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Diagnostic Feasibility of Ultrasound in Characterization of Thyroid Nodules Using Thyroid Imaging Reporting and Data System

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Abstract

Background: Thyroid nodules are common entities, which is frequently discovered in daily practice. B-mode US is the most sensitive, non invasive, easy to use method for detect thyroid nodules and describe it properly.

Aim of Study: The aim of this study is to evaluate the usefulness of Thyroid imaging reporting and data system in the differentiation of thyroid nodules in correlation with fine needle aspiration cytopathology.

Patients and Methods: This study conducted 60 patients (47 females and 13 males; age between (18-70 years) with mean age was (41 ± 11.52) years) during the period from December 2020 to December 2021 at Oncology Center - Mansoura University (OCMU). All patients had undergone thyroid ultrasound as well as ultrasound-guided fine needle aspiration (FNA).

Results: The study included 60 patients with thyroid nodules (41 benign and 19 malignant). Positive predictive value for nodules in this study was 0% for TIRADS 1 and TIRADS 2 nodules, 3.6% for TIRADS 3 nodules, 55.6% for TIRADS 4 nodules and 100% for TIRADS 5 nodules.

Conclusion: The ACR TIRADS risk-stratification system is simple, non invasive, easy to use method for assessing thyroid nodules which provide management and recommendations, aiming to reduce unnecessary biopsies and excessive surveillance.

Key Words: *Thyroid nodules – A CR TIRADS – FNAC.*

Introduction

THYROID nodules are frequent in the general population, although most of these thyroid nodules are benign but there has been a 2.5-fold elevation in thyroid malignancy in the last 30 years **[1]**.

Ultrasound (US) is the main and preferred imaging modality for thyroid nodule evaluation. Accurate US assessment of thyroid lesions can help decrease unwarranted FNA procedures of benign nodules. Several thyroid nodule risk classification systems that focus on US features have already been published. Some of them highlight only simple US patterns, while others rely on the presence of multiple US features to categorize thyroid nodules **[2]**.

In 2017, the American College of Radiology (ACR) developed and published the Thyroid Imaging, Reporting and Data System (TIRADS) based on a dictionary of ultrasound terms for thyroid nodules, assigning different values to different ultrasound features and ultimately classifying thyroid nodules into five categories (composition, echogenicity, shape, margin, and echogenic foci) by summing the points **[3]**.

Recently, many researchers demonstrated that the ACR TIRADS had superior diagnostic performance compared to other guidelines and reduced larger number of unnecessary FNAs **[4]**.

Aim of Study:

The aim of this study is to evaluate the usefulness of Thyroid imaging reporting and data system in the differentiation of thyroid nodules in correlation with fine needle aspiration cytology.

Patients and Methods

Patients:

This study conducted 60 patients (47 females and 13 males; age between (18-70 years) with mean age was (41 ± 11.52) years) during the period from December 2020 to December 2021 at Oncology Center, Mansoura University (OCMU). All patients had undergone thyroid ultrasound as well as ultrasound-guided fine needle aspiration (FNA).

The inclusion criteria were: Patients with single or multiple thyroid nodules diagnosed by high resolution superficial neck ultrasound and Patients

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who agree to participate in study according to the ethical considerations.

The exclusion criteria was: Patients who refused to join the study.

- All nodules were examined by a 7.5-10 MHz linear array transducer (LOGIQ P7 and P9 systems).
- Patients were in a supine position with their back raised and their head tilted back. Then gland scanned in both transverse and longitudinal real time imaging (Fig. 1). Then proper assessment of nodule in three dimensions and then the nodule classified according to ACR TIRADS.

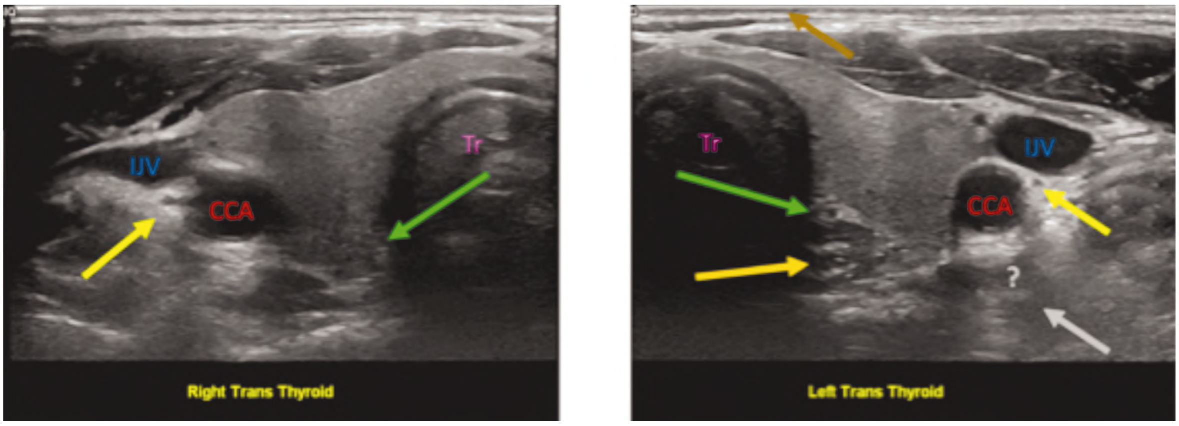

Fig. (1): Midline transverse view of the normal thyroid. The relationship of the thyroid to the carotid sheath structures, strap muscles, trachea, esophagus, and adjacent structures can be appreciated in this view. The muscle layers (the thin platysma, the strap muscles, and sternocleidomastoid muscle [SCM]) appear hypoechoic and are separated from adjacent structures and the skin by thin, hyperechoic lines representing the cervical fascia. Yellow arrow vagus nerve; green arrows tracheoesophageal groove and region of recurrent laryngeal nerves; orange arrow esophagus; gray arrow sympathetic trunk/ganglion with question mark designating region; brown arrow skin. IJV internal jugular vein, CCA common carotid artery, Tr trachea [5].

