ORIGINAL RESEARCH PAPER

Surgery

A CLINICO-PATHOLOGICAL STUDY OF SOLITARY THYROID NODULE

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ABSTRACT

Nodular thyroid is a common clinical entity. Currently, no less than 140 million people are estimated to be living in the goitre endemic regions of the country[1]. Occasionally, the optimum diagnostic strategy for the patient with nodular thyroid is still a matter of debate. The study to be discussed was undertaken to evaluate the patients with respect to age, sex, presentation and to evaluate the efficacy of USG and efficacy of FNAC and USG in differentiating malignant and benign thyroid nodules.

BACKGROUND-

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 malignancies and in detecting the multinodularity of the gland[2]. Advancements in the management of thyroid pathology have been possible, thanks to developments in the field of radiology and imaging. Rapid evolution in USG has made USG an important investigative adjunct.

FNAC and USG are used in association with clinical features but there are drawbacks of each technique. The present study is undertaken to evaluate the usefulness of clinical features, FNAC and USG in managing thyroid nodule.

METHODS-

A prospective study was carried out on 50 patients of nodular thyroid swelling between 11-70 years age group attending the surgery out-patient department in Krishna Hospital. Patients with non-nodular swelling and those who were unfit for surgery were excluded. After a detailed history and clinical examination they were investigated with FNAC and USG of the thyroid.

The FNAC results were interpreted as benign, malignant, suspicious or inadequate aspirate. On USG, the swellings 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. This workup was followed by surgery and histopathological examination of the specimen to correlate the findings with FNAC and USG.

Ethical statement- The study met the standards outlined in the Declaration of Helsinki and Good Epidemiological practices. This study did not change or modify the laboratory or clinical parameters which were present.

OBSERVATIONS AND RESULTS-

1. Distribution of cases as per the age and sex:

Age (years)	Male (n=11)	Female (n=39)	Total (n=50)
11-20	0	1	1
21-30	2	13	15
31-40	2	17	19
41-50	3	5	8
51-60	2	2	4
61-70	2	1	3
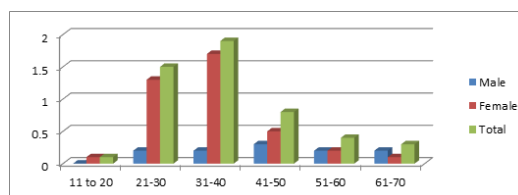
2. Presenting complaints: All the patients came with complaints of swelling in the neck.

3. Duration of complaints:

The duration of complaints ranged from 2 weeks to 8 years. Majority of the patients presented between 6 months to 3 years.

Duration of complaints	No. of patients
Less than 6 months	7
6 months to 3 years	36
>3 years	7

4. Family history and past history:

None of the patients had any significant family or past history.

5. Clinical diagnosis:

In all the cases the diagnosis was solitary nodule of thyroid.

### 6. Fine needle aspiration cytology:

Classification	FNAC lesions category	No. of cases
Benign (n=30)	Nodular goitre	7
	Colloid goitre	13
	Benign cystic lesion	8
	Hyperplastic thyroid nodule	2
Suspicious (n=13)	Follicular neoplasia	13
Malignant (n=7)	Papillary carcinoma	7

The benign category occupies the major group with 30 (60%) cases, followed by suspicious, 13 (26%) cases and malignant 7 (14%) cases.
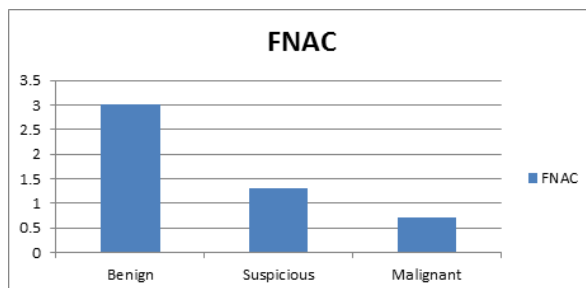
7. Histopathological diagnosis:

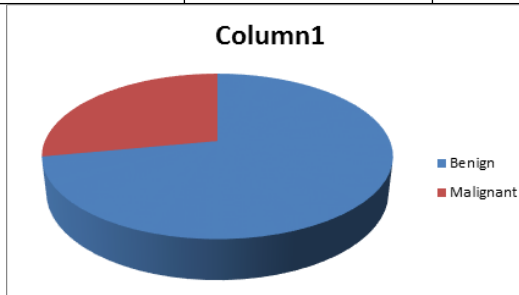| Histopathological diagnosis	n=50
Colloid nodule	13
Nodular goiter	3
Benign cystic lesion	1
Hyperplastic thyroid nodule	1
Benign follicular adenoma	17
MNG	6
Papillary carcinoma	9
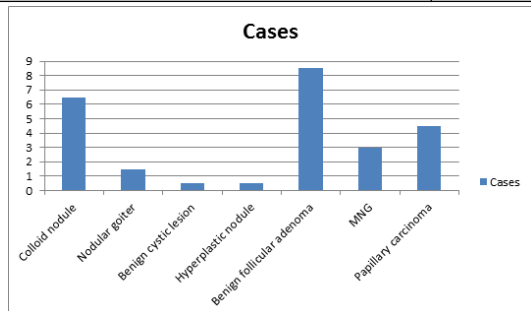
The most common lesion is benign follicular adenoma 17 (34%) and the least common is benign cystic lesion and hyperplastic thyroid nodule.

8. Ultrasonography:
The cases were classified into benign and malignant taking into consideration various ultrasonographic features.

Category	Lesion	No. of cases
Benign (n=36)	Cystic	5
	Hyperechoic nodule	22
	MNG	9
Malignant(n=14)	Mixed echogenic nodule	14

9. Comparison of clinical diagnosis with histopathology:

Clinical	Histopathological	No. of cases
Solitary nodule of thyroid (n=50)	Hyperplastic thyroid nodule	1
	Colloid nodule	13
	Nodular goitre	3
	Benign cystic lesion	1
	Benign follicular adenoma	17
	Multinodular goitre	6
	Papillary carcinoma	9

Out of 50 patients diagnosed to have solitary nodule of thyroid, histopathology revealed 41 benign and 9 malignant.

10. Correlation of FNAC lesions with histopathology:

Category	FNAC lesions	Histopathological diagnosis	
Benign (n=30)	Nodular goitre (n=7)	Nodular goiter	2
		Benign follicular adenoma	1
		MNG	4
	Benign cystic lesion (n=8)	Colloid nodule	1
		Nodular goitre	1
		Benign cystic lesion	1
		Benign follicular adenoma	3
		MNG	2

	Colloid nodule (n=13)	Colloid nodule	10
		Benign follicular adenoma	3
		MNG	0
	Hyperplastic thyroid nodule (n=2	Benign follicular adenoma	2
Malignant (n=7)	Papillary carcinoma (n=7)	Papillary carcinoma	7
Suspicious (n=13)	Follicular neoplasia (n=13)	Benign follicular adenoma	8
		Colloid adenoma	2
		Hyperplastic thyroid nodule	1
		Papillary carcinoma	2

In 30 cytologically diagnosed benign cases, all proved to be benign except papillary carcinoma as the only malignant lesion in 7 cases. All the 13 cases of follicular neoplasia were dubjected to surgery and correlated histopathologically. All of these 13 were given two options: either to proceed with total thyroidectomy or to get a hemithyroidectomy which would suffice if the HPR proves it benign. All of them underwent hemithyroidectomy , out of which two which were found to be malignant later on underwent a completion thyroidectomy later on.

