



## CLINICAL AND HISTOPATHOLOGICAL STUDY OF CARCINOMA THYROID IN NODULAR GOITER

### General Surgery

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### ABSTRACT

Thyroid carcinoma closely resembles its benign counterpart in physical features, measurable physiological parameters like serum T3/T4, TSH levels and some ultrasonic characteristics. Therefore, the surgical excision of the nodule and its histopathological examination is the only way to differentiate between the much less frequent malignant nodules and more frequent benign. Main objective of the study is to evaluate the STN and MNG cases clinically and pathologically. The present was carried out at the Department of General Surgery, Government General Hospital, Vijayawada during the period of 24 months extending between October 2014 to October 2016. This study included a total of 150 cases, 50 MNG & 100 STN, out of which all were operated. In the present study, thyroid swellings and thyroid carcinomas are more common in females but a thyroid swelling in males have high chances of malignancy. The favoured diagnostic strategy in the workup of patients with a Thyroid Swelling include US, FNAC, serum TSH combined with serum T4 and/or free T4, and scintigraphy. In case of clinical factors raising the likelihood of malignancy, the majority recommended diagnostic thyroidectomy despite FNAC suggesting a benign condition.

### KEYWORDS

Thyroid Carcinoma, Multinodular Goiter, Histopathology, Ultrasonography.

### INTRODUCTION:

Thyroid nodules present a challenge in their diagnosis, assessment 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 thyroid nodules in a given population depends on a number of factors including age, gender, 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 in life and extending into the eighth decade (Larsen and Ingbar. 1998; Fraker. 1995).

True solitary thyroid nodules (STN) occur in 4 - 7% of the adult population. They are present in 5% of persons at an average age of 60 years. They are more common in females (6.4%) as compared to males (1.5%) and this predisposition exists throughout all age groups. Many palpable thyroid nodules, thought to be solitary, are actually part of a multinodular thyroid gland. In general, a nodule must reach a size of 1cm in diameter to be detectable by palpation. Thyroid nodules could be adenomas or malignancies. Most thyroid nodules are benign hyperplastic lesions, but 5 - 20% of these nodules are true malignancies in nature.

Multinodular goitre (MNG) had been traditionally thought to be at a low risk for malignancy as compared to a solitary nodule thyroid (Memon et al. 2010; Gandolfi et al. 2004; Pedomallu et al. 2008). However, various studies have reported a 7 to 17% incidence of malignancy in MNG (Gandolfi et al. 2004; Cole et al. 1991; Sachmechi et al. 2000). Therefore, FNAC for diagnosis and resection for suspicious lesions is considered (Koh and Chang. 1992).

### Aims and Objectives

The aim of the present study is in the evaluation of solitary thyroid nodule (STN) and multinodular goitre (MNG) is to differentiate benign hyperplasia from true malignant neoplasms.

To evaluate the STN and MNG cases clinically and pathologically.

To study the incidence, clinical presentations and pathological variants of carcinoma in both STN and MNG.

### METHODS AND MATERIALS:

The present study conducted by utilizing the cases diagnosed clinically

as STN & MNG and managed both as inpatient and outpatient basis in the Department of General Surgery, Government General Hospital, Vijayawada. All the cases were studied in detail, clinically and recorded as per the questionnaire that was prepared.

The investigations included Haemoglobin, blood sugar, blood urea, blood grouping and Rh typing, X-ray of the neck-AP and lateral views, chest X-ray and IDL (Indirect Laryngoscopy) examination. All patients were investigated for Thyroid profile, FNAC, ultrasound neck, post-operative histopathology.

In our study over two years' duration, we have encountered 300 clinically diagnosed STN and 400 MNG cases out of 1000 Thyroid patients presented to General Surgery OPD in the same period. The analysis of incidence of malignancy was done among the 100 STN & 50 MNG cases of operated patients with histopathological evidence.