Image analysis:

All thyroid nodules were classified according to ACR TIRADS classification as follow; Regarding Composition: Solid or almost completely solid, Partially cystic partially solid, Spongiform, Cystic. Regarding margins: Well defined "smooth", Lobulated or irregular, Ill defined, Extra-capsular extension. According toechogenicity: Isoechoic (similar echogenicity as that of the thyroid parenchyma), Hyperechoic (more echogenic relative to the thyroid parenchyma), Hypoechoic (hypoechoic to the thyroid parenchyma, but not to strap muscles), Marked hypoechoic (hypoechoic to the thyroid parenchyma and the strap muscles). According tocalcifications: Non or large comet tail artifacts, Macrocalcifications, peripheral calcifications, Punctate echogenic foci. Regarding orientation (shape) of the nodule: Taller than wide (greater in its anteroposterior dimension than in its transverse dimension), Wider than taller. Then points were added to each feature as shown in Table (1) and Fig. (2).

Table (1): TI-RADS classification scheme for thyroid nodules [6].

Composition		Echogenicity		Shape		Margin		Echogenic foci	
Cystic or almost completely cystic	0	Anechoic	0	Wider-than-tall	0	Smooth	0	None or large comet-tail artifacts	0
Spongiform	0	Hyperechoic or isoechoic	1	Taller-than-wide	3	Ill-defined	0	Macrocalcifications	1
Mixed cystic and solid	1	Hypoechoic	2			Lobulated or irregular	2	Peripheral (rim) calcifications	2
Solid or almost completely solid	2	Very hypoechoic	3			Extrathyroidal extension	3	Punctate echogenic foci	3

ACR TIRADS Categories Nodules From 1-5 As Follow: TIRADS 1 (0 points): Benign lesions, TIRADS 2 (2 points): Not suspicious, TIRADS 3 (3 points): Mildly suspicious, TIRADS 4 (4-6 points): Moderately suspicious, TIRADS 5 (≥7 points): Highly suspicious.

