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General Surgery

A STUDY COMPARING THE CLINICAL SONOLOGICAL AND PATHOLOGICAL FEATURES IN A CLINICALLY DIAGNOSED STN

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ABSTRACT **Aims And Objectives Of Study**-This study is done to access the accuracy of diagnostic modalities in clinically diagnosed solitary thyroid nodule, to determine the reliability of ultrasound in differentiating benign and malignant conditions there by to reduce unnecessary FNAC and unnecessary surgery. **Methods**-It is a prospective analytical study done of 50 patients with clinically diagnosed STN presented to surgical out patient in June 2021- June 2022. After taking consent they were evaluated with ultrasound of neck, FNAC followed by surgery and HPE of the specimen. The study includes males and females of age 18-65 years with a clinically palpable solitary thyroid swelling. It excludes patients with age <18 and >65 years or with clinical diffuse or multinodular goiter. **Results-** Out of 50 patients, 44 were females and 6 were males, leading to female preponderance. Our study is relevant to other studies, with male to female ratio of 1:7.3. With mean age of 42. 82 ± 13.74 years, with mean age of 49 years and 43.09 years in malignant and benign groups. **Conclusion-** TIRADS has been used to stratify the solitary thyroid nodules based on the ultrasound features. Only indeterminate nodules should undergo FNAC. By using ACR- TIRADS one can prevent unnecessary FNAC for benign thyroid nodules. By using this 50% of the patients can be prevented from aggressive workup and invasive procedures.

KEYWORDS : STN, TIRADS, FNAC, HPE (histopathological examination), quadruple assessment.

INTRODUCTION

Thyroid diseases with prevalence of 4-7% remain a common clinical problem [1], thyroid nodules continue to be a common endocrine disease. Thyroid disease incidence has increased in recent years due to change in life style and goitrogens. They usually present with swellings, toxicity signs and/or pressure symptoms. Various pathologies afflict thyroid gland ranging from benign thyroid enlargement (goiter) to thyroid nodules, thyroiditis and malignancies [2]. Thyroid nodules have a incidence of 2-6% on clinical examination, 19 to 68 % with ultrasound (US), and it is 8-65 % in autopsy specimens [3, 4]. Most prevalent are the benign goiters seen in 8.5% Indian population. The majority of nodules don't require any kind of surgical procedure and don't require any significant amount of workup. The importance of the single thyroid nodule is that, when compared with other thyroid nodules, the risk of neoplasia is rather high. 15 % of STN happen to be malignant. No clinical or radiological or cytological parameters have singularly shown significant impact on clinical practice, histopathological examination post-operatively remains the gold standard diagnosis of malignancy [5].

OBJECTIVE:

This study is done to access the accuracy of diagnostic modalities in clinically diagnosed solitary thyroid nodule, to determine the reliability of ultrasound in differentiating benign and malignant conditions there by to reduce unnecessary FNAC and unnecessary surgery.

MATERIALS AND METHODS:

This study was a prospective analytical study done in department of general surgery in our hospital during the period of June 2021 to June 2022. Patients presenting to surgical OPD with complaints of a neck swelling in the midline were examined and a total of 50 patients with clinically diagnosed STN were included in the study. After taking consent they were evaluated with ultrasound of neck, fine needle aspiration cytology followed by surgery and histopathological examination of the specimen.

Inclusion Criteria:

The study includes both males and females of age between 18-65 years with a clinically palpable solitary thyroid swelling.

Exclusion Criteria:

The study excludes patients with age <18 and >65 years or with clinical diffuse or multinodular goiter.

RESULTS:

Out of 50 patients, 44 were females and 6 were males, leading to female preponderance. Our study is relevant to other studies, with male to female ratio of 1:7.3. Female to male ratio in malignant predisposition is 4:1. With mean age of 42. 82 ± 13.74 years, with mean age of 49 years and 43.09 years in malignant and benign groups. Out of 31 solitary thyroid nodules seen in right lobe, 28 were benign 3 turned out malignant. Out of 19 left sided solitary thyroid nodules, 17 were benign 2 turned out malignant.