### RESULTS:

Table 1 shows the age and gender distribution in STN & MNG cases. There were 87 females and 13 male cases in STN group, resulting in a female to male ratio of 6.69:1 and there are 44 females and six males in MNG group, resulting in a female: male ratio of 7.33:1. This ratio varied throughout the various age groups. Mean age for STN is 38.07, mean age for MNG is 44.62. Malignant cases were 28 in STN out of which three are males and 25 are females. In MNG malignant cases are nine out of which four are males and five are cases of females respectively.

In the present study 12% of our cases had a history of excessive eating of Brassica vegetables. 45% of the patients in our study were using rock salt, 30% were using iodized salt and 25% were using a combination of both. 32% of our cases were residents of hilly areas around Guntur and Vijayawada.

Table 2 shows the Clinical Presentation of STN and MNG cases. All cases were presented with thyroid swelling, either noticed themselves or noticed by others in case of STN about the presence of nodule. Only six cases of STN presented were with other symptoms. Four (4%) cases had pain during deglutition and out of 50 cases of MNG 4(8%) presented with pain during deglutition, 1(2%) came with change in voice.

Table 3 shows the Duration of Swelling of STN & MNG Cases. The

duration of complaints ranged from 1 month to 30 years before they came to our hospital. Majority of the patients i.e. 44 (44%) of STN presented between 1 week to 6 months. In MNG majority presented in between 6 months to 12 months-12 (24 %).

Table 4 shows FNAC of Swelling of STN & MNG Cases. FNAC reports are broadly classified as: a) Benign b) Suspicious of malignancy c) Malignancy d) Insignificant.

In surgical procedure, out of 100 cases, 28 cases diagnosed with benign nodule, follicular neoplasm in 45 cases, suspicious of malignancy in six cases and for malignancy in 18 cases, insignificant in two cases and only one case diagnosed with Hashimoto's thyroiditis.

Total thyroidectomy was done in 20 cases with neck dissection in eight cases. 80 cases underwent hemi-thyroidectomy of which eight cases again underwent completion thyroidectomy after confirmation of Malignancy on Histopathological examination (HPE). One case with previous history of right hemi-thyroidectomy eight years ago who presented with STN, had undergone left completion thyroidectomy, also showed malignancy on HPE. Though FNAC suggested benign cytology intraoperatively due to suspicious malignancy, total thyroidectomy was done in one case. one case was toxic nodule for which hemithyroidectomy done.

In MNG main indication for surgery in our series was cosmetic problem. The next common indication was for pressure effects of the goiter like dysphagia and dyspnoea and secondary thyrotoxicosis. The 13 cases of follicular neoplasms were operated to rule out follicular carcinoma. Of the 50 cases, 28 cases were subjected to total or near total thyroidectomy and remaining 22 cases underwent subtotal thyroidectomy.

#### DISCUSSION:

Thyroid nodules are a common clinical problem. Epidemiological studies have shown the prevalence of palpable thyroid nodules to be approximately 5% in women and only 1% in men living in iodine-sufficient parts of the world (Larsen PR, Ingbar. 1998; Fraker. 1995). Thyroid nodules are more frequent in women, in iodine deficient regions, in older age in iodine deficient areas, it is as high as 50% (Harrisons). The lifetime risk of developing a thyroid nodule is reported to be 15% (Ani. 1995). Nevertheless, only 5% of the clinically apparent thyroid nodules are malignant.

The mean age of the patients under the study was 38.07 and 44.62 years in STN & MNG. The range was 16 to 80 years and majority of them were females, with female to male ratio being 6.69: 1 & 7.33:1 in STN & MNG respectively. In our study, the common age group with thyroid nodules was in the third and fourth decade with female preponderance, similar observations were noted in other studies (Handa et al. 2008; Pandey et al. 2012; Sarunya et al. 2010).

In STN the commonest clinical presentation is the presence of swelling in front of the neck (100%) and majority presented between 1 week to 6 months. These incidences are comparable to those observed in the study by Simon Holzer et al. (2000).

The Chief complaint in MNG cases (100%) was swelling in front of the neck. However, few cases had associated local symptoms like difficulty in swallowing and/or breathing. Duration of swelling ranged from one month to 30 years and 82% (41 cases) were seen in the range of 1 month to 5 years.

