

A CLINICAL STUDY ON SOLITARY NODULE OF THYROID

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ABSTRACT

BACKGROUND

Solitary nodule of thyroid has increased in incidence in the present day as compared to two decades before. Because of possibility of malignancy, some clinicians especially those in surgical subspecialties recommended that all nodules have to be removed. This study aimed to determine the proportion of solitary nodule of thyroid in general population and in relation to age and sex, the proportion of solitary nodule of thyroid turning out to be multinodular goiter, the proportion of euthyroid, hyperthyroid or hypothyroid states in patients presenting with solitary nodule of thyroid to study the role of FNAC in the management of solitary nodule of thyroid and to determine the incidence of neoplastic and nonneoplastic conditions as a cause of solitary nodule of thyroid in Government Royapettah Hospital, Chennai.

MATERIALS AND METHODS

This prospective study includes 50 patients presenting in Government Royapettah Hospital, Chennai, who were clinically diagnosed as solitary nodule of thyroid between November 2014 to September 2015. All patients were admitted and were subjected to thyroid profile, USG and FNAC. All patients were operated appropriately depending on the FNAC report. Histopathological examination of the operated specimen was done for all the patients. Depending on the histopathological report, appropriate postoperative therapies were administered to all the patients and all the patients were followed up appropriately.

RESULTS

Commonest presentation of solitary thyroid nodule was asymptomatic. The peak incidence of solitary nodule was observed in 3rd to 5th decade constituting 60% of the cases studied. Females predominated in number over males in occurrence of solitary nodule in ratio of 1:5.25. 33% of all clinically solitary nodule turned out to be multinodular goiter. The common causes of solitary nodule was MNG (26%), follicular adenoma (24%), adenomatous goiter (24%). 95% of cases presented with euthyroid state. Incidence of malignancy in solitary thyroid nodule was 18%. Male-to-female ratio in case of malignant nodule was 1:5. Incidence of carcinoma in males presenting as solitary nodule was higher (16.67%) compared to that of females (10.20%). The most common cause of malignancy was papillary carcinoma (55%) followed by follicular carcinoma (45%).

CONCLUSION

Solitary nodule of thyroid is more common in 3rd to 5th decades. Solitary nodule of thyroid are more common in females. Most of the patients presenting with solitary nodule of thyroid are euthyroid and only a small percentage of patient with toxicity or hypothyroidism. USG can be accurately used to detect patients with multinodular goiter who clinically present as solitary nodule of thyroid. Common causes of solitary nodule of thyroid are MNG, follicular adenoma and adenomatous goiter. Incidence of malignancy in male patients presenting with solitary nodule of thyroid is more when compared to female. The most common cause of malignancy in solitary nodule is papillary carcinoma followed by follicular carcinoma.

KEYWORDS

Solitary Nodule, Malignancy, Euthyroid.

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BACKGROUND

Thyroid nodules are commonly encountered, though varying in incidence in different geographical regions.^{1,2} The prevalence of palpable nodules in general population is 4-7%. Solitary nodules of thyroid occur frequently in women in the ratio 4:1 compared to men.³ The proportion of malignancy in solitary nodules is 10 to 30%.⁴

DEFINITION

A solitary nodule is defined as "a palpable single clinically detected nodule in the thyroid gland that is, in general, otherwise normal."⁵

The usual presentation of a thyroid nodule is an asymptomatic mass, which is discovered by either the patient or the clinician.⁶ Nodules of at least 0.5 cm to 1 cm can be usually be detected by palpation.

The importance of discrete swelling lies in the risk of neoplasia compared with other thyroid swellings. Hence, proper clinical examination, investigations and FNAC helps in the early identification and appropriate management of solitary nodule thyroid.⁷ Favourable prognosis with reduced mortality and morbidity occurs for cases picked up at an earlier stage and for benign lesions.⁸

AIMS AND OBJECTIVES

1. To determine the incidence of solitary nodule thyroid in relation to age and sex.
2. To determine the proportion of solitary nodule of thyroid turning out to be multinodular goiter.
3. To study the percentage of euthyroid, hyperthyroid or hypothyroid states in patients presenting with solitary nodule of thyroid.
4. To study the role of FNAC in the management of solitary nodule of thyroid.
5. To determine the incidence of adenoma, carcinoma and thyroiditis as a cause of solitary nodule of thyroid in Government Royapettah Hospital, Chennai.