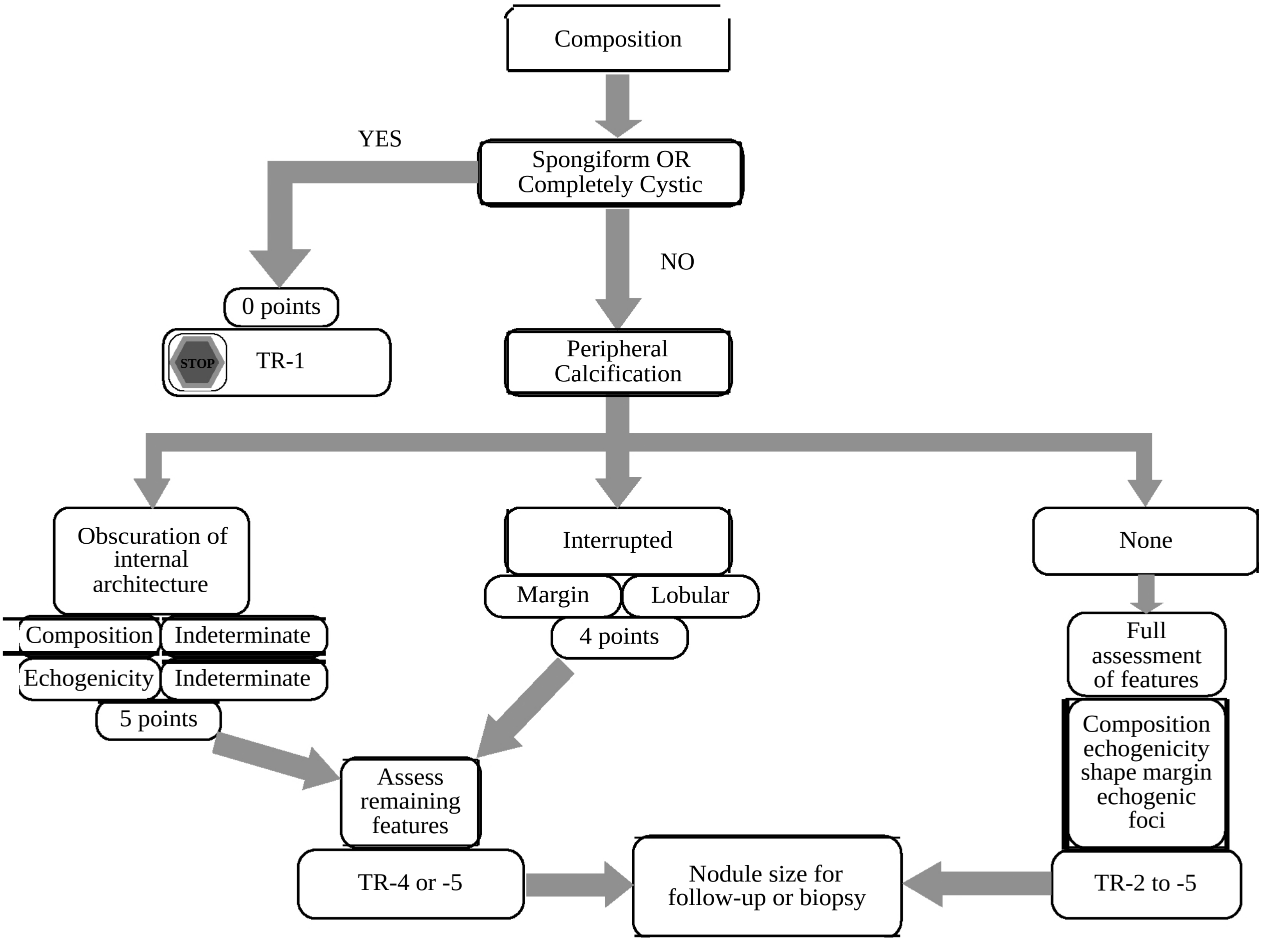

Fig. (2): Schema chartshows an algorithmic approach to interpreting and classifying a thyroid nodule by using ACR TI-RADS features. While all components should be reported as required, useful checkpoints include evaluation of composition and peripheral calcification. A nodule with these characteristics may be placed immediately into higher-suspicion categories. This is an efficient way to stratify indexed nodules [7].

US-gided FNAC:

FNAC technique was performed using a 20-gauge needle attached to a 10mL disposable plastic syringe as follow; The probe was fixed, with the puncture point on one side of the probe. Once the fine needle was set inside the nodular lesion, the needle was repeatedly inserted and rotated several times and subsequently quickly withdrawn. The specimen was fixed and sent for cytological examination which categorize results according to 2017 Bethesda System for Reporting Thyroid Cytopathology as follow: I. Non diagnostic or un satisfactory, II. Benign, III. Atypia of undetermined significance or follicular lesion of undetermined significance, IV. Follicular neoplasm or suspicious for a follicular neoplasm, V. Suspicious for malignancy, IV. Malignant. Category III,IV,V and VI underwent to histopathological correlation.

FNAC results in this study were diagnostic in 50/60 (83%) of cases, while 10 nodules needed surgical histopathology to detect properly its final nature.

Statistical analysis:

The statistical analysis of data was done by using SPSS program (Statistical package for social science version 26). The risk of malignancy was calculated for all sonographic features as well as TIRADS levels. The accuracy, sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of TIRADS system was calculated.

Results

This study included 60 patients (13 male, 47 female) at Mansoura Oncology Center; with age ranging between 18&70 years old with mean age 41.73±11.52 year. The majority of patients were between age group 31-40 years (43.3%). Right lobe is more affected with thyroid nodules than left lobe and isthmus as 30 patients (50%) presented with right thyroid nodule while 24 patients (40%) presented with left thyroid nodule and 6 patients (10%) presented with isthmus thyroid nodule. Mean size of benign nodules was 15.80±16mm, mean size of malignant nodules was 13.68±15.86mm.

All patients underwent FNAC which was diagnostic in 50 cases and the other 10 cases need excisional biopsy to find out its nature (Table 3). In this study 41 thyroid nodules were benign; 25 nodule were colloid, 5 nodules were follicular adenomas, 5 nodules were hyperplastic nodules, 3 nodules were hemorrhagic thyroid cysts, 2 nodules were lymphocytic thyroiditis and one nodule was hurthle cell adenoma. 19 nodule were malignant; 9 nodules were papillary thyroid carcinomas, 5 nodules were follicular carinomas, 3 nodules were hurthle cell carcinomas, one nodule was medullary thyroid carcinoma and one nodule was anaplastic carcinoma. Figs. (3,4).

The detected thyroid nodules were classified according to ACR TIRADS lexicon into 5 categories: Composition, echogenicity, shape, margin and echogenic foci. In this study we detected 38 solid nodule 16 of them were benign, 11 almost solid nodules one of them was malignant, 9 mixed cystic and solid nodules 2 of them were malignant, one benign cystic nodule and one nodule was spongiform. According to nodular echogenicity we detect one very hypoechoic malignant nodule, 21 hypoechoic nodule 14 of them were malignant, 34 isoechoic nodules 4 of them were malignant, 2 benign anaechoic nodules and 2 benign hyperechoic nodules. Regarding shape we found out 2 taller than wider malignant nodules and 58 wider than taller nodules 17 of them were malignant. According to margin we detect 50 well defined nodules 10 of them were malignant, one benign ill defined nodule, 3 malignant nodules with extra thyroid extension and 6 lobulated or irregular nodules 5 of them were malignant. Regarding echogenic foci, we detect 47 nodule without echogenic foci or with comet tail artifact 9 of them were malignant, 9 nodules with punctate echogenic foci 8 of them were malignant and 4 nodules with macrocalcifications 2 of them were malignant (Table 3).

