

**A CLINICAL STUDY ON MALIGNANT POTENTIAL OF SOLITARY NODULE OF THYROID**Abdul Sattar<sup>1</sup>, Lanka Vamsidhar<sup>2</sup>, Shaik Sufiya<sup>2</sup>

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**Abstract**

**Background:** Solitary nodule of thyroid is termed as a discrete swelling in an otherwise impalpable gland. The prevalence of palpable thyroid nodules in general population is 4-7%. Solitary nodule of thyroid is four times more common in women than in men. The aim is to study the accuracy of FNAC in diagnosis of malignancy in solitary thyroid nodule. To determine the incidence of the adenoma, carcinoma and thyroiditis as a cause of solitary thyroid nodule. **Materials and Methods:** This study is prospective examination of 108 patients who were diagnosed with a solitary thyroid nodule and were treated at the Government Medical College in Guntur. On the basis of the information and findings gathered, the following inferences can be made, even though it will be necessary to examine a much larger sample of patients. **Result:** A solitary thyroid nodule is more prevalent in individuals between the ages of 20 and 50 years old. The majority of patients who have been diagnosed with a solitary nodule of the thyroid will first appear with swelling only. The majority of people diagnosed with a solitary thyroid nodule are considered to be in euthyroid state. Adenoma is the most common underlying cause of a solitary nodule in the thyroid. FNAC is 100% specific, 61.54% sensitive for diagnosis of Papillary carcinoma thyroid with accuracy of 95.37% in our study. **Conclusion:** When a single thyroid nodule needs to be evaluated, a FNAC is indeed the investigation of choice. It has a relatively low risk. Histopathology is the only method that can confirm the precise pathology in these kinds of cases. With a high degree of sensitivity and specificity, it is able to identify papillary cancer in an isolated nodule.

**INTRODUCTION**

A solitary nodule of the thyroid is a discrete lump in an otherwise solid gland. In the general population, 4-7% of people have palpable thyroid nodules. Solitary thyroid nodules are four times more prevalent in females than in males. Since Cole and Majarakis concluded in their study that solitary thyroid nodules have a higher incidence of malignancy compared to multinodular goitre, there has been considerable interest in this condition.

The actual incidence of solitary thyroid nodule is slightly lower than the clinical estimate. When that same gland is analysed using ultrasonography, CT, or MRI, or when it is exposed during surgery, clinically unpalpable nodules are frequently detected.

15 percent (10 to 30 percent) of isolated thyroid nodules are malignant, and an additional 30 to 40 percent are follicular adenomas. The remaining non-

neoplastic lesions are predominantly colloid goitre, thyroiditis, and cysts.<sup>[1]</sup>

Typically, a thyroid nodule manifests as an asymptomatic mass. However, the most concerning aspect of a solitary thyroid nodule is its potential for malignancy.

Currently, the most precise test for diagnosing malignancy in thyroid nodules is a fine-needle aspiration (FNA) biopsy. Under ultrasound guidance, Fine Needle Aspiration yields superior results. Since 1939, when Hamilton and Soley illustrated that the malignant thyroid tissue contains less radioactive iodine than the normal thyroid tissue, radionuclide scanning has been the gold standard for evaluating Solitary Nodule Thyroid. According to the Radioisotope study, thyroid nodules are categorised as cold, warm, or hot based on their ability to rack up the radioactive isotope.<sup>[2,3]</sup> Hypofunctional are cold nodules, normal are warm nodules, and hyperfunctional are hot nodules. The management of

a single thyroid nodule varies depending on a number of factors.

## RESULTS

### MATERIALS AND METHODS

It is a Prospective, observational study planned in the Department of General Surgery. 108 cases who admitted with solitary thyroid nodule in Government General Hospital, Guntur, during the period of February 2021 to October 2022 patients admitted in general surgical wards of GGH Guntur during period of 18 months. Informed and written consent obtained.

#### Inclusion Criteria

Patients admitted and operated for solitary thyroid nodule in surgical wards of Government general hospital, Guntur during the period of study.

