

DIAGNOSTIC MODALITIES FOR PATIENT WITH THYROID NODULE IN A RURAL SETUP

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ABSTRACT:

INTRODUCTION: Thyroid nodules are a common endocrine disease whose prevalence in India is approximately 12.2%. Thyroid nodules are typically found on physical examination or incidentally when other imaging studies are performed. Malignant or symptomatic nodules that compress nearby structures warrant surgical excision. Yet, the majority of thyroid nodules are asymptomatic and benign, so the thyroid surgeon must rely on diagnostic studies to determine when surgery is indicated. Ultrasound is currently the preferred imaging modality for thyroid nodules.

Method: It was an observational study carried out on 48 patients of thyroid swellings admitted and were willing for intervention at a rural medical setup during October 2019 to September 2021. All patients were examined clinically after taking detailed history, age, sex, thorough clinical examination and the data was recorded. They were investigated with clinical, radiological (USG) and pathological (FNAC) parameters Intra operative surgical notes were recorded post-operative histopathology reports of the specimen were noted.

Results: Thyroid disorders are more common in females rather than males with a male: female ratio of 1:11. The commonest presenting complaint is neck swelling (100%) followed by dysphagia (4.17%). Lymph nodes were seen in 6.25%. Most common diagnosis on ultra sonography was multinodular goiter (31.25%). Sensitivity of USG in diagnosing malignant thyroid lesion is 92.11% and specificity of USG is 50%.

Conclusion: A careful physical examination along with relevant investigations like fine-needle aspiration cytology (FNAC) and ultra sonography (USG) are most helpful to reach an exact diagnosis and plan of management accordingly.

INTRODUCTION:

It is estimated that 140 million people currently reside in areas of the nation ,where GOITER is endemic. [1] Physiological GOITER, drug-induced GOITER, dysmorphogenetic goiter, goitrogens, genetic and growth factors, hereditary, etc. are some more causes of goiter. In cases of thyroid swellings, a clinical examination is typically reliable. The gold standard in the initial diagnosis of thyroid swellings is fine needle aspiration cytology. The primary goal of fine needle aspiration cytology (FNAC) of the thyroid gland is to confirm benign abnormalities and so prevent needless surgery. [2] Imaging has been proven to be a crucial component in the investigation of thyroid lesions that are clinically suspected. The method of choice for the initial characterization of a thyroid nodule is ultrasonography (US).[3] Treatment for various thyroid diseases, ranging from benign to malignant, typically involves thyroidectomy. With the use of technology breakthroughs, remote access surgical techniques are being created with the goal of concealing the scar. [4] These methods may be robotic or endoscopic. Easy to use, generally accessible, free of ionizing radiation, and easily integrated with FNAC is ultrasound. [5], High resolution real time grey scale and colour Doppler sonography may delineate and illustrate the thyroid architecture and pathological states with remarkable clarity due to the thyroid gland's superficial position and strong vascularization. In numerous investigations, the function of FNAC in the evaluation of thyroid swellings before to surgery has been well established.It has led to significant increases in diagnostic precision, cost savings, and a higher surgical yield of malignancy. [6] As a result, it is the best investigation to use when assessing thyroid nodules. Together, they can identify the cause of thyroid swelling and contribute to the development of an intelligent treatment plan.

Triple assessment

Triple assessment means:

- i. History and physical examination including malignancy risk stratification.
- ii. Imaging, usually the ultrasonographic evaluation of the thyroid and the neck.
- iii. Image guided FNAC for confirmation; FNAC without image guidance has a false positive rate of 40% which can be avoided by guided FNAC.[7]

Adenomas, carcinomas, and hyperplastic lesions are three possible classifications for thyroid nodules. Papillary and follicular carcinomas are examples of differentiated thyroid carcinomas (DTCs). [8] The likelihood of thyroid nodules becoming cancerous is overstated, which prompts numerous pointless treatments and raises the patient's morbidity. The definitive preoperative classification of thyroid nodules as benign or malignant aids in preventing unnecessary lengthy surgery and possible harmful surgical outcomes. Many clinical, radiological, and cytological characteristics have been explored in the past, but none of them has ever demonstrated a meaningful impact on clinical practice on its own.[9]The American Thyroid Association recommendations and the Thyroid Imaging Reporting and Data System (TIRADS) are regarded as the primary radiological

factors for diagnosing cancer sonographically. [10] Results from the FNAC are classified using the Bethesda system. However, the gold standard for determining a malignancy is still a post-operative histological investigation. [11] The goal of the current study was to assess the value of the triple assessment of the thyroid, which includes clinical examination, pathological testing, and ultrasonography, and to compare the results with histopathology. A secondary goal was to assess various surgical procedures and the complications that may result from them.

