**Original article:**

**Incidence of Thyroid Malignancy in Multinodular Goitre: A Comparison between Male and Female Patients**

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**Abstract:**

The incidence and subtype of thyroid cancer within multi-nodular goiters were investigated, with a focus on comparing the occurrence between male and female patients. This prospective observational study was conducted at the Department of General Surgery, Government Medical College and ESI Hospital in Coimbatore, India, from April 2019 to March 2020, involving fifty-eight patients. Ultrasound-guided fine-needle aspiration cytology followed by total thyroidectomy was performed. The incidence of thyroid cancer and gender-based analysis were undertaken. Among the patients, six (10.34%) exhibited malignant foci, with four being male and two female. Factors contributing to gender disparities, such as hormonal, genetic, environmental factors, and metabolic syndrome, were analyzed. The analysis revealed papillary carcinoma in four cases and follicular carcinoma in two cases. Among these, three male patients and one female patient had papillary carcinoma, while one male and one female patient each had follicular carcinoma. In conclusion, a significant incidence of malignancy was found in multi-nodular goiters. Gender-based analysis indicated a higher predisposition for malignancy in males compared to females.

**Keywords:** Thyroid Cancer, Multi-nodular Goiter, Gender-based Analysis

**Introduction:**

The prevalence of thyroid disorders has been a growing concern in the medical landscape. Among these, multi-nodular goiter, characterized by the presence of multiple nodules within the thyroid gland, holds significant clinical relevance due to its potential association with thyroid malignancies. Thyroid cancer is one of the most common endocrine malignancies, and understanding its occurrence within the context of multi-nodular goiters is of paramount importance for both diagnosis and treatment strategies. This study aims to investigate the incidence and specific subtypes of thyroid cancer within the realm of multi-nodular goiters, with a particular focus on discerning any disparities in occurrence between male and female patients. Given the prevalence of thyroid disorders and the potential implications of thyroid malignancy, unraveling the gender-based differences in cancer predisposition within this context could provide valuable insights into underlying mechanisms and risk factors.

Gender-based variations in thyroid diseases have been documented in various studies, highlighting potential hormonal, genetic, and environmental factors that might contribute to differential disease presentation. Moreover, exploring the relationship between gender and thyroid cancer incidence could potentially shed light on the intricate interplay between hormonal influences and malignancy development. This prospective observational study, conducted at the Department of General Surgery in Government Medical College and ESI Hospital, Coimbatore, India, utilizes ultrasound-guided fine-needle aspiration cytology and total thyroidectomy to diagnose and categorize thyroid nodules. By investigating the incidence of thyroid cancer and its subtypes within multi-nodular goiters and comparing this occurrence between genders, this research endeavors to enhance our understanding of the complex interplay between gender, thyroid disorders, and malignancy.

**Material and methods:**

The study was designed as a prospective observational investigation conducted at the Department of General Surgery, Government Medical College and ESI Hospital, Coimbatore, India. The research spanned from April 2019 to March 2020 and enrolled a total of fifty-eight patients diagnosed with multi-nodular goiter.

To determine the incidence and specific subtypes of thyroid cancer, a comprehensive methodology was implemented. Ultrasound-guided fine-needle aspiration cytology (FNAC) was employed as the initial diagnostic approach for all enrolled patients. Following FNAC confirmation, patients with suspected or confirmed malignancy underwent total thyroidectomy.

The collected data were meticulously analyzed, focusing on gender-based comparisons of thyroid cancer incidence. Factors contributing to gender disparities, including hormonal influences, genetic predisposition, environmental factors, and metabolic syndrome, were investigated through a thorough examination of patient histories, medical records, and relevant literature. The study identified six cases (10.34%) with malignant foci within the multi-nodular goiters. Out of these cases, four were male patients and two were female patients. Further categorization revealed that four cases were papillary carcinoma, while two were follicular carcinoma. Among the papillary carcinoma cases, three occurred in male patients and one in a female patient. Additionally, one male and one female patient each exhibited follicular carcinoma.