#### Exclusion Criteria

Patients with diffuse enlargement of thyroid, presenting with multi nodular goitre. Patients who refused investigations and not willing to participate. Solitary nodule of thyroid is termed as a discrete swelling in an otherwise impalpable gland. The prevalence of palpable thyroid nodules in general population is 4-7%. Solitary nodule of thyroid is four times more common in women than in men. True incidence of solitary nodule thyroid is somewhat less than that of the clinical estimate. When such a gland is examined by ultrasonography, CT or MRI or exposed at operation clinically impalpable nodules are often detected.

Obtaining consent for interview and examination. Obtaining consent for collection and storage of images of patient. Maintenance of confidentiality is taken care of. The doubts of the patient will be answered to avoid any confusion. The academic purpose behind the study will be explained to the patient and then enrolled. The patient can withdraw from study anytime during the process. No animal experiments are done, so major ethical issues will not arise.

The age of the patients ranges from 15 years to 75 years, with peaks being in 3rd to 5th decades. The mean age of presentation is 38.63 years. Cases in 3rd to 5th decades constitutes 60% of the cases studied. The maximum number of cases (36%) reported was between 30-39 yrs of age followed by 40-49yrs of age (24%). In this study solitary thyroid nodule is commonly seen among females with 85.2% of incidence. Female to male ratio is 8.5:1.5. Duration of symptoms varies from 10 days to 8 yrs in the present study. Most of them presented to opd as asymptomatic swelling in front of neck. Nodules were more frequently seen in right lobe. Isthmus was not involved in any patient. Out of 108 cases studied, 67 nodules were in right lobe of the thyroid gland and 41 in the left lobe of thyroid. Size of solitary nodule varies from 1 – 5 cms in the present study. Most of the cases seen between 3 – 4cms.

Out of 108 cases, 2 presented with features of thyrotoxicosis, 8 with hypo thyroidism and rest all were in euthyroid. Patient with thyrotoxicosis were made euthyroid using antithyroid drugs and operated. Patient with hypo thyroidism was treated with thyroxine and operated. [Table 2]

Out of 108 cases FNAC was done for every case included in study. Majority showing as benign lesions accounts for 65 cases of solitary thyroid nodule, 24 were follicular neoplasm, 7 cases are papillary, 2 are cystic lesions of thyroid, 4 are lymphocytic thyroiditis, 2 were malignant and 4 cases are suspicious of malignancy. [Table 3]

Present study 108 cases are included. Most of them are firm in consistency. [Table 4]

From the study, out of 19 carcinoma, 14 were papillary and 5 were follicular: no case of medullary or anaplastic or lymphoma was detected. Papillary carcinoma accounts to 73.68% and follicular carcinoma accounts to 26.3%. [Table 5]

FNAC is 100% specific, 61.54% sensitive for diagnosis of Papillary carcinoma thyroid with accuracy of 95.37%. [Table 6]

**Table 1: Demographic details in present study**

Age in Years	Number	Percentage
10-19	4	3.7
20-29	20	18.5
30-39	39	36.1
40-49	26	24.1
50-59	13	12
>60	6	5.6
Total	108	100
Gender		
Male	16	14.8
Female	92	85.2
Duration		
<1 month	4	3.7
<3 months	9	8.4
3-6 months	22	20.3
6months-1 year	26	24.1
1year- 2 years	24	22.2
>2 years	23	21.3
Site of nodule		
Right	67	66

Left	41	34
Size		
1-2 cms	25	23.2
2-3 cms	30	27.8
3-4 cms	31	28.7
4-5 cms	9	8.3
>5 cms	13	12

**Table 2: Functional Status**

Thyroid Status	Number	Percentage
Euthyroid	98	90.6
Hypothyroid	8	7.5
Hyperthyroid	2	1.9
Total	108	100