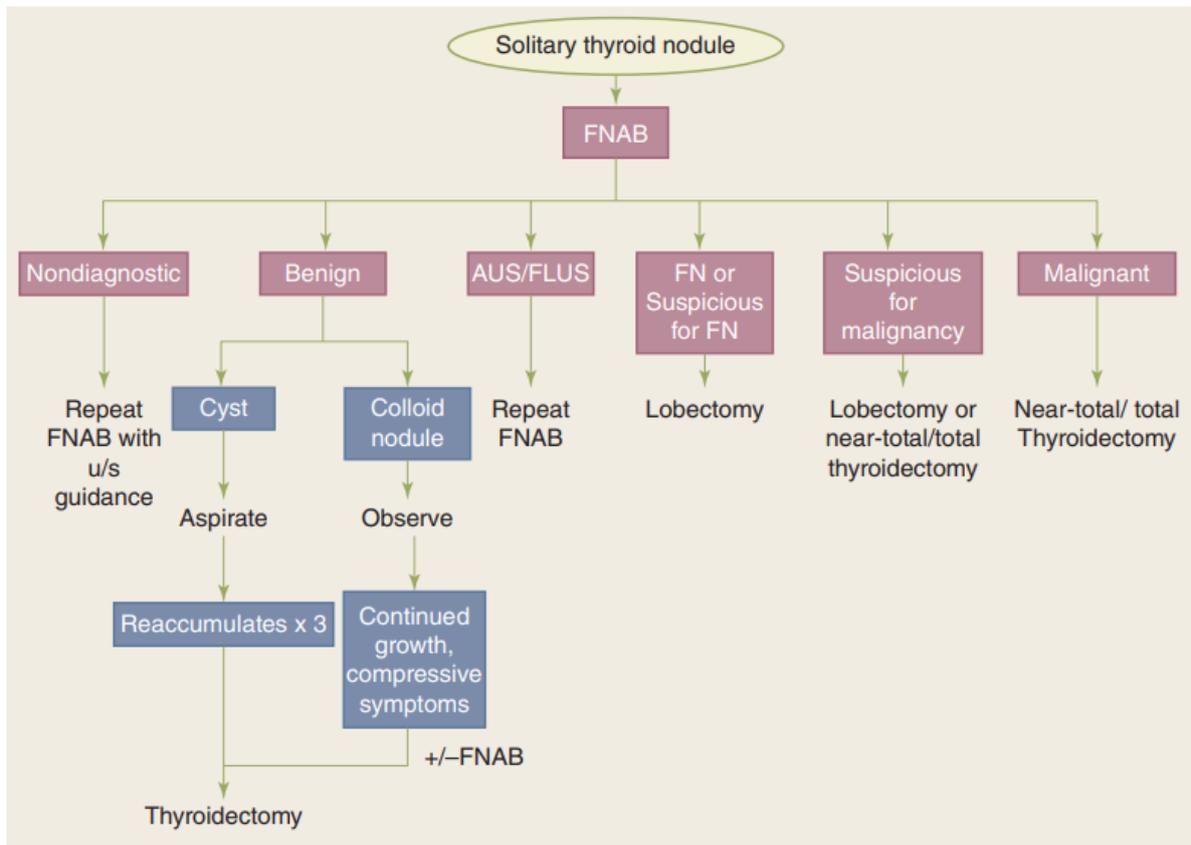


Figure 38-14. Management of a solitary thyroid nodule based on Bethesda criteria. a = except in patients with a history of external radiation exposure or a family history of thyroid cancer; FNAB = fine-needle aspiration biopsy; AUS = atypia of unknown significance; FLUS = follicular lesion of unknown significance; FN = follicular neoplasm.

Reference :Schwartz’sprinciple of surgery 11th edition

Methodology:

It was an observational study carried out on 48 patients of thyroid swellings admitted and were willing for intervention at a rural medical setup during October 2019 to September 2021. After obtaining consent form from all the patients, patients were examined clinically after taking detailed history, age, sex, thorough clinical examination and the data was recorded. They were investigated with clinical, radiological (USG) and pathological (FNAC) parameters Intra operative surgical notes were recorded post-operative histopathology reports of the specimen were noted. All patients of thyroid swellings admitted to and who underwent surgery with at Pravara Rural Hospital were included where Patients of recurrent thyroid swellings, Pregnant females with thyroid swelling were excluded.

