

A Clinico – Pathological Study of Solitary Thyroid Nodule

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Abstract

Background : Solitary thyroid nodule is a challenge for surgeons and pathologists. The prevalence of these nodule depends on age,sex,and iodine deficiency. The clinical and cytological evaluation of the nodule is important for the management. Fine needle aspiration cytology is important for preoperative diagnosis of benign and malignant thyroid lesions thus decreasing the incidence of surgeries.

Objectives: The present study was to understand the role of FNAC in the diagnosis of solitary thyroid nodule and to know the incidence of malignancy and to evaluate the the management of the solitary nodule.

Methods: This study was conducted in Government General hospital Guntur over a period of two years.About 140 patients were evaluated . Patients with goiter were excluded from study

Results: All cases that were benign on FNAC showed benign features on histopathology except in 4 cases which was papillary carcinoma .Sensitivity and specificity of fnac was 96.7% and 100% respectively.

Conclusion: FNAC is a safe , simple ,highly accurate , universally accepted modality for the management of thyroid lesion especially developing countries such as India.Majority of solitary nodules were benign and hemithyroidectomy is the preferred procedure .According to TBSRTC those that are grouped in suspicious are indeterminate category on cytology they are followed by hemithyroidectomy and confirmed by histopathological examination.

Keywords: FNAC , Solitary thyroid nodule, sensitivity, specificity , clinical examination.

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I. Introduction.

Thyroid disorders are the most common endocrine disorder seen in clinical practice and solitary thyroid nodule is one of the common presentations of thyroid disease .The term solitary thyroid nodule refers to distinct lesion that is palpable and radiologically distinct from thyroid parenchyma.A discrete swelling in an otherwise impalpable gland is termed as solitary and discrete swelling in agland with clinical evidence of abnormality elsewhere in thyroid is dominant nodule. About 70% of discrete thyroid swelling is clinically isolated and 30%are dominant .In India the prevalence of palpable thyroid nodule in the community is 12.2%. The incidence of thyroid cancer is increasing over years. It is better to have clear diagnostic approach to ensure patients, presenting with thyroid nodules and are managed appropriately and are not overtreated and undertreated .The present study is to evaluate the role of FNAC in the diagnosis of solitary thyroid nodule and to know the incidence of malignancy and we evaluated the management plans based on FNAC. Thyroid FNAC was started by Martin and Ellis in 1930.In 2007 Tbsrtc Was evolved with the aim of forming uniformity in the reporting of FNAC findings of thyroid that would facilitate effective discussion among pathologist and clinicians. Fine needle aspiration cytology(FNAC) plays important role in the managing patients with thyroid nodule .The majority of thyroid nodules are benign and only 5% are malignant .Clinical examination alone cannot distinguish between benign and malignant nodules .Thyroid cytology not only provides a definitive diagnosis of malignancy but also the tumour type thus enabling appropriate therapeutic surgery. .FNAC is safe ,simple and cost effective for evaluation of thyroid patients .Now a days , most surgeons rely on FNAC for making diagnosis of benign lesions .The incidence of malignancy in thyroidectomy patients has increased from 10% to 30% in recent years. FNAC itself has some limitations.The reported pitfalls are mostly related to sampling techniques, the skill of doctor performing the aspiration, sample adequacy,experience of pathologist interpreting the aspirate overlapping cytological features between benign and malignant swelling .In this study the effectiveness of FNAC is evaluated in clinical management of thyroid disease .

Ultrasound has become imaging modality of choice for diagnosing different thyroid disease. The continuous advancement of high resolution ultrasound machine has resulted in discovery of large number of obscured, non palpable and tiny nodules. Diagnostic accuracy of FNAC increases when guided by ultrasound.