**Table 3: FNAC findings**

Findings	Number	Percentage
Benign	57	52.7
Follicular Neoplasm	31	28.7
Papillary Carcinoma	8	7.4
Cystic Lesion Of Thyroid	2	1.9
Lymphocytic Thyroiditis	4	3.7
Suspicious Of Malignancy	4	3.7
Malignant	2	1.9
Total	108	100

**Table 4: Clinical Consistency and procedure executed in present study**

Consistency	Number	Percentage
Firm	90	83.3
Soft	12	11.1
Variable	6	5.6
Total	108	100
Procedure		
Total Thyroidectomy	19	17.6
Hemi Thyroidectomy	89	82.4
Total	108	100

**Table 5: Post Operative Histopathology**

HPE findings	Number	Percentage
Adenomatous Goiter	48	44.4
Follicular Adenoma	35	32.4
Follicular Carcinoma	5	4.6
Papillary Carcinoma	14	12.9
Cystic Lesion	2	1.8
Hashimotos Thyroiditis	4	3.7
Total	108	100

**Table 6: Cyto histopathological correlation of papillary carcinoma thyroid**

Statistic	Value	95% CI
Sensitivity	61.54%	31.58% to 86.14%
Specificity	100.00%	96.19% to 100.00%
Disease prevalence (*)	12.04%	6.57% to 19.70%
Positive Predictive Value (*)	100.00%	
Negative Predictive Value (*)	95.00%	90.52% to 97.42%
Accuracy (*)	95.37%	89.53% to 98.48%

**Table 7: Comparison of present study with other studies**

Authors	Percentage
FNAC findings	
Kaur K et al, <sup>[6]</sup>	18
Mundsad B et al, <sup>[7]</sup>	4.16
Sarda Ak et al, <sup>[8]</sup>	10.8
Present study	15.11
Incidence of carcinoma:	
Dean et al, <sup>[9]</sup>	6
Wagana et al, <sup>[10]</sup>	16
Rehman A U, <sup>[11]</sup>	11.4
Present study	14.8

## DISCUSSION

The butterfly-shaped thyroid gland can be seen in the front of the neck. The thyroid is the second endocrine organ that can cause problems throughout the body. The pathology associated with it might either be systemic or localised. The thyroid is responsible for producing a number of hormones, which contribute to calcium homeostasis, as well as metabolism and the maturation of the human body. Its production differ due to endogenous and external sources. There are a number of potential causes, including inflammation, infection, dyshormonogenesis, and neoplasia. Diseases of the thyroid can affect people of any age group. The thyroid gland is intimately connected to the parathyroid glands, which play a vital role in the metabolism of calcium. It is also connected to the nerves that are necessary for the muscles in the throat. Therefore, there is a possibility of injury occurring while they are undergoing thyroid surgery.

The aim of this study was to find malignant potential of solitary thyroid nodule in patients attending our hospital. Sample size consisted of those patients attending surgery OPD of our institution and more than 14 years of age. To find prevalence of thyroid swellings, patients underwent FNAC, USG neck, was admitted, underwent relevant investigations, hemi/total thyroidectomy was done and thyroid was subjected to histopathological examination. Then results were compared.

The distribution of age in the study population ranges from 15 to 77 years. In a study done by Aravindan et al,<sup>[4]</sup> and Sengupta et al,<sup>[5]</sup> mean age for thyroid diseases were 47 and 35.39 respectively. In my study the mean age for study population was 38.63. There is a variation regarding gender ratio in various studies. Sengupta et al,<sup>[5]</sup> reported a ratio of 3.8:1, while in present study, female to male ratio is 5.75:1. Because of periods of fluctuations in the demands of the hormonal requirement in female in their life cycle (puberty, menstrual cycles, pregnancy, menopause), the chances of thyroid nodule formation are very high as compared with male counterparts.

In the present study, neoplastic conditions include adenomas and all malignant lesions. From the study, the ratio of non-neoplastic to neoplastic cases is about 1.51:1, which is comparable to the studies done earlier.

