ORIGINAL RESEARCH

To study the clinico-pathology of solitary thyroid nodule, in tertiary care hospital, South India

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ABSTRACT

Introduction: Solitary Thyroid nodule presents a challenge in s diagnosis, evaluation and management. Often these abnormal growths/lumps are large in size and develop at the edge of the thyroid gland, so that they are felt or seen as a lump in front of the neck. The ultimate aim in the study of solitary nodule of thyroid (SNT) is to find out the incidence of malignancy. **Methodology:** Hospital based prospective study. The present study is carried out in Department of General Surgery at Siddhartha medical college. With 80 samples over a time period of one year.

Inclusion Criteria:

1. Patients admitted in general surgery department with solitary nodule during the period of study will be included.
2. All the patients of age more than 13 years.
3. Both sex are included. Statistical analysis was done by spreading the data over excel sheet using EpiInfo software.

Results: 80 cases were included in the study, out of which 73 cases (91.25%) were females while 7 cases (8.75%) were male and female to male ratio was 10.42:1. Nodules predominantly presented in right side i.e., 62.5%. **Conclusion:** Incidence of Malignancy of solitary thyroid nodule was 7.50% as compare to benign incidence. Complications of STN, 8.75% cases of STN became toxic and 7.5% cases turned into malignancy. Hemi thyroidectomy was commonly performed on all the cases.

Key words: Nodule, solitary thyroid nodule, malignancy, hemi thyroidectomy

INTRODUCTION

Solitary Thyroid nodule presents a challenge in s diagnosis, evaluation and management. Often these abnormal growths/lumps are large in size and develop at the edge of the thyroid gland, so that they are felt or seen as a lump in front of the neck. The prevalence of these nodules in a given population depends on a number of factors like age, sex, diet, iodine deficiency, and even therapeutic and environmental radiation exposure. One of the major importance in the evaluation of the solitary thyroid nodule is the differentiation of hyperplasia from true neoplasm. Prevalence increases with age, with spontaneous nodule occurring at a rate of 0-0.8% per year, beginning early in life and extending into the eighth decade [1,2].

FNAC has become the most important diagnosis tool of choice for initial evaluation of STN [3]. Also, there are neither reports of needle track deposit nor any significant complications. For a long time the solitary nodule in thyroid gland due to its malignant potential and possibility of toxicity in the nodule it has become more sensitive topic. Majority of these are localized, hyper involutional, colloid containing tumefaction's but a small significant group of about 25-30% is comprised of carcinoma, true adenoma and toxic nodule. Krishna district being an endemic area for goitre, it has prompted to undertake the present study of clinic-pathological study of Solitary Nodule of Thyroid with a view to study the clinical pattern and behaviour of Solitary Nodule of Thyroid and to know the incidence of various thyroid disorders manifesting as solitary nodule of thyroid attending our General Surgery OPD.

Objectives of this present study are,

1. To study the clinical presentation, age, sex distribution and complications of solitary nodule of thyroid.

2. To compare and correlate the findings of investigations i.e. USG and FNAC with the histopathology of resected specimen.
3. To study the incidence of malignancy in solitary nodule of thyroid.
4. To study the management of solitary nodule of thyroid.

MATERIAL AND METHODS

This is a hospital based prospective study. Carried out in Department of General Surgery at Siddhartha Medical College and Hospital. The sample size was 80. Purposive sampling method is adopted. The study period was one year (2023-2024).

INCLUSION CRITERIA

1. Patients admitting to general surgery department of Siddhartha Medical College during the period of study will be included.
2. All the patients of age more than 13 years.
3. Both the sexes are included.

EXCLUSION CRITERIA

1. Pregnant and Lactating women.
2. Patients unfit for surgery.
3. Patients who didn't give their consent.

METHODS

In the patients who fulfilled the inclusion criteria, detailed history and clinical examination was done. They are subjected to biochemical and other investigations: Thyroid function tests, Ultrasound examination, Fine needle aspiration cytology (FNAC), X-Rays like chest and Neck (AP/Lateral), Indirect laryngoscopy, Computed Tomography/Magnetic Resonance Imaging Scan, Radio-isotope scanning, ECG, serum cholesterol, serum creatinine. After attaining the provisional diagnosis all the patients were subjected to surgery. Any intraoperative/ postoperative complication was also noted. Final diagnosis was made with the help of histopathology. Postoperative medication after discharge if needed was advised. Follow up was kept in patients who reported after specific period in outpatient department (OPD).