II. Materials And Methods

This is a prospective study of solitary thyroid lesions carried out at Department of General Surgery, Government General Hospital, GUNTUR over a period of two years from 2015 to 2017. All patients who attended surgical Op with solitary thyroid nodule are included in this study. 140 patients were included in the study. Patients of all ages and both sexes were included in the study. Out of 140 patients histological confirmation was available for 114 patients. Methods used in this study included clinical presentation, thyroid function tests, FNAC, and histopathology. Signs and symptoms related to thyroid gland were studied. All patients with solitary thyroid nodule with age between 14 to 60 years were included in the study. Patients with goiter were excluded from study. Patients who fail to give proper history and who are unfit for surgery were excluded from study. Study tools: Detailed history, thorough examination, routine investigations, FNAC of nodule, treatment modality, histopathology of specimen were studied.

Table – 1 . Age And Sex Distribution

AGE	MALE	FEMALE	TOTAL
10-20	02	14	16
20-30	05	42	46
30-40	08	38	48
40-50	06	13	18
50-60	03	4	07
60-70	02	3	05
TOTAL	26	114	140

III. Results

The present study included 140 patients having solitary thyroid nodule. The age range of patients was from 14 to 60 years with a mean age of 32 years. Females were 114 and, males were 26 with a male to female ratio is 1:3.5. The FNAC results were categorised as per the recent 2007 Bethesda classification into **i**-non diagnostic or unsatisfactory; **ii**-benign; **iii**-atypia of undetermined significance (AUS) or follicular lesion of undetermined significance; **iv**-follicular neoplasm or suspicious for follicular neoplasm; **v**-suspicious for malignancy; **vi**-malignancy. Aspirates yielding insufficient low cellularity are considered as unsatisfactory. The thyroid FNAC specimen to be labelled as satisfactory for evaluation at least 6 groups of benign follicular cells are required and each group should be composed of at least 10 cells. Aspirates classified as benign included colloid nodule, adenomatous nodule, dominant nodule of multinodular goiter, lymphocytic thyroiditis thyroglossal cyst. Suspicious smears include follicular neoplasms, hurthle cell proliferation, lesions suspicious for malignancy. Benign lesions are comprised maximum number of cases (115) and followed by AUS. In cases that underwent lobectomy, total thyroidectomy were subjected to histopathological examination. The biopsy reports were correlated with preoperative cytology reports.

Table – 2 Presenting Complaints :

S. No	Presenting Complaints	No Of Patients
1	Swelling In Front Of Neck	140
2	Mild Pain In In Swelling	24
3	Difficulty In Breathing	4
4	Change In Voice	3
5	Cervical Lymphadenopathy	8
6	Symptoms Of Hyper Thyroidism Or Hypothyroidism	10

Table – 3 Site Of The Solitary Thyroid Nodule :

Site	Number
Right Lobe	76
Left Lobe	52
Isthmus	12
Total	140

Table – 4 Duration Of Complaints :

S.NO	DURATION	NO . OF PATIENTS
1	<3 MONTHS	08
2	3-6 MONTHS	18
3	6M- 3 YRS	86
4	>3YRS	28

Table – 5 Fine Needle Aspiration Cytology :

S.No	Fnac Finding	Number Of Patients
1	Inadequate Aspiration	06
2	Colloid Nodule	28
3	Nodular Goitre	20
4	Benign Cystic Lesion	18
5	Chronic Lymphocytic Thyroiditis	06
6	Follicular Neoplasm	36
7	Papillary Carcinoma Thyroid	12
8	Suspicious Of Papillary Carcinoma Thyroid	10
9	Anaplastic Carcinoma	03

Table – 6 Type Of Surgery Performed :

S.No	Type Of Surgery	No.Of Patients
1	Lobectomy	68
2	Sub Total Thyroid	16
3	Total Thyroidectomy	24
4	Total Thyroidectomy With Neck Dissection	06
Total		114

Table – 7 Correlations Of Fnac Lesion With Histopathology :

