ORIGINAL ARTICLES

MALIGNANCY IN MULTINODULAR GOITER-POST THYROIDECTOMY: A PROSPECTIVE STUDY

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ABSTRACT

***Objective*:** To find out the frequency and types of malignancy in patients treated surgically for nontoxic multinodular goiter and its correlation in different age groups and gender.
***Study Design*:** Prospective observation study.
***Place and Duration of Study*:** Department of ENT, Combined Military Hospital Rawalpindi, from Dec 2018 to Dec 2019.
***Methodology*:** A total of 116 patients operated for nontoxic multinodular goiter were included in the study. Demographic details along with pre-op Ultrasonography findings, Fine Needle Aspiration Cytology, thyroid function test results and post-op histopathological reports of the thyroid specimen were entered on pre-designed proforma. Results were analyzed using the Statistical Package for Social Sciences (SPSS) Version 22.
***Results*:** Age ranges from 19-70 years (mean 43.51 years). Out of 116 cases operated for multinodular goiter, 37 (31.8%) had malignant thyroid lesions (13 males, 24 females). Papillary carcinoma of the thyroid (45.9%) was the commonest malignancy followed by a follicular variant of papillary carcinoma (24.3%). The most common age group with malignancies was 49-58 years.
***Conclusion*:** Malignant Thyroid cancers showed a female preponderance and were most common in age group 49-58 years. Papillary carcinoma of thyroid was the commonest tumor. Radical thyroid surgery is a recommended surgical management option for nontoxic Multinodular goiter.

Keywords: Fine needle aspiration cytology, Incidental thyroid carcinoma, Malignant thyroid carcinoma, Multinodular goiter, Thyroidectomy, Thyroid cancer.

INTRODUCTION

It was a long-standing belief that the multinodular goiter has usually lesser malignant potential than solitary nodules and that's the prime reason for conservative management of such cases. However, recent studies in the past decade suggested a rise in incidental cases of malignancy in surgically treated cases of Multinodular goiter[1]. Multinodular goiter is no longer considered benign as studies have suggested the incidence of malignancies to be 7-17%[2].

The global prevalence of Multinodular goiter is 4-7%[3]. If the prevalence of goiter is greater than 10%, it is called endemic goiter. Multiple risk factors for the disease have been identified including the black race, female gender, deficiency of iodine and exposure to irradiation. With the advances in diagnostic techniques including PET scan, FNAC and high resolution ultrasonography, the prevalence of incidental thyroid carcinoma has raised from 5% to 10%[5].

Malignant thyroid tumors are a heterogeneous group of endocrine malignancies which account for 1% of all the malignancies in general and are the commonest endocrine malignancies (90% of all endocrine malignancies) with a prevalence of up to 40 cases per million per year[6]. This prevalence may increase further if occult cancers of thyroid are taken into consideration. Thyroid carcinomas are found in all age groups with a slight female preponderance. However, the studies on the mortality and morbidity associated with these carcinomas have shown an aggressive pattern in males[7]. In Pakistan, thyroid carcinoma accounts for 1.2% of all the malignant carcino-

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mas[8]. The objective of study was to find out the frequency and types of malignancy in patients treated surgically for nontoxic multinodular goiter and its correlation in different age groups and genders.

METHODOLOGY

This was a prospective observational study carried out in Department of ENT Combined Military Hospital Rawalpindi, from December 2018 to December 2019. Non-probability consecutive sampling was done. A sample size of 102 was calculated (by using a reference prevalence of 4% of Multinodular Goiter) 3 by Open Epi software (Confidence Level: 99%) but we included all the patients who underwent surgery during the study period i.e.116. Demographic details of the patients including age, sex and time since diagnosis was documented in pre-designed proforma. Age of the patients was divided into 6 groups; group 1 (19-28 year), group 2 (29-38 year), group 3 (39-48 year) group 4 (49-58 year), group 5 (59-68 year) and group 6 (>68 years). Their clinical examination along with the relevant radiological investigations were carried out. We included the patients of multinodular goiter who had diagnostic quality cytology sample and histopathology report after total thyroidectomy. All patients with active thyroid disease and chronic diseases like hypertension, diabetes, chronic pulmonary, liver, heart or kidney disease were excluded from this study. Before Fine Needle Aspiration Cytology (FNAC) was carried out, a diagnostic ultrasonography of the neck was done by a radiologist. Size, morphology, and enlargement of the surrounding lymph nodes was focused. The consistency of the thyroid nodule was classified into predominantly cystic, solid and mixed. Fine Needle Aspiration Cytology was performed under real-time Ultrasound guidance by the pathologist. Those cases in which diagnostic quality FNAC sample was suspicious or positive for surgery were operated by a team of qualified ENT & Head and Neck surgeons with expertise in Thyroid surgery. Elective radical thyroid surgeries were performed on different patients according to the primary diagnosis, size of mass and extent of disease. Follow up after surgical intervention was done in all cases. All excised thyroid tissues were sent to one histopathologist to reduce bias. Histopathology reports were com-pared to the pre-operative Cytology reports. Data was analyzed using Social package for Statistical Sciences version 22. The *p*-value ≤0.05 was considered significant. Informed consent of all the patients and approval from the ethical review committee and institutional review board (IRB # ENT-1018) was obtained.

RESULTS

Age ranges from 19 to 70 years (mean 43.5 ± 4.1 years). Out of 116 cases operated for multinodular goiter, 37 (31.8%) had malignant thyroid lesions on post-op histopathological examination of the sample, while 79 (68.1%) had benign lesions. Amongst the 37 patients who had malignant thyroid nodules, 13 (35.1%) were males while 24 (64.9%) were females. Maximum patients with thyroid malignancy (n=12) belonged to age group 4 i.e. 49-58 years with a mean age of 53.4 ± 2.9 years. Distribution of age in the patients with malignancies is given in table-I. Frequencies of various carcinomas are given in table-II. Correlation between age groups and histopathological

Table-I: Age wise frequencies of thyroid carcinoma (n=37).