STATISTICAL ANALYSIS

The data was spread over excel sheet and analysis was done using EpiInfo software. The results were expressed in percentages, ratios.

RESULTS

80 cases were studied, out of which 73 cases (91.25%) were females while 7 cases (8.75%) were male and female to male ratio was 10.42:1. Majority of cases were presented in the age group of 21-30 years i.e., 42.5% and 10% in age group of 51-60 years. Majority of nodules are presented in right side i.e., 62.5%

1. Clinical Presentation among the study participants in relation to the solitary thyroid nodule.

Complaints	Number of Cases (N=80)
Swelling in the neck	80
Swelling in neck associated with Palpitation	7
Swelling in neck associated with Weight loss	2
Swelling in neck associated with Tremors	7
Swelling in neck associated with Sweating	7
Swelling in neck associated with Hoarseness of voice	6
Swelling in neck associated with Palpable cervical lymph node	5

According to Table 1, swelling in the anterior aspect of neck is most common presenting feature among all the 80 cases, but 7 cases showed palpitation, tremor, sweating along with swelling and 6 cases showed hoarseness of voice along with swelling.

2. Duration of swelling among the study participants.

Duration	No. of cases (N=80)	Percentage
1-6 months	40	50%
6-12 months	10	12.75%
1-2 years	15	18.75%
2-3 years	5	6.25%
3-4 years	5	6.25%
>4 years	5	6.25%

Duration of swelling, 50% presented within 6 months, 18.75% in 1-2 years, and 6.25% after 4 years.

3. Ultra-sound and Histo-pathological diagnosis of the study samples

USG	No. of cases (N=80)	Histopathological diagnosis	
		Benign	Malignant
Benign	72	71	1

Suspicious	5	3	2
Malignant	3	0	3
Total	80	74	6

72 cases diagnosed as benign lesion on USG, 71 were confirmed to be benign on HPE, and 5 cases which were suspicious on USG, 2 were malignant on histopathology and all 3 cases malignant on USG were confirmed on histopathology.

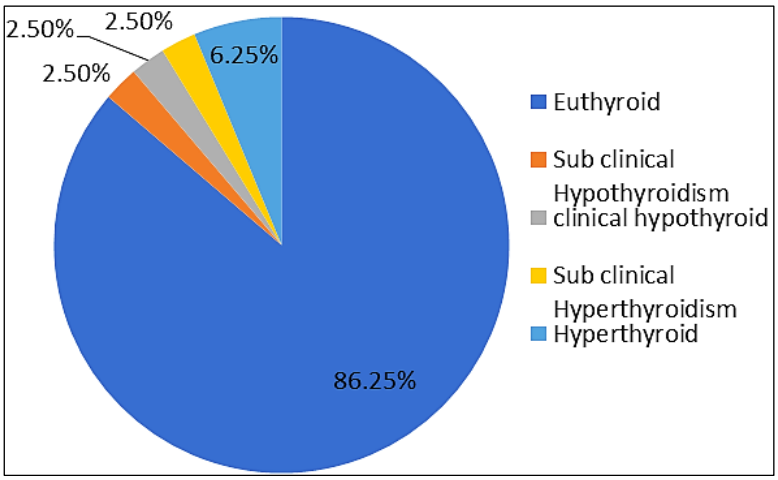

Figure 1: Status of Thyroid function test among the study participants

69 cases i.e., 86.25% were in euthyroid state and 5 cases (6.25%) were clinical hyperthyroid and only clinical hypothyroid were 2.5%.

4. Sensitivity of FNAC in the study samples

FNAC	No of cases	Percentage
Cases correlated with HPE	74	92.5%
Cases not correlated with HPE	6	7.5%

74 cases out of 80 cases were correlated with HPE hence sensitivity of FNAC is 92.5%.

