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Clinicopathological patterns of Thyroid Malignancy in Multinodular Goiter in a Tertiary Care Hospital – Retrospective study

Mallepogu Anil Kumar[1], Mandla Janaki[2]

[1] Associate Professor of Pathology, Santhiram Medical College and General Hospital, Nandyal, Andhra Pradesh, India.
[2] Professor of the Pathology Department, Santhiram Medical College and General Hospital, Nandyal, Andhra Pradesh, India.

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Corresponding Author:

Mallepogu Anil Kumar

Associate Professor of Pathology, Santhiram Medical College and General Hospital, Nandyal, Andhra Pradesh, India.

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ABSTRACT

Background: Multinodular goiter is a very common endocrine disorder, affecting 500 to 600 million people worldwide. In India, 54 million people have goiter, with an estimated risk of 167 million. The incidence of malignancy in multinodular goiter varies from 0.9 % to 13% in different parts of the world. Among malignancies, Papillary Thyroid Carcinoma was the most common. Most cases were diagnosed between the fifth and sixth decade of life and were frequently seen in females.

Aims & Objectives:

* To study the age and sex-wise incidence of multinodular goiter.
* To evaluate the various morphological types of thyroid malignancy in multinodular goiter.
* To study the thyroidectomy specimens by routine histopathological examination.

Materials and Methods: A retrospective study was performed on 136 surgically resected thyroidectomy specimens of multinodular goiter. The study was conducted in the department of pathology for a duration of two years, from January 2020 to December 2021, at Santhiram Medical College and General Hospital, Nandyal, Andhra Pradesh, India.

Results: Among the 136 cases of multinodular goiter, 107 (79%) were female and 29 (21%) were male. Histopathological examination showed benign multinodular goiter was present in 124 (91%) cases. Malignant thyroid lesions were found in 12 (9%) cases. Among the malignancies, Papillary Thyroid Carcinoma was the commonest.

Conclusion: Multinodular goiter could be a sign of different types of thyroid malignancy. The most common type was papillary carcinoma.

Keywords: *Multinodular goiter, Thyroid malignancy, Papillary carcinoma.*

INTRODUCTION

Multinodular goiter (MNG) is a very common endocrine disorder, affecting 500 to 600 million people worldwide[1]. In India, 54 million people have goiter, and the estimated risk is about 167 million[2].

Thyroid carcinoma represents the most common malignancy of the endocrine system and accounts for only a total of 1% of neoplasms, with an increasing incidence over the last four decades[3]. Thyroid neoplasms usually present as a solitary palpable nodule or multiple discrete nodules. Epidemiologically, risk factors for thyroid malignancy are ionizing radiation, the presence of thyroid adenoma, and multinodular goiter (MNG). Multinodular goiter has been considered to be at a low risk for malignancy as compared to a solitary thyroid nodule[4-6].

The incidence of malignancy in multinodular goiter varies from 0.9% to 13% in different parts of the world[7]. Various studies have reported a 7% to 17% incidence of malignancy in Multinodular Goiter[8,9]. Among malignancy, papillary

carcinoma was the commonest[10]. Carcinoma of the thyroid occurs at all ages[11]. Most of the cases are diagnosed between the fifth and sixth decade of life[12]. It is most frequently seen in females.

MATERIALS AND METHODS

A retrospective study was conducted on surgically resected thyroidectomy specimens of multinodular goiter in the department of pathology at Santhiram Medical College and General Hospital, Nandyal. The study period was 2 years, from January 2020 to December 2021.

Patients in and around Nandyal who attended the surgery outpatient department with a clinical diagnosis of multinodular goiter were included in the study. Patients with a solitary thyroid nodule were excluded from the study. The present study consisted of 136 patients with multinodular thyroid disease. The clinical details were taken from hospital records and analyzed.

All resected specimens were analyzed in the pathology department for histopathological examination. Hemi- and total thyroidectomy specimens were fixed in 10% formalin. After processing, H & E (Hematoxylin and Eosin) stained sections were examined under the light microscope, and thorough analysis was done.

