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Original Research Article

A clinical study of solitary nodule thyroid

Shashikala V., Archit Muralidhar*, Anand Kuchinoor, Anand Suntan

Department of General Surgery, Bangalore Medical College and Research Institute, Bangalore, Karnataka, India

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***Correspondence:**
Dr. Archit Muralidhar,
E-mail: architmuralidhar@gmail.com

ABSTRACT

Background: A solitary Nodule Thyroid is a palpable swelling in an otherwise normal thyroid. It is noted to have a higher incidence of malignancy. The disease is seen to affect 4-7% of the total population with a predominance for females to males with a ratio of 4:1. A systemic approach is thus needed to evaluate and treat Solitary Nodule Thyroid.
Methods: A prospective study of 80 patients admitted with solitary nodule thyroid admitted to Bowring and Lady Curzon Hospital between September 2017 and November 2018. A detailed history and examination were carried out and routine investigations were sent. Hemi thyroidectomy was done in all patients.
Results: Peak incidence seen at the 3rd and 4th decades of life, with 73 females and 7 males. Most common was swelling in the thyroid region, with the duration being 1 month to 6 years. Right lobe to be involved in 52 of the total cases studied. Multinodular goitre is the most common cause of solitary nodule thyroid followed by follicular Adenoma. Most common malignancy noted was papillary carcinoma, followed by follicular carcinoma. All patients underwent hemi thyroidectomy. There was no mortality in our study.
Conclusions: Solitary nodule thyroid is a common clinical entity that occurs more commonly in females. Usually presents as a painless neck swelling. FNAC and thyroid profile are the most important investigations that help in its diagnosis. MNG is the most common cause of SNT. Surgery is the treatment of choice of all cases. Hemi thyroidectomy is the most appropriate and least expensive procedure that can be done for its treatment.

Keywords: Hemi thyroidectomy, Multinodular goiter, Solitary nodule, Thyroid

INTRODUCTION

The term thyroid is derived from the Greek word for shield, due to its shape resembling those of shields used by the ancient Greeks. The credit for recognizing the significance of the solitary nodule of the thyroid as a separate entity should be given to Colles WH et al, who noticed the incidence of malignancy was much higher than that of the multinodular goiters. Thyroid disorders remain one of the most commonly seen endocrine disorders in clinical practice, seen more commonly in females.

A solitary nodule of thyroid is defined as a palpable discreet swelling in an otherwise apparently normal thyroid with visibility and palpability of the opposite lobe precluding a diagnosis of the same. Benign causes of thyroid nodule include the colloid nodule and a dominant nodule of multinodular goiter. Occasionally, nodularity is noticed in patients with Hashimoto's thyroiditis and graves' disease. Malignant causes of nodules include differentiated thyroid cancer (papillary, follicular), Medullary carcinoma or undifferentiated cancers such as anaplastic.[1]

Some rare causes of solitary nodules of thyroid includes lymphoma, sarcoma, squamous cell Ca, metastasis to the thyroid and mucoepidermoid cancer.

The disease is seen to affect 4-7% of the total population with a predominance for females to males with a ratio of 4:1.[2] But the incidence of malignancy is seen to be 5-10%.[3]

However, the solitary nodules are a source of controversy and are found to have a very wide variation in the clinical, radiological and histopathological features of the nodule, requiring the approach and management to every patient be individualized after a thorough evaluation of all the factors.

In thyroid disease, the greatest challenge in the future is to ensure a clear comprehension of the biology of the disease process of the thyroid without which further surgical therapy cannot be designed.

With the development of techniques such as FNAC and Ultrasound, the performance of thyroidectomy has become more selective.

METHODS

A prospective study of all patients diagnosed clinically as solitary nodule thyroid from November 2017 to December 2018 and being treated as inpatients in Bowring and Lady Curzon Hospital and which were in accordance with our inclusion and exclusion criteria were included in the study.