Age Group (In Years)	n (%)
19-28	2 (5.4)
29-38	9 (24.3)
39-48	6 (16.2)
49-58	12 (32.4)
59-68	5 (13.5)
>68	3 (8.1)

Table-II: Histopathological variants of malignant thyroid nodules (n=37).

Histopathological Variant	n (%)
Anaplastic carcinoma	3 (8.1)
Follicular Variant of Papillary Carcinoma	9 (24.3)
Papillary Carcinoma	17 (45.9)
Insular Carcinoma	1 (2.7)
Medullary Carcinoma	3 (8.1)
Follicular Carcinoma	2 (5.4)
Lymphomas	2 (5.4)

types of malignant nodules is given in table-III. The chi-square test was applied and results were statistically significant (*p*-value 0.019). Total Thyroidectomy was done in 78 (67.2%) patients, Total Lobectomy in 28 (24.1%), Near Total thyroidectomy in 10 (8.6%) patients. Frequencies of malignant carcinomas onhistopathological examination (HPE) in different thyroid surgeries (table-IV).

studied the clinicopathological correlation of Multinodular goiter and reported the frequencies of malignancy to be 20% on histopathological examination[11]. Nadeem *et al*, documented 14.9% incidence of malignancy in multinodular goiters[12].

The most common type of thyroid malignancy found in our study was papillary carcinoma (45.9%) followed by a follicular variant of

Table-III: Correlation of various age groups and histopathological variants of malignant thyroid nodules.

Age Groups (years)	Histopathological variants of malignant thyroid nodules (n=37)							*p*- value
	Anaplastic Carcinoma	Follicular variant of Papillary carcinoma	Papillary carcinoma	Insular Carcinoma	Medullary Carcinoma	Lymphomas	Follicular carcinoma	
19-28	-	-	2	-	-	-	-	0.019
29-38	-	2	5	1	1	-	-	
39-48	-	2	3	-	1	-	-	
49-58	2	5	3	-	-	1	1	
59-68	1	-	4	-	-	-	-	
>68	-	-	-	-	1	1	1	

Table-IV: Frequencies of malignancies in different thyroid surgeries.

Surgical Procedures Performed	n	Malignancy on HPE
Total Thyroidectomies	78	27 (34.6%)
Near Total Thyroidectomies	10	3 (30%)
Total Lobectomies	28	7 (25%)

Table-V: Comparison of frequency of different thyroid tumors with other studies.

Type of thyroid Carcinoma	Our study	Shah *et al*[15]	Yogish *et al*[16]	Solomon *et al*[6]
Papillary Carcinoma	45.9 %	69 %	71.42 %	90 %
Follicular Variant of Papillary Carcinoma	24.3%	11.6 %	23.80 %	8 %
Medullary Carcinoma	8.1%	9.7 %	4.76 %	2 %
Anaplastic carcinoma	8.1 %	-	-	-

DISCUSSION

In our study, among 37 cases of malignancy, 13 were males and 24 were females with a male to female ratio of 1:2 in line with other national and international studies[9]. The frequency of malignant thyroid carcinoma on histopathological examination was 31.8% in our study which was slightly higher than other similar studies in the literature. Athavale *et al*, reported 10% of the operated cases of multinodular goiter to be malignant[9]. Anwar *et al*, reported 16.18% frequency of malignant tumors amongst multinodular goiters[10], while Solomon *et al*, documented 18% prevalence of thyroid malignancy[6]. Padmawar *et al*,

papillary carcinoma (24.3%). Nadeem *et al*, in his study in Rahim yar Khan, Pakistan, reported the incidence of papillary carcinoma to be 50% while Haq *et al*, and Hanumanthappa *et al*, documented 60% frequency of papillary carcinoma in malignant goiters[13,14]. Comparison of frequency of different thyroid tumors with other studies is shown in table-V.

Papillary carcinoma is a well-differentiated tumor with the least invasive potential. Its better prognosis is expected in patients of early age. Surgery is the definitive treatment. Follicular carcinoma originates from the follicular cells of the thyroid and is the second most common tumor of

the thyroid. Medullary carcinoma has its origination from parafollicular C type cells of the thyroid and Anaplastic tumors are the least differentiated or undifferentiated type with most aggressive potential[17].

The dramatic rise in the incidence of malignancy has led to increased use of radical thyroid surgeries in patients with multinodular goiter with suspicious FNAC[17]. The results of our study depict a higher frequency of malignancy in patients who underwentradical thyroid surgeries. In this study 67.2% of patients with multinodular goiter, Total Thyroidectomy was performed, Total Lobectomy in 24.1% and Near Total thyroidectomy in 8.6% patients. In 34.6% cases with Total Thyroidectomy, 30% with Near Total Thyroidectomy and 25% with Total Lobectomy, malignancy was reported on histopathological examination. Kapoor *et al*, reported Total Thyroidectomy is the most common procedure found and incidence of malignancy in 14% cases[18]. These results were similar to a study done by Athavale *et al*[9], and a similar trend was reported in this study as well.

CONCLUSION

There is a high frequency of malignant thyroid cancers in patients with non-toxic multinodular goiter. Malignant Thyroid cancers showed a female preponderance and were the most common in age group 49-58 years. Papillary carcinoma of thyroid was the commonest tumor found followed by Follicular variant of Papillary carcinoma. Radical thyroid surgery is a recommended surgical management option for nontoxic Multinodular goiter owing to the increased incidence of malignant disease in such cases.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any authors.

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