MATERIALS AND METHODS

The present study on "clinical study of solitary nodule of thyroid" has been conducted by utilising cases admitted and managed in the Department of Surgery at Government Royapettah Hospital attached to Government Kilpauk Medical College Hospital, Chennai, over a period of 10 months from November 2014 to September 2015.

Descriptive analysis of 50 cases of solitary nodule thyroid in the specified period done. These cases were selected by random sampling method and studied in detail clinically. Routine investigations and specific investigations including FNAC of the nodule, thyroid profile, IDL, plain x-ray neck, USG neck were done in all cases. All the patients were managed by surgery and diagnosis was confirmed by histopathological examination.

Inclusion Criteria

- Patients above the age of 12 years.
- Patients presenting clinically with solitary nodule thyroid.
- Both male and female patients are included in study.

Exclusion Criteria

- Patients below the age of 12 years.
- Patients clinically with multinodular goitre.
- Patients with lateral aberrant thyroid.
- Patients have diffuse swelling of thyroid.

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 histopathological examination reports, then analysed and compared with the previous similar studies conducted elsewhere. Finally, conclusions were drawn accordingly.

Treatment

Preoperative

Use of antithyroid drugs, beta blockers, blood transfusions or any other medications were prescribed based on individual status and was noted.

Peroperative

Position of the patient, type of anaesthesia, incision, type of operation planned, peroperative findings and type of operation performed were recorded.

Postoperative

Every patient was followed up postoperatively during the course of management in the hospital to note the development of and management of complications.

Follow-up

At the time of discharge, all the patients were advised to attend the surgical OPD regularly for follow up. Any recurrences or complications were noted. Thyroid functional status was assessed, accordingly thyroxine tablets prescribed if necessary.

RESULTS

Total of 50 cases of solitary nodule of thyroid studied and following conclusions were drawn.

Age in Years	No. of Patients
0-9	0
10-19	2
20-29	14
30-39	10
40-49	11
50-59	9
60-69	4
Total	50
Age Incidence	

Age Incidence

The age of the patients ranges from 18 years to 66 years with peaks being in 3rd to 5th decades. The mean age of presentation is 37.26 years. Cases in 3rd to 5th decades constitutes 60% of the cases studied.

Sex Incidence

Out of 50 cases studied, 42 were females and 8 were males and the ratio comes to M:F=1:5.25. Also, the malignant nodules are common in females. Out of 9 cases of malignancy in the study, 8 were females.

Sex	Number of Patients
Males	8
Females	42
Total	50

Clinical Features

All the cases in the present study presented with 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 50 cases, 3 cases had pain, 3 cases had discomfort and another 1 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.

Duration of Symptoms

In our study, duration of onset symptoms varied from 15 days to 8 years.

Also, duration of malignant nodules extend from 1 month to 4 years.

Duration of Symptoms	No. of Patients
<1 Month	1
1-3 Months	5
3-6 Months	11
6-12 Months	7
1-2 yrs.	11
2-5 yrs.	12
>5 yrs.	2
Total	50

Site of the Nodule

Out of 50 cases studied, 26 cases presented with nodule in right lobe of the thyroid gland and the remainder 24 in the left lobe of thyroid. One patient among left-sided solitary nodule had undergone right lobectomy 30 years back and presented with recurrent nodule in the rest of the lobe.

Site of The Nodule	Number of Patients
Right	26
Left	24
Total	50

Size of the Nodule

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

Size of the Nodule	Number of Patients
<1 cm	0
1-2 cm	3
2-3 cm	7
3-4 cm	15
4-5 cm	15

5-6 cm	7
6-7 cm	1
>7 cm	2
Total	50

Thyroid Functional Status

Out of 50 cases, two presented with features of thyrotoxicosis, one with hypothyroidism and rest all were in euthyroid state. Patients with thyrotoxicosis were made euthyroid using antithyroid drugs and operated and both cases turned out to be toxic follicular adenoma. Patient with hypothyroidism was treated with thyroxine.

