

Solitary Thyroid Nodule and its Chances of Being Malignant

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Abstract

Aim: To evaluate the solitary thyroid nodule (STN) cases clinically and pathologically, study the frequency of malignancy and correlating it with FNAC and histopathology. To observe which pathological variant of carcinoma occurs most commonly. **Method:** The present study of "Solitary thyroid nodule and its chances of being malignant" has been conducted retrospectively utilizing 100 cases which were diagnosed clinically as STN and managed both as inpatient and outpatient basis in the department of General Surgery at NRI General Hospital from October 2014 to September 2016, Chinakakani. **Results:** There were 87 female and 13 male patients in STN group, resulting in a female to male ratio of 6.69:1. This ratio varied throughout the various age groups. Mean age for STN is 38.07 years. Malignant cases were 28 in STN out of which 3 were males (10.71%) and 25 were females (89.28%). **Conclusion:** Thyroid swellings and thyroid carcinomas are more common in females. The risk of malignancy is high in STN (28%). Amongst the malignant lesions most common was papillary carcinoma in STN (75%).

Keywords: Solitary Thyroid Nodule; FNAC; Histopathology; Malignancy.

Introduction

Solitary thyroid nodule (STN) is a common condition which is asymptomatic and detected incidentally by the patient, physician or during various imaging

procedures. Solitary thyroid nodule is defined as "a clinically palpable single nodule in an otherwise normal thyroid gland". Thyroid nodules may be adenoma, cyst, multi-nodular goitre, thyroiditis or thyroid cancer. A nodule of at least 0.5 cm -1 cm can be usually detected by palpation [1]. Thyroid nodule has been reported to be found in 4 - 7% of population on neck palpation and 30-50% of population by ultrasound USG [2-4]. There is significant increase in incidence of STN in India so also worldwide [5]. The incidence of solitary nodule in general population in India is 9% [6]. The incidence of the thyroid malignancy ranges from 0.9% to 13% in different parts of world [7]. The incidence of malignancy within a clinically apparent STN is approximately 5-10% [4]. If imaging investigations show the nodule to be truly solitary, then the likelihood of it being malignant increases to about 20%. The exposure to ionizing radiation and the availability of more sensitive diagnostic tests may be the possible explanations for a worldwide increase in the incidence of thyroid carcinoma.

Thyroid nodule presents a challenge in their diagnosis, evaluation and management. Solitary palpable nodules are about four times more prevalent in women than in men and this predisposition exists throughout all age groups [8]. Even though the overall incidence of differentiated thyroid cancer is more common in women than in men, a nodule in a man is more likely to be malignant than in a woman. Often these abnormal swellings are large and develop at the edge of the thyroid gland, so that they are felt or seen as a swelling/lump in front of the neck. The prevalence of these nodules in a given population depends on several factors like age, sex, diet, iodine deficiency, therapeutic and environmental radiation exposure. Prevalence increases with age, with spontaneous nodules occurring at a rate of 0 - 0.8% per year, beginning early

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in life and extending into the eighth decade [9]. STN are present in 5% of persons at an average age of 60 years.

The clinical diagnosis of solitary nodule may not be accurate always. Only 56.8% were true solitary on imaging, at operation or on histopathology [10]. Many palpable thyroid nodules, thought to be solitary, are usually part of a multinodular thyroid gland.

Childhood thyroid nodules need special attention due to higher incidence of malignancy, i.e., 15-25% as compared to adults. Further, thyroid cancer runs more aggressive course in children and is associated with early metastasis locally to regional lymph nodes and distant sites including lungs and bones [11,12].

The clinical importance of thyroid nodules rests with the need to exclude malignancy which occurs in 5-15% cases depending on age, sex, radiation exposure history, family history, and other factors. Thyroid carcinoma annual incidence is 1-2 per 100,000 population, which accounts for 90% of the malignancies of the entire endocrine system, 1% of total malignancies and 0.5% of total deaths from malignancies [13]. We planned this study to determine the frequency of malignancy in solitary thyroid nodule in our population, so that people can be educated for early diagnosis and adequate treatment.

Currently, many investigations including diagnostic imaging studies, serologic and cytogenetic tests as well as histopathological techniques are available to evaluate STN. Out of all these investigations ultrasound (USG) and fine needle aspiration cytology (FNAC) has become the diagnostic tool of choice for the initial evaluation of STN. The aim in the evaluation of solitary thyroid nodule (STN) is to differentiate benign hyperplasia from true neoplasms. Most thyroid nodules are benign hyperplastic lesions, but 5 - 20% of these nodules are true malignancies.