The size of the swelling increased gradually in MNG in 44 cases (88%), rapidly in two cases (4%) and was stationary in four cases (8%). Most of the swellings 46 cases (92%) were not associated with pain and 4 cases (8%) had pain.

In our Andhra Pradesh state, in coastal areas and hill areas (agency areas) the incidence of thyroid diseases was high. So, the incidence of thyroid diseases was high in Guntur and Vijayawada surrounding hilly areas and agency areas. Patients come to our hospital from different types of areas like foothills, river beds, sea coast and fertile delta lands.

Iodine deficiency, goitrogenic diet and drugs, irradiation to head and neck regions and Iodised salt (Kessler et al.2005) administration may cause goitre and induce carcinoma of the thyroid but in our study, no etiological factor mentioned could be elicited except for the rock salt taken commonly by our cases.

STN cases: In 100 cases, 28(28%) are malignant, 40(40%) are adenoma and rest are 32(32%). Commonest malignancy is papillary carcinoma 21 cases constituting 75% of 28 all carcinomas. Follicular adenoma (38 cases-38% of total cases) is commonest pathology observed in our study and nodular colloid goitre is commonest non-neoplastic lesion 24 cases -24%. The high incidence of malignancy in our study may be due to the fact that surgery was done only in 100 cases, it is less number compared to other study and majority of them are suspicious.

In 50 cases of MNG, 9(18%) are malignant, 25(50%) are colloid goiter, 9(18%) are Hashimotos thyroiditis, and 7(14%) are Follicular adenoma MNG and Malignancy, the controversial issue whether MNG is significant associated with carcinoma or not. Therefore, considering above facts, a nodule harbouring malignancy in MNG cannot be distinguished clinically or radiologically but can be assessed by FNAC and histopathology in combination.

#### CONCLUSION:

In the present study, thyroid swellings and thyroid carcinomas are more common in females but a thyroid swelling in males have high chances of malignancy. The risk of malignancy is high in STN (23.59%). Amongst the malignant lesions most common was papillary carcinoma in both STN and MNG cases (80.95%). Ultrasonography (US) can be used to determine changes in the size of nodules during follow-up or to detect recurrent lesions in patients suspected for thyroid malignancy, although there are no specific US findings that conform malignancy. The favoured diagnostic strategy in the workup of patients with a Thyroid Swelling include US, FNAC, serum TSH combined with serum T4 and/or free T4, and scintigraphy. In case of clinical factors raising the likelihood of malignancy, the majority recommended diagnostic thyroidectomy despite FNAC suggesting a benign condition.

**Table 1. Age and Gender Distribution in STN & MNG cases**

Age	STN			Malignancies	MNG			Malignancies
	Female	Male	Total		Female	Male	Total	
0-10	0	0	0	0	0	0	0	0
11-20	9	0	9	3	0	0	0	0
21-30	24	5	29	6	6	0	6	1
31-40	28	1	29	8	18	3	21	4
41-50	12	1	13	3	5	1	6	1
50 & above	14	6	20	8	15	2	17	3
<b>Total</b>	<b>87</b>	<b>13</b>	<b>100</b>	<b>28</b>	<b>44</b>	<b>6</b>	<b>50</b>	<b>9</b>

**Table 2. Clinical Presentation of STN and MNG cases**

Symptom/sign	STN		MNG	
	Number	%	Number	%
Swelling in front of the neck	100	100	50	100
Painful deglutition	4	4	4	8
Hoarseness of Voice	0	0	1	2
Palpable Cervical lymph nodes	8	8	3	6
Dyspnea	0	0	0	0

**Table 3. Duration of Swelling of STN & MNG Cases**

Duration of Swelling	MNG		STN	
	Total No. of Cases	Percentage	Total No. of Cases	Percentage
1-6 months	11	22	44	44
6-12 months	12	24	25	25
1-2 years	7	14	11	11
2-5 years	11	22	8	8
5-10 years	7	14	10	10
>10 years	2	4	2	2
<b>Total</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 4. FNAC of Swelling of STN & MNG Cases**