Inclusion criteria

- Patients found to have a solitary thyroid nodule on clinical examination.
- Patients above 18 years and below 70 years.
- Patients giving consent for participation in the study

Exclusion criteria

- Patients with previous thyroid Surgeries
- Patients with Thyroid enlargement except solitary nodule Thyroid
- Patients not giving consent for participation

All patients underwent a thorough history taking and examination and were subjected to FNAC and thyroid profile as the main line of investigations. USG was done to detect any impalpable nodules on the opposite lobe and assess vascularity, size of the nodule and any suspicious areas.

Patients whose FNAC was reported as colloid nodule, cystic nodules or follicular adenomas were posted for a hemi thyroidectomy, while patients with FNAC findings of Papillary Ca were posted for total thyroidectomy with or without neck dissection depending on the status of the neck nodes. Post-operative HPE suggestive of follicular Ca was treated with a completion thyroidectomy.

Patients were followed up once a week for the first month then once in 6 weeks for the remained of the year. Those without malignancy were started on thyroxine replacement post operatively.

Data for the study was collected in questionnaire format after taking consent and the statistics were evaluated with MS Excel 2007.

RESULTS

A total of 88 patients attended the OPD of our hospital with solitary nodule thyroid, out of which 8 were excluded from study as they were unwilling for admission and investigations. Of the remaining, the majority of the patients were between 30-39 years of age, with the youngest being 19 years of age and the oldest 68. Mean age of the patients was 35.5 years. Peak incidence seen at the 3rd and 4th decades of life, with 46% of the patients falling in that range (Table 1). In present study the female patients far outnumbered the males, with 73 females and 7 males, making the sex ratio of 10:1 (Table 1).

Table 1: Age distribution of patients.

Age	Females	Males	Total
10-19	2	0	2
20-29	16	0	16
30-39	33	4	37
40-49	12	2	14
50-59	9	1	10
60-69	1	0	1
Total	73	7	80

Table 2: Clinical features at presentation.

Clinical features	Number
Swelling	80
Pain	0
Hoarseness	0
Pressure symptoms	0
Rapid increase in size	0
Tracheal deviation	0
Euthyroid	78
Hyperthyroid	1
Hypothyroid	1
Lymphadenopathy	0

Most common clinical feature on presentation was swelling in the thyroid region, seen in all of the cases on admission (80 of 80). Disturbances in Thyroid function i.e. hypo, and hyperthyroidism were seen in one case each. Hypothyroidism was treated with thyroxine supplementation prior to performing surgery.

Hyperthyroidism with Antithyroid drugs prior for at least 6 weeks till the TSH levels returned to the euthyroid range and then the patient was taken for surgery (Table 2).

Table 3: Duration of swelling in patients.

Duration	Number
1 month	3
1-3 months	5
4-6 months	19
7-11 months	14
1-2 years	28
3-5 years	5
>5 years	6

Pain, hoarseness of voice and pressure symptoms were not seen in any of our cases even in cases of malignancy. Most patients reported the swelling being present for 1-2 years prior to consulting a doctor (28 of 80). In most cases (64 of 80) the swelling was noticed by and brought to the attention of the patient by relatives but in 16 of the cases it was seen initially by the patients themselves. The duration of the swelling ranged from 1 month to 7 years with the overall average being 18 months prior to visiting the doctor for a detailed evaluation (Table 3).

The prolonged duration prior to seeking medical advice is believed to be due to the lower socioeconomic status and education status of the patients visiting authors' hospital.

Size and site of the nodule

Present study noted that the right lobe was the most commonly involved with 52 of the total number of cases having the right while 28 of 80 had involvement of the left lobe (Table 4). No significant correlation between the side affected and malignancy was noted, with 6 of the 10 cases of malignancy found in the right lobe and 4 of 10 in the left lobe. No isthmus involvement was noted.

Table 4: Lobe involved in patients.

Size	Number
Right lobe	52
Left lobe	28
Isthmus	0
Total	80

Table 5: Size distribution of nodules.

Size of nodule in cm	Number
<3cm	7
3-6cm	66
7-10cm	7
>10cm	0
Total	80

The size of the nodules may vary from 2x2cm to a maximum of 10 x 6cm, with the majority of the nodules being in the 3-6 cm range when measured at its greatest dimension. All the nodules fell within the 10 cm range, with none exceeding that (Table 5). While several studies have noted an association between size of nodules and Malignancy of the thyroid, present study was unable to prove the same.

