Section: General Surgery

Original Research Article

A CLINICO PATHOLOGICAL STUDY OF SOLITARY NODULE OF THE THYROID WITH SPECIAL REFERENCE TO IMPRINT CYTOLOGY

P Sathish Kumar[1], N Himavathi[2], S Shiva Shankar[3]

[1]*Assistant Professor, Department of General Surgery, Government Medical College, Khammam, Telangana, India.*
[2]*Assistant Professor, Department of General Surgery, Government Medical College, Janagaon, Telangana, India.*
[3]*Assistant Professor, Department of General Surgery, Government Medical College, Khammam, Telangana, India.*

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Corresponding Author:
Dr. S Shiva Shankar,
Assistant Professor, Department of General Surgery, Government Medical College, Khammam, Telangana, India.
Email: drshivashankar88@gmail.com

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ABSTRACT

Background: Aim: The study was proposed to compare and correlate between FNAC, imprint cytology and histopathological examination findings in ultrasound proven solitary nodule thyroid (confirmation with histopathological examination) among the patients getting admitted in Chalmeda Anandrao Institute of Medical Sciences, Karimnagar.

Material and Methods: The case material for the present study consist of 50 cases which were ultrasonographically and histopathologically proven solitary nodule thyroid among the 72 cases of clinically diagnosed solitary nodule thyroid admitted in Department of General Surgery, Chalmeda Anandrao Institute of Medical Sciences, Karimnagar from September 2018 to September 2020.

Results: Out of 72 clinically solitary nodule thyroid admitted, 50 cases (76.92%) were clinically, ultrasonographically and histopathologically solitary nodule thyroid. 70 % of nodules occured in right lobe and 24 % in left lobe and 6% in isthmus. Indirect laryngoscopy was normal in all cases.96% of patients were euthyroid and 4% had high T_4 values which was corrected before surgery. Ultrasound diagnosed solitary nodule in right lobe in 72% cases, left lobe in 26% and isthmus in 2% cases. In FNAC 46% had follicular neoplasm, 22% had colloid goitre and 8% had hurthle cell lesion. 14 % (7 cases) came as cystic lesion, out of that HPE of 4 came as follicular adenoma and 3 came as colloid goitre. In one case FNAC came as malignancy (cystic papillary carcinoma) which was false positive. 94% underwent hemithyroidectomy, 4% total thyroidectomy and 2% isthmucectomy. Peroperative imprint cytology was done in all 50 cases and gave definite diagnosis of follicular adenoma in 4 cases (8%). 40% of imprint cytology came as follicular neoplasm out of that one came as follicular carcinoma in HPE and rest came as follicular adenoma in HPE. The sensitivity and specificity of imprint cytology to diagnose benign lesions of thyroid especially follicular neoplasm/adenoma and colloid goitre was more than FNAC. The sensitivity and specificity of imprint cytology over FNAC to diagnose malignant lesions of thyroid was not done in the present study as the number of malignant cases was less (2%). In histopathology examination,50% had follicular adenomas and 28% had colloid goitre. Out of the two total thyroidectomy cases, histopathology came as follicular carcinoma for the first case for which total thyroidectomy was done in the first operation itself as the ultrasound showed a cervical lymphnode.

Conclusion: The present study concluded that, Both FNAC and imprint cytology are easy and cheap and sensitive and specific method to diagnose benign lesions of thyroid but imprint cytology was more sensitive and specific than FNAC to diagnose follicular neoplasms/adenoma and colloid goitre.

Keywords: Thyroidectomy, Follicular Adenoma, Histopathology, FNAC, USG, Imprint cytology.

INTRODUCTION

Thyroid disorder is one of the commonest endocrine disorder seen in clinical practice. Solitary thyroid nodule is defined as presence of a palpable nodule in otherwise normal thyroid gland.[1]

The frequency of appearance of thyroid nodule increases with age. Solitary palpable nodules are about four times more prevalent in women than in men.[2] Ninety percent of solitary nodules are benign, but at extremes of life over 50% are malignant.[3]

In all,3-5% of population have a clinically palpable thyroid nodule, at autopsy 50% of adults are found to have thyroid nodule and 30% of all adults can be shown by ultrasound to harbour a nodule. The incidence is substantially higher in areas of Iodine deficiency and endemic goitre,[4] and approximately 1 in 10-20 solitary nodules present with hyperthyroidism.[5] While most of them are benign,5% of all palpable nodules are malignant.[5]

his study was undertaken because:

Solitary nodules are one of the commonest presentation of thyroid disorder in our hospital. The most important in solitary nodule thyroid is to differentiate between benign and malignant nodules and FNAC is the most important investigation for this except in case of follicular carcinoma. Histopathological examination is the only way to confirm follicular carcinoma. As per some studies it is seen that Imprint cytology,[5] is more valuable in differentiating benign and malignant follicular nodules than FNAC .So by doing imprint cytology following hemithyroidectomy definite peroperative diagnosis can be arrived at in most of the cases and appropriate surgical management can be done at the first instance.