Aims and Objectives

To evaluate the STN cases clinically and pathologically, study the incidence of malignancy in STN and observe which pathological variant of carcinoma occurs most commonly.

Materials and Methods

The present study has been conducted retrospectively by utilizing 100 cases diagnosed clinically as STN and which are managed both as inpatient and outpatient basis in the Department of General Surgery at NRI General Hospital, Chinakakani for a period of two years from October 2014 to September 2016 after approval by institutional ethics committee.

Patients with clinical evidence of STN according to their records were included into the study. The relevant

investigations like Hemoglobin percentage, blood sugar estimation, blood urea estimation, blood grouping and Rh typing, Thyroid profile, ultrasound neck, FNAC, X-ray of the neck-AP and lateral views and chest X-ray and IDL examination were entered in the proforma from their records.

Cases with FNAC report of non-neoplastic nodule and follicular neoplasm underwent hemithyroidectomy. If histopathology HPE shows malignancy completion thyroidectomy was done. Total thyroidectomy was performed in cases with proven malignancy and suspicious of malignancy. In cases with cervicallymphadenopathy modified unilateral/bilateral block neck dissection was done simultaneously. All specimens were sent for HPE.

Results

There were 87 female and 13 male patients in STN group, resulting in a F:M ratio of 6.69:1. This ratio varied throughout the various age groups. Mean age for STN is 38.07 years. Malignant cases were 28 in STN out of which 3 were males (10.71%) and 25 were females (89.28%) [Table 1]. 71% of cases showed benign lesions on FNAC, 9% were suspicious of malignancy, 18% cases were malignant and 2% cases were insignificant [Table 2].

Table 1: Age & Sex Distribution in STN

Age	STN		Total	Malignancy
	Female	Male		
11-20	9	0	9	3
21-30	24	5	29	6
31-40	28	1	29	8
41-50	12	1	13	3
50 and above	14	6	20	8
Total	87	13	100	28

Table 2: FNAC of The STN

FNAC of the swelling	STN	
	No	Percentage
Benign	71	71
Suspicious of malignancy	9	9
Malignancy	18	18
Insignificant	2	2
Total	100	100

Out of 100 STN, 18 cases were diagnosed as malignant lesions by FNAC. One of these cases was non-neoplastic lesion, 17 were carcinoma on histopathological examination. Out of 30 cases which were diagnosed as Nodular Goitre (Non-Neoplastic) by FNAC, 24 of these cases were nodular Colloid Goitre, 2 were carcinoma, 2 were follicular adenoma, one was Hashimoto's thyroiditis and one was Hurthle cell adenoma on histopathological examination. Out of 49 cases which were diagnosed as Follicular

Neoplasm by FNAC, 36 of these cases were Follicular Adenoma, 5 cases were Follicular Carcinoma, 3 cases were Colloid Nodular Goitre, one was Hashimotos Thyroiditis and 4 cases were Papillary carcinoma on histopathological examination. One case, which was identified as Hurthle cell adenoma by FNAC, was reported as Hurthle cell adenoma on histopathological examination. 2 cases were insignificant by FNAC. Among two insignificant cases, one was Hurthle cell adenoma and another one was Hashimotos Thyroiditis on histopathological examination [Table 3 & 4].

Table 3: Post Op Histopathological Report In STN Cases

Sl. No	Type	No of cases	Percentage
1	Papillary carcinoma	21	21
2	Follicular carcinoma	5	5
3	Medullary carcinoma	2	2
4	Follicular adenoma	37	37
5	Hurthle cell adenoma	2	2
6	Hashimoto's thyroiditis	6	6
7	Adenomatoid nodules	3	3
8	Nodular colloid goiter	24	24
	Total	100	100

Table 4: Correlation between FNAC and HPE

FNAC	No of cases	Histopathology	No of cases
Nodular goitre (non-neoplastic)	30	Colloid nodular goitre	24
		Hashimotos thyroiditis	1
		Follicular adenoma	2
		Papillary carcinoma	1
		Medullary carcinoma	1
		Hurthle cell adenoma	1
Follicular neoplasm	49	Follicular adenoma	36
		Follicular carcinoma	5
		Colloid nodular goitre	3
		Hashimotos thyroiditis	1
		Papillary carcinoma	4
Malignancy	18	Papillary carcinoma	16
		Medullary carcinoma	1
		Hashimotos thyroiditis	1
Hurthle cell adenoma	1	Hurthle cell adenoma	1
		Insignificant	2
Insignificant	2	Hurthle cell adenoma	1
		Hashimotos thyroiditis	1
		Total	100

Discussion

Thyroid nodules are a common clinical problem in South Asia. Most of thyroid swellings are multi-nodular, but a good percentage is solitary thyroid nodule. Epidemiological studies have shown the prevalence of palpable thyroid nodules to be approximately 5% in women and 1% in men living in iodine-sufficient parts of the world [14,15].