From previously described classification we allocate score to each nodule according to ACR TIRADS lexicon as follow: 2 nodules with 0 points, 4 nodules with 2 points, 28 nodule with 3 points, 12 nodule with 4 points, one nodule with 5 points, 5 nodules with 6 points, 3 nodules with 7points, one nodule with 8 points, 2 nodules with 9 points, one nodule with 10 points and one nodule with 14 points.

In this study, distribution of thyroid nodules according to ACR TIRADS lexicon was 2 benign TIRADS 1 nodules, 4 benign TIRADS 2 nodules, 27 benign TIRADS 3 nodules and one malignant TIRADS 3 nodule, 10 malignant TIRADS 4 nodule and 8 benign TIRADS 4 nodule and 8 TIRADS 5 malignant nodules (Fig. 5).

Sensitivity, specificity, accuracy, positive and negative predictive values were calculated according malignant pathology for each TIRADS category. Sensitivity is 0% for TR1&TR2 nodules, 5.5% for TR3 nodules, 52.6% for TR4 nodules and 42.1% for TR 5 nodules. Specificity is 95.1% for TR1, 90.2% for TR2, 34.1% for TR3, 80.5% for TR4 and 100% for TR5. Accuracy is 65% for TR1, 61.7 for TR2, 25% for TR3, 71.1% for TR4 and 81.7% for TR 5. Positive predictive value increase gradually from 0% for TIRADS 1&2 to 3.6% for TIRADS 3 then 55.6% for TIRADS 4 then 100% for TIRADS 5% and negative predictive value is 67.2% for TR1, 66.1% for TR2, 43.8% for TR3, 78.6% for TR4 and 78.8% for TR5 (Fig. 6).

Table (2): Analysis of nodular pathology.

Benign nodules (N=41)	No.
Confirmed by FNAC	N=38
Colloid nodules	25
Follicular adenoma	3
Hyperplastic nodules	5
Haemorrhagic thyroid cyst	3
Lymphocytic thyroiditis	1
Hurthle cell adenoma	1
Confirmed by surgical excision histopathology	N=3
Follicular adenoma	2
Lymphocytic thyroiditis	1
Malignant nodules (N=19)	No.
Confirmed by FNAC	N=12
Papillary thyroid carcinoma	7
Follicular thyroid carcinoma	5
Confirmed by surgical excision histopathology	N=7
Anaplastic carcinoma	1
Hurthle cell carcinoma	3
Papillary thyroid carcinoma	2
Medullary thyroid carcinoma	1

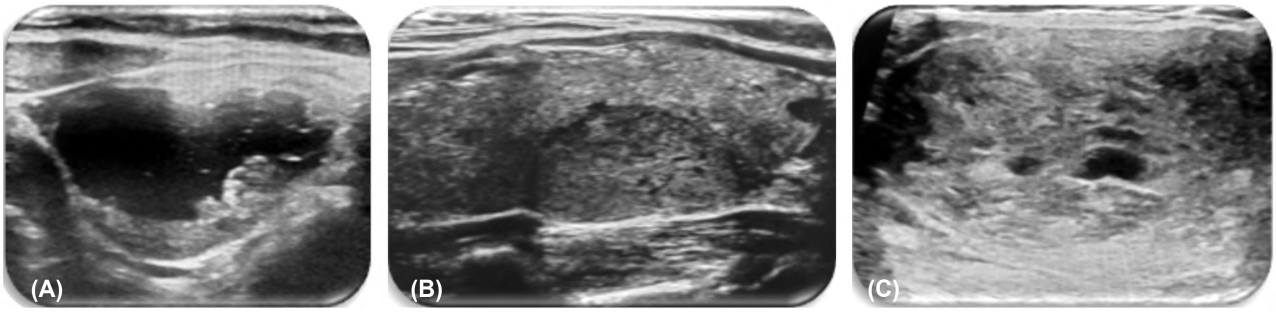

Fig. (3): Nodules confirmed by FNAC (A. Colloid nodule, B. Lymphocytic thyroiditis, C. Hyperplastic nodule).

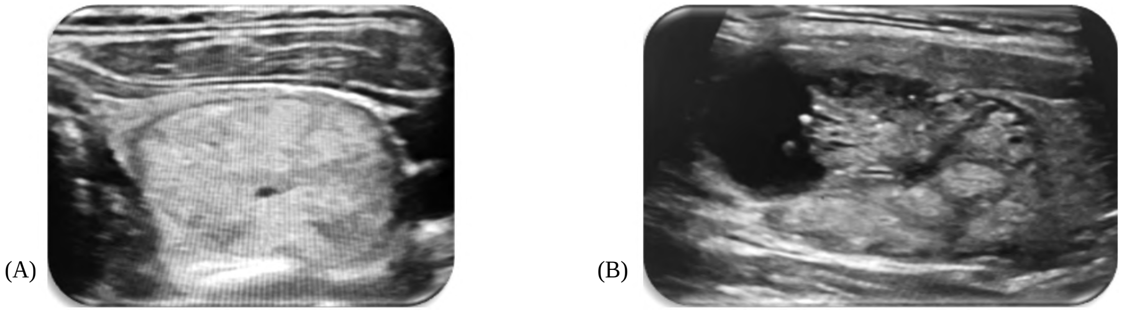

Fig. (4): Nodules confirmed by Histopathology (A. Follicular adenoma and B. Papillary thyroid carcinoma).

