

**Clinical, Sonological and Pathological Evaluation of Thyroid Nodule**Ritika Gupta<sup>1</sup>, Pratibha Srivastava<sup>2</sup>, Dilip Kumar<sup>3</sup><sup>1</sup>Senior Resident, Department of Pathology, PMCH, Patna<sup>2</sup>Assistant Professor, Department of Pathology, PMCH, Patna<sup>3</sup>Associate Professor, Department of Pathology, PMCH, Patna

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**Abstract:**

**Background and Objectives:** Nodular thyroid is a common clinical entity. The optimum diagnostic strategy for the patient with nodular thyroid is still a matter of debate. The goal of diagnostic workup now is to select those patients for surgery who have a high likelihood of harboring malignancy in the thyroid nodules. The present study was undertaken to evaluate the efficacy of FNAC and USG in differentiating benign and malignant nodules.

**Methods:** A prospective study was carried out on 100 patients from 11-70 years age group of both sexes, presenting with thyroid nodules to Dept. of Surgery and ENT during the Duration of Two Years. All patients were evaluated clinically and subjected to FNAC and USG of thyroid. The results of clinical diagnosis, FNAC and USG compared with histopathology reports.

**Conclusion:** The commonest presentation was from the females in the age group of 31-40 years, with swelling in the anterior neck. Solitary thyroid nodule cases had 18% rate of malignancy. It was found that FNAC is a safe, reliable and cost effective diagnostic modality with a high sensitivity of 80% and specificity of 100% and is the single best investigation for preoperative evaluation of thyroid nodules. However, a combination of FNAC and USG give optimum results and avoid unnecessary surgery.

**Keywords:** Fine needle aspiration cytology ( FNAC), Ultrasonography( USG).

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**Introduction**

The diseases of thyroid form a major share of head and neck surgery. 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. Diseases of thyroid gland, especially multinodular goiter due to deficiency of iodine is prevalent in India. India has the world's biggest goiter belt in the SubHimalayan region with nearly 55 million cases are estimated to be suffering from endemic goiter. Currently, no less than 140 million people are estimated to be living in

goiter endemic regions of the country [1]. Ultrasonologists have laid down some ultrasonologic features that will help in management in thyroid disorders. There are certain features that will help to identify benign from malignant lesions. FNAC and USG are used in association with clinical features but there are drawbacks of each technique and the final answer to the problem is still elusive. The present study is undertaken to evaluate usefulness of clinical features, FNAC and USG in managing thyroid nodule.

**Objectives**

To correlate Clinical diagnosis with investigative parameters, ie Ultrasonography and fine needle aspiration cytology and histopathology in the evaluation of thyroid nodule.

**Material and Methods**

A prospective study was carried out on 100 patients of nodular thyroid swelling between 11-70 yr age group, attending department of surgery and ENT, Patna Medical college and Hospital Patna. Study

duration of two years. 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, mar-

gins, 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.

#### Observations and results

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.

#### Presenting complaints

Sl.No.	Presenting complaint	No. of patients
1	Swelling in front of neck	100
2	Pain in the swelling	14
3	Difficulty in breathing	03
4	Difficulty in swallowing	08
5	Change of voice	-
6	Hypo / hyperthyroidism features	-

All the patients presented with swelling in the anterior neck region of the thyroid. In addition to swelling in the neck, fourteen patients presented with pain in the swelling, three with difficulty in breathing and eight with difficulty in swallowing.

Twelve of the patients who presented with thyroid swelling had cervical lymphadenopathy on clinical examination. No patient had any change in voice or history suggestive of hypo/hyperthyroidism features.

#### 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.

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.

**Assessment of nodularity by various methods**

Modality	Nodularity	
	Solitary	Multiple
Clinical examination	100	-
USG	83	17

**Types of surgeries performed**

Sl.No.	Type of surgery	n=100
1	Hemithyroidectomy	63
2	Subtotal thyroidectomy	08
3	Total thyroidectomy	16
4	Functional neck dissection	13

The commonest performed surgery was Hemithyroidectomy, which accounts for 63 (63%) cases. Functional neck dissection was done in 13 cases of papillary carcinoma of thyroid where lymph nodes were palpable.

Comparison of USG with histopathology

**Benign:**

USG	Histopathology			
		+	-	total
	+	66	04	70
-	16	14	30	
Total	82	18	100	

Sensitivity- 80.4%, Specificity- 77.7%, Positive Predictive Value-94.28%, Negative Predictive Value-46%.

**Malignant:**

USG	Histopathology			
		+	-	total
	+	13	12	25
-	05	70	75	
Total	18	82	100	

Sensitivity- 73%, Specificity- 85.3% Positive Predictive Value-52%, Negative Predictive Value-93.3%

**Discussion**

In the present study age of the patient ranged from 11-70 years with a median age of 35years. Age distribution of the present study is comparable to Jose RJ et al.

**Age range and median age of different studies.** [2,3,4,5,6,7]

Authors	Range of age	Median age
Tabaqchali et al(2000)	8.5-85	48
Sekhri et al(2001)	9-70	33.9+11
Jose R J et al(2002)	17-65	35.5
Afroze N et al(2002)	16-78	40.2
Mitra R B et al(2002)	16-70	39.6
Present study	11-70	35

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.

Sex distribution and male to female ratio in different studies.

Series	Total cases	Male	Female	M:F ratio
Sekhri T et al(2001)	300	44	256	1:6
Tabaqchali et al(2000)	239	26	213	1:8.2
Popivanov et al(2000)	175	10	165	1:16.5
Jose RM et al	98	16	82	1:5.1
Afroze et al(2002)	170	48	122	1:2.54
Present study	100	31	69	1:2.2

The commonest clinical presentation is the presence of swelling in front of the neck and majority presented between 6 months to 3 years.

**Comparison of FNAC results [8,9,10,11,12,13]**

Study	Sensitivity (%)	Specificity (%)
Altavilla et al	71.43	100
Goellner et al	98	99
Cai et al	83.5	98
Morgan et al	55.0	73.7
Kim et al	85.7	100
Carol et al	86	81

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 thyroid nodules on USG were subdivided in to 3 groups-benign, suspicious and malignant on the basis of various sonographic features. Features suggestive of malignancy on USG are-hypoechoic pattern, incomplete peripheral halo, irregular margins, internal microcalcification, increased vascularity, presence of cervical lymphadenopathy and peripheral degeneration in mixed nodules. Features suggestive of benign diseases on USG are- halo sign (transonic uniform rim surrounding the mass), variable echogenicity, multinodularity, large cystic lesion, diffusely nodular in homogenous gland and peripheral calcification.

Comparison of USG results [14,15,16]

Series	Sensitivity	Specificity
Watters et al.	74%	83%
Jones et al.	75%	61%
Ajith et al	20%	97.6%

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.

**Conclusion**

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

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