



Accuracy of Tirads Classification System in the Risk Stratification of Thyroid Swellings

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I. INTRODUCTION

- Swellings of thyroid are frequently encountered. Clinical evaluation helps in early diagnosis but it is difficult to distinguish early malignant lesions from the most prevalent benign goiters.
- Various diagnostic modalities are available to distinguish between benign from malignant thyroid nodules.
- Ultrasound forms an integral component in the evaluation of thyroid swellings.
- Thyroid Imaging Recording And Data System [TIRADS] is a scoring system which classifies thyroid nodules into 6 classes, based on certain sonographic features and thus help differentiate benign from malignant based on ultrasound characteristics.
- Cytological and histopathological examination still remains the gold standard.
- This study aims to assess the accuracy of TIRADS classification in the evaluation of thyroid swellings by comparing with cytological examination reports.

TESTS OF THYROID

- SERUM T3, T4, TSH
- THYROID ANTIBODIES
- ULTRASOUND:

It is helpful to distinguish between solid and cystic lesions in thyroid nodules. It also provides information about size and multicentricity.

It also provides information about size and multicentricity, to assess lymph node status and for guided FNAC, especially B-mode that can be used preoperatively and intraoperatively.

OPTIONAL

- A) Chest radiography and thoracic inlet to rule

out deviation of trachea and retrosternal extension

- B) CT / MRI are rarely indicated
- C) Isotope scan if discrete swelling and toxicity co-exist.

FNAC and HPE of THYROID LESIONS

1. Low cellular smears are benign and high cellular smears are suspicious.
2. Degenerative changes and old haemorrhages are seen as histiocytes, which are seen as large cells with peripherally pushed pyknotic nuclei and cloudy cytoplasm, with many vacuoles and granules of degraded undigested material.
3. Hurtle cells look longer than follicular cells, with well defined cellular borders, granular cytoplasm and moderate to large nuclei.
4. Inflammations and malignancy can be ruled out

FNAC

- ACCURACY OF FNAC
- (According to the study of Orrel SR et al)
- Colloid goiter (simple nodular) – 96%
- Hashimoto's thyroiditis – 90 to 95%
- Papillary carcinoma of thyroid – 60 to 90%
- Follicular carcinoma of thyroid – 70%
- Grave's / Plummer's disease – variable (needs clinical and biochemical correlation).

TIRADS CLASSIFICATION

- Thyroid Imaging and Reporting System (TIRADS) was proposed similar to BIRADS classification. It was proposed by Howarth.
- The classification is used to differentiate thyroid swellings into benign or malignant without invasive procedures, based on ultrasound evaluation of thyroid using suspicious Sonographic features.



TIRADS	Interpretation
1	Normal thyroid gland
2	Benign lesion
3	Probably benign lesion
4 a,b,c	Suspicious of malignancy
5	Probably malignant (>80% risk)
6	Biopsy proven malignancy

SUSPICIOUS SONOLOGICAL FACTORS

1. Solid components
2. Hypoechogenicity
3. Microcalcification
4. Taller than wider
5. Irregular margins

TIRADS 1

- Normal thyroid gland with no features of nodularity or enlargement of thyroid.
- #### TIRADS 2
- Thyroid nodule without suspicious sonographic features but, iso / hyperechoic, vascular, expansile and capsulated.

TIRADS 3

- Thyroid nodule without suspicious sonographic features but heteroechoic, and partially formed capsule and peripheral vascularization.

TIRADS 4

- TIRADS 4a - one of the suspicious sonographic features.
 - TIRADS 4b - two suspicious sonographic features.
 - TIRADS 4c - three / four suspicious sonographic features.
- #### TIRADS 5
- All of the suspicious sonographic features.

TIRADS 6

- Biopsy proven malignancy.

PURPOSE OF THE STUDY

- To assess the accuracy of TIRADS classification in the risk stratification of thyroid

swellings.

- To determine the role of ultrasound in the diagnosis and management of thyroid disorders.
- To distinguish between the malignant and benign solitary nodule.

