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# Diagnostic value of Ultrasonography and Scintigraphy in detection of Thyroid Lesions

Amel bushra. Ahmed[1,2], Mohamed Yousef[1, 3], Salah Ali Fadlalah[1]
[1]*College of Medical Radiological Science, Sudan University of science and Technology, Sudan Khartoum*
[2]*Fujairah Hospital, Fujairah, UAE*
[3]*College of Batterjee Science College, Radiological Science, Jeddah, Saudi Arabia*

***Abstract***
***Objective:*** *The present study was conducted to evaluate the thyroid gland lesions using scintigraphy and ultrasound*
***Methods:*** *The study population included 101 patients who referred to Nuclear Medicine and Radiology Department, Fujairah hospital, Fujairah, UAE for thyroid scintigraphy and neck ultrasound.*
***Results:*** *Ultrasound scan reported that 10% of subjects presented with normal and abnormal in 90 %, while thyroid nuclear medicine scan reported as normal in 13 % and abnormal in 87 % ,multi nodules in 49 of the patients while nuclear medicine scan is able to detect only 27 patients. For thyroiditis ultrasound better than nuclear medicine, (19 patients) 18.8% to (9 patients) 9% but for toxic multi nodular goiter nuclear medicine thyroid scan was better than ultrasound, (16 patients) 16 % to (1 patients) 1%. the ability of both modalities in detecting nodules.*
***Conclusion****: Our results show that both modalities revealed almost similar results. Ultrasound has the additional advantages of being non-ionizing radiation and accurately localizes and characterizes the thyroid abnormalities. Ultrasound examination should be obtained routinely for patients with suspected thyroid diseases and scintigraphy is reserved for selected cases.*
***Key Words****: Thyroid, Ultrasonography, Scintigraphy · Nodule, Diagnostic value*

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## I. Introduction

Thyroid nodules are a common medical problem [1]. Although they are traditionally found as palpable masses at neck examination in patients with or without suspected thyroid disease, the apparent prevalence of non-palpable thyroid nodules (i.e. <1 cm in diameter) in the general population has recently increased, probably as a consequence of the increasing application of ultrasound [2–5] .

Thyroid nodular disease (TND) is one of the most widespread endocrine disorders. While only about 3 - 7% of the population display palpable nodules, thyroid lesions in ultrasound (US) examination are reported in a large part of population. The exact prevalence differs strongly among studies, oscilating from about 10 to about 70% of the adult population or even more in women, the elderly or patients with certain particular conditions, such as acromegaly [6-9] Most studies estimate the risk of malignancy as quite low, within the range from less than 3 to about 10% [10,11]. These facts indicate a great need for diagnostic tools allowing a reliable distinction of nodules representing a high risk of malignancy. The decision whether to conduct surgery or follow-up is taken on the basis of thyroid US together with US-guided FNAB. Power Doppler (PD) examination and elastography are additional sonographic techniques, which are believed to increase the diagnostic value of conventional US [12].

## II. Materials and methods

A total of 101 patients referred to Nuclear Medicine and Radiology Department, Fujairah hospital for thyroid scintigraphy and neck ultrasound during the period from Jan. 10, 2016 to June. 30, 2018.

The thyroid scintigraphy obtained 10-20 minutes after intravenous injection of 37-111MBq of sodium pertechnetate Tc-99m using a LEHR (low energy high resolution collimator-equipped gamma-scintillation camera. All thyroid scintigraphy's were interpreted by one Nuclear Medicine Physician. For ultrasound, all patients were scanned supine with their necks hyperextended using a 7.5-10-MHz transducer. All patients underwent neck ultrasound by one expert radiologist. The data analyzed using the SPSS program. Scanning is done both in transverse and longitudinal planes. Real time imaging of thyroid lesions is performed using both

gray-scale and color Doppler techniques. The imaging characteristics of a mass (viz. location, size, shape, margins, echogenicity, contents and vascular pattern) should be identified.

**Data Collection and Analysis**

Data was collected in tabulated database sheet . The data included the age , gender, Us finding and Nuclear medicine scintigraphy findings

## III. Results :

**Table (1) shows patients gender**

| Patients | Numbers |
|---|---|
| Male | 8 |
| Female | 93 |
| Total numbers | 101 |

**Table (2) shows patient's ages**

| Age group | Numbers of patients |
|---|---|
| 0 > 15 | 5 |
| 16 > 30 | 26 |
| 31 > 45 | 44 |
| 46 > 60 | 20 |
| 61 > 75 | 5 |
| 76 > 90 | 1 |
| Total | 101 |

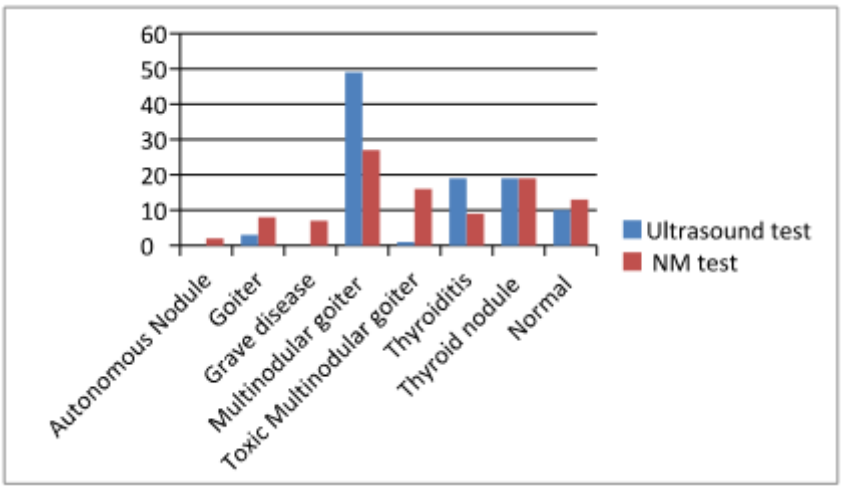


**Figure (1) shows ultrasound and nuclear medicine findings**

**Table 4 shows Nodules site in both investigations (thyroid scintigraphy and thyroid ultrasound)**

| Nodule site | Scintigraphy | Ultrasound |
|---|---|---|
| Lt lobe | 41 | 69 |
| Rt lobe | 49 | 66 |
| isthmus | 11 | 12 |
| Total | 101 | 146 |