Table (3): Characteristic of the nodules according to nature (benign, malignant) and risk of malignancy.

Characteristic	Benign	Malignant	Total	Risk of malignancy
Consistency:				
- Solid	22	16	38	42.1 %
- Almost solid	10	1	11	9.09%
- Mixed solid and cystic	7	2	9	22%
- Cystic	1	0	1	0%
- Spongiform	1	0	1	0%
Echogenicity:				
- Isoechoic	30	4	34	11.8%
- Hypoechoic	7	14	21	66.2%
- Hyperechoic	2	0	2	0%
- Anechoic	2	0	2	0%
- Very hypoechoic	0	1	1	100%
Shape:				
- Taller than wider	0	2	2	100%
- Wider than taller	41	17	58	29.3 %
Echogenic Foci:				
- None or comet tail artifact	38	9	47	19.1%
- Punctuate echogenic foci	1	8	9	88.9%
- Macro calcification	2	2	4	50%
Margins:				
- Well defined	40	10	50	20%
- Ill defined	1	0	1	0%
- Lobulated or Irregular	1	5	6	83.3%
- Extra-thyroid extension	0	3	3	100%

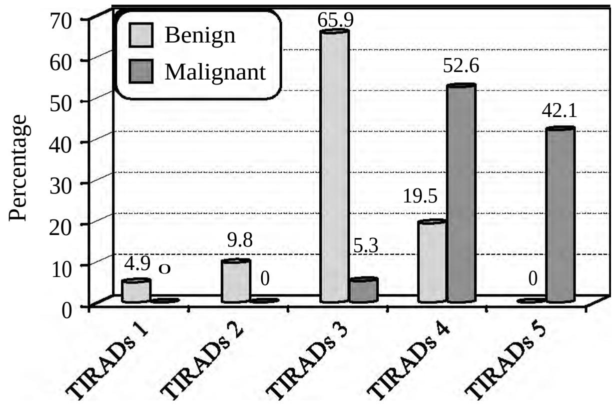

Fig. (5): Correlation between TIRADS and pathology.

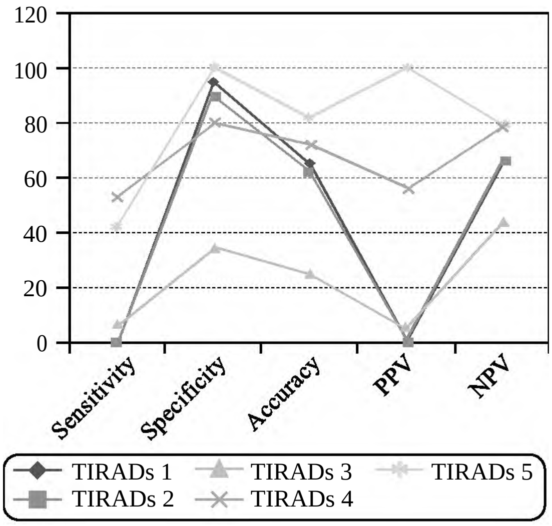

Fig. (6): Predictive ability of TIRADS score to detect the occurrence of malignancy.

Discussion

Thyroid nodules are common entities, which is frequently discovered in clinical practice, either during physical examination or incidentally during various imaging procedures. They are clinically important primarily due to their malignant potentiality.

In this study which was applied on 60 patients with age ranging from 18 to 70 years and mean age was (41 ± 11.52) years. Most of them were noticed in fourth decade of life (43.3%) close to study was done by Majeed Ullah Buzdar et al. [8] that total 58 (45%) patients belonged to age group 20-40 years and 72 (55%) patients belonged to age group 41-60 years.

Prevalence of thyroid nodules in our study was detected more in females; 47/60 (78.3%) more than males 13/60 (21.7%), this gives female to male ratio=3.61:1, which are parallel to findings reported by Germano et al. [9] in which females represent 79%, and males represent (21%) with ratio 3.7:1.

The commonest site for thyroid gland nodular lesion was right lobe 50% followed by left lobe 40% then isthmus 10% similar to study done by Tuladhar et al. [10] revealed that the most common site presenting with thyroid nodule in this study was the right side (57.4%) followed by the left side (35.7%) and isthmus (6.9%).

The ACR TIRADS categorizes the nodules according to their composition, echogenicity, shape, margin and echogenic foci and then adding up the points. The ACR-TIRAD category is according to the points and is categorized as TR1 (0 point - benign), TR2 (2 points - not suspicious), TR3 (3 points - mildly suspicious), TR4 (points 4-6 - moderately suspicious) or TR5 (points more than 7 - highly suspicious) (103).

Middleton et al. [6] assigned points to each nodule for the separate previously mentioned categories, Nodules with different combinations of findings could have the same total number of points and therefore could be assigned the same final TIRADS level. For instance, a solid (2 points) hyperechoic (1 point) smoothly marginated (0 points) nodule with punctate echogenic foci (3 points) and a solid (2 points) mildly hypoechoic (2 points) irregularly marginated (2 points) nodule with no echogenic foci (0 points) would both be allocated 6 points and would be categorized as level TR4. Our study was found that 3.3% for nodules with 0 points, 6.7% with 2 points, 46.7% with 3 points, 20% with 4 points, 1.7% with 5 points, 8.3% with 6 points, 5% with 7 points, 1.7% with 8 points, 3.3% with 9 points, 1.7% with 10 points and 1.7% with 14 points.