The study was proposed to compare and correlate between FNAC, imprint cytology and histopathological examination findings in ultrasound proven solitary nodule thyroid (confirmation with histopathological examination) among the patients getting admitted in Chalmeda Anandrao Institute of Medical Sciences, Karimnagar with solitary nodule thyroid from September 2018 to September 2020. Only cases which has been confirmed as solitary nodules after ultrasound and biopsy has been taken for further evaluation.

Aims & Objectives of The Study

1. To study the age and sex incidence and the incidence of malignancy in solitary nodule thyroid
2. To compare and correlate between FNAC, Imprint cytology and histopathological examination of solitary nodule thyroid.

MATERIALS AND METHODS

The case material for the present study consist of 50 cases which were ultrasonographically and histopathologically proven solitary nodule thyroid among the 72 cases of clinically diagnosed solitary nodule thyroid admitted in Department of General Surgery, Chalmeda Anandrao Institute of Medical Sciences, Karimnagar from September 2018 to September 2020. The present study is a prospective analysis of 50 cases of solitary nodule thyroid, among whom 48 were females and 2 were males.

Study design

A cross sectional study.

Inclusion Criteria

Patients fitting well into the definition of solitary nodule thyroid (toxic/non- toxic/malignant/benign) after ultrasound & histopathology.

Exclusion Criteria

Thyroid swellings other than solitary nodules (Ultrasound and histopathologically proved). Patients with ultasonographically proved solitary nodule thyroid willing for surgery were taken. Prior informed consent was obtained before evaluating each patient. A detailed history and clinical examination including indirect laryngoscopy was done based on the proforma. All routine investigation, Thyroid function test, Ultrasound of thyroid, FNAC was done. All patients underwent surgery and during surgery direct imprint of the specimen was prepared and staining done. HPE was done in all cases and those 50 cases in which both ultrasound and histopathology showed solitary nodule thyroid were taken for further analysis. There wasn't any post operative complications in any patients and all patients were discharged after removing sutures and were asked to come for follow up.

The patients were grouped into decades of age, sex and site of the swelling and keeping HPE as gold standard, the sensitivity and specificity of FNAC and imprint cytology was done separately.

Statistical Methods: Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance.

RESULTS

Observation Analysis

A clinicopathological study with 50 patients with solitary nodule thyroid (ultrasound and histopatholgy proven) was undertaken to study the incidence of malignancy, the age and gender distribution, and to study and compare and correlate between FNAC, Imprint cytology and Histopathological examination. Out of total 180 cases of thyroid admitted,72 were clinically solitary nodule thyroid.

Table 1: Total STN cases

	Number of patients	%
Total no of thyroid cases admitted	180	100.0
Total STN	72	40.0

Out of the 72 clinically solitary nodule thyroid,65 cases of clinically solitary nodule thyroid were operated in which histopathology came as multi nodular goiter in 15 cases. Hence further analysis was done in those 50 cases which was clinically, ultrasonographically and histopathologically solitary nodule thyroid.

Table 2: STN Clinical, USG and HPE

	Number of patients	%
Total STN clinically operated	65	100.0
Clinically, USG, HPE STN	50	76.9
Clinically STN, USG STN, HPE MNG	2	3.1
Clinically STN, USG MNG, HPE MNG	13	20.0

Of the 50 cases studied 86% of cases were in 21-50 years age group with maximum incidence of 40% in the age group of 31 to 40 years. Minimum age was19 years and maximum age was 57 years.

Table 5: Location of nodule

Locaton of nodule	Number of patients	%
Left	12	24.0
Right	35	70.0
Midline(isthmus)	3	6.0
Total	50	100.0

Indirect laryngoscopy showed both vocal cords mobile in all cases.

X-ray neck showed tracheal shift to left in 32 patients, to right in 10 patients and trachea central in 8 patients. Even though 35 patients had swelling in the right lobe tracheal shift to left was seen in only 32 cases as the size of the swelling in the rest 3 of the cases was small (2x3 cms).

