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Original Research Article

A clinico pathological study of solitary nodule of the thyroid with special reference to imprint cytology

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Abstract

Solitary thyroid nodule is defined as presence of a palpable nodule in otherwise normal thyroid gland. Imprint cytology 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. This study is mainly aimed to compare and correlate between FNAC, Imprint cytology and histopathological examination of solitary nodule thyroid. The present study is a prospective analysis of 50 cases of solitary nodule thyroid, among whom 48 were females and 2 were males. The sensitivity and specificity of FNAC and imprint cytology to diagnose each lesion 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. 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 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.

Keywords: Solitary Thyroid Nodule, Benign, Malignant, FNAC, Histopathology, Imprint Cytology, Follicular Adenoma, Colloid Goitre

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].
In all, 3-5% of population have a clinically palpable thyroid nodule, at autopsy 50% of adults

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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 goiter [3] and approximately 1 in 10-20 solitary nodules present with hyperthyroidism [4]. While most of them are benign,5% of all palpable nodules are malignant. [4]. Solitary nodules are one of the commonest presentation of thyroid disorder in our hospital. Imprint cytology [4] 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 Government General Hospital with solitary nodule thyroid from September 2019 to August 2021. Only cases which has been confirmed as solitary nodules after ultrasound and biopsy has been taken for further evaluation.

Methodology

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, Government General Hospital,Mahabubnagar, from September 2019 to August 2021. 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).

Observation and Results

A clinicopathological study with 50 patients with solitary nodule thyroid (ultrasound and histopathology proven) was undertaken to study the incidence of malignancy, compare and correlate between FNAC, Imprint cytology and Histopathological examination.

Out of total 180 cases of thyroid admitted,72 were clinically solitary nodule thyroid. Out of these 65 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.

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.

The swelling in the region of thyroid was the main complaint in all 50 cases. The duration of swelling ranged from one month to 12 years. None of the patients had pain or pressure symptoms or toxic symptoms. Indirect laryngoscopy showed both vocal cords mobile in all cases.

In 48 patients TFT was normal and in 2 patients T_4 was marginally high, which was corrected and taken up for surgery. In USG, solitary nodule was seen in isthmus in one case for which isthmecectomy was done.

Table 1: 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 goitre. 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 goitre in HPE.

Table 2: FNAC diagnosis

FNAC	Number of patients (n=50)	%
1.Follicular neoplasm (FN)	23	46.0
2.Colloid goitre (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 3: 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 4: Imprint cytology diagnosis

Imprint	Number of patients(n=50)	%
1.Follicular neoplasm(FN)	20	40.0
2.Colloid goitre(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

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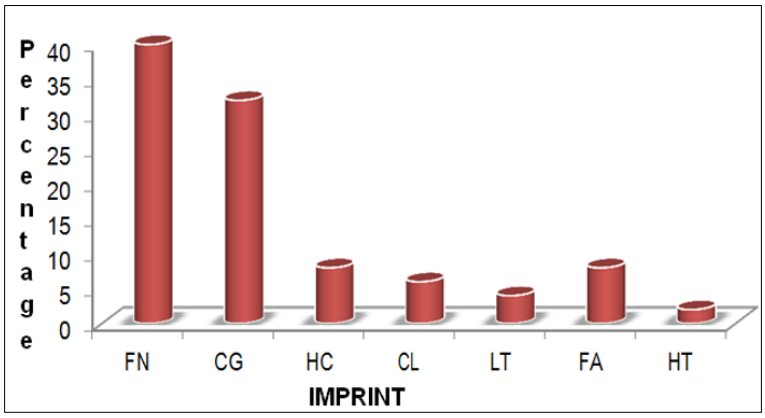

Fig 1: Imprint cytology diagnosis

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 5: Histopathology diagnosis

Histopathology	Number of patients (n=50)	%
1.Follicular adenoma(FA)	25	50.0
2.Hashimotos(HT)	3	6.0
3.colloid goitre(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

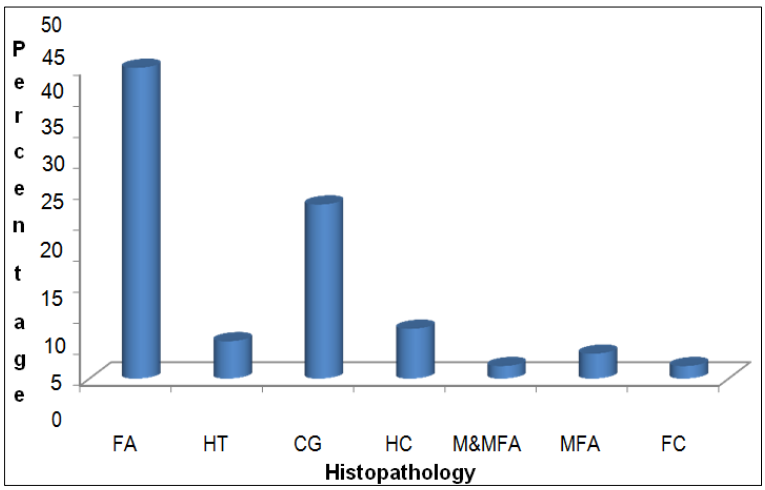

Fig 2: Histopathology diagnosis

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

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lesions was not done in the present study as the number of malignant cases in the study was less (2%).