Category	Fnac Lesion	Histopathological Diagnosis	No Of Patients
Thyroid -1	Inadequate Aspiration (08)	Follicular Adenoma	05
		Colloid Nodule	03
Thy 2	Colloid Nodule (32) Nodular Goitre (24) Benign Cystic Lesion(16) Chronic Lymphocytic Thyroiditis (06)	Follicular Adenoma	08
		Colloid Nodule	12
		Multinodular Goitre	08
		Lymphocytic Thyroiditis	04
Thy 3	Follicular Neoplasia (42)	Hyperplastic Nodule	02
		Follicular Carcinoma	06
		Follicular Variant Of Paillary Carcinoma	08
Thy 4 Suspicious	Suspicious Of Papillary Carcinoma Of Thyroid (10)	Follicular Adenoma	03
		Colloid Nodule	02
		Papillary Carcinoma	05
Thy 5 Malignant	Papillary Carcinoma Hurthle Cell Neoplasm Anaplastic Carcinoma	Papillary Carcinoma 08	08
		Hurthle Cell Neoplasm 02	02
		Anaplastic Carcinoma	02

The commonest age group presentation was 31 to 40 years, mean age is 32 years . Ratio of Male to female ratio is 1:3.5. Most common presenting complaint is swelling in front of the neck on examination 8 patients had lymph node enlargement . 10 patients are presented with symptoms of either hyperthyroidism or hypothyroidism Majority of patients presented between 6 months to 3 years of onset of swelling .On FNAC 68 percent of the nodules were benign and 32 percent were malignant .Most common benign nodule was follicular adenoma (32%) followed by colloid nodule and dominant nodule of multinodular goitre.68% of clinically diagnosed solitary nodules were benign and 32% of nodules were malignant .All inadequate FNAC were benign on histopathological examination .Out of 36 follicular neoplasm 6 turned into follicular carcinoma and 8 were follicular variant of papillary carcinoma.In 10 cases of suspicious of papillary thyroid carcinoma on FNAC 5 cases are papillary carcinoma on HPE .Most commonly performed surgery was lobectomy,Subtotal thyroidectomy was performed in benign nodule of larger size .All patients diagnosed as malignant thyroid underwent total thyroidectomy and central neck dissection was performed in 6 patients .All the patients with follicular neoplasm went for lobectomy and 14 patients underwent completion thyroidectomy depending on the histopathological report.

IV. Discussion

Solitary thyroid nodules are the common clinical problem found in 4 to 8 percent of the adults .The Solitary thyroid nodules are the common clinical problem found in 4 to 8 percent of the adults .The incidence of thyroid nodules are common in females with male to female ratio 1:3.5 (5).And this study this correlated with the study of Sharma et.al.In our study there was female preponderance.Most common presentation is swelling in front of the neck . In recent years the role of FNAC is increasing in the management of the thyroid nodule . In this study effectiveness of FNAC is evaluated in the clinical management of thyroid disease. FNAC has diagnostic role in many thyroid lesions especially for papillary carcinoma and lymphocytic thyroiditis. For follicular carcinoma of thyroid FNAC is considered as a screening test and these smears are reported as