Table 6: Tracheal Shift

Trachea	Number of patients	%
Left	32	64.0
Right	10	20.0
Central	8	16.0
Total	50	100.0

In 48 patients TFT was normal and in 2 patients T4 was marginally high, which was corrected and taken up for surgery.

Table 7: Thyroid status

Thyroid status	Number of patients	%
Normal	48	96.0
T4 high	2	6.0
Total	50	100.0

In USG, solitary nodule was seen in isthmus in one case for which isthmecectomy was done.

Table 8: USG diagnosis

USG diagnosis	Number of patients (n=50)	%
Nodule in isthmus	1	2.0
Solitary nodule in Right lobe	36	72%
Solitary nodule in Left lobe	13	26%

Majority of FNAC showed follicular neoplasm (46%) and 22% showed nodular goiter. Cystic papillary carcinoma was seen in one case in FNAC, the imprint of which came as cystic lesion and histopathology came as follicular adenoma. FNAC showed cystic lesion in 7 cases out of that 4 came as follicular adenoma and 3 came as colloid goiter in HPE.

Table 9: FNAC diagnosis

FNAC	Number of patients (n=50)	%
1.Follicular neoplasm(FN)	23	46.0
2.Colloid goiter(CG)	11	22.0
3.Cystic lesion(CL)	7	14.0
4.Hashimotos(HT)	2	4.0
5.hurthle cell lesion(HC)	4	8.0
6.lymphocytic thyroiditis(LT)	2	4.0
7.cystic papillary carcinoma(CP)	1	2.0

Hemithyroidectomy was done in 47 patients, isthmecectomy in one case and total thyroidectomy in 2 cases. In first case, FNAC has come as papillary carcinoma for which imprint cytology showed cystic lesion and HPE in that case came as follicular adenoma. In the second case USG had shown a lymph node and the thyroid nodule in the right lobe was hard in consistency. The FNAC and imprint cytology of that case came as follicular neoplasm. Total thyroidectomy was done and HPE came as follicular carcinoma.

Table 10: Type of Surgery

Surgery	Number of patients (n=50)	%
Hemi thyroidectomy	47	94.0
Total thyroidectomy	2	4.0
Isthmucectomy	1	2.0

Imprint cytology showed follicular neoplasm in 20 cases and follicular adenoma in four cases, thus imprint cytology was able to make definite diagnosis of follicular adenoma in four cases. The case in which histopathology turned out as follicular carcinoma, the imprint cytology report was follicular neoplasm.

Table 11: Imprint cytology diagnosis

Imprint	Number of patients (n=50)	%
1.Follicular neoplasm(FN)	20	40.0
2.Colloid goiter(CG)	16	32.0
3.hurthle cell neoplasm(HC)	4	8.0
4.Cystic lesion(CL)	3	6.0
5.lymphocytic thyroiditis(LT)	2	4.0
6. Follicular adenoma(FA)	4	8.0
7.hashimotos thyroiditis(HT)	1	2.0

The main HPE findings were follicular adenoma (50%) and colloid goiter(28%). Micro follicular adenoma was seen in 2 cases and micro and macro follicular adenoma was seen in one case in HPE for which FNAC came as cystic lesion in 2 cases and follicular neoplasm in one case and imprint cytology came as cystic lesion in 2 cases and hurthle cell neoplasm in one case.

Table 12: Histopathology diagnosis

Histopathology	Number of patients (n=50)	%
1.Follicular adenoma(FA)	25	50.0
2.Hashimotos(HT)	3	6.0
3.colloid goiter(CG)	14	28.0
5.hurthle cell adenoma(HC)	4	8.0
6.micro and macro follicular adenoma thyroid(M&M FA)	1	2.0
7microfollicular adenoma(MFA)	2	4.0
8.follicular carcinoma (FC)	1	2.0

Out of the 49 lesions which came as benign by HPE, FNAC was able to diagnose only 14 lesions and imprint cytology was able to diagnose 22 benign lesions. Thus in the present study imprint cytology was found to be more sensitive and specific than FNAC in diagnosing benign lesions of thyroid.

The sensitivity and specificity of imprint cytology over FNAC in the diagnosis of malignant lesions was not done in the present study as the number of malignant cases in the study was less (2%).