FNAC of Swelling	STN	MNG
	Number with Percentage	Number with Percentage
Benign	71 (71)	35 (70)
Suspicious	9 (9)	5 (10)
Malignancy	18 (18)	6 (12)
Insignificant	2 (2)	4 (8)
<b>Total</b>	<b>100</b>	<b>50</b>

**REFERENCES**

1. Ain, K. B. (1995), "Papillary thyroid carcinoma: Aetiology, assessment, and therapy." *Endocrinol Metab Clin North Am*, 24, 711.
2. Burch, H. B. (1995), "Evaluation and management of solid thyroid nodule." *Endocrinol Metab Clin North Am*, 24, 663.
3. Chang, W. F., Lo, C. Y. (2005), "Pitfalls of Intraoperative Neuro monitoring for Predicting Postoperative Recurrent Laryngeal Nerve Function during Thyroidectomy." *World Journal of Surgery*, 30(5), 806-812.
4. Cole, W. H. (1991), "Incidence of carcinoma of the thyroid in nodular goitre." *Semin Surg Oncol*, 7(2), 61-63.
5. Fraker, D. L. (1995), "Radiation exposure and other factors that predispose to human thyroid neoplasia." *Surg Clin North Am*, 75, 365.
6. Gandolfi, P. P., Frisina, A., Raffa, M., Renda, F., Rocchetti, O., Ruggeri, C., et al. (2004), "The incidence of thyroid carcinoma in multi-nodular goitre: a retrospective analysis." *Acta Bio Medica Ateneo Parmense*, 75, 114-17.
7. Handa, U., Garg, S., Mohan, H., Nagarkar, N. (2008), "Role of the fine needle aspiration cytology in diagnosis and management of thyroid lesions: A study on 434 patients." *J Cytol*, 25, 13-7.
8. Kessler, A. H., Gavriel, S., Zahav, et al., (2005), "Accuracy and consistency of fine-needle aspiration biopsy in the diagnosis and management of solitary thyroid nodules." *Israel Medical Association Journal*, 7(6), 371-3.
9. Koh, K. B., Chang, K. W. (1992), "Carcinoma in multi-nodular goitre." *Br J Surg*, 79(3), 266-67.
10. Larsen, P. R., and Ingbar, S. H. (1998), "The thyroid gland." In: Wilson, J. D., Foster, D. W., *Williams Text Book of Endocrinology*, 9th Edition, Philadelphia, W. B Saunders, 353-487.
11. Memon, W., Khanzada, T. W., Samad, A., Kumar, B. (2010), "Incidence of thyroid carcinoma in multi-nodular goitres." *Rawal Med J*, 35.
12. Okamoto, T., Yamashita, T., Harasawa, A. et al. (1994), "Test performances of three diagnostic procedures in evaluating thyroid nodules: physical examination, ultrasonography and fine needle aspiration cytology." *Endocr J*, 4, 243-7.
13. Pandey, P., Dixit, A., Mahajan, N. C. (2012), "Fine-needle aspiration of the thyroid: A cytohistologic correlation with critical evaluation of discordant cases." *Thyroid Res Pract*, 9, 32-9.
14. Pedamallu, R., Pedamallu, S. B., Rama Rao, K., Pedamallu, C. S. (2008), "Incidence of occult carcinoma in multi-nodular goitre which was diagnosed on the basis of the histopathological findings." *The Internet Journal of Surgery*, 17, 1.
15. Sachmechi, I., Miller, E., Varatharajah, R., et al. (2000), "Thyroid carcinoma in the single cold nodules and in the cold nodules of multi-nodular goitres." *Endocr Pract*, 6(1), 110-12.
16. Sarunya, K., Kornkanok, S., Pongak, M. (2010), "The study of thyroid lesions and the correlation between histomorphological and cytological findings at Maharaj Nakorn Chiang Mai Hospital between 2003-2007." *Chiang Mai Med J*, 49, 105-10.
17. Simon Holzer, Reiners, C., Mann, K., Bamberg, M., Rothmund, M., Dudeck, et al. (2000), "Patterns of care for patients with primary differentiated carcinoma of the thyroid gland in Germany during 1996." *Cancer*, 89(1), 192-20.