Results:

Table 1: Age and sex distribution

Age (in years)	Male (n=4)	Percentage (%)	Female (n=44)	Percentage (%)	Total	Percentage (%)
11 – 20	0	0	1	2.27	1	2.08
21 – 30	0	0	7	15.91	7	14.58
31 – 40	3	75	19	43.18	22	45.83
41 – 50	0	0	9	20.45	9	18.75
51 – 60	1	25	4	9.09	5	10.42
61 – 70	0	0	1	2.27	1	2.08
> 70	0	0	3	6.82	3	6.25
Total	4		44		48	100

Table 2: Lymph node

Lymph node	No. of cases	Percentage (%)
Present	3	6.25
Absent	45	93.75
Total	48	100

Table 3: Consistency

Consistency	No. of cases	Percentage (%)
Firm	37	77.08
Hard	4	8.33
Soft	3	6.25
Tense	4	8.33
Total	48	100

Table 4: Distribution of lesion on USG

Category	Lesion	No of cases	Percentage (%)
Benign (n=43)	Colloid Nodule	15	31.25
	Multi nodular goiter	15	31.25
	Solitary nodule	12	25.00
	Thyroiditis	1	2.08
Suspicious (n=5)	Suspicious Mixed echogenic Nodule	5	10.42

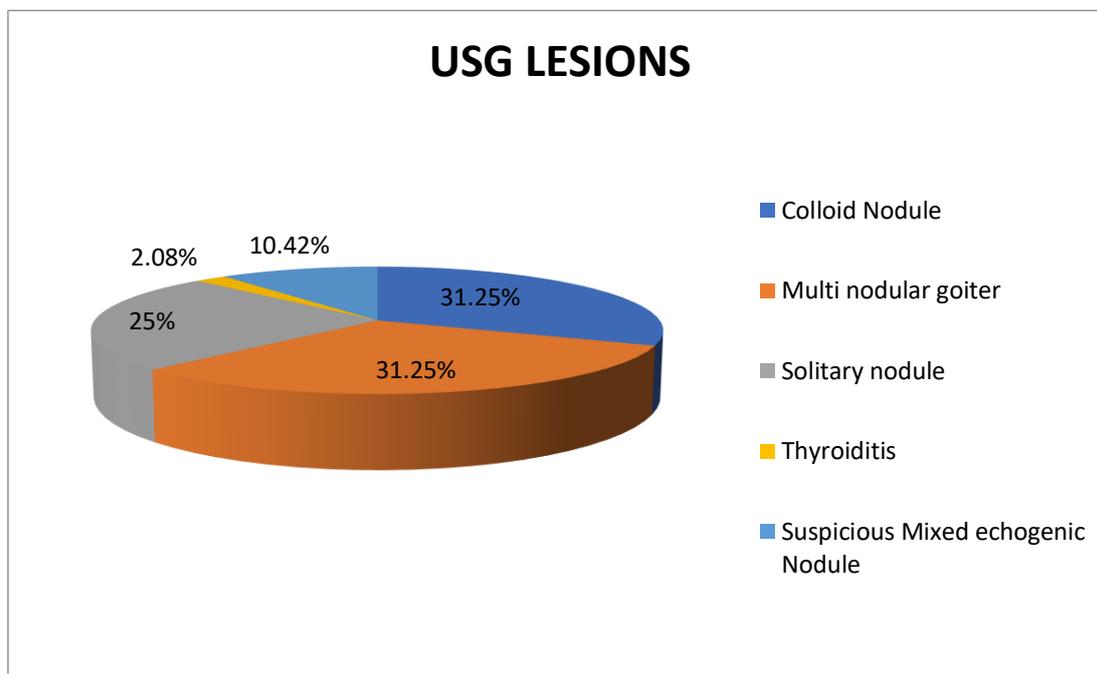


Table 5: Distribution of lesions of FNAC

Classification	FNAC LESION		Percentage (%)
	Category	No of cases	
Benign (n=43)	Benign	1	2.08
	Nodular GOITER	13	27.08
	Colloid Nodule	7	14.58
	Benign Cystic lesion	1	2.08
	Benign Follicular lesion	3	6.25
	Colloid goiter	16	33.33