Tirads

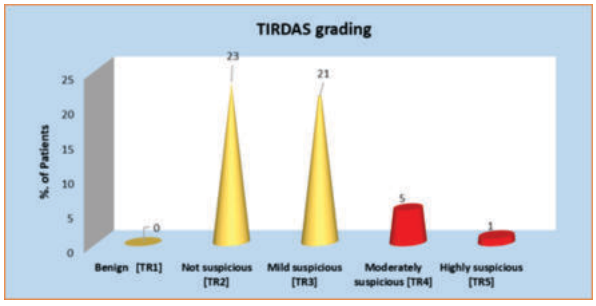

Chart – 1:

Out of 50 patients**,** 39 patients were found to have both cystic and solid components, of which 2 turned out to be malignant lesions, rest were benign lesions. 11 patients having solid components with malignancy picture in 3 cases. 12 patients showed anechoic picture on ultrasound, while no one had very hypoechoic features. Highest percentage, 33 of the study population had hyper or isoechoic features. Only 5 had hypoechoic features, of them 2 were having malignant picture, while three had benign picture. 3 patients showed taller than wider which turned out to be malignant. 2 patients not having taller than wider lesions were diagnosed to have malignancy. One patient had irregular margins, one had extra thyroidal extension on ultrasound.

Of 50 patients, on evaluation using TIRADS grading, none were given TR1, 46% were given as TR2, 42% had been given TR3, and 10% had moderately suspicious features (TR4) while 2% had highly suspicious features with TR5 grading.

Fine Needle Aspiration Cytology:

Of the 50 cases, 36 of them were reported as benign using BETHESDA grading system, 3 was reported non diagnostic and 3 were reported as AUS. 2 were reported to have suspicious features of follicular

neoplasm. 3 patients were having suspicious for papillary carcinoma, of them one patient had follicular variant of PCT and other 3 were reported as papillary carcinoma.

Of the 50 cases observed, in 44 cases that are having benign features on US (TR2 and TR3), 43 were proved to be benign while 1 case turned out to be malignant on FNAC. Of the 6 cases that are having malignant features (TR4, TR5), 5 proved as malignancy while 1 proved to be benign on FNAC. According to above findings TI-RADS is having sensitivity of approximately 83% and Specificity of 97% with diagnostic accuracy of 96%. It has positive predictive value of approximately 83% and negative predictive value of approximately 97 % when compared with FNAC.

Table No 1: Comparison of TIRADS with BETHESDA

	BETHESDA GRADE					
	I	II	III	IV	V	VI
TR2	2	19	1	1	0	0
TR3	1	17	2	0	0	1
TR4	0	0	0	1	3	1
TR5	0	0	0	0	0	1

According to above findings, TI-RADS is having sensitivity and specificity of approximately 80% and 95.5% respectively with diagnostic accuracy of 94%. It has positive predictive value of 66% and negative predictive value of 97% when compared with HPE. Chi-square test is performed to compare TIRADS with HPE showing significant p value of 0.00001, showing strong association between TIRADS and HPE.

DISCUSSION:

With the help of quadruple assessment method, which includes a proper history and clinical examination, thyroid US and US guided FNAC based on TIRADS along with thyroid function tests, a significant clinic-pathological correlation will help us determine the likelihood of malignancy and, as a result, will influence how we should treat thyroid lesions.

Although FNAC is less invasive treatment, it is helpful and affordable method for thyroid cancer detection. It is crucial to choose cases based on their likelihood of developing cancer because performing such test on all thyroid nodules is not practical nor prudent. With an effort to aid in this choice, a number of classifications based on sonographic properties have been put out recently. Of all the methods, the ACR-TIRADS categorization is the most straightforward and similar to the BIRADS system, which has been around for a long time and is known to the majority of radiologists.