MATERIALS AND METHODS

- An observational study was carried out on 10 patients with palpable thyroid swellings for a period of 6 months from Jan 1st 2021 to June 30th 2021.
- Conducted at department of general surgery, pratima institute of medical sciences
- **Inclusion criteria:** All patients who came to surgery OPD and emergency department with palpable thyroid swelling
- **Exclusion criteria :** Patients below 12 yrs of age, not willing for FNAC and lost for follow up.

PROCEDURE

- Patients with goiter were evaluated clinically. Relevant aspects of patient's history including age, sex, rapidity of growth, recent onset of hoarseness, dysphagia, dyspnoea, symptoms of hypo or hyperthyroidism, history of head and neck irradiation, family history of endocrine diseases were included.
- Physical examination to determine whether the gland was diffusely enlarged, solitary, nodular or multinodular with symmetric or asymmetric enlargement was done.
- In nodular swelling, the size, shape, consistency, location and mobility was assessed. The patient was also examined for the



presence of cervical lymphadenopathy.

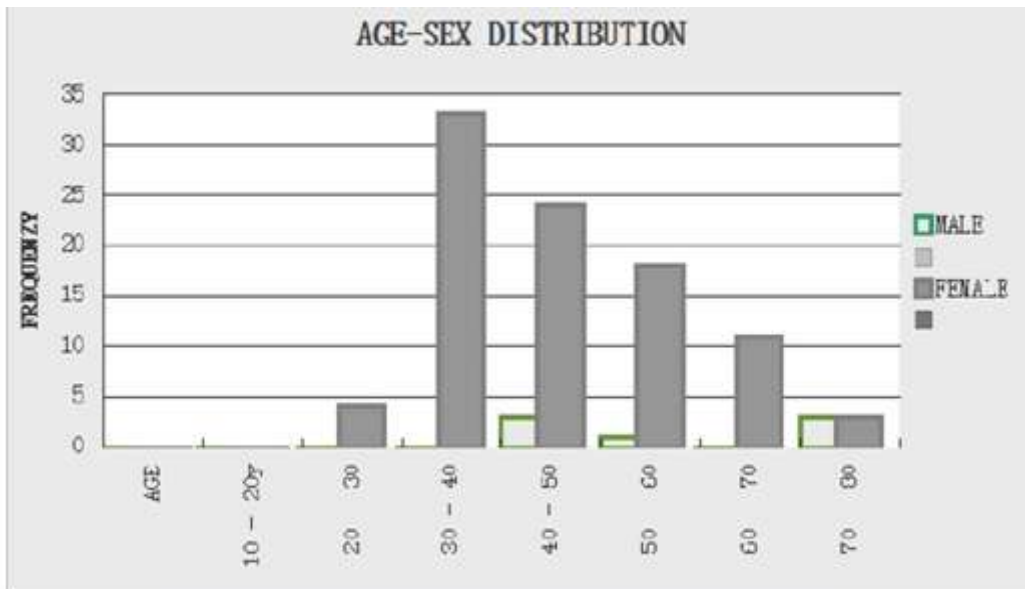
- A thyroid function test and an ultrasound were performed using a 7.5 MHZ high frequency linear array transducer. FNAC was carried out in the Department of Pathology, Pratima institute of medical sciences.
- The ultrasound findings were classified into various classes of TIRADS and the same compared with FNAC diagnosis.

II. RESULTS

- The results of the 10 patients studied with their FNAC and TIRADS classification are as follows:

