



ORIGINAL RESEARCH PAPER

General Surgery

CLINICAL, SONOLOGICAL AND PATHOLOGICAL EVALUATION OF THYROID NODULE

KEY WORDS: Thyroid, Nodule, Multinodular goiter.

Dr. Mulakapati Ramesh

Assistant Professor, Kakatiya medical college/MGM Hospital, Warangal, Telangana.

Dr. Gaje Venu*

Associate professor, Kakatiya medical college/MGM Hospital, Warangal, Telangana. *Corresponding Author

ABSTRACT

Total 100 cases of nodular thyroid were evaluated in MGM Hospital Warangal from July 2020 to June 2022, with respect to age, sex and duration of symptoms, and investigated with routine hemogram, thyroid profile, fine needle aspiration cytology and USG thyroid. The results of FNAC and USG were compared with histology. Nodular goiter is more common in females (M:F ratio 1:2.2). Majority of the patients are in the age group of 31-40 years. Swelling in the anterior neck was the commonest mode of presentation. In majority of the patients, duration of swelling prior to presentation was between 6 months and 3 years. On FNAC majority of the lesions were benign, with nodular goiter being the largest group. Among suspicious lesions on FNAC, 31.03% proved to be malignant, indicating the need for surgery. FNAC is the diagnostic modality of choice for the initial workup of thyroid nodule with sensitivity of 74.3% and specificity of 100%. USG with a sensitivity of 73% and specificity of 85.3%, helps in diagnosing doubtful cases. USG proved to be a more sensitive modality to evaluate the nodularity of the thyroid than clinical evaluation.

INTRODUCTION:

Diseases of thyroid gland, especially multinodular goiter due to deficiency of iodine is prevalent in India. Clinical examination although very accurate in most cases, is inadequate in some areas especially in staging of thyroid malignancies and in detecting the multinodularity of the gland. The advancements in management of thyroid pathology has been possible, thanks to developments in the field of imaging radiology. Most importantly the application of ultrasound in the preoperative evaluation has enhanced the armamentarium of the head and neck surgeon. Rapid evolution in sonographic technology has made ultrasound an important adjunct to the practice of head and neck surgery. Ultrasound of the neck is extremely sensitive in detecting thyroid and cervical lymph node pathology and is felt to be the most complete and cost-effective imaging method for the evaluation of the thyroid gland. The present study is undertaken to evaluate usefulness of clinical features, FNAC and USG in managing thyroid nodule.

MATERIALS AND METHODS:

This prospective study was carried out on 100 patients of nodular thyroid swelling between 11-70 yr age group, attending department of surgery and ENT in MGM Hospital Warangal during the period of July 2020 to June 2022. Patients with thyroid swellings which are not nodular and unfit patients for surgery are excluded.

All patients were examined clinically after taking a detailed history.

Then, they were investigated with FNAC and USG of the thyroid. High resolution 7.3 MHz probe is used. The results of FNAC were interpreted as benign, malignant, suspicious and inadequate aspirate. Sonographically, the nodules were evaluated for size, location, echotexture, margins, presence of halo, calcification, vascularity, accessory nodules, associated cervical lymphadenopathy and consistency (solid, cystic or mixed) in order to differentiate between benign and malignant nodules. Then, all the patients were subjected to surgery and histopathological examination (HPE) of the specimen obtained. Finally, the histopathology reports were correlated with the findings of FNAC and USG in order to evaluate their sensitivity and specificity by statistical methods.

Analysis of Results:

AGE & SEX:

Age and sex distribution of patients

Age (yr)	Male (n=30)	Female (n=70)	Total (n=100)
11-20	1	9	10
21-30	6	24	30
31-40	9	27	36
41-50	9	5	14
51-60	4	4	8
61-70	1	1	2

The age of the patients ranges from 11-70 years. The commonest age group with thyroid pathology is between 31-40 years and mean age group is 35.4 years. Majority of the patients were females i.e 69 (69 %) and male to female ratio is 1:2.2.

Fine Needle Aspiration Cytology:

Sl.No.	Classification	FNAC lesions	
		Category	No
1	Benign (n=61)	Nodular goiter	15
		Colloid nodule	26
		Benign cystic lesion	17
		Hyperplastic thyroid nodule	03
2	Suspicious (n=29)	Follicular neoplasia	29
3	Malignant (n=10)	Papillary carcinoma	10
4	Inadequate (nil)	Nil	Nil

The benign category occupies the major group with 61 (61%) cases, followed by suspicious, 29 (29%) cases and malignant 10 (10%) cases. There is no inadequate or insufficient cytological smear.

Histopathological Diagnosis:

Results of histopathological diagnosis

Sl. No.	Histopathological diagnosis	n=100
1	Colloid nodule	26
2	Nodular goiter	07
3	Benign cystic lesion	02
4	Hyperplastic thyroid nodule	02
5	Benign follicular adenoma	33
6	MNG	12
7	Papillary carcinoma	18

The most common lesion is benign follicular adenoma 33 (33%) and the least common is benign cystic lesion.