Inclusion criteria: Patients with diffuse thyroid enlargement of all ages and sexes were included in the study.
Exclusion criteria: Patients with a solitary thyroid nodule were excluded from the study.

RESULTS

Table 1: Age and Sex wise Distribution of cases of MNG

Gender	0-20	21-30	31-40	41-50	51-60	61-70	71-80	No. of cases &%
Female	02	07	27	47	12	08	04	107 (79%)
Male	01	02	08	11	03	02	02	29 (21%)
Total no. of cases &%	03 (2.2%)	09 (6.6%)	35 (25.7%)	58 (42.7%)	15 (11%)	10 (7.4%)	06 (4.4%)	136 (100%)

Table 2: Case wise distribution of MNG among age groups for both females and males

Histopathological diagnosis	Gender	0-20	21-30	31-40	41-50	51-60	61-70	71-80	No of cases	%
Pure multinodular goiter	F	01	04	16	28	7	04	02	62	45.6
	M	-	-	02	05	-	01	-	08	5.9
Colloid nodule	F	01	02	06	11	02	02	02	26	19.1
	M	01	01	03	03	01	01	01	11	8.1
Follicular adenoma	F M	-	01	03	04	02	01	- 01	11	8.1
		-	01	02	01	01	-		06	4.5
Papillary carcinoma	F	0	0	2	3	1	1	-	07	5.1
	M	-	-	-	1	1	-	-	01	0.7
Follicular carcinoma	F	-	-	-	-	-	-	-	0	0
	M	-	-	1	1	-	-	-	2	1.5
Medullary carcinoma	F	-	-	-	1	-	-	-	1	0.7
	M	-	-	-	-	-	-	-	0	0
Anaplastic carcinoma	F	-	-	-	-	-	-	-	0	0
	M	-	-	-	-	-	-	-	1	0.7
Total	F+M	03	9	35	58	15	10	06	136	100

Table 3: Age & Sex wise distribution of cases of MNG with out thyroid cancer

Gender	0-20	21-30	31-40	41-50	51-60	61-70	71-80	No.of cases &%
Female	2	7	25	43	11	07	04	99 (80%)
Male	01	02	07	09	02	02	02	25(20%)
Total no & %	3 (2.4%)	9 (7.3%)	32 (25.8%)	52 (41.9%)	13 (10.5%)	09 (7.3%)	06 (4.8%)	124 (100%)

Table 4: Case wise distribution of MNG without thyroid cancer among age group for both females and males

Histo Pathological Diagnosis	Gender	0-20	21-30	31-40	41-50	51-60	61-70	71-80	No. of cases	%
Pure MNG	F	01	04	16	28	7	04	02	62	50
	M	-	-	02	05	-	01	-	08	6.5
Colloid Nodule	F	01	02	06	11	02	02	02	26	20.9
	M	01	01	03	03	01	01	01	11	8.9
Follicular Adenoma	F	-	01	03	04	02	01	-	11	8.9

	M	-	01	02	01	01	_	01	06	4.8
Total	F & M	03	09	32	52	13	09	06	124	100

Table 5: Age &Sex wise distribution of cases of MNG with thyroid cancer

Gender	0-20	21-30	31-40	41-50	51-60	61-70	71-80	Total No of cases &%
Female	0	0	2	4	1	1	0	8 (66.7%)
Male	0	0	1	2	1	0	0	4(33.3%)
Total no of cases &%	0 (0)	0 (0)	3 (25%)	6 (50%)	2 (16.7%)	1 (83%)	0 (0)	12 (100%)

Table 6: Case wise distribution of MNG with thyroid cancer among age groups for both females and males