5. Correlation of FNAC with Histo-Pathological Diagnosis among the study participants.

HPE	FNAC					Total (%)
	Non-diagnostic	Benign	Follicular	Suspicious	Malignant	
Colloid goitre	0	45	0	4	0	49 (61.25%)
Follicular adenoma	0	0	15	0	0	15 (18.75%)
Hashimoto's thyroiditis	0	7	0	0	0	7 (8.75%)
Cyst in lobe of thyroid	0	2	0	1	0	3 (3.75%)
Papillary carcinoma	0	0	0	1	2	3 (3.75%)
Follicular carcinoma	0	0	2	0	0	2 (2.50%)
Medullary carcinoma	0	0	0	0	1	1 (1.25%)
Total	0	54(67.5%)	17(21.25%)	6(7.5%)	3(3.75%)	80 (100%)

Table 5: out of 80 cases of FNAC, 54 were said to be benign of which (45 were colloid goitre, 7 were Hashimoto's, 2 were cyst in lobe of thyroid) which were confirmed on HPE. 17 cases were of follicular in nature which (15 were confirmed as follicular adenoma and 2 were follicular carcinoma on HPE) 6

were suspicious of which (4 were colloid goitre, 1 was cyst in lobe of thyroid, 1 was papillary carcinoma) which were confirmed on HPE.

3 cases diagnosed as malignant on FNAC were confirmed by HPE (2 were papillary carcinoma, 1 was medullary carcinoma) Hashimoto's disease has i.e., 7(100%) TPOAb (Antithyroid peroxidise antibody) levels positive and 6 cases (85.71%) TgAb (Antithyroglobulin antibody) levels positive. 3 cases of colloid goitre is positive for TPOAb (6.12%) and 1 case (2.04%) for TgAb; 2 (13.3%) cases of follicular adenoma positive for TPOAb and 1 case (6.6%) positive for TgAb and 1 case of thyroid carcinoma (papillary) 33.3% is positive for both TPOAb and TgAb.

Table 6: Incidence of different Thyroid disorders manifesting as solitary nodule of thyroid

Disorder	No. of Cases	Percentage
Colloid goitre	49	61.25%
Follicular adenoma	15	18.75%
Hashimoto's thyroiditis	7	8.75%
Thyroid cyst	3	3.75%
Papillary carcinoma	3	3.75%
Follicular carcinoma	2	2.5%
Medullary carcinoma	1	1.25%
Total	80	100%

Table 6: Among the 80 cases, 49 (61.25%) were colloid goitre, 15 cases (18.75%) were follicular adenoma, 7 cases (8.75%) were diagnosed to be Hashimoto's, 3 cases (3.75%) were thyroid cyst, 3 cases (3.75%) were diagnosed to be papillary carcinoma, 2 cases (2.5%) were follicular carcinoma and 1 case (1.25%) was medullary carcinoma.

74 cases were benign 92.5% and 6 cases were malignant i.e., 7.5%. The most common complications of solitary thyroid nodule are toxicosis 8.75% and malignancy in 7.5% individuals.92.5% cases underwent hemi thyroidectomy, 3 cases underwent total thyroidectomy and 3 cases underwent total thyroidectomy with neck dissection.

Table 7: Post-operative complications among the study participants

S. No.	Complications		No. of Cases	Percentage
1.	Wound haematoma and infection		6	7.5%
2.	Recurrent laryngeal nerve palsy	Temporary	4	5.0%
		Permanent	0	0
3.	Respiratory distress		0	0
4.	Thyroid storm		0	0
5.	Hypothyroidism		2	2.50%
6.	Hypocalcemia	Temporary	3	3.75%
		Permanent	0	0
7.	Haemorrhage		0	0

Table 7, shows that most common post-operative complication is wound haematoma and infection 7.5% while temporary RLN palsy 5% followed by hypocalcaemia (temporary) 3.75% and hypothyroidism 2.5%.

DISCUSSION

Inthis study,34 cases i.e. 42.5% were seen in 21-30 years of age group, while the only 8 cases i.e. 10% were seen in 51-60 years age group. The above findings were similar from the study conducted by Gary Haffman *et al.* [4] who reported average age was benign solitary nodule were also common in 3rd decade but also observes in 4-7 this decade as well. In 1993, Ananthakrishnan *et al.* [5] reported a clinico pathological profile of 503 patients with a single thyroid nodule. Nearly 2/3rdof the patients were in the 3rd or 4th decades of life.

