

## ORIGINAL RESEARCH

### A clinical study of solitary nodule thyroid

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#### ABSTRACT

**Introduction:** In the preoperative decision-making of the thyroid swellings, fine needle aspiration cytology (FNAC) is becoming an ever more vital tool.

**Aim:** To determine the incidence and role of FNAC in the management of the solitary nodule thyroid.

**Materials and methods:** A prospective analysis of 55 cases of solitary nodule of thyroid, admitted to Govt .E.N.T. Hospital, Hyderabad, during the period 18 months from Jan 2014 to June 2015.

**Results:** Commonest presentation of solitary nodule is swelling in front of neck. The peak age at presentation of solitary nodule thyroid is 3<sup>rd</sup> to 5<sup>th</sup> decade, constituting about 60% of the cases. Solitary nodule is more common in females with the ratio M:F = 1:8:16. Most of the solitary nodule of thyroid are benign (89%). Most of patients with solitary nodule of thyroid are in euthyroid state(95%). After evaluation of solitary nodule thyroid, 33% of all the clinically solitary nodule turned out to be multi-nodular 93 goiter. Common causes of solitary nodule thyroid are MNG (33%), follicular adenoma (25%) and adenomatous 93goiter (25%).Incidence of malignancy of solitary nodule is about 10.9%. Male to female ratio in case of malignant nodule is 1:5. Incidence of carcinoma in males presenting as thyroid nodule is higher (16.67%) compared to that of females (10.20%).The most common malignancy in solitary nodule thyroid is papillary carcinoma (67%), followed by follicular carcinoma (33%).

**Conclusion:** FNAC is an important investigation in the evaluation of the solitary nodule of thyroid. Surgery has been the treatment of choice in most of the either because of cosmetic reasons or toxicity or FNAC diagnosis of follicular neoplasm or malignancy.

**Keywords:** Solitary nodule, Follicular adenoma, Adenomatous, Papillary carcinoma.

#### INTRODUCTION

Solitary nodule of thyroid is the most frequent of the various thyroid diseases and it is only a descriptive term and does not refer to any specific pathological entity. In literature, the terms adenoma thyroid and solitary nodule of thyroid are used interchangeably. However, this is not accurate. Though every adenoma is a solitary nodule, not every solitary nodule is an adenoma. It is difficult on clinical examination to give any final opinion regarding the nature of the solitary nodule because a nodule, which on clinical examination is solitary, may reveal itself to be a cyst, multinodular goiter or it may come as a histological surprise as thyroiditis or malignancy, when they are least suspected. This is the inherent problem faced by the surgeon

confronted with a solitary nodule to decide whether it is benign or malignant. This problem occurs not only in diagnosis but also in treatment.<sup>1,2</sup>

There is divided opinion regarding the management of solitary nodule. At present the majority view is that the correct line of treatment of the solitary nodule of the thyroid is surgical only, as there is possibility of the nodule harboring malignancy which may not have the typical clinical features of malignancy in early cases.<sup>3</sup> In the present series a detailed study of 55 cases of thyroid nodule which were admitted and treated at Govt. E.N.T. Hospital Hyderabad has been done to evaluate the disease with special reference to diagnosis and management.

## **MATERIAL AND METHODS**

The present study on clinical Study has been conducted by utilizing cases admitted and managed in the Department of E.N.T at Govt E.N.T Hospital, Hyderabad over a period of 18 months from Jan 2014 to Jun 2015.

### **INCLUSION CRITERIA**

All patients who presented clinically solitary nodule (by definition)

### **EXCLUSION CRITERIA**

Clinically multinodular goiter, nodule with palpable lymph nodes, swelling with previous h/o of surgery for malignancy