In our present study, peak incidence was noted in 4th and 5th decade. 44 were females and 6 were males with a female to male ratio of 7.3:1. With mean age of 42.82 ± 13.74.

In a study conducted by **Allen S Jabar et al** [6] that included 127 patients, 110 were females and 17 were males. Male to female ratio of 1:6.4, making our study comparably relevant to this study.

In a study conducted by **Periakaruppan et al** [7] that included 184 patients, 156 were females and 28 were males. Male to female ratio is of 1:5.7 which is in comparable range of our study.

When our study was compared with outcomes of **Abdelkader et al**, our study showed increased sensitivity and specificity with 80% and 95.5% respectively, while it had 76.9% and 91.3%. But had decreased positive predictive value (66% verses 71.4%) while negative predictive value remains higher (97% versus 76.4%).

While comparing the results with **kwak et al** study [8], our study showed decreased sensitivity (60% versus 92.7%) but specificity proved to be more (82.2% versus 41.7%) with diagnostic accuracy of 80% in diagnosing malignant lesions in thyroid based on composition of the nodule.

When comparing our study with **kwak et al**, our study showed decreased sensitivity (40% versus 61.4%) but increased specificity(93.33% versus 63.2%) with diagnostic accuracy of 97.7% in detecting the malignant lesions based on echogenicity of nodule. Both studies had low positive predictive values of 40 % and 24.9% respectively.

When comparing the results with **kwak et al** study, our study showed comparable sensitivity and specificity with (40% versus 33%) and (100% versus 98.9%) respectively. Our study showed diagnostic accuracy of 94% based on margins of thyroid nodule.

On comparison with kwak et al study, our study showed comparable results with sensitivity (60% versus 51.2%) and specificity (100% versus 95.8%) based on shape of the nodule. Present study showed diagnostic accuracy of 96%.

As the sensitivity of the individual characteristics seem to be low, hence no single risk feature is used for differentiating benign from malignant lesions. Collectively they have the diagnostic accuracy in differentiating the both.

Our study showed risk of malignancy of approximately 0%, 4%, 60% and 100% in TR2, TR3, TR4 and TR5, which is relative with kwak et al study showing 0%, 1.7%, 3.3%, 9.2%, 44.4–72.4%, and 87.5% in TR2, TR3, TR4a, TR4b, TR4c and TR5 respectively.

When comparing the FNAC results with other studies like **chandanwale et al**[9] study showed sensitivity and specificity of 90% and 100% with diagnostic accuracy of 87.55. While current study done by us showed 100% sensitivity and specificity of 97.7%. Our study showed a diagnostic accuracy of 98%.

FNAC being the accurate investigation in identifying malignant lesions has positive predictive value of 83.3% and negative predictive value of 100% in our study which are relative to other studies.

Table No 2: Comparison of our study with other

	Kwak et al		Our study	
Characteristics feature	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
Solid	92.7	41.7	60	82.2
Hypoechoic	61.4	63.2	40	93.3
Taller than wide	51.2	95.87	60	100
Margins	33	98.9	40	100
Microcalcifications	40.3	96.3	-	-

CONCLUSION:

Our study concludes that by using ACR-TIRADS classification, positive predictive value for benign nodule is high for not suspicious lesions (TR2). High scores of TIRADS and BETHESDA grade are shown to have higher risk of malignancy rate. Comparison between the ACR-TIRADS scoring system with BETHESDA grades has shown high correspondence with final histopathological report. Though FNAC is a safe and simple procedure but it is invasive test when compared to Ultrasound. Hence TIRADS has been used to stratify the solitary thyroid nodules based on the ultrasound features. Only lesions that are having suspicion of malignancy and indeterminate nodules should undergo FNAC. By using ACR- TIRADS one can prevent unnecessary FNAC for benign thyroid nodules. By using this approximately 50% of the patients can be prevented from aggressive workup and invasive procedures like FNAC and surgery in our study.

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