Thyroid Functional Status	Number of Patients
Euthyroid	47
Hyperthyroid	2
Hypothyroid	1
Total	50

FNAC Reports

FNAC is the important investigation in the evaluation of solitary nodule of thyroid. All 50 cases were subjected to FNAC during the course of evaluation. FNAC reports are mainly categorised into 6 entities- Benign, follicular neoplasm, suspicious (of malignancy), malignant, lymphocytic thyroiditis and cysts. In our study, out of 12 follicular neoplasms, 4 turned out to be follicular carcinoma. One suspicious (of papillary carcinoma) case confirmed papillary carcinoma on histopathological examination. 5 cases of papillary carcinoma were diagnosed preoperatively by FNAC alone.

Two cases diagnosed as cysts by FNAC confirmed to be simple cysts on histopathological examination.

FNAC Reports	Number of Patients
Benign	25
Follicular neoplasm	14
Suspicious	1
Malignant	4
Lymphocytic thyroiditis	3
Cysts	3
Total	50

Aetiological Incidence of Solitary Nodule of Thyroid

Out of 50 cases studied, common causes of solitary nodule are MNG, follicular adenoma and adenomatous goiter; the most common being MNG, which constitutes about 26% of cases.

Follicular adenoma and adenomatous goiters found almost at the same incidences accounting to 24% each.

Out of 50 cases, nine were malignant, 5 papillary carcinoma and 4 follicular carcinoma.

45 patients were subjected to surgery. 5 patients (2 simple cysts and 3 lymphocytic thyroiditis) were conservatively managed. HPE reports of 45 were documented.

Ultrasonography 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, which turned out to be papillary CA on histopathological examination.

Two cases of follicular carcinoma were diagnosed follicular neoplasm, one of them showed suspicious features on USG.

Postoperative Histopathology in SNT

HPE Reports	Number of Patients
Follicular adenoma	13
Adenomatous goitre	8
MNG	13
Carcinoma	9
Lymphocytic thyroiditis	1
Simple cyst	1
Total	45

From the study, incidence of malignancy in solitary nodules is 18%.

Solitary Nodule of Thyroid	Number of Cases
Benign	41
Malignant	9
Total	50

Type of Carcinoma

From the study, out of 9 carcinoma, 5 were papillary and 4 follicular. No case of medullary or anaplastic or lymphoma was detected. Papillary carcinoma accounts to 55.6% and follicular carcinoma accounts to 44.4%.

Type of Carcinoma	Number of Cases	Percentage
Papillary	5	55.6
Follicular	4	44.4
Medullary	0	0
Anaplastic	0	0
Lymphoma	0	0
Total	9	100

Surgery/Operative Procedure Done

Depending upon the clinical diagnosis and FNAC features, all 45 out of the 50 patients underwent surgery. Among them, patients 22 had undergone hemithyroidectomy, 14 cases undergone subtotal thyroidectomy and 9 cases undergone total thyroidectomy.

In 3 cases, HPE after hemithyroidectomy showed follicular carcinoma, then completion of total thyroidectomy done.

Distribution of Non-Neoplastic and Neoplastic Lesions Diagnosed by FNAC

Authors	Non-Neoplastic	Neoplastic	Ratio
Sarda AK (1997) ¹⁰	487	59	8.25:1
Das DK (1999)	346	85	4.07:1
Gupta C (2001)	470	30	15.66

Postoperatively, suppressive dose of thyroxine was started for patients who had undergone total thyroidectomy. Three cases out of 7 cases of total thyroidectomy showed features of hypocalcaemia on 2-4 postoperative day, hence, they are supplemented with oral calcium and vitamin D3.

All the cases were followed up for 6 months, two cases had husky voice without any change in vocal cord movements.

DISCUSSION

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

Mean Age at Presentation

Authors	Mean Age in Years
Das DK (1999)	35
Talepoor M. (2005)	38.6
Quari F. (2005)	36.7
Rehman A.U.(2009)*	34.7
Khurshid Anwar (2012)*	37
Present study	37.26

In the study done by Quari F and Talepoor M separately in 2005 reported the mean age at presentation as 36.7 years and 38.6 years, respectively. Khurshid Anwar reported, in 2012, the mean age of presentation as 37 years. From the present study, the mean age at presentation found to be 37.27 years correlates with the previous studies.

Most of the earlier series reported peak incidence of solitary nodule thyroid in the 3rd and 4th decades. Bhansali S.K (1982) in his similar study reported the peak incidence in 4th and 5th decade. In the present study, the peak incidence found to be 3rd to 5th decades, which constitutes about 60% of the cases studied.