Ultrasonography:

Taking into consideration of the various ultrasonographical features, cases were classified in to benign, suspicious and malignant.

Distribution of lesions on USG.

Category	Lesion	No. of cases
Benign (n=70)	Cystic	12
	Hyperechoic nodule	42
	MNG	16
Suspicious	Suspicious MNG	03
	Suspicious mixed echogenic	02
Malignant (n=25)	Mixed	25

The benign category occupies the major group with 70 (70%) cases, followed by malignant 25 (25%) cases and suspicious, 5 (5%) cases.

Correlation of Fnac Lesions With Histopathology:

Category	FNAC lesions	Histopathological diagnosis	
Benign (n=61)	Nodular goite (n=15)	Nodular goiter	04
		Benign follicular adenoma	03
		MNG	08
		Papillary carcinoma	00
	Benign cystic lesion (n=17)	Colloid nodule	04
		Nodular goiter	03
		Benign cystic lesion	01
		Benign follicular adenoma	05
	Colloid nodule (n=26)	MNG	04
		Colloid nodule	19
		Benign follicular adenoma	07
	Hyperplastic thyroid nodule (n=03)	MNG	00
		Benign follicular adenoma	03
Malignant (n=10)	Papillary carcinoma (n=10)	Papillary carcinoma	10
Suspicious (n=29)	Follicular neoplasia (n=29)	Benign follicular adenoma	15
		Colloid nodule	03
		Hyperplastic thyroid nodule	02
		Papillary carcinoma	09

In 61 cytologically diagnosed benign cases, all proved to be benign, only malignant lesion found was papillary carcinoma in 10 (10%) cases. All the 29 cases of follicular neoplasia were subjected to surgery and correlated with histopathology. Twenty cases were found to be benign and nine cases to be malignant

Correlation of Usg With Histopathological Diagnosis:

Category	USG Lesions	Histopathological Diagnosis	
		category	no
Benign (n=70)	Cystic (n=12)	Colloid nodule	09
		Nodular goiter	03
		Benign follicular adenoma	25
	Hyperechoic nodule (n=42)	Colloid nodule	14
		MNG	02
		Papillary carcinoma	01
	MNG (n=16)	Papillary carcinoma	03

		MNG	05
		Hyperplastic thyroid nodule	02
		Benign cystic lesion	02
		Benign follicular adenoma	04
Suspicious (n=5)	Suspicious MNG (n=3)	Nodular goiter	02
		MNG	01
	Suspicious mixed echogenic (n=2)	Papillary carcinoma	02
Malignant (n=25)	Mixed echogenic nodule (n=25)	Nodular goiter	03
		Papillary carcinoma	13
		MNG	04
		Colloid nodule	02
		Benign follicular adenoma	03

The USG diagnosis of benign lesion was confirmed in 66 (93.05%) out of 70 cases and was disputed in 4 (6.09%) cases by histopathology which turned out to be malignant. In 5 USG suspects, histopathology revealed benign in 3 cases and malignant lesion in 2 cases. Among 25 USG diagnoses of malignant lesions, 13 were confirmed by histopathology, and 12 were disputed to be benign.

Comparison of Usg With Fnac:

Category	USG Lesions	FNAC category	
		category	no
Benign (n=70)	Cystic (n=12)	Colloid nodule	06
		Benign cystic lesion	06
	Hyperechoic nodule (n=42)	Benign cystic lesion	07
		Colloid nodule	20
		Nodular goiter	03
		Hyperplastic thyroid nodule	02
		Follicular neoplasia	10
	MNG(n=16)	Nodular goiter	04
Benign cystic lesion		04	
Follicular neoplasm		08	
Suspicious (n=5)	Suspicious MNG (n=3)	Nodular goiter	03
	Suspicious mixed echogenic (n=2)	Papillary carcinoma	02
Malignant (n=25)	Mixed echogenic nodule (n=25)	Nodular goiter	06
		Papillary carcinoma	09
		Follicular neoplasm	10

The USG diagnosis of benign lesion was confirmed in 52 (74.25%) out of 70 cases and was suspicious in 18 cases by FNAC. Out of 5 suspect cases 2 turned out to be malignant. Out of 25 malignant cases 9 were proved by FNAC and 10 turned out to be suspicious.

Among total 100 cases of Solitary thyroid nodule, USG revealed multiple nodules in 17 cases. Thus USG is more sensitive diagnostic modality to detect nodularity.

DISCUSSION:

In the present study age of the patient ranged from 11-70 years with a median age of 35 years. Age distribution of the present study is comparable to Jose RJ et al. The number of males in the present study was 31(31%) and the females were 69 (69%) with a male to female ratio of 1:2.2. Sex distribution was similar when compared to Afroze et al. The commonest clinical presentation is the presence of swelling in front of the

neck and majority presented between 6 months to 3 years. The overall sensitivity in our series was 81.3%, 74%, while the specificity was 100%, 100% for both benign and malignant lesions. FNAC has certain limitations because of suspicious diagnosis.