Table 6: 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 goitre	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+

#, Cystic lesion, lymphocytic thyroiditis etc

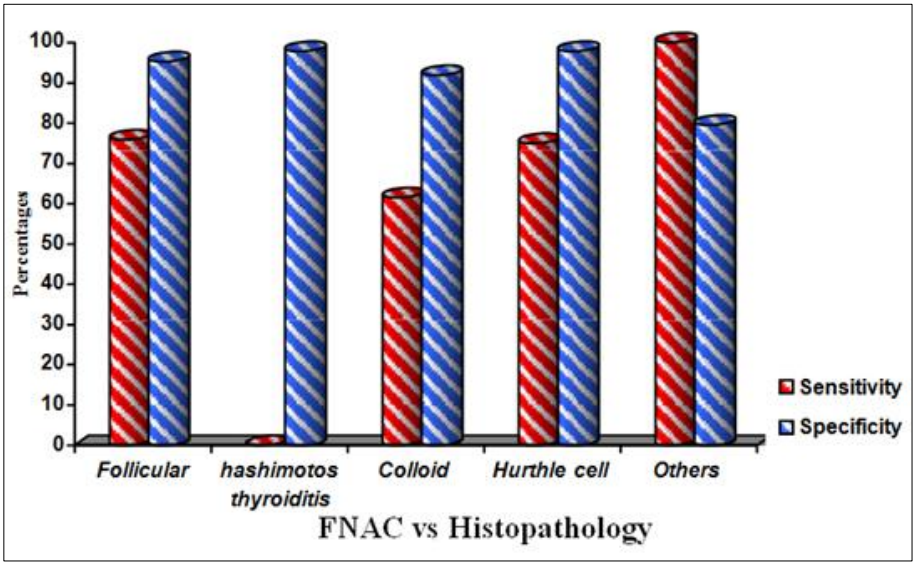

Fig 3: Correlation of FNAC with HPE

In the present study imprint cytology was found to be more sensitive and specific than FNAC in diagnosing benign lesions of thyroid.

Table 7: 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 goitre	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**

#, Cystic lesion, lymphocytic thyroiditis etc

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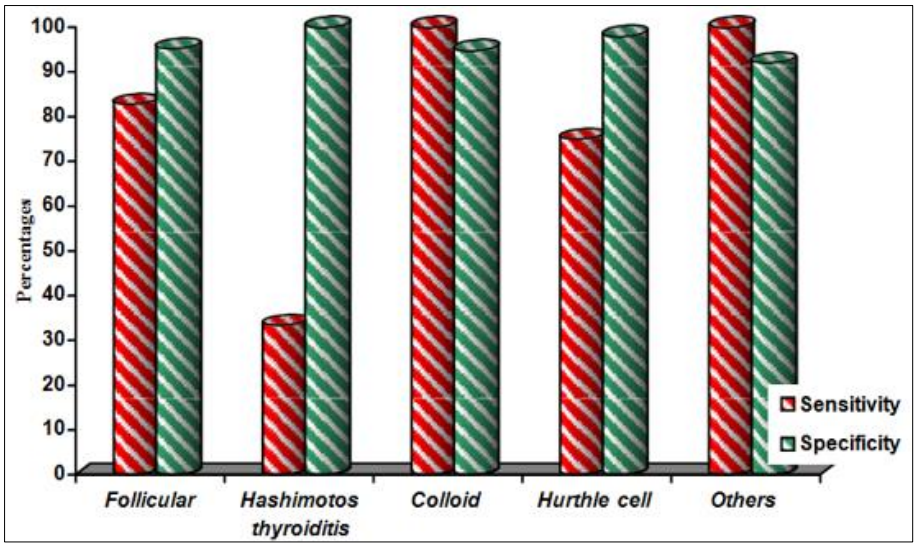

Fig 4: Correlation of imprint cytology with HPE

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*,[(8)] in which they studied 60 cases of solitary nodule thyroid with complaints of swelling in front of
Pre-operative indirect laryngoscopy was normal in all cases. Preoperative FNAC was done in all cases which shown benign lesions in 14 cases(28%) and neoplastic in 36 cases(72%).Out of the neoplastic, one was shown as malignancy(2.77%) which was false positive and indeterminate in 97.22%. Per operative imprint cytology was done in all cases and showed benign lesions in 22 cases (44%) and neoplastic which was indeterminate in 28 cases. Histopathological examination showed benign lesion in 49 cases (98%) and malignancy in 1 case (2%).
FNAC findings of the benign lesions of this study was compared with Dr. Aimel, *et al*., [8] study. The main benign lesions in the present study were follicular neoplasm and colloid goitre, which was same as the other study. The present study had more incidence of follicular neoplasm but Dr. Aimel, *et al*., [8] study had more incidence of colloid goitre which may be because of the study being done in iodine deficient areas in Kashmir valley.
FNAC findings of this study was compared with Khadilkar *et al*., [10] 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*., [10] 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% [4-9].
Imprint cytology of the present study was compared with Shaha, *et al*., [6] 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*., [6] and Francis *et al*., [9] 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*., [8] 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 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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