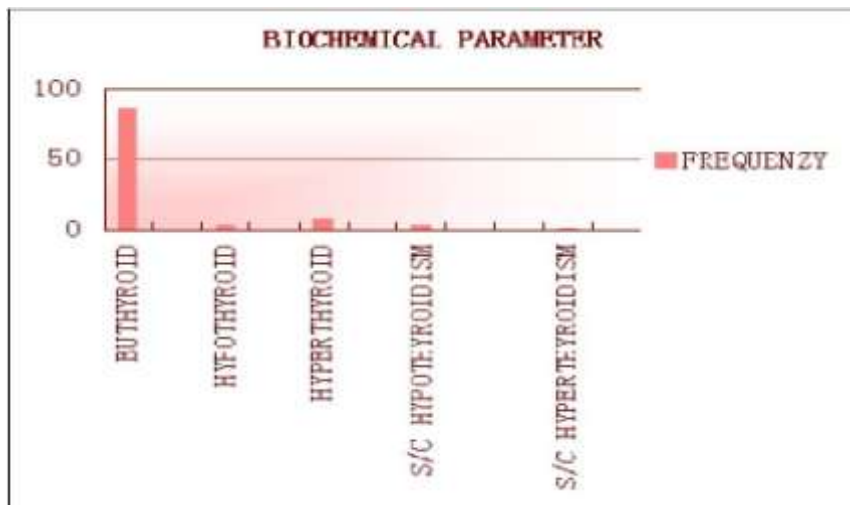
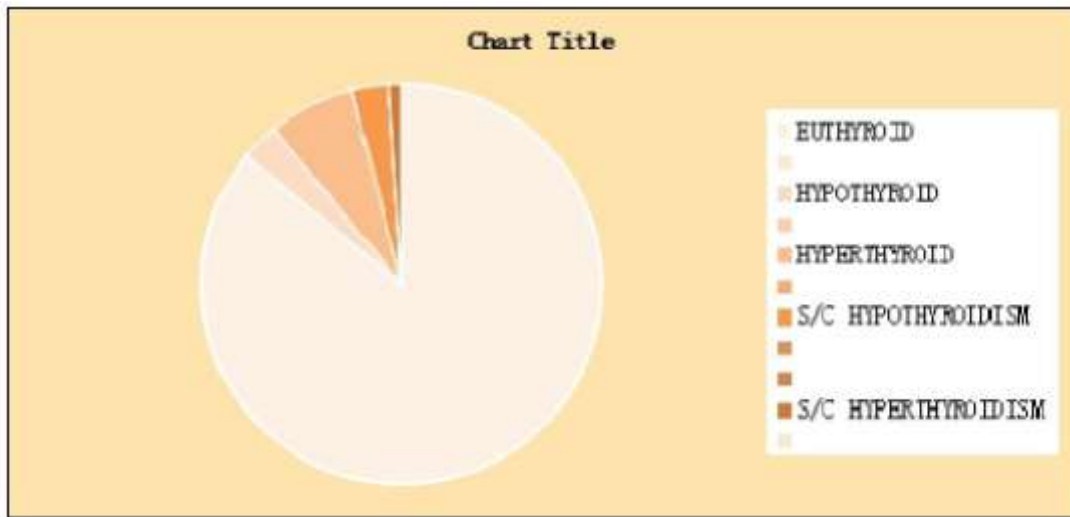
- Age and Sex distribution

Majority of the patients were in the fourth and fifth decade of life with a female predominance in all age groups. The female to male ratio in our study was found to be 13.2 :1. But above 70 years we had equal number of male and female patients.