	Dequarains thyroiditis	1	2.08
	Thyroiditis	1	2.08
Malignant (n=4)	Malignant	4	8.33
Inadequate (n=1)	Inadequate	1	2.08
Total = 48		48	

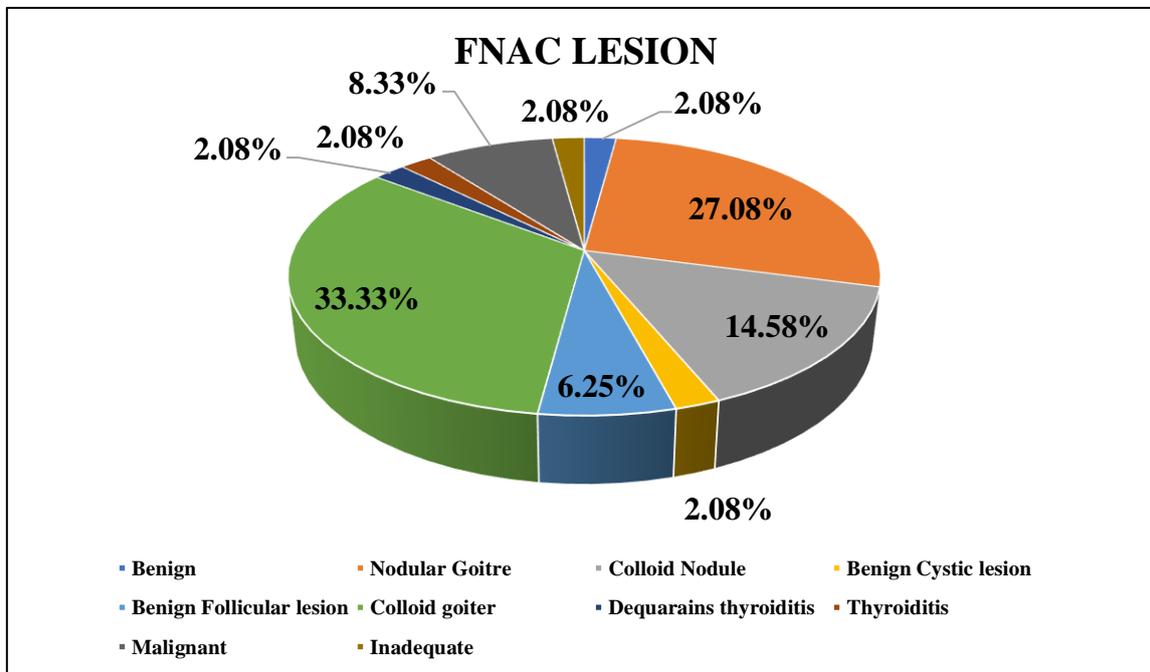


Table 6: Histopathological Diagnosis

Histopathological Diagnosis	No of cases	Percentage (%)
Adematoid goiter	1	2.08
Benign Follicular Adenoma	2	4.17
Colloid Goiter	14	29.17
Colloid goiter with calcification	1	2.08
Follicular carcinoma	1	2.08
Follicular nodule	1	2.08
Hurtle cell	1	2.08
Multi nodular goiter	14	29.17
Nodular Goiter	2	4.17
Nodular hyperplasia	1	2.08
Papillary Carcinoma	2	4.17
No	8	16.67
Total	48	100



Figure 38-10. Radioactive iodine scan of the thyroid, with the arrow showing an area of decreased uptake, a cold nodule.



Figure 38-11. Thyroid ultrasound showing a lymph node (arrow) along the carotid artery.

Table 7: Comparison between USG AND Histopathology

USG	HISTOPATHOLOGY Finding	
	Yes	No
Benign	35	1
Malignant	3	1
FNAC	HISTOPATHOLOGY Finding	
	Yes	No
Benign	42	1
Malignant	3	1
Triple Diagnosis		
	Benign	38
Malignant	3	2

USG and HISTOPATHOLOGY FINDINGS	
Sensitivity	92.11%
Specificity	50%
Positive Predicted Value	97.22%
Negative predicted Value	25%
FNAC and HISTOPATHOLOGY FINDINGS	
Sensitivity	93.33%
Specificity	50%
Positive Predicted Value	97.67%
Negative predicted Value	25%
TRIPLE DIAGNOSIS AND HISTOPATHOLOGY FINDINGS	
Sensitivity	92.68%
Specificity	66.67%
Positive Predicted Value	97.44%
Negative predicted Value	40%