In present series, 29(29%) cases were found to be suspicious, out of which 9 were found to be malignant on final histopathology examination. Thus, an overall malignant rate of about 31.03% for the suspicious group was found. Because of this high incidence of malignancy in suspicious lesions, surgical removal of these nodules should be strongly considered in these cases. The overall incidence of malignancy in solitary thyroid nodules varies from 10%-30% according to various studies. In our study, the overall incidence of malignancy in solitary nodule was 18%.

The overall sensitivity in our series was 80.4%, 73%, while the specificity was 77.7%, 85.3% for both benign and malignant lesions on USG. Watter et al. interpreted an USG report as suggestive of malignancy if the nodule was solid or of a mixed solid-cystic variety and a hypoechoic and nonhaloed lesion. They emphasized that the USG has added advantage of allowing the whole gland to be examined rather than the dominant nodule but was limited by the fact that no features were pathognomic for malignancy, so that it should be regarded as complementary rather than an alternative investigation to FNAC in the management of solitary thyroid nodule. It has been a consistent observation according to published literature, that the risk of thyroid cancer is less with multiple nodules than with the solitary nodules. High resolution real-time USG is far better than clinical examination in detecting thyroid nodularity. Walker et al. have shown that the prevalence of multinodularity in clinically solitary thyroid nodules is between 20% and 40%, and it has been observed that for a thyroid nodule to be detected by palpation, it must be at least 1 cm in diameter, while USG detects nodules as small as 3mm in diameter.

CONCLUSION:

The present study was undertaken to evaluate the usefulness of clinical examination, FNAC and USG of thyroid in the management of thyroid nodule and compare the efficacy of each of the investigation. Thyroid nodules are common in females of age group 31 to 40 years. Commonest presenting complaint is swelling in the anterior neck.

In our study, the sensitivity and specificity of FNAC was 74% and 100% respectively. All malignant lesions on FNAC, were confirmed by histopathology indicating its excellence. Therefore FNAC helps in planning the correct management and avoids second surgery.

In our study, the sensitivity and specificity of USG was 73% and 85.3% respectively. Therefore use of ultrasound along with FNAC will improve the diagnostic accuracy to higher level and help in better management. All solitary thyroid nodules needs surgery and minimal surgery is Hemi-thyroidectomy. This was undertaken in all cases, which help in establishing the histopathological diagnosis and in comparing the efficacy of above investigations.

The ideal test should have a sensitivity and specificity of 100%. The closest method to ideal test is, thus, FNAC which has high sensitivity and specificity. However, a combination of both FNAC and Ultrasound will give optimal results and avoid mismanagement.

REFERENCES:

- 1) Park K. Nutrition and Health, Park's text book of Preventive and Social Medicine 18th edition. Banarasidas Bhanot publishers; 2005:10:419-420.
- 2) Jhon B Hanks, Thyroid. Sabiston Textbook of surgery: The biological basis of Modern Surgical Practice Vol 1, 18th. Saunder's Elsevier publishers; 2004: 947-983.
- 3) Gregory P Saddler, Orlo H Clarke, Jon A, Van Heerder. Schwartz- Principles of Surgery, 7th edition. Mcgraw hill; 1999:36:1661-1711.

- 4) Inderbir Singh B, Pal J P. Embryology of thyroid gland. Text book of Embryology; 2000:30-40.
- 5) Otolaryngologic clinics of north America august 2004.
- 6) Grays anatomy 38th edition: The Thyroid gland.
- 7) Decker G A, Pleiss D J. The Thyroid, Thymus and the Parathyroid gland. Lee Mc Gregors Synopsis of Surgical Anatomy. 17 12th edition: 1996:198-205.
- 8) Monfared A, Gorti G, Kim D. Microsurgical Anatomy of the laryngeal nerves as related to thyroid surgery. Laryngoscope 2002; 112:386-92.
- 9) Miller F R, Netterville J L. Surgical management of Thyroid and Parathyroid disorders. Med Clin North Am 1999; 83:247-259.
- 10) Hooper M, Thyroid, Jamieson and Kay's: Textbook of Surgical Physiology. 4th edition; Churchill Livingstone; 1990:7:85-107.
- 11) Gharib H, Papini E. Thyroid nodules: Clinical importance, assessment and treatment. Endocrinol Metab Clin North Am 2007; 36 :707-735.
- 12) Boelaert K, Horacek J, Holder R L, Watkinson J C, Sheppard M C, Franklyn J A. Serum thyrotropin concentration as a novel predictor of malignancy in thyroid nodules investigated by a fine-needle aspiration. J Clin Endocrinol Metab. 2006; 91:4295-4301.
- 13) Anna L B. Thyroid physiology and Thyroid function testing, Disorders of Thyroid. Otolaryngol Clin N Am 2003:36:9-15.
- 14) Larry J, Anthony P Weetman. Disease of Thyroid gland, Harrison's Principles of Internal Medicine Vol 2. 16th edition 2005; 2104-2125.