follicular neoplasm or suspicious for follicular neoplasm. This category of follicular neoplasm forms a grey zone with various differentials such as follicular carcinoma, follicular variants of papillary carcinoma and adenomatous nodule. Among 140 patients in whom FNAC was performed 68% were non-neoplastic, most of them are colloid nodules followed by multinodular goitre, lymphocytic thyroiditis and hyperplastic nodule and 32% were neoplastic on cytology, most of them were follicular neoplasm and followed by papillary carcinoma of thyroid on cytology. All inadequate aspirations were benign on histology. Our study was correlated with Sinna EA and Uma H et al. (3,4). Out of 42 cases which were given on FNAC as follicular neoplasm 14 cases turned into malignant. In these 6 into follicular carcinoma of thyroid and 8 were follicular variant of papillary carcinoma of thyroid, the remaining cases were follicular adenomas. Out of 114 cases 12 cases were diagnosed as papillary carcinoma of thyroid and they turned into papillary carcinoma of thyroid in HPE also, and 10 cases were diagnosed as suspicious of papillary carcinoma of thyroid. Out of 10 cases 6 were papillary carcinoma of thyroid on HPE and 4 cases were multinodular goitre in HPE, the present study was correlated with Pandey P, Dixit A et al. (5,6). Patients who were diagnosed as suspicious of papillary carcinoma we performed lobectomy and depending on the HPE report we performed completion thyroidectomy (8). In patients with papillary carcinoma of thyroid we performed total thyroidectomy if the lymph nodes were present we performed functional block dissection. The most common surgery performed for solitary thyroid nodule is lobectomy followed by subtotal thyroidectomy (6,8). In cases of suspicious of papillary carcinoma of thyroid 5 cases were turned into follicular adenoma and colloid nodule and for these cases lobectomy was justified. FNAC has a good diagnostic role in many thyroid lesions especially for papillary carcinoma of a thyroid and lymphocytic thyroiditis. For thyroid follicular carcinoma, FNAC is considered as screening test and these smears are reported as follicular neoplasm or suspicious for follicular neoplasm. To label it as follicular carcinoma, histopathology must show evidence of vascular or capsular invasion. In general smears from adenomatous nodules show less number of cells, have presence of dispersed rather than tightly cohesive follicular cells and more colloid than those from follicular neoplasm. About 35% of cases don't show any evidence of neoplasia but rather show hyperplastic proliferation of follicular cells as in multinodular goitre. Follicular lesions are categorized histopathologically as benign in some cases and malignant in some cases. Inclusion of such cases in benign and malignant category imparts a significant difference in the sensitivity and specificity rates. The benign lesion constitute majority of cases, the lesions included in the benign category are colloid goitre, adenomatous goitre, nodular goitre, cystic lesions. In our study all cytologically benign thyroid nodules are subjected to histopathological evaluation. In the present study sensitivity for cytological diagnosis for neoplasia was 92.3%, specificity 100% and diagnostic accuracy of 93%. This showing a positive correlation with histopathology. Our results are comparable with previous studies by Vojvodich et al and Kamaljit et al the overall accuracy of FNAC was found to be 85.6% and 85.9% respectively where FNAC of thyroid is reported to have sensitivity ranging from 60% to 96% and specificity of 45% to 100% (9,10). Various factors contribute to this wide range of sensitivity and specificity. It depends on the adequacy of sample, technique of sample collection, experience of the pathologist interpreting the smears, presence of overlapping cytological findings between some benign and malignant thyroid lesions and duration of the follow up of the patient. FNAC has an overall accuracy rate of around 90% – 100% in the deduction of thyroid malignancy. Any and every diagnostic procedure has its own limitations and diagnostic fallacies. It includes the presence of false negative and false positive results. False negative results usually occur following sampling errors, coexistence of benign and malignant lesions or due to overlap between the benign and low grade malignant tumours. These cases are of great importance more so since they indicate the potential of missing underlying malignant pathology. False negative rates can be minimised by clinical followup, repeat sono guided aspirations and reviewing the slides by more than one cytopathologist. False positive rates are less common not found in any patient in our study. No single diagnostic method helps in providing a definitive diagnosis of cancer thyroid. However FNAC is still the procedure of choice, particularly if ultrasound is used as an ancillary technique for better sample collection. The interpretation errors can be reduced by obtaining aspirates from different portions of the lesion using ultrasound guided FNA procedure and reviewing of slides by more than one cytopathologist. Both the cytopathologist should not be aware of each others diagnosis thus making it a blinded method of quality control.

V. Conclusions

The present study was undertaken to evaluate the usefulness of clinical examination, FNAC of thyroid in the management of solitary thyroid nodule and to know the sensitivity and specificity of the investigations by comparing with histopathological report. Thyroid nodules are more common in females of age group 30 to 40 years. Commonest presenting complaint is swelling in front of the neck. Most of the patients presented between 6 months to 3 years. In our study the sensitivity and specificity of fnac was 92.3% and 100 percent respectively. Most common surgery is performed is Lobectomy. FNAC exhibits an adequate diagnostic correlation with the final histopathological examination and enables the comparison of levels. FNAC is a valuable tool in the management of thyroid lesions with high degree of accuracy. It is safe, simple, cost

effective procedure with absence of major complications and can be performed on out patients with wide patient compliance. FNAC provides a more rapid and accurate diagnosis of thyroid lesion than any other combination of laboratory tests . However a combination of both FNAC and ultrasound will give optimal results and avoid mismanagement.