In the present study majority of the cases 45.83% were seen having age between 31-40 years of age with mean age of 41.54 years. M:F ratio 0.09:1 was seen. Lymph nodes were absent in 93.75% cases of thyroid swellings. 77.08% cases had firm consistency, 8.33% each case were seen having hard and tense respectively where 6.25% cases were seen with soft consistency. On USG 31.25% each cases were seen with colloid nodule, multi nodular GOITER, 25% cases were seen giving solitary nodule, and 2.08% cases of thyroiditis. 10.42% cases were seen as suspicious lesion with Suspicious mixed echogenic nodule. After performing FNAC on the 48 cases of thyroid swellings, 89.59% were found to be benign. Out of 43 benign cases 16 cases were observed having colloid goiter, 13 cases with nodular Goiter, 7 cases with Colloid nodule, 3 cases having benign follicular lesion, 1 case each of Benign, benign cystic lesion, Dequarains thyroiditis and Thyroiditis was seen. 8.33% of all the cases had malignant lesion on FNAC. 1 case of the 48 cases had inadequate result in FNAC. On Histopathology examination 29.17% each cases were

seen with colloid goiter, Multi nodular goiter respectively, 4.17% each case with Benign follicular adenoma, nodular goiter, papillary carcinoma, 2.08% each cases with Adematoid goiter, colloid goiter with calcification, follicular carcinoma, follicular nodule, hurtle cell respectively. 35 cases were seen having benign lesion on USG and histopathology. 1 case was seen with benign lesion on USG but Histopathology findings didn't show it like benign lesion. 3 cases of malignant were seen on both findings. 92.11% sensitivity and 50% specificity were seen between USG findings and Histopathology findings. 42 cases were seen having benign lesion on FNAC and histopathology and 3 cases were shown as malignant. 93.33% sensitivity and 50% sensitivity were seen after comparing FNAC and histopathology results. 6.25% cases were seen having Hypocalcemia, 4.17% each case was seen having hemorrhage, Stridor, Recurrence complications respectively and 2.08% cases were seen having wound infection.

DISCUSSION:

When compared to USG, FNAC had a greater sensitivity and specificity: 93.33 % (81.73 % to 98.60 %) and 50%, respectively (1.26 % to 98.74 %). The lowest sensitivity for distinguishing thyroid nodules was 92.11 % with USG. Despite the fact that numerous studies have shown that physical examination is a poor predictor of malignancy, clinical examination in this study was sensitive and specific in making a diagnosis of malignancy. [12,13] However, the specificity of every parameter was greater than or equal to 50.00 %. The greater sensitivity and specificity values of the individual parameters in this study could be attributed to sampling bias. The triple test's accuracy, PPV, NPV, sensitivity, and specificity were all 92.67, 66.67 %, respectively, 97.44 % and 40%. This demonstrates that as compared to any of the three characteristics used separately, the triple test demonstrated higher sensitivity, specificity, and accuracy in differentiating thyroid nodules. There have always been some murky areas in thyroid nodules. These may include Bethesda Categories 3 and 4: suspected for follicular neoplasm and atypia of unknown importance/follicular lesion of unknown significance, respectively. [14] Follicular lesions have long been difficult to diagnose. [15,16] In these ambiguous situations, the addition of TIRADS to these lesions might be helpful. Triple evaluation, which combines three factors, is considerably more effective at identifying benign from malignant follicular lesions. In this study, 25 Bethesda category 3 patients with benign triple-test and HPE results were included. According to this study, Bethesda category 3 lesions had a malignancy risk of 3 %. Other studies that compared FNAC results and HPE estimated that between 25 and 30 % of Bethesda category 3 lesions were malignant. [17] However, the triple test was successfully used in this investigation to classify all Bethesda category 3 lesions as benign, which was in perfect agreement with HPE. More research with bigger sample sizes is necessary, though. These studies can aid in validation if they can minimize confounding variables and bias.

CONCLUSION:

To determine a precise diagnosis and a therapeutic strategy in accordance to a thorough physical examination in addition to investigations like fine-needle aspiration cytology (FNAC) and ultrasonography (USG) are most beneficial. To help assess preoperatively the nature of a thyroid nodule before patients are scheduled for surgery, there is a need for a single trustworthy test that can include all these technologies.

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