Histo pathological diagnosis	Gender	0-20	21-30	31-40	41-50	51-60	61-70	71-80	No .of cases	%
Papillary carcinoma	F	0	0	2	3	1	1	-	7	58.4
	M	-	-	-	1	1	-	-	1	8.3
Follicular carcinoma	F	-	-	-	-	-	-	-	0	0
	M	-	-	1	1	-	-	-	2	16.7
Medullary carcinoma	F	-	-	-	1	-	-	-	1	8.3
	M	-	-	-	-	-	-	-	0	0
Anaplastic carcinoma	F	-	-	-	-	-	-	-	0	0
	M	-	-	-	-	1	-	-	1	8.3
Total	F & M	-	-	3	6	2	1	-	12	100

Table 7: Prevalence of malignancy in various studies

Study	Incidence of malignancy
Al Hashimi et al (2013)	3.03%
Benzarti et al (2002)	10%
Prades et al (2002)	12.2%
Mofti et al (1991)	29%
Present study (2022)	8.8%

In present study, included 136 cases of multinodular goiter. Of these 136 cases ,107 (79%) were female and 29 (21%) were male .Maximum number of multinodular goiter, 58(42.7%) cases were seen in 4th decade and 35 (25.7%)cases were seen in 3rd decade **(Table 1).**

Histopathological examination of 136 cases of Multinodular goiter revealed that 70 (51.5%) cases were Benign MNG 37 (27.2%) cases were colloid nodule, 17 (12.6%) cases were follicular adenoma,08 (5.8%) cases were papillary carcinoma,02(1.5%) cases were follicular carcinoma,01(0.7%) case of medullary carcinoma and 01 (0.7%) anaplastic carcinoma **(Table 2).**

Among 136 multinodular goiter cases, 124 (91%) cases are benign, 12 (09%) cases are malignant. Of 124 benign multinodular goiter, 99 (80%) cases were female and 25 (20%) cases were male **(Table3).**Maximum number of benign multinodular goiter 52 (41.7%) cases are seen in 4thdecade **(Table 4).**

Among 12 malignant thyroid lesions, 08 (66.7%) cases were female and 04 (33.7%) cases were male**(Table 5).** Maximum number of malignant thyroid lesions 06(50%) cases are seen in 4thdecade and most common malignant lesion was papillary carcinoma 08(66.7%) cases **(Table 6).**

Gross examination of papillary thyroid carcinoma shows an encapsulated, multifocal, solid, grey-white area with a firm consistency. It has a granular cut surface along with variable cysts filled with colloid, fibrosis, and calcification.

Histopathological examination shows numerous papillae with a fibrovascular core. The papillae are lined by cuboidal cells, which show nuclear features including Orphan Annie nuclei, overlapping of nuclei, nuclear grooving, and eosinophilic pseudo inclusions. Another feature of papillary thyroid carcinoma is the presence of psammoma bodies **(Figure 1).**