Figure No. I

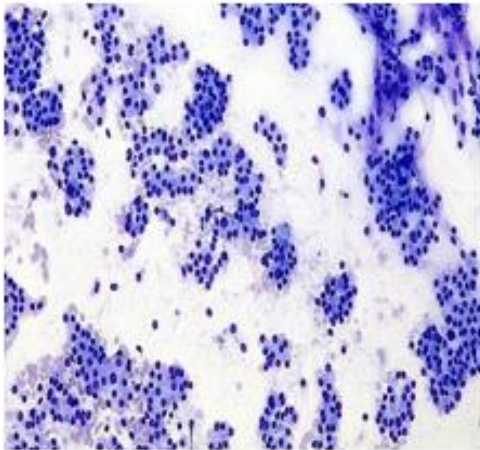


Figure No. II

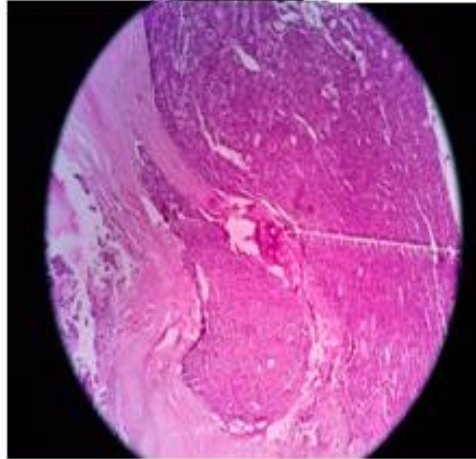


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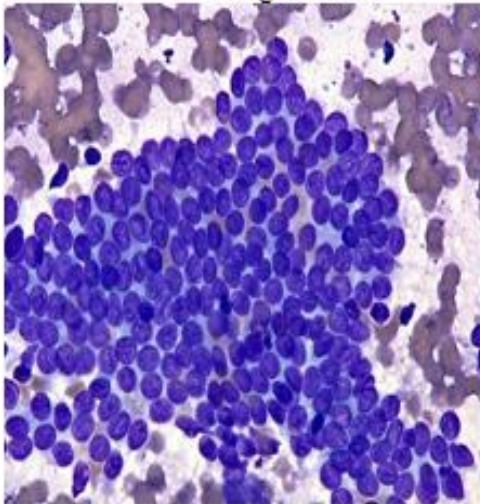


Figure no. IV

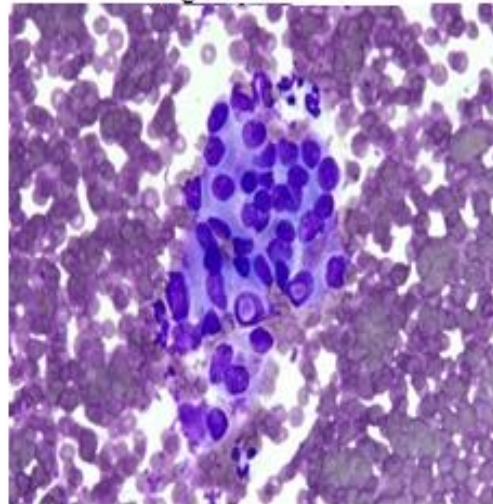


Figure no.V



Figure no.I : FNAC smear showing repetitive follicular pattern in follicular neoplasm .

Figure no.II :HPE showing capsular invasion in follicular carcinoma .

Figure no.III : FNAC smear showing thyroid acinar cells in papillary pattern of PTC (PAPILLARY THYROID CARCINOMA).

Figure no.IV : FNAC smear showing intra nuclear inclusion of PTC.

Figure no. V : HPE showing branching papillary architecture with ORPHAN ANIIE – EYE NUCLEI.

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