Regarding nodular size; Xu et al. [11] found that mean size of benign nodules was 18.68 ± 12.96 mm and mean size of malignant nodules was 13.64±9.03mm. In our study we found that mean size of benign nodules was 15.80 ± 16mm, and mean size of malignant nodules was 13.68 ± 15.86mm.

Fine needle aspiration cytology (FNAC) is considered as an essential tool in providing a rational approach to the clinical management of thyroid nodules and determines the correct surgical procedure when surgery is needed (105).

FNAC results in our study were diagnostic in 50/60 (83%) of cases, while 10 nodules needed surgical histopathology to detect properly its final nature and this result is lower than results detected by Azab et al. [12] study; where FNAC was diagnostic in 26/40 (65%) of cases and rest of cases needed surgical histopathology for final diagnosis.

Our study was conducted on 60 thyroid nodular lesions; 41 (68.3%) out of them were benign and 19 (31.7%) nodule were malignant in comparison done by Sahli et al. [13] study which applied on 133 nodule majority of them had benign nature (103, 77%) and malignant nodules were found in 30 nodules (22.6%).

Regarding benign nodules; out of the 41 nodule, 25 of them were colloid nodules (60%), 5 of them were follicular adenomas (12.2%), 5 of them were hyperplastic nodules (12.2%), 3 of them were haemorrhagic thyroid cysts (7.3%), 2 of them were lymphocytic thyroiditis (4.9%) and one of them was hurthle cell adenoma (2.4%) which were close to Manoj et al. [14] study revealed that the most common benign pathology were benign colloid goitre seen in 60% cases. Follicular adenoma was seen in 12% and thyroiditis in 8% of patients.

Regarding malignant nodules; out of 19 nodule, 9 of them were papillary thyroid carcinomas (47.4%), 5 of them were follicular thyroid carcinomas (26.3%), 3 of them were hurthle cell carcinomas (15.8%), one of them was medullary thyroid carcinoma (5.3%), and one of them was anaplastic carcinoma (5.3%) close to Kumar et al. [15] study which was revealed that most common malignant pathology were papillary thyroid carcinomas (56.2%), followed by follicular thyroid carcinomas (37.5%) followed by anaplastic carcinoma (3.1%) and medullary carcinoma (3.1%).

In present study; risk of malignancy for TR1 was 0/2 (0 %), for TR 2 was 0/4 (0%) and which for TR 3 was 1/27 (3.5%). These findings can cope with study done by Rao et al. [16] as risk of malignancy for TR 1, TR 2 and TR3 were 0%, 0% and 3.6% respectively.

In present study; risk of malignancy for TR 4 was 10/8 (55.5%) and for TR 5 was 8/0 (100%), and these findings were agreed with the study done by Latif et al. [17] in which the risk of malignancy for TR 4 and TR 5 were 56% and 100% respectively.

Grayscale sonographic features of thyroid nodules including composition, echogenicity, shape, margins, and echogenic foci were divided into categories identical to those found in the ACR lexicon [18].

The first feature was composition; we found that 63.3% of nodules were solid, 18.3% were almost solid (<10% solid), 15 % were mixed cystic and solid (<90% cystic and >10% cystic), 1.7% were cystic and 1.7% were spongiform (>50% small cystic spaces).

Solid nodular lesions occupied the highest risk of malignancy 16/38 (42.1%) followed by mixed solid and cystic nodular lesions 2/9 (22%) followed by almost solid nodular lesions 1/11(9.09%) compared to study done by Barbosa et al. [19] which revealed that the risk of malignancy with solid nodules were 47.7% and with mixed solid and cystic lesions were 42.9%. This can be explained by relatively smaller number of cases in our study comparing to Barbosa et al. [19].

Regarding risk of malignancy among cystic and spongiform nodular lesions (0%) each of them. These finding similar to Chakrabartty [20] study in which risk of malignancy among cystic and spongiform nodular lesions was (0%).

The second feature included in analysis was echogenicity; we found that 3.3% of nodules were anechoic, 3.3% of nodules were hyperechoic, 1.7% was very hypoechoic, 35% were hypoechoic and 56.7% were isoechoic.

Risk of malignancy among nodules regarding echogenicity was 100% for hypoechoic nodules, (66.2%) for hypoechoic nodules followed by isoechoic nodules (11.8%) while all of hyperechoic and anaechoic nodular lesions were benign in comparison with study by Xu et al. [11] which found that there is no risk of malignancy among anaechoic nodules while hypoechoic nodules displayed the highest percentage by (56%) followed by hyper echoic nodules (16%) followed by isoechoic nodules (6.2%).

The third feature included in our study was nodular shape; we noticed that 3.3% of nodules had taller than wider orientation while 96.7% of nodules had wider than taller orientation.