The results were indicative of a notable incidence of malignancy within multi-nodular goiters. Moreover, the gender-based analysis unveiled a higher predisposition for malignancy in males compared to females, warranting further investigation into the underlying factors that may contribute to this discrepancy.

**Results:**

**Table 1: Age-Wise Distribution of Malignancy**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Age of the Patients** | **No. of Patients** |
| 1 | 20 - 40 years | 4 |
| 2 | 40 - 60 years | 2 |

**Table 2: Type of Malignancy in Multinodular Goitre**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Type of Carcinoma** | **No. of Patients** |
| 1 | Papillary Carcinoma | 4 |
| 2 | Follicular Carcinoma | 2 |
| 3 | Medullary Carcinoma | 0 |
| 4 | Anaplastic Carcinoma | 0 |

**Table 3: Sexwise Distribution of Malignancy**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Sex** | **Type of Carcinoma** | **No. of Patients** |
| 1 | Male | Papillary Carcinoma | 3 |
| 2 | Female | Papillary Carcinoma | 1 |
| 3 | Male | Follicular Carcinoma | 1 |
| 4 | Female | Follicular Carcinoma | 1 |

**Discussion:**

The discussion section presents a comprehensive analysis of the study's findings, contextualizes them within existing literature, and elucidates their clinical implications. The study aimed to investigate the incidence and subtypes of thyroid cancer in multi-nodular goiters while comparing their occurrence between male and female patients. The results provide valuable insights into the prevalence of malignancy and gender-related trends in thyroid disorders.

The study's patient cohort consisted of 58 cases of goiter, with a striking predominance of female patients (89.66%), aligning with the well-established higher incidence of thyroid disorders in women. The higher prevalence among females might be attributed to hormonal factors, considering the role of estrogen and its impact on thyroid function.

Age-wise distribution revealed that the majority of malignancy cases were observed within the 20 - 40 years age group, accounting for four cases, followed by two cases in the 40 - 60 years group. These findings are consistent with the literature, as thyroid cancer often affects younger individuals, possibly due to increased screening, diagnostic advances, and enhanced awareness.

Analyzing the type of malignancies in multi-nodular goiters, the study identified papillary carcinoma as the most prevalent subtype, with four cases, followed by two cases of follicular carcinoma. Notably, medullary and anaplastic carcinomas were not observed in this cohort. The preponderance of papillary carcinoma is congruent with global trends, as it represents the most common and least aggressive form of thyroid cancer. The absence of medullary and anaplastic carcinomas is consistent with their relatively rare occurrence and distinct clinical characteristics.

Gender-based analysis revealed an interesting pattern. Among male patients, three cases of papillary carcinoma and one case of follicular carcinoma were identified. In female patients, one case of papillary carcinoma and one case of follicular carcinoma were noted. These findings suggest that while papillary carcinoma is prevalent in both genders, the distribution of follicular carcinoma appears more even. It's essential to note that the limited sample size might influence the apparent gender disparities, and further research is warranted to validate these trends in larger populations.

The study's outcomes have several clinical implications. The substantial incidence of malignancy within multi-nodular goiters underscores the importance of thorough evaluation and timely intervention. For clinicians, a vigilant approach to diagnosis and management is crucial, especially in females and individuals aged 20 - 40 years. Additionally, the predominance of papillary carcinoma aligns with its generally favorable prognosis, although close monitoring and appropriate follow-up are essential for comprehensive patient care.

The gender-based analysis prompts consideration of underlying factors contributing to differential cancer predisposition. Hormonal influences, genetic factors, and environmental exposures might contribute to the observed variations. Exploring these mechanisms could guide future research into tailored prevention and management strategies based on gender-specific considerations.

**Conclusion:**

In conclusion, this study's findings shed light on the incidence and subtypes of thyroid cancer within multi-nodular goiters, emphasizing the significance of early detection and management. The observed gender-based trends in malignancy occurrence warrant further investigation, which could ultimately lead to improved patient care and personalized approaches to thyroid disorder management.

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