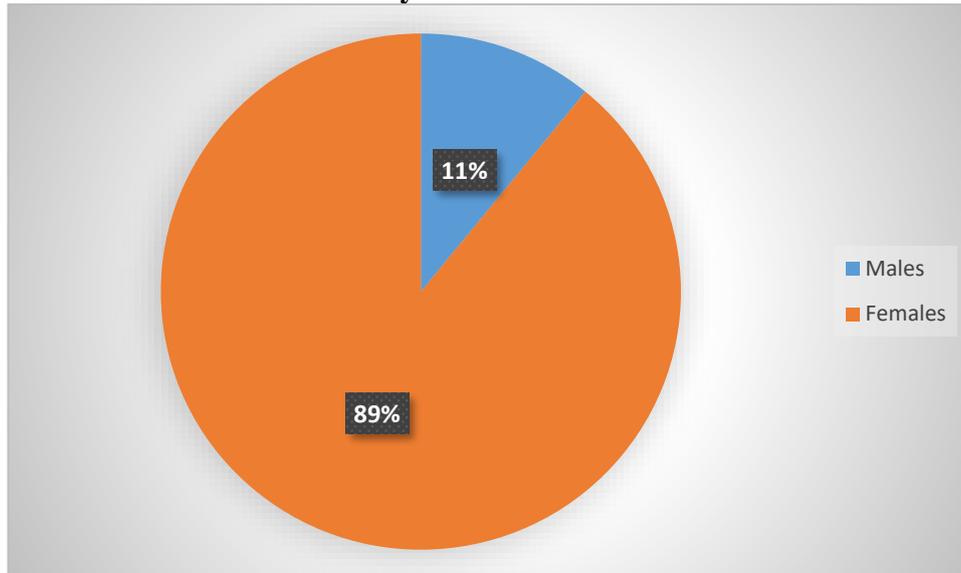
Prospective analysis of 55 cases of solitary nodule thyroid in the specified period done. These cases were selected by random sampling method and studied in detail clinically and recorded as per the proforma. Routine investigations and specific investigations including FNAC of the nodule, Thyroid profile, IDL. Plain X-ray neck, USG neck were done in all cases. Special investigations like radio-isotope scanning was not performed as the facilities were not available. All the patients were managed by surgery, identification of recurrent laryngeal nerve was made mandatory in all cases, diagnosis was made mandatory in all cases, and diagnosis was confirmed by histo-pathological examination.

The patients were grouped according to different variables like age, sex, size of the nodule, site of the nodule functional thyroid status, FNAC reports and histo-pathological examination, reports, then analyzed and compared with the previous similar studies conducted elsewhere. Finally conclusions were drawn accordingly.

Use of anti-thyroid drugs, beta-blockers, blood transfusions or any other medications were prescribed based on individual status and was noted. Position of the patient, type of anaesthesia, incision, type of operation planned, per-operative findings and type of operation performed were recorded. Every patient was followed up post-operatively during the course of management in the hospital to note the development of and management of complications. At the time of discharge, all the patients were advised to attend the ENT OPD regularly for follow up. Any recurrences or complications were noted. Thyroid functional status was assessed, accordingly thyroxine tablets prescribed if necessary.

## **RESULTS**

Solitary nodule of thyroid are much more common in females. All the cases in the present study presented complaint of swelling in the region of the thyroid. Only few patients presented with pain, discomfort and dysphagia. All the mentioned additional symptoms were of mild degree. Out of 55 cases, 3 cases had pain, 3 cases had discomfort and another 2 had dysphagia. Also none of the patient had lymphadenopathy which was confirmed by ultrasonographic examination. Two patients had symptoms of thyrotoxicosis, and one had features of hypothyroidism. The latter patients' thyroid profile confirmed the functional status.

**Figure-1: Gender distribution in study**

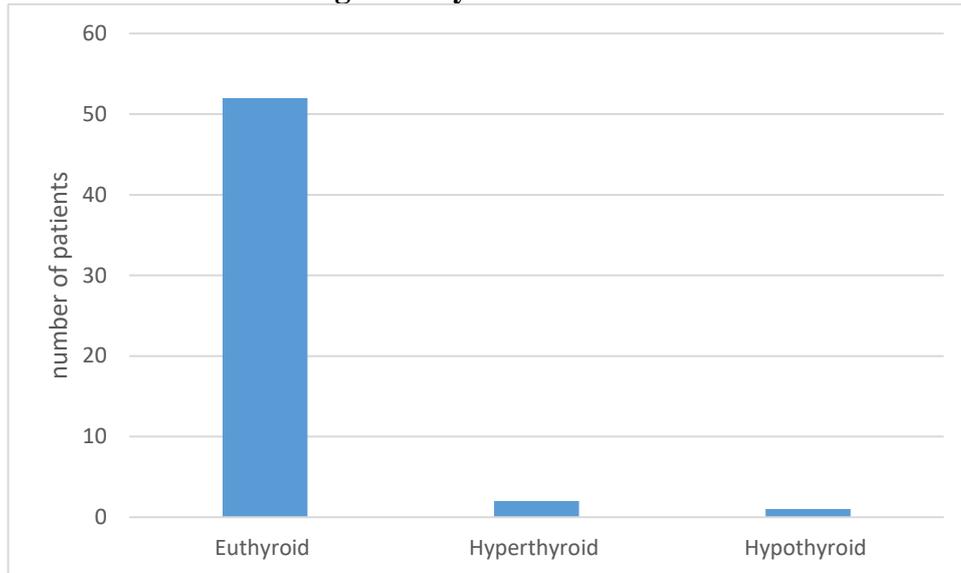
Out of 55 cases, studied 49 were females and 6 were males, and the ratio comes to M: F = 1: 8:16. Also the malignant nodules are common in females. Out of 6 cases of malignancy in the study, 5 were females.