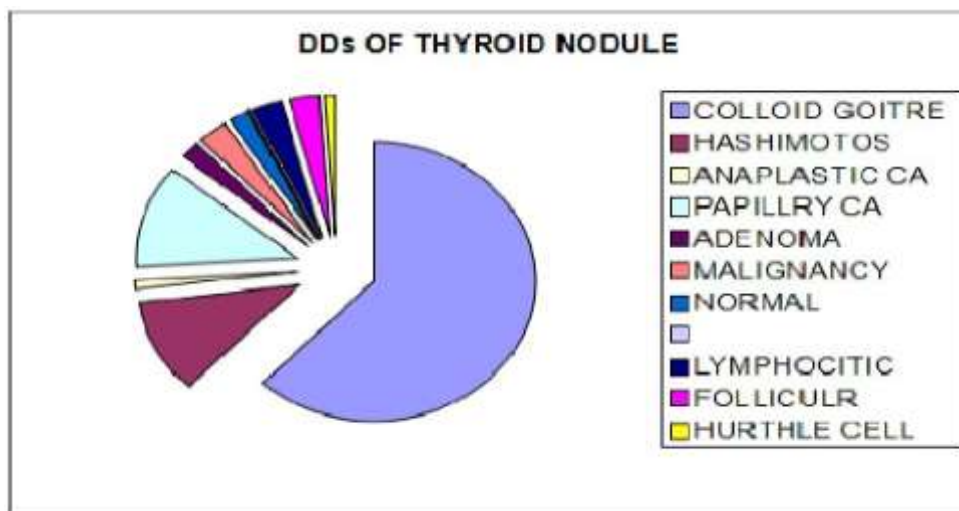




Biochemical parameters:

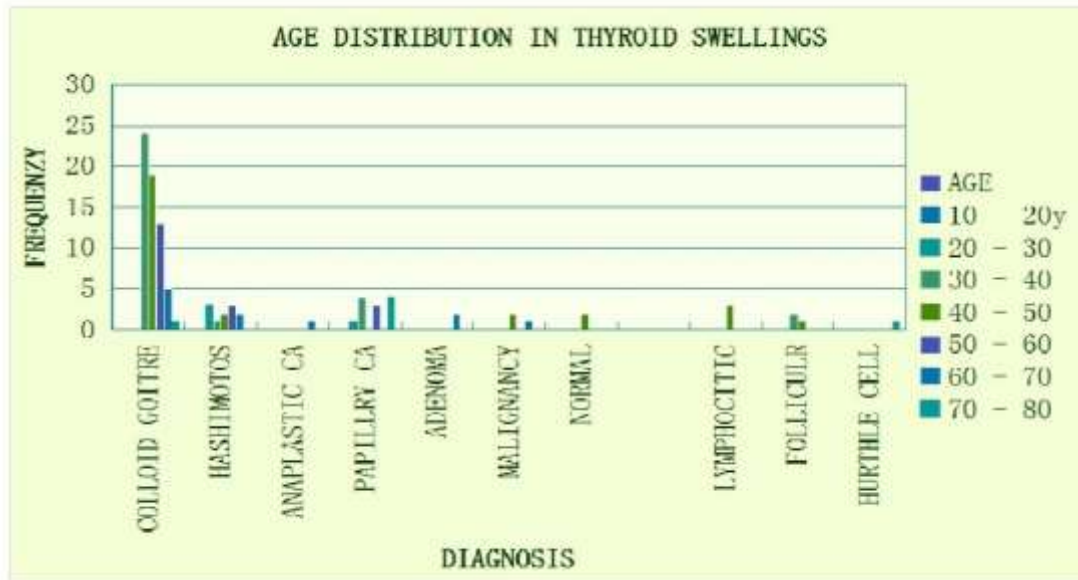


DDs of thyroid nodule

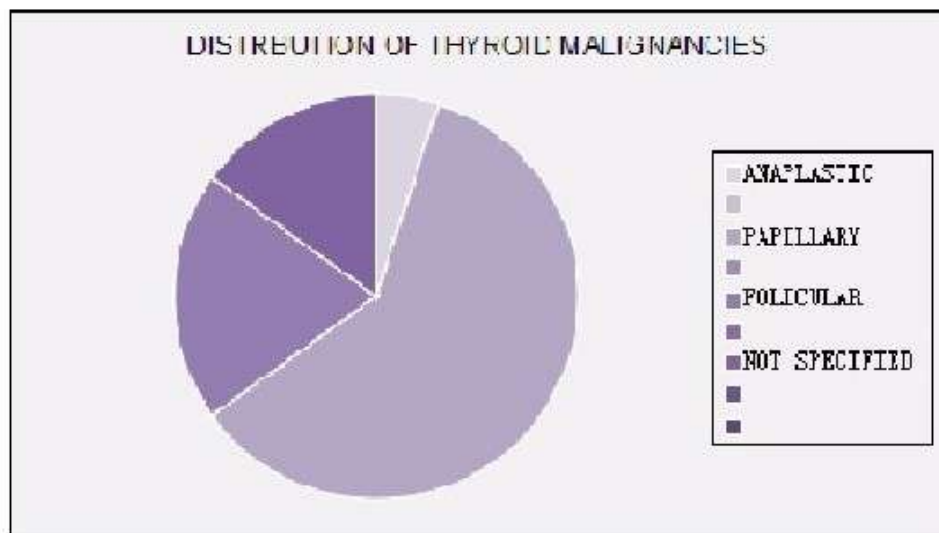


DDs OF THYROID NODULE

Benign disorders mainly affected 4th and 5th decades of life but for malignancy there we found an increased incidence in the fourth decade and also above 65 years. Of all the malignancies papillary carcinoma constitutes 60%, follicular neoplasm 20%, not specified malignancy 15% and anaplastic carcinoma 5%

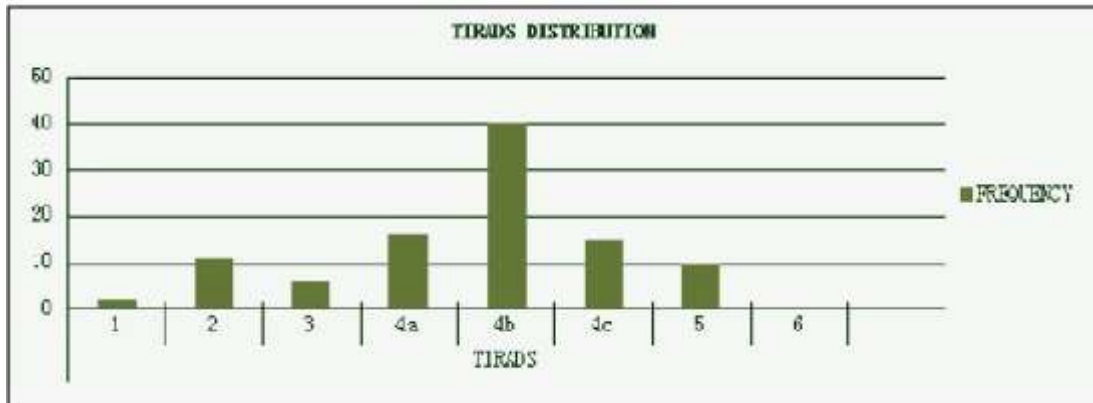


DISTRIBUTION OF THYROID MALIGNANCIES:



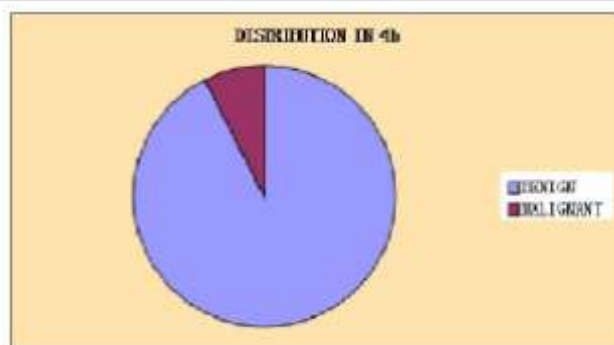
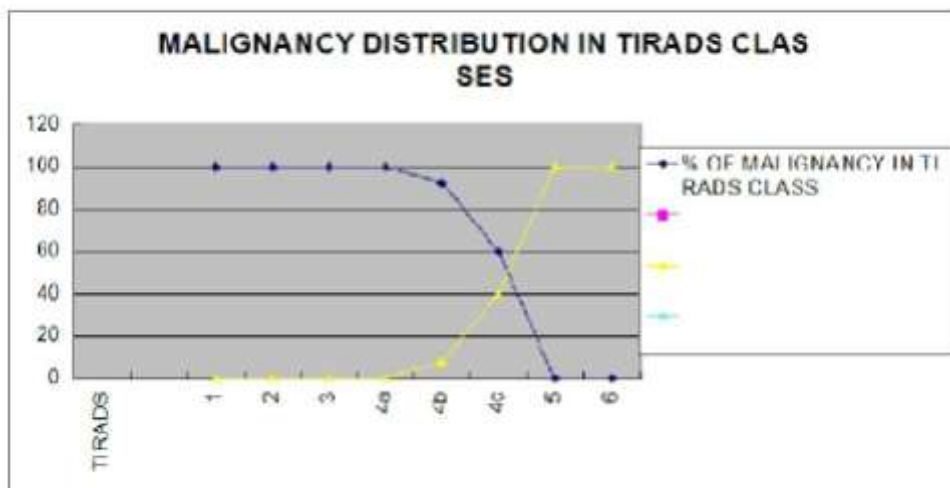