Thyroid nodules are more frequent in women and older age group people residing in iodine deficient regions, which is as high as 50% (Harrisons) [16]. The lifetime risk of developing a thyroid nodule is

reported to be 15% [6]. Nevertheless, only 5% of the clinically apparent thyroid nodules are malignant.

In our study over 2-year duration, we have encountered 300 clinically diagnosed STN cases out of 1000 Thyroid patients who presented to General Surgery OPD in the same period. Excluding the patients who did not come for follow up and those cases which are diagnosed to be Dominant Nodule of an MNG on USG of neck. We have done a retrospective case series study on 100 patients. The analysis of incidence of malignancy was done among the 100 STN cases operated with histopathological evidence.

In this study, the common age group with STN was in the third and fourth decade with the mean age of the patient under the study being 38.07 years which correlated with the study of Md Abul Hossain et al. (36.5± 12.33) [14], Jena A et al. (36.8 ± 13.3 years) [15], Uday MM et al. (36.14) [10]. Most of them were females, with female to male ratio being 6.69: 1, similar observations were noted in other studies of Md Abul Hossain et al. (7.31:1) [14], S. Anitha et al. (6.71:1) [16], Ibrahim Falih Noori (6:1) [17]. It was since thyroid disorders are female prone owing to the presence of estrogen receptors in the thyroid tissue and because of periods of fluctuation in the demands of hormonal requirement in their life cycle i.e. puberty, menstrual cycles, pregnancy and menopause, the chances of thyroid nodule formation are high as compared with their male counterparts [18].

Nine cases out of 100 STN cases were operated with clinical suspicion of malignancy due to signs and symptoms of dysphagia, hoarseness of voice, cervical lymphadenopathy, hardness of nodule fixity and metastasis, but only 4 cases proved to be malignant. Many authors have also mentioned that the clinical diagnosis of malignancy based on history and physical findings has not been so successful. Currently, FNAC of the thyroid nodule is a well-established, widely accepted, accurate, reliable and cost-effective diagnostic modality in the pre-operative diagnosis of various thyroid lesions. One case with strong clinical suspicion of malignancy with FNAC as benign proved to be malignant. Hence, although the accuracy of clinical diagnosis of thyroid malignancy is low, patients with high clinical suspicion of malignancy need surgical treatment whatever the FNAC result may be as the sensitivity of the thyroid FNAC ranges from 43% to 99% and its specificity from 72% to 100% [20-22].

The clinical features of the nodule were not helpful in the diagnosis of malignancy. There was no correlation between the consistency, duration and size of the nodules and malignancy.

Histopathology of 100 STN cases showed malignancy in 28 cases (28%), which was similar to the study of HebaJaheen and Mahmoud Sakr (22%) [23], Md. Abul Hossain et al. (28%) [14], Anwar K (24.32%) [24]. Commonest malignancy was papillary carcinoma

in 21 cases constituting 75% of 28 carcinomas which is corresponding with Karthiyayini T et al. (67%), Md Abul Hossain et al. (66.66%). [14].

The high incidence of malignancy in our study may be because the number of patients in the study group is a small group that is only 100 as the incidence is more in case of studies with large group of study population.

Conclusion

From this study we have come to the conclusions that thyroid swellings and thyroid carcinomas are more common in females (6.69:1) but a thyroid swelling in males have high chances of malignancy. The risk of malignancy is high in STN (28%). Amongst the malignant lesions most common was papillary carcinoma in STN (75%).

The favored diagnostic strategy in the workup of patients with a Thyroid swelling include USG, FNAC, serum TSH combined with serum T4 and/or free T4. In case of clinical factors raising the likelihood of malignancy, we recommended diagnostic thyroidectomy despite FNAC suggesting a benign condition.

Counselling is a must to all patients and attendants with thyroid disorders regarding,

- Incidence of malignancy in the nodules,
- Regarding unavailability of one single diagnostic test to rule out preoperative malignancy and thereby need for surgery to rule out malignancy in indeterminate cases,
- In postoperative patients, the need for regular follow up is needed.