**Table-1: Clinical features of cases in study**

Duration of symptoms	Number of patients	Percentages
< 1 month	1	1.8
< 1- 3 months	7	12.7
3-6 months	11	20
6-12 months	7	12.7
1-2 years	14	25.5
2-5 years	13	23.6
>5 years	2	3.6
<b>Site of nodule</b>		
Right	28	51
Left	27	49
<b>Size of the nodule</b>		
< 1cm	0	0
1-2 cm	2	3.6
2-3 cm	9	16.4
3-4 cm	17	31
4-5 cm	14	25.5
5-6 cm	9	16.4
6-7 cm	2	3.4
>7 cm	2	3.4

In our study, duration of onset symptoms varied from 15 days to 8 years. Also duration of malignancy, extend from 1 month to 4 years. Out of 55 cases studied, 28 cases presented with nodule in the right lobe of the thyroid gland and remainder 27 in the left lobe of thyroid. Suggestive of equidistributional of STN in both lobes.

In the present study, on clinical examination size of the Nodule in its largest dimension, varies from 2cm to 12 cm. most of the patients presented with the size of about 3-5 cm in the study, as such there is no correlation between the size of the nodule and the occurrence of malignancy.

**Figure-2: Presentation of swelling in study**

Out of 55 cases, two presented with features of thyrotoxicosis, one with hypothyroidism and rest all were in euthyroid state. Patient with thyrotoxicosis were made euthyroid using anti-thyroid drugs and operated. Patient with hypothyroidism was treated with thyroxine.

**Table-2: Findings of FNAC reports in study**

FNAC reports	Number of patients	Percentages
Benign	32	58.2
Follicular Neoplasm	16	29
Suspicious	1	1.8
Malignant	3	5.5
Lymphocytic Thyroiditis	1	1.8
Cysts	2	3.6
Total	55	100

Fine Needle Aspiration Cytology is the important investigation in the evaluation of the solitary nodule of thyroid. All 55 cases were subjected to FNAC during the course of evaluation. FNA reports are mainly categorized into 6 entities- Benign, Follicular neoplasm, Suspicious (malignancy), Malignant, Lymphocytic Thyroiditis, Cysts. In our study, out of 16 follicular neoplasms, two turned out to be follicular neoplasm carcinoma. One suspicious (of papillary carcinoma) cases confirmed papillary carcinoma on histopathological examination. Three cases of papillary carcinoma were diagnosed pre-operatively by FNAC alone. Two cases diagnosed as cysts by FNAC confirmed to be simple cysts on histopathological examination.

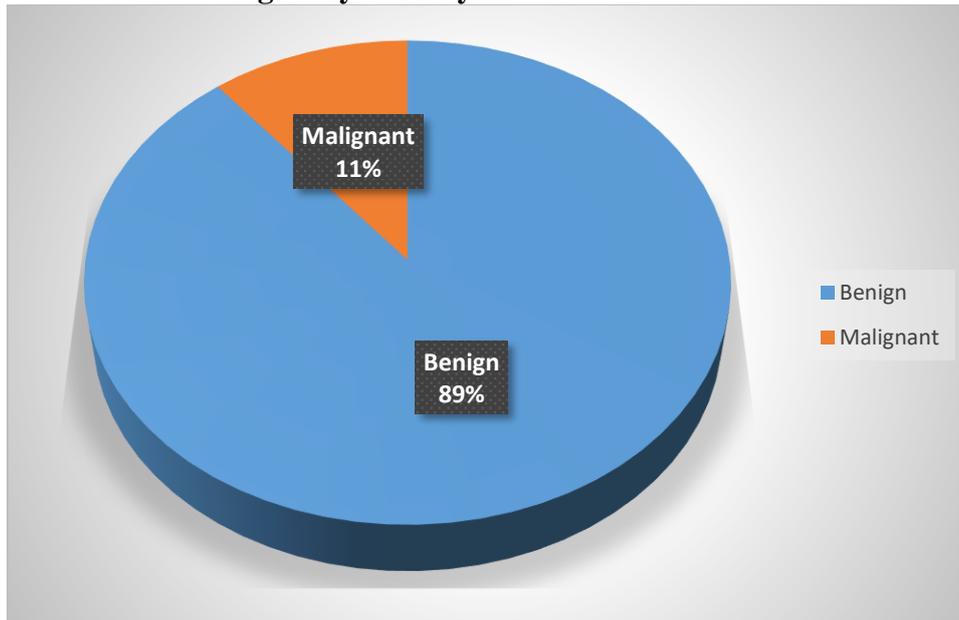
**Table-3: Aetiological incidence of solitary nodule of thyroid**