A) Benign:

		Histopathology		
		+	-	Total
FNAC	+	30	00	30
	-	11	09	20
Total		41	09	50

Sensitivity: 73.17%
Specificity: 100%

B) Malignant:

		Histopathology		
		+	-	Total
FNAC	+	07	00	7
	-	02	41	43
Total		09	41	50

Sensitivity: 77.77%
Specificity: 100%

11. Correlation of USG with histopathological diagnosis:

Category	USG lesions	Histopathological diagnosis	
Benign (n=36)	Cystic (n=5)	Category	No. of cases
		Colloid nodule	4
	Hyperechoic nodule (n=22)	Nodular goitre	1
		Benign follicular adenoma	13
		Colloid nodule	7
		MNG	1
	MNG (n=9)	Papillary carcinoma	1
		Papillary carcinoma	2
		MNG	3
		Hyperplastic nodule	1
		Benign cystic lesion	1
Malignant (n=14)	Mixed echogenic nodule (n=14)	Benign follicular adenoma	2
		Nodular goitre	2
		Papillary carcinoma	6
		MNG	2
		Colloid nodule	2
		Benign follicular adenoma	2

The USG diagnosis of benign cases was confirmed in 33 out of 36 cases abd was disputed in 3 cases by histopathology which turned out to be malignant. Among 14 USG diagnosis of malignant lesions, were confirmed by histopathology, and 8 were disputed to be benign.

A) Benign:

USG		Histopathology		
		+	-	Total
	+	33	03	36
	-	08	06	14
Total		41	09	50

Sensitivity: 80.48%
Specificity: 66.66%

B) Malignant:

USG		Histopathology		
		+	-	Total
	+	06	08	14
	-	03	33	36
Total		09	41	50

Sensitivity: 66.66%
Specificity: 80.48%

DISCUSSION-

In the present study, the age of the patient ranged from 11-70 years with a median age of 35 years. The number of males was 11 (22%) and the females were 39 (78%) with a male to female ratio of 1:3.54. The Most common presenting symptom was swelling in front of neck with the usual duration being 6 months to 3 years.

The overall sensitivity in our series was 73.17%, 77.17%, while the specificity was 100%, 100% for both benign and malignant lesions. FNAC has ceratin limitations because of uncertain diagnosis. In this study, 13 (26%) cases were found to be suspicious, out of which 2 were found to be malignant on final histopathological examination. Thus, an overall malignant rate of about 15.38% for the suspicious group was found. Because of this high incidence of malignancy in suspicious lesions, surgical excision should be strongly considered in these cases. The overall incidence of malignancy in solitary nodules varies from 10%-30% according to various studies. In our study, the overall rate was 18%.

The cases on USG were divided into 2 groups – benign and malignant based on sonographic features; the once suggestive of malignancy being hypoechoic pattern, incomplete halo, irregular margins, internal microcalcifications, increased vascularity, presence of cervical lymphadenopathy and peripheral degeneration in mixed nodules. 14 cases were diagnosed to be malignant on USG as confirmed by histology while 8 were later confirmed as benign. In the ones diagnosed as benign on USG, 3 were confirmed to be papillary carcinoma on histology. The overall sensitivity for benign and malignant cases was 80.48% and 66.66%, while the specificity was 66.66% and 80.48%.

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 investigations.

1. Thyroid nodules were common among females in the age group of 31-40 years.
2. Most common presenting complaint was swelling in the anterior aspect of neck.
3. The sensitivity and specificity of FNAC was 77.77% and 100% respectively. Hence, FNAC helps in planning management and avoiding a second surgery.
4. The sensitivity and specificity of FNAC was 77.77% and 100% respectively. All malignant lesions on FNAC were confirmed by histopathology indicating its excellence. So, use of USG with FNAC will improve diagnostic accuracy.
5. Minimum surgery done was hemithyroidectomy which helped in making a histopathological diagnosis and in comparing the efficacy of the above investigations.
6. The ideal test should have a sensitivity and specificity of 100%. The closest method to ideal test is, thus, FNAC which has a high sensitivity and specificity. However, a combination of both FNAC and USG will give optimal results and avoid mismanagement.

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2. Jhon B. Hanks, Thyroid. Sabiston textbook of surgery: The Biological Basis of Modern Surgical practice volume 1, 18th. Saunder's Elsevier Publishers; 2010:918-985