Table 13: Correlation of FNAC with Histopathology

	Sensitivity	Specificity	PPV	NPV	Accuracy	P value
Follicular neoplasm/Adenoma	75.86	95.24	95.65	74.07	84.00	<0.001**
hashimotos thyroiditis	0.00	97.87	0.00	93.88	92.00	0.798
Colloid goiter	61.54	91.89	72.73	87.18	84.00	<0.001**
hurthle cell neoplasm	75.00	97.83	75.00	97.83	96.00	<0.001**
Others#	100.00	79.59	9.1	100.00	80.00	0.057+

Table 14: Correlation of imprint cytology with Histopathology

	Sensitivity	Specificity	PPV	NPV	Accuracy	P value
Follicular Adenoma	82.75	95.24	96.00	80.00	88.00	<0.001**
hashimotos thyroiditis	33.33	100.00	100.00	95.92	96.00	<0.001**
Colloid goiter	100.00	94.59	86.67	100.00	96.00	<0.001**
hurthle cell neoplasm	75.00	97.83	75.00	97.83	96.00	<0.001**
Others#	100.00	91.84	20.00	100.00	92.00	0.002**

DISCUSSION

Out of the 180 thyroid cases admitted, 72 cases were clinically solitary nodule thyroid.

Out of the 72 solitary nodule thyroid, 65 were operated. Pre operative ultrasound was done in all 65 clinically solitary nodule cases and in 13 cases histopathology came as multinodular goitre. Hence those 50 cases which were clinically, ultrasonographically and histopathologically solitary nodule thyroid were taken for further analysis.

In the present study 50 cases of ultrasound and histopathologically proven solitary nodule thyroid were studied in relation to age and sex distribution, site, size, symptoms, signs and pathological characteristics. In all 50 cases FNAC and imprint cytology was compared with histopathological examination.

All patients in the present study presented with swelling in front of the lower aspect of neck of varying duration which was same as study by Dr. Aimel, et al,[6] in which they studied 60 cases of solitary nodule thyroid with complaints of swelling in front of the neck.

None of the patients had pressure symptoms on the trachea or oesophagus. None of the patients had vocal cord paralysis. Nodules were mainly seen in 31-40 year age group which was similar to studies of Dr Aimel et al study,[6] Sukumar Shaha et al,[7] and Francis et al.[10] FNAC findings of this study was compared with Khadilkar et al,[8] study of 100 cases of solitary nodule thyroid which showed benign lesions in 66% and neoplastic in 34 % in which the histopathology came as 79% benign and 21% malignancy, where as in present study the HPE came as benign in 97.22% and malignancy in 2.77%.

Histopathological diagnosis was done for the neoplastic lesions in both the studies and in case of Khadilkar et al,[8] study,79% of neoplastic lesions came as malignant and 21% came as benign and in the present study, 97.22% of neoplastic lesions came as benign and only 2.77% came as malignant. In the present study FNAC has given a false positive value for malignancy in one case, (2%), but the false positive values of FNAC can vary from 0-8%.[9]

Imprint cytology of the present study was compared with Shaha,et al,[7] study and the ability of imprint cytology in the present study to diagnose benign lesions from all 50 cases was 44% where as in the other study it was 56.14%.In that study there was 12.5% of false positive where as in the present study there was not any false positive cases.

The sensitivity and specificity of imprint cytology in the present study was compared with Shaha et al,[7] and Francis et al,[10] studies.

In the present study the main benign lesions diagnosed by FNAC, imprint and HPE were follicular adenoma and colloid goitre. The sensitivity and specificity of FNAC and imprint cytology to diagnose each lesions were compared and from this study it can be inferred that imprint cytology is more sensitive and specific than FNAC to diagnose benign lesions of thyroid like follicular adenoma and colloid goitre.

The sensitivity and specificity of FNAC and imprint cytology to diagnose malignancy was not compared as the number of malignant cases in the present study was only 2%.

Incidence of malignancy in this study was only 2% which was comparable with Belfiore et al,[11] report of 4.2% and Dr. Aimel et al,[6] of 4%.
There wasn't any mortality or post-operative complication other than wound seroma in 4 cases, hence the incidence of complications not compared with any other similar studies.

CONCLUSION

In the present study majority of case of solitary nodule thyroid occurred in females (96%) in the third decade. Both FNAC and imprint cytology are easy and cheap and sensitive and specific method to diagnose benign lesions of thyroid but imprint cytology was more sensitive and specific than FNAC to diagnose follicular neoplasms/adenoma and colloid goitre. The sensitivity and specificity of FNAC and imprint cytology to diagnose malignant lesions has not been arrived at in this study as the number of malignant cases was less (2%) in the present study.

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