Taller than wider nodules (transverse diameter greater than anteroposterior diameter) had a 100% risk of malignancy while wider than taller nodules (anteroposterior diameter greater than transverse diameter) had a (29.3%) risk of malignancy. This corroborated with similar study done by Azab et al. [12] which found that all taller than wider nodules were malignant while wider than taller nodule were carried out (16.2%) risk of malignancy which is lower than percentage mentioned in our study.

The fourth feature was nodular margin; we found that 5% of nodules had extra thyroid extension, 10% had irregular margin, 85% had smooth margin and no nodules detected in our study with ill-defined out line.

All nodules with extra thyroid extension and 83.3% of irregular nodules were malignant, while nodules with smooth margin carried out 20% malignancy risk similar to study conducted by Chakrabartty [20] which was revealed that nodules with smooth margin had a 18.2% risk of malignancy and nodules with extra thyroid extension had a 100% risk of malignancy while nodules with irregular margin had a 66% risk of malignancy which were lower than percentage in our study.

The fifth and last feature was echogenic foci within the lesion; 78.4% of nodules did not reveal echogenic foci, 15% of nodules had punctate echogenic foci, 6.6% of nodules had macrocalcifications and no nodules detected in our study with peripheral rim of calcifications.

We noticed that malignancy risk among nodules with punctate echogenic foci was 88.9% and among nodules with macrocalcifications was (50%) then the lowest malignancy risk was found among nodules without echogenic foci by (19.1%).

Zheng et al. [18] study found that the highest malignant risk was with nodules with punctate echogenic foci by (87.11%) followed by nodules with macrocalcifications by (75.9%) followed by nodules with peripheral rim of calcifications by (57.7%) followed by nodules without calcifications by (13.6%).

Our study confirmed that risk of malignancy increased among nodules which had the following features; solid in composition, hypoechoic in echogenicity, taller than wider orientation, extra thyroid extension, irregular margin and punctate echogenic foci within nodule. Matching findings is reported by Azab et al. [12] that showed that the risk of malignancy is inversely proportional to nodule echogenicity; the more echogenicity, the less possibility of malignancy, Not only Irregular and lobulated margins are suspicious for thyroid malignancy but also nodules with extra thyroid extension, and nodules with taller than wider orientation carried out the highest risk of malignancy.

Middleton et al. [6] found that the risk of malignancy associated with peripheral calcifications, and punctate echogenic foci in solid nodules was 20.2% and 35% respectively.

Based on our study analysis of nodules we found out that sensitivity among raised gradually from TIRADS 1 to TIRADS 5 nodules as follow 0% for TR1, 0% for TR2 , 5.3% for TR 3, 52.6% for TR4 and 42.1 % for TR 5. Specificity among TR1, TR 2, TR 3, TR 4 and TR 5 nodules was 95.1%, 90.2%, and 34.1%, 80.5% and 100% respectively. Accuracy was 65% for TR1 nodules, 61.7% for TR 2 nodules, 25% for TR 3 nodules, 71.7% for TR 4 nodules and 81.7% for TR 5. Positive predictive value for nodules in our study was 0% for TR 1 and TR 2 nodules, 3.6% for TR 3 nodules, 55.6% for TR 4 nodules and 100% for TR5 nodules. Negative predictive value for TR 1 nodules was 67.2%, for TR 2 was 66.1 5, for TR3 was 43.8%, for TR4 was 78.6% and for TR 5 was 78.8%. Combined sensitivity was 20.06%, combined specificity was 81.6%, combined accuracy was 62.2%, combined positive predictive value was 30.2% and combined negative predictive value was 68.8%.

According to the results of Albair Ashamallah et al. [21], sensitivity is 0% TIRADS (1 & 2), 9.1% TIRADS (3), 25% TIRADS (4A), 60% TIRADS (4B), 100% TIRADS (5). Specificity is 59.5% TIRADS (1), 60.5% TIRADS (2), 58.8% TIRADS (3), 65.9% TIRADS (4A), 70% TIRADS (4B), 85.7% TIRADS (5). PPV of malignancy increased from 0% for TIRADS type 1 & type 2 to 6.7% for TIRADS type 3 & type 4A to 20% for TIRADS type 4B to reach 67% for TIRADS type 5. NPV increased was 73.3% for TI-RADS 1, 76.6% for TI-RADS 2, 66.7% for TI-RADS 3, 90% for TI-RADS 4A, 93.3% for TI-RADS 4B and 100% for TI-RADS 5.

Conclusions:

- The ACR TIRADS risk-stratification system is non invasive, easy to use method for assessing thyroid nodules.
- 2017 ACR TIRADS generates a numeric scoring of features, designate categories of relative probability of benignity or malignancy, and provide management recommendations, aiming to reduce unnecessary biopsies and excessive surveillance.

Recommendations:

- Diagnostic thyroid US should be performed in all patients with a suspected thyroid nodule, nodular goitre, or incidentally detected thyroid nodule by neck us or any other neck imaging study.
- Measurements of nodule recorded in 3 dimensions (anteroposterior, transverse, and longitudinal planes). Then categories it according to ACR TIRADS lexicon.
- FNAC should be performed to suspicious thyroid nodules only according to ACR TIRADS classification.