**Table 5 Thyroid size in both investigations (thyroid scintigraphy and thyroid ultrasound)**

| size | Nuclear medicine | Ultrasound |
|---|---|---|
| Normal | 28 (28%) | 31( 31%) |
| Enlarge | 73 (72%) | 70 (69%) |
| Total | 101 (100%) | 101 (100%) |

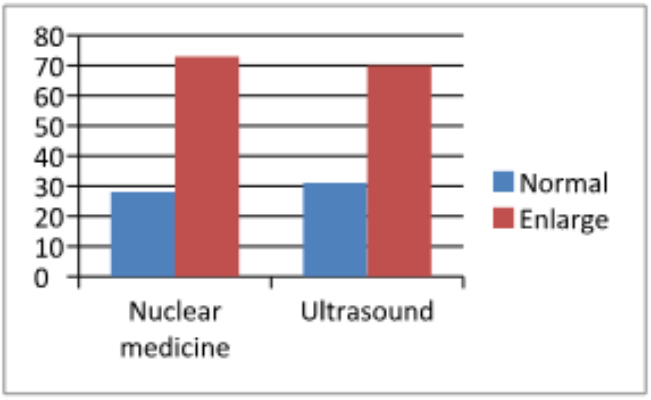


**Figure 2 shows the thyroid gland sizes in both investigations.**

## IV. Discussion

The study population consisted of 101 patients were referred to Nuclear Medicine and Radiology Department, Fujairah hospital for thyroid scintigraphy and neck ultrasound during the period from Jan. 10, 2016 to Jan. 10**,** 2018**.**All patients Thyroid function test were done before coming to radiology department. So all results were comparing with the TFT results.

Thyroid ultrasound , nuclear medicine thyroid scintigraphy and demographic data are presented in Tables and figures for this study revealed that, among this patients 92% were female(93) and 8% were male (8), table ( 1).The mean age of patients was 37.7 years , table (2). Thyroid ultrasound scan results were normal in 10% (10 patients) and abnormal in 90 % (91 patients), while thyroid nuclear medicine scan were reported as normal in 13 % (13 patients) and abnormal in 87 % (88 patients) table (3).

In this study table (3) shows that ultrasound examination is able to detect multi nodules in 49 Of the patients while nuclear medicine scan is able to detect only 27 patients. However, when the nodule is solitary, the ultrasound and the nuclear medicine thyroid scan are same in detecting it. And if multi nodules are toxic, nuclear medicine is better in detecting it (16 patients) compering to Ultrasound (1 patients). In diagnosis of Autonomous nodule nuclear scan was able to detect it while ultrasound couldn't detect it. In graves' disease Nuclear medicine was superior than ultrasound in detecting it, while ultrasound failed . For thyroiditis ultrasound was better than nuclear medicine, (19 patients) 18.8% to (9 patients) 9%. However in diagnosis of toxic multi nodular goiter nuclear medicine thyroid scan was better than ultrasound, (16 patients) 16 % to (1 patients) 1%.

Table (5) shows the different sizes of patients thyroid glands. Which was enlarged in 73 patients (72%) in nuclear medicine and normal 28 patients (28%), while it was enlarged in 70 patients (69%) and normal in 31 patients (31%).

Table (6) shows the ability of both tests, thyroid ultrasound and nuclear medicine thyroid scan , in detecting nodules. Nuclear medicine was good in detecting solitary nodules in 25 patients more than ultrasound which detected in only 16 patients. Put when patient have multiple nodules , ultrasound was best in detecting nodules in 65 patients compare to nuclear medicine which detect nodules in only 34 patients. That means ultrasound have more sensitivity and specify than nuclear medicine in diagnosis of multinodular goiter diseases.

In all cases the ultrasound made the diagnosis in 90% (90 patients ) more than nuclear medicine 87% (87 patients) by 3 %, Table (3).

In spite of some limitations of this, ultrasound examination plays an important role for patients in diagnosis of thyroid abnormalities, especially in thyroid nodules.

Thyroid imaging is necessary to establish diagnosis, and it involves mainly thyroid ultrasound examination and scintiscan. Awareness of both the advantages and limitations of sonographic and scintigraphic imaging are central to the successful interpretation of their results and reasonable recommendation of these procedures for patients with thyroid diseases of different age and clinical picture.

## V. Conclusion

Ultrasound can be able to evaluate the thyroid abnormalities especially multinodular goiter and thyroiditis. And have same ability as nuclear medicine scintigraphy in detecting solitary thyroid nodules, nodular goiter. When the ultrasound examination is performed by an experienced operator with high resolution equipment, it presents good accuracy in detecting thyroid abnormalities. Consequently, ultrasound can be used for evaluation and follow up. Thyroid scintigraphy examination would be indicated for patients with alterations in ultrasound examination or when there is a higher possibility of detecting new graves diseases or Toxic nodules because of it is his ability of making it is diagnosis.

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