typical ultrasound features of metastatic lymph nodes include hypoechogenicity, rounded appearance, irregular borders, macro- or microcalcifications, loss of the fatty hilus, and increased size.

The frequency of agreement between ultrasound and FNAC in differentiating benign and malignant thyroid neoplasm reveals 96(80%) agreement in our study which is in agreement with a study conducted by Yunas and Ahmed⁹ the cases who showed agreement between ultrasonound and FNAC was found in 82.05% in differentiating benign and malignant thyroid neoplasm.

Ultrasound features that are helpful in differentiating the malignant from benign lesions and this is further reassured by other study¹⁵. However, there is almost unanimous agreement that the presence of microcalcifications within a nodule is associated with thyroid cancer among rest of the ultrasonic features intrinsic microcalcifications is the strongest criterion predicting malignancy¹⁵⁻¹⁶.

However, we concluded that ultrasound is the most sensitive method for diagnosing intrathyroid lesions, and is valuable for differentiating benign and malignant thyroid neoplasm.

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