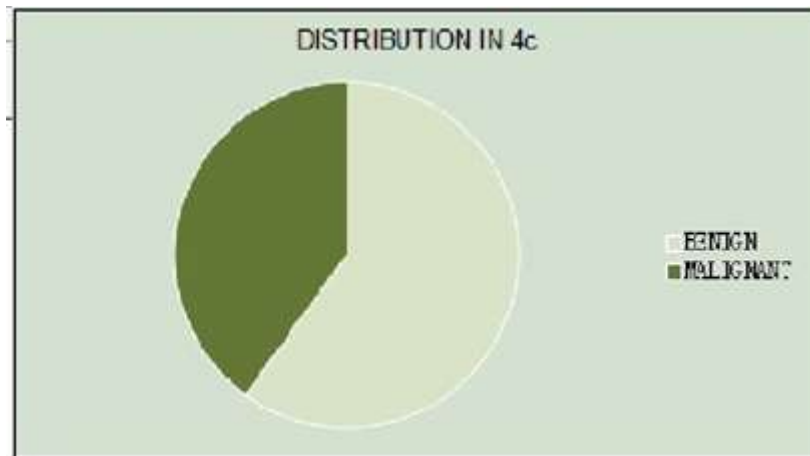
TIRADS DISTRIBUTION



TIRADS 1 - 2%
TIRADS 2 - 11%
TIRADS 3 - 3-6%
TIRADS 4 - 4-71%
TIRADS 5 - 5-10%

MALIGNANCY DISTRIBUTION IN TIRADS CLASSIFICATION





III. DISCUSSION

- Thyroid swellings were seen to affect mainly females within the age group of 30-40 years in the above series. Female to male ratio was found to be 13.2:1. 20% of the cases were found to have malignancy, of which papillary carcinoma accounted for 60%, follicular neoplasm 20%, not specified malignancy 15% and anaplastic carcinoma 5%.
- When classified into TIRADS, majority of them fell into TIRADS 4 (71%). TIRADS 4b showed incidence of malignancy of 7.5%, TIRADS 4c - 66.7%, TIRADS 5 - 100%. Study by Horvath et al showed malignancy rate in TIRADS 3 - <5%; TIRADS 4a- 5-10%; TIRADS4b - 10-80%; TIRADS 4c - >80%.
- The suspicious sonographic features were evaluated. Solid components and hypoechogenicity were found to be maximum sensitive but less specific.
- Sensitivity, specificity, positive predictive value, negative predictive value were found to be maximum for irregular margins.

IV. CONCLUSION

1. Ultrasound thyroid plays a major role in the evaluation of thyroid swellings as it provides suspicious sonographic features to classify patient into high risk. Further when ultrasound guided FNAC is used, it enhances the diagnostic outcome
2. TIRADS classification can standardise the ultrasound findings so as to select at risk patients requiring detailed evaluation.
3. TIRADS 4b included maximum cases with 7.5% malignant chances. TIRADS 4c showed 66.7% malignancy and TIRADS 5 showed 100% malignancy.
4. The significance of various sonographic features studied showed irregular margin as

most accurate feature suggestive of malignancy. Taller than wider and microcalcifications also have high chance of malignancy when compared to solid components and hypoechogenicity

5. Ultrasound is simple, safe, quick and non invasive. It should be exploited to its maximum benefit for all thyroid swellings.