References

- Karthiyayini T, Sridhar SK. A Clinical Study Of Incidence Of Malignancy In Solitary Nodule Of Thyroid;sch.j.app.med.sci., 2017 May;5(5c):1888-1891.
- Pang H-N, Chen C-M. The incidence of cancer in nodular goitres. *Ann Acad Med Singapore* 2007;36:241-43.
- Belfiore A, La Rosa GL, Padova G, Sava L, Ippolito O, Vigneri R. The frequency of cold thyroid nodules and thyroid malignancies in patients from an iodine-deficient area. *Cancer* 1987;60:3096-102.
- Mazzaferri EL, De los Santos ET, Rofagha-Keyhani S. Solitary thyroid nodule: diagnosis and management. *Med Clin North Am* 1988;72:1177-211
- Garrison FH. An introduction to history of medicine. 4th edition. W.B. Saunders Company; 1960:554-563,695,729,730-872.
- Ananthkrishnan N. The single thyroid nodule - A South Indian Profile of 503 Patients with special Reference to Incidence of Malignancy. *Ind J Surg*. 1993;55(10):487-92.
- NajumulHaq R, Ali Khan B, Ahmed Chaudhry I. Prevalence of malignancy in goitre—a review of 718 thyroidectomies. *J Ayub Med Coll Abbottabad* 2009; 21(4).
- Mazzaferri EL. Management of solitary thyroid nodule. *N Engl J Med*. 1993;328:553-9.
- Chakraborty M et al. A hospital based clinical study of 100 patients of solitary thyroid nodule. *Int Surg J*. 2018 Feb;5(2):466-473.
- Uday MM, Lakshmidevi M, Hanumanthaiah KS, Yasaswini H, Manjunath K, Akhila S. Surgical anatomy of thyroid and incidence of malignancy in solitary nodule of thyroid. *Int Surg J* 2016;3:893-9.
- Gregory P, Sadler and Orlo H, Clark. In: Principles of Surgery: Schwartz, Shires Spencer, Daly, Fischer, Galloway (eds). Seventh Edition June 1998;2:1678-81.
- Leonard Wartofsky. Diseases of the thyroid gland. In: Anthony S, Fauci Braunwald E, Isselbacher KJ (eds). Harrison's Principles of Internal Medicine, 14th Edition, New York 1998;2:2012-35.
- Wong CK, Wheeler MH. Thyroid nodules: rational management. *World J Surg* 2000;24:934-941.
- Vander JB, Gaston EA, Dawber TR. The significance of nontoxic thyroid nodules. *Ann Intern Med*. 1968;69:537-540.
- Tunbridge WMG, Evered DC, Hall R, et al. The spectrum of thyroid disease in a community: the Whickham Survey. *Clin Endocrinol (Oxf)*. 1977;7:481-93. 10.1111/j.1365-2265.1977.tb01340.x
- J. Larry Jameson, Susan J. Mandel, Anthony P. Weetman; Disorders of thyroid gland; 2307; Harrison's principles of internal medicine 19th edition.
- Md. Abul Hossain, Md. Zakaria Sarkar, Utpal Kumar Dutta, Md. Abdul Karim, Md. Zahedul Alam. Frequency of Malignancy in Solitary Thyroid Nodule and Multinodular Goitre; Bangladesh J Otorhinolaryngol 2014; 20(2):55-65.
- Jena A, Patnayak R, Prakash J, Sachan A, Suresh V, Lakshmi AY. Malignancy in solitary thyroid nodule: A clinicoradiopathological evaluation. *Indian J Endocr Metab* 2015;19:498-503.
- S. Anitha, T.R. Ravimohan. A study of incidence of malignancy in solitary nodule of thyroid. *International Journal of Contemporary Medical Research* 2016;3(4): 993-995.
- Ibrahim Falih Noori: Clinical Predictors of Malignancy in Solitary Thyroid Nodule, A Study of 146 Cases; *Medical Journal of Babylon* 2017;14(1):99-112.
- Orlo H, Clark, Nadine R. Caron, Thyroid disorders. In: Mastery of Surgery. Josef E. Fischer, editor, 5th edition. p.398.
- Pandey P, Dixit A, Mahajan NC. Fine-needle aspiration of the thyroid: A cytohistologic correlation with critical evaluation of discordant cases. *Thyroid Res Pract* 2012; 9:32-9.
- Caraway NP, Sneige N, Samaan NA. Diagnostic pitfalls in thyroid fine-needle aspiration: A review of 394 cases. *Diagn Cytopathol* 1993;9:345-50.
- Gharib H, Goellner JR. Fine-needle aspiration biopsy of the thyroid: An appraisal. *Ann Intern Med* 1993; 118:282-9.

25. Jaheen H, Sakr M. Predictors of Malignancy in Patients with Solitary and Multiple Thyroid Nodules. Journal of Surgery [Jurnalul de chirurgie]. 2016;12(3):105-10.
26. Anwar K, Din G, Zada B, Shahabi I. The Frequency of Malignancy in Nodular Goitre - A Single Center Study. J Postgrad Med Inst 2012;26(1):96-101.
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