Inthis study, 73 (91.25%) were females and 7 (8.75%) were males. Thyroid nodules are 4 times more common in women than men and their frequency increases with age and low iodine intake [5]. The gender disparity is perhaps explained by the hormonal influences of both estrogen and progesterone, as increasing nodule size and new nodule development have been demonstrated to be related to pregnancy and multiparity. In Htwe TT, Hamdi M M *et al.* [6],reported that, 143 (17.4%) male subjects and 677 (82.6%) female subjects.

In this study, swelling in anterior part of neck was most common presenting feature seen in 80 cases while palpitation, tremors, sweating seen in 7 cases, Hoarseness of voice present in 6 cases, palpable neck lymph nodes in 5 cases and weight loss in 2 cases. This observation was similar in the studies carried out by Kapur M M *et al.* [7], who reported lump in neck, Pain in swelling was not a prominent feature in the

benign or malignant group, changes of voice noted in 17 cases of which benign condition was 11 and malignant account in 6 cases, Bansali Sk *et al*. [8], who reported the swelling in front of neck is a commonest to start with majority of cases followed by pain of variable duration (78) dysphagia (70) increase in size(40) change in voice (33), Ananthakrishnan *et al*. found the commonest symptom apart from swelling was hyperthyroidism was present in small population all were benign.

In this study, right lobe of thyroid 62.5%, followed by left lobe 37.5% this is similar to the study conducted by Khadilkar UN *et al*. [9], who reported the solitary nodules involved the right side of the thyroid more commonly than the left.

In this study, maximum 40 cases 50% presented within 1-6 months after appearance of swelling while 15 cases i.e. 18.75% presented after 1-2yrs and 5 cases were seen after 4 years. This was in accordance with study carried out by NS Neki *et al*. [10], reported Prevalence increases with age, with spontaneous nodules occurring at a rate of 0-0.8% per year, beginning early in life and extending into the eighth decade.

In this study, size of swelling varied from 1-6 cm. This is Supported by Ananthakrishnan *et al*. reported size of swelling was 1-15 cm and majority 3-6 cm, Obad Kovacevic *et al.* [11], reported the mean size of the carcinomas was 28 + 12 mm versus 18 + 10 mm for benign in nodules (p<0.01) However, histological type and local aggressiveness were largely independent of nodule size.

In this study, out of 80 operated cases the most common consistency encountered was firm in 78 cases, 2 cases were hard, follicular and medullary carcinoma. In this study, thyroid function test were used to evaluate the functional status of thyroid, it was found that 69 cases i.e. 86.25% were euthyroid while 5 cases i.e..6.25% were hyperthyroid and 2 cases were hypothyroid. In 1978, Hameda N, Miura T *et al*.[12] stated that, whenever functional status of thyroid is in doubt, there is role of thyroid function test and it is helpful to improve accuracy of diagnosis.

In this study, out of 80 cases of FNAC, 54 were said to be benign of which (45 were colloid goitre, 7 were Hashimoto's, 2 were cyst in lobe of thyroid) which were confirmed on HPE. 17 cases were of follicular in nature which (15 were confirmed as follicular adenoma and 2 were follicular carcinoma on HPE) 6 were suspicious of which (4 were colloid nodule, 1 was cyst in lobe of thyroid, 1 was papillary carcinoma) which were confirmed on HPE. 3 cases diagnosed as malignant on FNAC were confirmed by HPE (2 were papillary carcinoma, 1 was medullary carcinoma) Present Studyis in accordance with studies carried out by Vojvodich SM, Ballagh RH *et al.* [13] who reported, FNAC was correct in predicting malignancy in 29 of 35 nodules (82.9%).

Inthis study, out of 72 cases diagnosed as benign lesion on USG, 71 were confirmed to be benign on histopathology, and 5 cases which were suspicious on USG out of which 2 cases were malignant on histopathology, 3 were benign on histopathology, all the 3 cases of malignant tumour were confirmed on histopathology.

In the present studyall cases of Hashimoto's disease has i.e. 7(100%) TPOAb levels positive and 6 cases (85.71%) TgAb levels positive. 3 cases of colloid nodule is positive for TPOAb (6.12%) and 1 case (2.04%) for TgAb; 2 (13.3%) cases of follicular adenoma positive for TPOAb and 1 case (6.6%) positive for TgAb and 1 case of thyroid carcinoma (papillary) 33.3% is positive for both TPOAb and TgAb.