HPE reports	Number of patients	Percentages
Follicular	14	25.5
Adenoma	0	
Adenomatous	14	25.5
Goiter	0	0
MNG	18	32.7
Carcinoma	6	11
Lymphocytic thyroiditis	1	1.8
Simple cyst of Thyroid	2	3.6
Total	55	100

Out of 55 cases studied, common causes of solitary nodule are MNG, follicular adenoma and adenomatous goiter; the most common being is MNG which constitutes about 33% of cases. Follicular adenoma and adenomatous goiter found almost at the same incidence, accounting to 25% each.

Out of 55 cases, six were malignant – 4 papillary carcinoma and 2 follicular carcinoma. Ultra sonography detected suspicious findings in two cases among six malignant cases – 1 papillary and 1 follicular. Three cases of papillary carcinoma were diagnosed with certainty by FNAC, one case was suspicious with turned out to be papillary CA on pathological examination. Two cases of follicular carcinoma was diagnosed follicular neoplasm, one of them showed suspicious features on ultra-sonographic examination.

**Figure-3: Incidence of malignancy in study**



Incidence of malignancy in solitary nodule is 10.9%.

**Table-4: Types of carcinoma in present study**

Types of Carcinoma	Number of cases	Percentage %
Papillary	4	67%
Follicular	2	33%
Medullary	0	0
Anaplastic	0	0
Lymphoma	0	0
Total	6	100%

From the study out of 6 carcinoma 4 were papillary and 2 follicular: no cases of medullary or Anaplastic or Lymphoma was detected. Papillary carcinoma accounts to 67% and follicular carcinoma accounts to 33%.

Depending up on the clinical diagnosis and FNAC features all the 55 patients under gone surgery. Among them 30 patients had undergone hemi-thyroidectomy, 18 cases under gone Subtotal thyroidectomy and six cases under gone total thyroidectomy.

Post operatively suppressive dose of thyroxin was started for patient who had undergone total thyroidectomy. Threecases out of six cases of total thyroidectomy showed features of Hypocalcemia. On 2-4 post-operative day, hence they are supplemented with oral calcium and vit.D3. All the cases were followed-up for 6 months, two cases had with Husky voice with uni lateral vocal cord palsy, which was stated conservatively and recovered in 3 months.

## DISCUSSION

The observation and results of present study were compared with the available previous similar studies.

**Table-5: Comparison of characteristic with other studies**

Authors	Mean age in Years
A. Rehman U <sup>4</sup>	34.7
Kurshidanvar et al <sup>5</sup>	37
Present study	37.24
Authors	Sex incidence M:F
Dorairajan et al <sup>6</sup>	1:9
Das DK et al <sup>7</sup>	1:5.3
Gupta C et al <sup>8</sup>	1:5
Present study	1:8:16

In the study done by A Rehman U<sup>4</sup> and Kurshidanvar et al<sup>5</sup> reported the peak incidence in between 3<sup>rd</sup> and 4<sup>th</sup> decade. Naz Aktar<sup>9</sup> in his study on solitary thyroid nodule reported that most of the patients are between 21 - 40 years of age, i.e. 64.5%. From the present study mean age at presentation found to be 37.27 years, co-relates with the previous studies.

Most of the earlier series reported the peak incidence of Solitary Nodule thyroid in the 3<sup>rd</sup> and 4<sup>th</sup> decades.