Table 6: Pre-operative FNAC findings.

FNAC findings	Number
Follicular neoplasm	9
Mixed solid and cystic components	23
Nodular goiter with cystic changes	48
Total	80

Pre-operative FNAC was done in all patients, with Nodular goiter with cystic changes being the most common finding in 48 of 80 cases, amounting to almost 60% of the cases. Follicular Neoplasm was seen in 9 cases (11%) with no cases testing as Papillary carcinoma pre-operatively (Table 6). No cases were found to have any lymph node enlargement clinically or on Ultrasound which would have raised the possibility of malignancy.

Etiological incidence

All cases were confirmed by post-operative histopathology.

Table 7: Etiology of the solitary thyroid nodule (post-operative HPE).

Etiology	Number	Percentage
Adenoma	21	26.25%
MNG	46	57.5%
Carcinoma	10	12.5%
Colloid goiter	3	3.75%
Lymphocytic thyroiditis	0	0
Total	80	100%

Table 8: Types of carcinoma seen.

Types of carcinoma	Number
Papillary	9
Follicular	1
Medullary	0
Anaplastic	0
Lymphoma	0
Others	0
Total	10

The most common etiology was noted to be Multinodular goiter after intra operative exposure of the thyroid. Carcinoma was seen in 10 out of the total number of cases, amounting to 12.5% (Table 7). Papillary was noted to be the most common cause of carcinoma of the 10

cases, with 9 out of those 10 being papillary and 1 case being follicular (Table 8). No cases of medullary or anaplastic carcinoma were seen. The youngest patient with malignancy was found to be 20 years old and the oldest was 57. The average age of patient with solitary nodule thyroid harbouring malignancy was found to be 36 years of age.

Treatment modalities

Hemi thyroidectomy was the standard protocol followed for solitary nodule thyroid with all 80 cases undergoing hemi thyroidectomy as no preoperative malignancy was detected on FNAC. Cases which were found to be MNG at operative exposure underwent subtotal thyroidectomy (46 of 80). Completion thyroidectomy was done in cases where malignancy was detected on post op histopathology (10 of 80).

Post op complication seen in our study were minimal, with only 2 cases presenting with transient hypocalcemia on the 3rd post-operative day presenting as tingling and numbness of the extremities and carpopedal spasm on examination, which was treated with oral calcium supplementation (Table 9). Those patients were discharged only after the symptoms subsided and the serum calcium levels were under the normal range.

The average duration of hospital stay was noted to be 8 days, with the surgery taking place on the 4th day after admission and being discharged on the 3rd post-operative day. Patients with transient hypocalcemia were kept under observation for 24 hours after which both patients symptomatically improved and serum calcium was found to be normal.

Table 9: Post-operative complications.

Complication	Number
Hypocalcemia (transient)	2
Recurrent laryngeal nerve palsy	0
Reactionary hemorrhage	0
Secondary hemorrhage	0
Surgical site infection	0

DISCUSSION

Solitary thyroid nodule as most thyroid disorders was found to be more common in females, with a ratio of almost 10:1, which is similar to studies done by Yamashita et al.[4] The age most commonly affected was found to be between 30-39 years of age with 46% of the total patients affected belonging to that bracket., and 96% of the total patients falling in between the age groups of 20-60 years, which is similar to the findings on the series by Khafagi et al.[5] The duration of the swelling varied widely, ranging from 1 month to 7 years, but 35% of patients reported complaints for a duration of 1-2 years. Patients of malignancy reported noting the swelling for between 6 months to 2 years. All of the evaluated patients complained of swelling as their primary complaint, with almost 97% of the total number of patients being euthyroid.[1] patient was hyperthyroid prior to surgery which was confirmed by thyroid function tests and by radio iodine scanning. The hyperthyroidism was controlled with medical line of management and then the Patient was taken up for surgery. Similarly, 1 was found to be hypothyroid, started on T. Eltroxin and then taken up for surgery after TFT was normal. No patients complained of stridor, hoarseness of voice or tracheal deviation pre-operatively, no patients had significant lympadenopathy which would arise the suspicion of malignancy. The right lobe is involved in almost 65% of the total number of cases, with the remainder being seen in the left lobe (35%) with no cases having isthmus involvement. The findings are similar to those done in a series by Ananthkrishna N et al, who found that the right lobe is usually preferentially involved, however the exact reason for this phenomenon is yet to be elicited.[6]