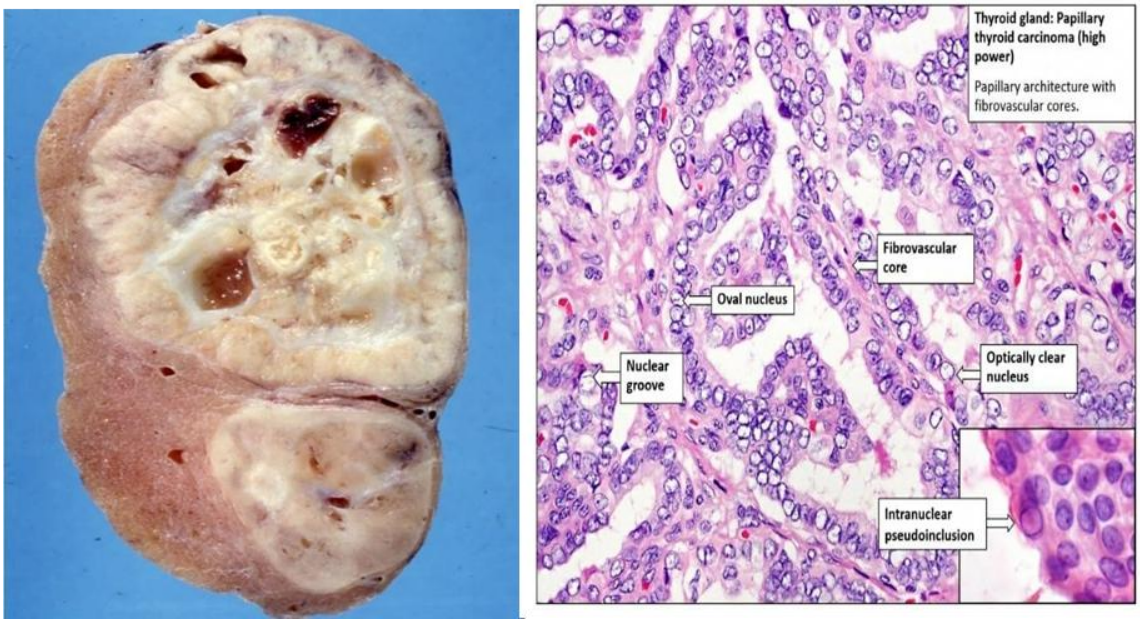

Figure 1: Papillary carcinoma of Thyroid (A) Gross picture, (B) High power view

DISCUSSION

Thyroid carcinoma is the most common endocrine tumor. The incidence of thyroid cancer has increased by up to five folds during the last six decades[13,14]. Possible risk factors for malignancy in multinodular goiter are a history of radiation to the neck, a family history of thyroid diseases, and the detection of calcifications by ultrasound[15].

In the present study, histopathological analysis of 136 cases shows that benign multinodular goiter was present in 124 (91%) cases, and malignant thyroid lesions were present in 12 (9%) cases. Among the 12 malignancy cases, papillary carcinoma, with 08 (66.7%), was the most common malignant tumor. Hence, this study correlates with various international studies.

In a study done by Pedamallu in 2008, MNG was found to be higher in females (88%) compared to males (12%)[6]. In the current study, MNG was found in females (79%) compared to males (21%). Therefore, this study is correlated with the above author.

The male-to-female ratio was noted to be between 1:2.5 to 1:4 in different parts of the world[16,]. The ratio was shown as 1:5 by Rahman in 2006[17], 1:4 by Welkar in 2003[18], and 1:2.5 to 1:4 by Zuberi in 2009[19]. In the current study, the male and female ratio was 1:3.7. Hence, this study is correlated with the above authors.

Aqeel Shakir Mahmood et al.'s study in 2019 reported the highest frequency of multinodular goiter, 141 (32%) cases, in the 41-50 years age group [20]. Yogendra Kumar et al.'s study in 2019 also reported the highest frequency of multinodular goiter, 24 (40%) cases, in the 41-50 years age group[21]. In the present study, the highest frequency of multinodular goiter, 58 (42.7%) cases, was seen in the 41-50 years age group. Hence, this study is correlated with the above authors.

The incidence of malignancy in multinodular goiter varies. 0.9 to 13% in different parts of world [7]. Various studies have reported a 7 to 17% incidence of malignancy in Multinodular goiter [8,9],.and highly consistent with other studies . Al Hashimi et al(2013) in Iraq, the incidence was 3.03%[22].Benzarti et al (2002) in Tunis , incidence was 10%[23]. Prades et al (2002) documented, incidence of 12.2%[24]. Mofti (1991) observed higher incidence of thyroid malignancy 29%[25]. In our study, Incidence of malignancy inmultinodular goiter was 8.8%.Hence our study correlated with above authors**(Table 7).**

CONCLUSION

Multinodular goiter is a common problem of thyroid disease.

* In this study, the male-to-female ratio was 1:3.7.
* The maximum number of multinodular goiter cases, 58 (42.7%), were seen in the 41-50 years age group.
* The incidence of thyroid carcinoma in MNG is high.
* Papillary carcinoma was the most common malignant tumor of the thyroid among MNG patients.
* The frequency of malignancy in the present study was 8.8%.

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