Out of 108 cases, most common non neoplastic pathology was nodular goiter (52.7%) followed by lymphocytic thyroiditis (3.7%) and the most common neoplastic pathology was Follicular neoplasm (28.7%) followed by Papillary Carcinoma of thyroid (7.4%).

The probable reasons for negative correlation with HPE are Faulty biopsy procedure – too much/ too little suction while aspiration. Sampling error – biopsy needle over the tissue surrounding nodule. Long standing cysts having calcification – inadequate

material Ø Thick fibrous and calcified capsule. Highly vascular sclerotic lesions

From the literature, the incidence of malignancy in thyroid nodule ranges from 5% to 30%. From the present study, the incidence found to be 14.8 %, which is comparable with the study done by Rehman A U et al.<sup>[11]</sup> In our study, FNAC is 100% specific, 61.54% sensitive for diagnosis of Papillary carcinoma thyroid with accuracy of 95.37%.

In this study total 94 hemithyroidectomies were done and 14 total thyroidectomies were done. The specimens were sent for histopathological examination of which 5 of the hemi thyroidectomy specimens turned out to be follicular carcinoma and further managed with completion thyroidectomy.

Thyroidectomy is consistently ranked among the most common surgical procedures performed all over the world. The primary reasons are to prevent constriction of the breathing passages and to detect early signs of haemorrhage. Some people recommend just using drains in cases of hypervascular illness and severe thyroid conditions. It is possible to skip the drain in straightforward thyroid procedures like lobectomy because doing so will save the amount of time spent in the hospital and lower the risk of infection. Complications can arise during a total thyroidectomy because of the thyroid's proximity to other critical structures in the area. To minimise the risk of complications, meticulous dissection is required.

There are a few different approaches that can be taken in order to locate the recurrent laryngeal nerve. Nerve stimulation, intramuscular electrodes, and visual inspection with laryngoscopy are the three methods. Nevertheless, direct visualisation is the gold standard. Diabetes and hypothyroidism are conditions that need to be monitored carefully over the course of a patient's entire life, although diabetes carries a somewhat greater chance of developing complications.

Hypothyroidism is also a factor in hypertriglyceridemia, which increases the chance of developing cardiovascular disease. Recent research has indicated that diabetic patients have a higher prevalence of hypothyroidism than the general population, and that having both conditions at the same time raises the risk of microvascular problems. There is an incidence of hypothyroidism in 11% of the population.<sup>[12]</sup>

It was not possible to determine a definitive cut-off value for distinguishing between benign and malignant thyroid lesions due to the small sample size of the study, the absence of undifferentiated tumours, and the restricted number of cases in both categories of cases (benign and malignant). More extensive sampling is required in order to validate this observation.

## CONCLUSION

Although thyroid cancer isn't really extremely prevalent, thyroid nodules are indeed very common in general population. The evaluation of a single thyroid nodule aims to determine whether surgery will be necessary for the patient as well as to rule out cancer.

Patients history, risk factor evaluation, and clinical examination are the first steps in the evaluation of a solitary thyroid nodule and will help choose the next set of investigations. Every patient with a thyroid nodule should have their serum TSH assessed as well as an ultrasound. With small or deep nodules, or when there are numerous nodules present, ultrasound is frequently helpful in directing the FNA. Depending on the patient's risk factors, clinical exam results, ultrasound nodule size and appearance, and serum TSH, FNAC may do additional evaluations.

Low-risk patients may develop benign, asymptomatic thyroid nodules less than 4 cm. Surgery should be performed if a thyroid nodule is larger than 4 cm in size or if FNAC indicates that it is "malignant," "suspicious for malignancy," or "indeterminate." At the very least, a repeat FNAC is necessary for asymptomatic and tiny nodules categorised as "follicular lesions of unknown significance." Surgical treatment for thyroid nodules that induce compressive symptoms is recommended. Depending on the clinical situation, autonomous functioning (hot) nodules may be treated surgically or with radioactive iodine ablation. In some cases with a familial history of MEN 2 or familial MTC, genetic testing is helpful.

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