Sex Distribution

Authors	Sex Incidence (M:F)
Dorairajan (1996) ⁹	1:9
Das DK (1999)	1:5.39
Gupta C (2001)	1:5
Present Study	1:5.25

In the study done by Dorairajan (1996) and Das DK (1999) reported ratio of sex incidence as 1:9 and 1:5.39, respectively. In the present study, it is found to be 1:5.25, which correlates with Das DK study (1999).

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.

Karur (2002)	32	15	2.13:1
Talepoor M (2005)	325	70	4.33:1
Hurtado Lopez M (2005)	80	50	1.6:1
Nagada (2006)	51	18	2.83:1
Chao CT(2007)	276	264	1.04:1
Present study	31	19	1.63:1

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 1.63:1, which is comparable to the studies done earlier like Hurtado Lopez M (2005), Chao CT (2007) and Karur (2002).

Distribution of Malignancies by FNAC

Authors	Percentage
Sarda Ak et al (1997)	10.8
Karur K et al (2002)	18
Mundsad B et al (2006)	4.16
Present study	10

Aetiological Incidence (In Percentage)

Series	MNG	Adenoma	Carcinoma	Others	Total Number of Cases
Zaman and Bhagbati (1971)	83	9	8	-	2221
Ananth Krishnan (1983)	12	47	2	2	104
Bhansali (1982)	71	20	9	-	449
Fenn (1980)	22	55	12	11	342
Kapur (1982)	28	50	11	11	221
Present series	13	13	9	15	50

From the present study, common causes of solitary nodule are dominant nodule of multinodular goiter and follicular adenoma, which is comparable with above studies.

Incidence of Carcinoma¹¹

Study	Year	Percentage
A S Fenn et al	1980	12.0%
Bhansali S K	1982	9.0%
Kapur et al	1982	11.0%
Wagana et al	2002	16%
Rehman A U	2009	11.47%
Present study	2015	18%

From the literature, the incidence of malignancy in thyroid nodule ranges from 5% to 30%. From the present study, the incidence found to be 18%, which is comparable with the study done by Wagana et al 2002.

CONCLUSION

The present study is a descriptive study of 50 cases of solitary nodule of thyroid admitted to Government Royapettah Hospital, Chennai, during the period of November 2014 to September 2015 has been made. Though a large number of patients are required to come to better conclusions based on the data and results obtained in the present study. The following conclusions can be drawn-

- Solitary nodule of thyroid is more common in females.

In the present study, among 5 cases of papillary carcinoma, 4 were diagnosed with certainty by FNAC and the rest one was suspicious of malignancy. But, 4 cases of follicular carcinoma were initially reported as follicular neoplasm. From the study, distribution of malignancy is about 10 percentage, which is comparable with the earlier study Sarda Ak et al.

- Solitary nodule of thyroid is more common the age group of 20-50 years.
- Most of the patients with solitary nodule of thyroid present with swelling alone.
- Most of the patients with solitary nodule of thyroid are in euthyroid state and only few present with toxicity and hypothyroidism.
- Incidence of malignancy in male patients presenting with solitary nodule thyroid is more when compared to female patients presenting with the same.
- Commonest cause of solitary nodule of thyroid is dominant nodule of multinodular goitre.
- USG can be used to detect multinodular goitre 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. It detects papillary carcinoma in a solitary nodule with high sensitivity and specificity.

- Papillary carcinoma is the most common malignancy of thyroid followed by follicular carcinoma.

SUMMARY

A descriptive analysis of 50 cases of solitary nodule of thyroid admitted to Government Royapettah Hospital, Chennai, during the period of November 2014 to September 2015 has been made and summarised below-

- Commonest presentation of solitary nodule is swelling in front of neck.
- The peak age at presentation of solitary nodule thyroid is 3rd to 5th decade constituting about 60% of the cases.
- Solitary nodule is more common in females with the ratio M:F=1:5.25.
- 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, 26% of all the clinically solitary nodule turned out to be multinodular goitre.
- Common causes of solitary nodule thyroid are MNG (26%), follicular adenoma (24%) and adenomatous goiter (24%).
- Incidence of malignancy of solitary nodule is about 18%. 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 (55%) followed by follicular carcinoma (45%).
- 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 cases either because of cosmetic reasons or toxicity or FNAC diagnosis of follicular neoplasm or malignancy.
- Transient hypocalcaemia is common after total thyroidectomy for malignancies.

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