In the present study, it found to be 1:8:16, which co-relates with the previous study. Das DK<sup>7</sup> reported 1: 5.3 as sex ratio of solitary thyroid nodule and Dorairajan<sup>6</sup> reported sex ratio of patients presenting with solitary thyroid nodule as 1: 9. The occurrence of thyroid nodule formation is very high in females as compared with male counterparts due to fluctuations in the demands of the hormonal requirement in their life cycle (puberty, menstrual cycles, pregnancy and menopause).

Because of periods of fluctuations in the demands of the hormonal requirements in female in their life cycle (Puberty, Menstrual cycle, Pregnancy, Menopause) the chances of Thyroid nodule formation are very high as compared with male counter parts.

**Table-6: Distribution of non-epileptic and neo-plastic lesions diagnosed by FNAC**

Authors	Non-neoplastic	Neoplastic	Ratio
Saradha A.K. <sup>25</sup>	487	59	8.25:1
Kaur (2002)	32	15	2.13:1
Nagada (2006)	51	18	2.83:1
Chao CT(2007)	276	264	1.04:1
Present Study	36	19	1.89:1

In the present study, neoplastic conditions include adenomas and all malignant lesions. From the study, the ratio of non-neoplastic to neoplastic cases about 1.89:1. A study done by Jena et al<sup>10</sup> reported that fine-needle aspiration cytology done before the surgery on 146 patients, the findings were nodular goitre in 62 (42.5%), follicular neoplasm in 55 (37.7%), papillary carcinoma in 25 (17.1%), Hashimoto thyroiditis in two (1.4%), toxic nodule in one (0.7%) and medullary carcinoma in one (0.7%) patient. The actual incidence of malignancy was found to be at 8% in the present study based on histopathological reports. Fenn et al<sup>11</sup> reported incidence of 12%, Bhansali SK<sup>12</sup> reported 9% as incidence, Kapur et al<sup>13</sup> and Rehman AU<sup>14</sup> reported 11% as incidence of malignancy among patients with solitary nodule. NazAktar in his study reported a higher prevalence of malignancy (15.3%) in solitary nodule.<sup>9</sup>

**Table-7: Distribution of malignancies by FNAC**

Authors	Percentage
<b>Incidence of Carcinoma</b>	
Bhansali SK <sup>12</sup>	9.0%
Kapur et al <sup>13</sup>	11.0%
Rehman AU <sup>14</sup>	11.47%
<b>Present study</b>	<b>10.9%</b>

In the present study among are 4 cases of papillary CA, 3 were diagnosed with certainly by FNAC and the rest one was suspicious of malignancy. But, both the follicular CA were initially reported the follicular neoplasm. From the study, distribution of the malignancy is about 7.27, which is comparable with the earlier studies.

From the present study, commonest causes of the solitary nodule is MNG, which is comparable with the studies done by Bhansali<sup>12</sup> and Kapur<sup>13</sup>. The common causes are follicular adenoma and adenomatous goiter. From the literature, the incidence of thyroid nodule ranges from 5-15%. From the present study the incidence found to be 10.9%, which is comparable with the study done by Bhansali SK<sup>12</sup>, Kapur et al<sup>13</sup>, Rehman A U<sup>14</sup>.

Based on novel pattern analysis in the interpretation of a solitary thyroid nodule, the study at Salem showed a sensitivity of 66.7% and specificity of 98.9%. The positive predictive value and negative predictive value were 88.9% and 96% respectively and the overall diagnostic accuracy was 95.4%. The study demonstrated the feasibility and applicability of pattern analysis in diagnosing thyroid lesions by FNAC.<sup>15</sup> The study from Queen Elizabeth II Health Sciences Centre, Canada concluded that the introduction of a reporting template increased the diagnostic precision of thyroid FNAC reporting without impacting the overall diagnostic categorization or cytohistologic concordance.<sup>16</sup> FNAC is a common investigation in the diagnosis of superficial lumps though its success depends on the skill of the person performing the procedure.<sup>17</sup>

## CONCLUSIONS

USG can be used to detect multi-nodular goiter in patients presenting with solitary nodule thyroid. FNAC is the investigation of choice in the evaluation of solitary nodule of thyroid. It has few pitfalls. In such situations, only histopathology can confirm the exact pathology. Papillary carcinoma is the most common malignancy of thyroid, followed by follicular carcinoma. The study highlights that FNAC should be treated as a first-line diagnostic test for thyroid swellings to guide the management though this is not a substitute for HPE as a need to improve primary healthcare in India.

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