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دراسة الجدوى التشخيصية للموجات الفوق صوتية
فى توصيف درنات الغدة الدرقية
باستخدام نظام تقارير وبيانات تصوير الغدة الدرقية

تعتبر عقيدات الغدة الدرقية من الأمراض الشائعة بين المرضى، وتعرف بأنها تورمات منفصلة داخل الغدة الدرقية على الرغم من أن معظم العقيدات حميدة ولا تسبب أى أعراض للمريض إلا أن بعضها يحمل صفات خبيثة لا يمكن تجاهلها.

تعد الموجات فوق الصوتية هى الطريقة الأفضل لإكتشاف عقيدات الغدة الدرقية نظراً لسهولة فحصها بسبب قربها من سطح الجلد لسوء الحظ لا توجد خاصية تصوير واحدة تكفى للتمييز بين بؤر الغدة الدرقية الحميدة والخبيثة، ولكن مجموع هذه الخواص سوياً يمكن أن يساعد فى تحديد البؤر ذات الخطورة العالية للإصابة بالأورام الخبيثة.

خزعة الإبر الدقيقة هى واحدة من أكثر التقنيات دقة لتقييم عقيدات الغدة الدرقية. بل وإنها تعتبر الدعامة الأساسية للتمييز بين العقيدات الحميدة والخبيثة فى معظم الحالات. ويتم إجراؤها متسخدمين الموجات فوق لاصوتية لتحديد مكان العقدة محل الفحص وإجراء خزعة منها ثم إجراء التحليل النسيجى لها.

تستخدم الجمعية الأمريكية للأشعة نظام تصوير الغدة الدرقية وإعداد البيانات كمصدر موحد لتقييم آفات الغدة الدرقية ويتحقق ذلك من خلال إعطاء نقاط لكل سمة عقيدية ويهدف ذلك للكشف عن العقيدات التى يحتمل أن تكون خبيثة وبذلك تقل نسبة حدوث الخزعات غير الضرورية.

اشتملت دراستنا على ٦٠ مريضاً معظمهم من الإناث (٤٧) مريضة و (١٣) ذكر بمتوسط عمر ٤١±١١.٥٢ عاماً، خضعت جميع الحالات لخزعة الإبرة الدقيقة وكانت نتائج الخزع دقيقة فى ٥٠ حالة من أصل وفقاً لنظام تقرير العينة للغدة الدرقية المعروف بإسم نظام بيثيسدا. فى حين تم التوصل للتشخيص النهائى لبقية الحالات من خلال تحليل الأنسجة بعد التدخل الجراحى.

تم تصنيف جميع العقيدات الدرقية وفقاً لنظام التصوير الطبى والتقارير المعتمدة على البيانات الموحدة الصادر عن الجمعية الأمريكية للأشعة فى تصوير الغدة الدرقية كالأتى : فيما يتعلق بالمحتوى وجد أن ٤٢٪ من العقيدات ذات المحتوى الصلب خبيثة، أما بالنسبة للصدى وجد أن ٦٨.٢٪ من العقيدات قليلة الصدى بشكل ملحوظ كانت خبيثة، أما عن الحواف فقد وجد أن كل العقيدات التى لها إمتداد خارجى خبيثة وأيضاً كل العقيدات ذات التمدد الطولى خبيثة، و ٨٨.٩٪ من العقيدات التى تحتوى على جزيئات كالسيو م صغيرة خبيثة.

تم تصنيف ٦٠ حالة بإستخدام نظام التصوير الطبى والتقارير المعتمدة على البيانات الموحدة الصادر عن الجمعية الأمريكية للأشعة فى تصوير الغدة الدرقية كالأتى : عقدتين حميدتين فى الفئة الأولى، ٤ عقد حميدة فى الفئة الثانية، ٢٨ عقدة حميدة وعقدة خبيثة فى الفئة الثالثة، و ١٠ عقد خبيثة و ٨ عقد حميدة فى الفئة الرابعة و ٨ عقد خبيثة فى الفئة الخامسة.

طبقاً للدراسة الحالية، كانت معظم بؤر الغدة الدرقية حميدة وذلك بنسبة وصلت إلى ٦٨.٣٪ وجاءت العقيدات الغروية على رأس البور الحميدة بنسبة ٦٠.٩٪. بينما احتلت العقيدات الحليمية المرتبة الأولى بين البؤر الخبيثة بنسبة وصلت إلى ٤٧.٤٪.

ولقد كشفت دراستنا عن إرتفاع القيمة التنبؤية الإيجابية للورم الخبيث تدريجياً من ٠٪ للفئة الأولى والثانية إلى ٣.٦٪ للفئة الثالثة إلى ٥٥.٦٪ للفئة الرابعة و ١٠٠٪ للفئة الخامسة.

\الخلاصة : يعتبر نظام التصوير الطبى والتقارير المعتمدة على البيانات الموحدة الصادر عن الجمعية الأمريكية لأشعة نظام سهل الإستخدام وقابل للتطبيق لتقييم عقيدات الغدة الدرقية.

ولقد قدم نظام التصوير الطبى والتقارير المعتمدة على البيانات الموحدة وصفاً كمياً لسمات عقيدات الغدة الدرقية يعتمد على النقاط ويعين بدوره فئات الإحتمال النسبى للعقيدات الحميدة والعقيدات الخبيثة. وذلك بهدف تقليل كمية الخزعات غير الضرورية.