Assays for TPOAb and TgAb are highly sensitive but less specific; therefore absolute concentration is very important in interpretation of the test. Monitoring antibody titers is important to evaluate the disease progression/regression over time.

In present study**,** out of 80 operated cases presented for histopathological examination colloid goitre was most common contributing 49 cases i.e. 61% followed by follicular adenoma 15 cases i.e.18.75%, and chronic lymphocytic thyroiditis 7 cases i.e., 8.75% and cyst 3.75% while 6 cases of malignancy in which 3 cases of papillary carcinoma i.e. 3.75%, followed by 2 cases of follicular carcinoma 2.50% and 1 case of medullary carcinoma i.e. 1.25%. Present study was correlated with studies carried out by Cheng Hing Fai *et al.* [14], who reported of the 54 patients that underwent surgery, the histological diagnosis were colloid and adenomatous goitre in 34, benign adenoma in 17, carcinoma in 1, thyroiditis in 3.

In present study**,** 80 operated cases of solitary thyroid nodule. Hemi thyroidectomy was the most common operation performed in 74 cases followed by total thyroidectomy in 3 cases, total thyroidectomy with neck dissection in 3 cases. In 2006, A. Melck *et al*. [15], reported that, of the 422 patients undergoing thyroidectomy, 27 presented with a fine-needle aspiration biopsy diagnosis of HCN, and by pathologic assessment 7 HCN patients (25.9%) had a cancer diagnosis. A. Melck *et al*. reported Hemi thyroidectomy representing with nodular thyroid disease and a cytologic diagnosis of HN. And Bansali SK *et al.* [8] mentioned hemi thyroidectomy was most commonly performed in maximum cases.

In present study**,** wound haematoma with infection was the most common complication in 6 cases i.e. 7.5% while recurrent laryngeal Nerve palsy was seen in 4 cases i.e. 5%. hypocalcaemia and hypothyroidism in 3 i.e. 3.75% and 2 i.e. 2.50% cases respectively. In 2009, Jong-Lyel Roh *et al*.[16] reported that, temporary and permanent RLN palsy rates were 2.8% and .9% at nerve-at-risk-based analysis, respectively. Wound infection in present study is in accordance with study carried out by Ananthakrishnan N who observed 503 patients found that 2.5% had wound infection.

Radioactive iodine therapy (I131) is given if tumour is multicentric, >1cm size, presence of nodes,

extrathyroidal spread; high risk group with a dose of 100mCi and in cases of follicular carcinoma, in cases of anaplastic carcinoma external radiotherapy is given. If radio iodine isotope scan detects remnant disease then 30-100mCi of radio ablation dose of (I131) is given orally. It will destroy occult microscopic disease. To detect metastases radioisotope (I131) 100-200mCi is given and 250-300mCi is given for bone.

CONCLUSION

Incidence of solitary thyroid nodule was common in Female than male. Incidence of Solitary Thyroid nodule is common in age group of 21-40yrs. Fine Needle Aspiration Cytology is an important Diagnostic tool which is also easy minimally invasive inexpensive and less painful procedure. It is single most sensitive and specific Investigation on Solitary thyroid nodule for etiological diagnosis. All the cases of Hashimoto's disease has serum TPOAb levels positive and 85.7% cases show TgAb levels positive. 6.12% cases show TPOAb levels positive in colloid goitre and 2% show TgAb positive. In cases of follicular adenoma 13.3% show TPOAb positive and 6.6% show TgAb positive. In cases of carcinoma thyroid (papillary) 33.3% show positive for both TPOAb and TgAb. In cases of STN, Colloid goitre was most common followed by follicular adenoma, hashimoto's thyroiditis, cyst in thyroid, papillary carcinoma, follicular carcinoma and medullary carcinoma. Incidence of Malignancy of solitary thyroid nodule was 7.50% as compare to benign incidence. Complications of STN, 8.75% cases of STN became toxic and 7.5% cases turned into malignancy. Hemi thyroidectomy was commonly performed in maximum cases.

CONFLICT OF INTEREST: None to be declared.

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