Present study noted that the size of the nodules could vary from 2x2cm to a maximum of 7x10cm, with the majority of the cases being between 3-6cm, with 82% of the total number of patients falling in this range. The size of the thyroid gland is known to have an association with the chance of malignancy, with nodules larger than 4cm more likely to harbor malignancy within them.[7] Since most of the nodules of our study fall within the 3-6cm group, careful evaluation of the patients is needed to rule out malignancy.

All 80 patients underwent FNAC as the primary investigation, and in cases where FNAC was reported to be inconclusive or no diagnostic, USG guided FNAC was done. While the yield is traditionally considered to be better if USG guided FNAC is done due to the ability to isolate suspicious areas of the nodule, however ours being a government institution, we could only do it in cases where traditional FNAC failed. While in present study, FNAC failed to detect a malignancy pre-operatively in any case, with 9 of the total cases being reported as follicular neoplasm - post operative histopathology showed malignancy in 10 cases – one being follicular carcinoma and the other 9 being papillary carcinoma. FNAC diagnosis in experienced hands is found to have a 95.2% sensitivity, 68.4% specificity, 83.3% positive predictive value, 89.6% negative predictive value, and 85.14% accuracy as per studies done by Hajmanoochehri et al.[8]

Present study found that the predominant etiology in our case series was multi nodular goiter which was diagnosed on table, amounting to almost 56% of the total number of cases which is similar to the findings of Bennedback et al, who found that the most common etiology was multinodular goiter followed by adenoma, which constituted 26% of studied cases.[9] Carcinoma was 12.5% of the total number of cases, with the most common being the papillary Ca (11.5% of the total number of

cases and 90% of the malignancies), and only one cases being positive for follicular Ca.

The incidence of malignancy in our study was found to be 12.5%. The youngest patient with malignancy was found to be 20 years old and the oldest was 57. The average age of patient with solitary nodule thyroid harbouring malignancy was found to be 36 years of age . Studies have shown that the age of presentation is extremes of age (<20 and >70) for both follicular and papillary ca and women are usually affected 3 times more than men.[10] Present study found that most patients with malignancy fell in the 4th - 5th decade of life, and out of the total cases of malignancy, 8 were seen in females and 2 in males for a ratio of 4:1). No significant correlation between the side affected and malignancy was noted, with 6 of the 10 cases of malignancy found in the right lobe and 4 of 10 in the left lobe. Present study found that papillary Ca was the most commonly seen malignancy in thyroid in present study, with almost 90% of the total malignancies being from the papillary group. One case of follicular carcinoma was seen. Treatment for all cases initially started with a subtotal thyroidectomy. In those patients for whom MNG was found out on operative exposure, the patient underwent a sub total thyroidectomy. In all cases, careful dissection was done to avoid injuring the recurrent laryngeal nerve. There were no incidences of primary or reactionary hemorrhage seen. In patients for whom malignancy was detected, patients underwent a total thyroidectomy and followed up regularly for 6 months.

Present study found transient hypocalcemia in 2 cases post operatively and were treated with oral calcium supplementation till normalization of the calcium. No other significant post-operative complications were seen.

CONCLUSION

Solitary nodule thyroid is a common clinical entity that occurs more commonly in females. Usually presents as a painless neck swelling. FNAC and thyroid profile are the most important investigations that help in its diagnosis. MNG is the most common cause of SNT. Surgery is the treatment of choice of all cases. Hemi thyroidectomy is the most appropriate and least expensive procedure that can be done for its treatment.

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