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# Histological Pattern of Thyroid Malignancies in Tertiary Hospital

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**Abstract:** ***Introduction: Thyroid cancers are the most common among endocrine malignancies with geographical variation in incidence and histopathological pattern related to age,sex,dietary and environmental factors. The majority of thyroid tumors comprise well differentiated (papillary and follicular) thyroid carcinoma (85%) and Medullary carcinoma of thyroid represents (5%). A minority of cases progress to poorly differentiated carcinoma (PDTC) and ultimately to the highly aggressive undifferentiated carcinoma (UTC) or anaplastic carcinoma. PDTC constitutes 1% to 15% of all thyroid malignancies. ATC represents 1–2% of thyroid cancers. Aim: To describe histopathological pattern of thyroid malignancies at a tertiary hospital over a period of 6-years. Methods: Retrospective study of all thyroid malignancy cases diagnosed among the thyroidectomy patients at endocrine surgery department of a tertiary medical centre in South India from august 2011 to July 2017. The data collected included demographics, clinical presentation, histopathology, treatment, and outcomes. Results: 386 Thyroid carcinomas were diagnosed over a period of 6 years. Out of 386 thyroid malignancies 354 were differentiated thyroid carcinomas (92%) and 7 cases of medullary thyroid carcinoma (2%), 25 cases of poorly differentiated and anaplastic carcinoma were diagnosed which comprises of about (6%).***

**Keywords:** Papillary cancer thyroid, iodine deficiency

## 1. Introduction

Thyroid cancer is the third fastest rising cancer diagnosis in the United States with an annual rate of increase at 3% and with a doubling of incidence in the past 30 years.[1] Globally, many autopsy studies have reported incidences of thyroid nodules of more than 50%, and presently with the use of high-resolution ultrasonography, the incidence reports are approximately 40% of patients with nonthyroidal illness.[2] In the Framingham study, ultrasonogram showed that 3% of men above the age of 60 years and 36% of women of age between 49 and 58 years had thyroid nodules.[3] The increasing incidence of goiter is associated with an increase in the incidence of thyroid cancer globally, attributed variably to better detection and diagnostic methods.[4] In India, there is a significant burden of thyroid diseases. A study on thyroid disorders estimated that about 42 million people in India suffer from thyroid diseases.[5] The Indian National Cancer Registry Program (Indian Council of Medical Research) reported a nationwide relative frequency of thyroid cancer among all the cancers of 0.1%–0.2% with a female-to-male ratio of 4:1. In the Wickham study, 26% of women had a goiter, compared to 7% of men. Thyroid nodules are less frequent in men than in women, but when found, they are more likely to be malignant. The frequency of goiters decreases with advancing age. The decrease in frequency differs from the incidence of thyroid nodules, which increases with advancing age. The age-adjusted incidence rates of thyroid cancer are 1/100,000 for males and 1.8/100,000 for females (Mumbai Cancer Registry Data). A hospital cancer registry of 1185 cases of thyroid cancer has reported papillary thyroid carcinoma (PTC) to be most common, followed by follicular thyroid carcinoma.[6] We report here the various thyroid malignancies admitted in Endocrine Department of a tertiary hospital.

## 2. Materials and Methods

This retrospective study was conducted for 6 years from 2011 to 2017, included patients who were admitted in the endocrine surgery department in the tertiary hospital with thyroid malignancies. These patients were registered, subjected to clinical examination, and investigated with radiological and basic laboratory tests including thyroid hormone assay and fine-needle aspiration cytology of thyroid. Patients who were found with cytological evidence of thyroid malignancy or metastatic deposits in cervical lymph node aspirates were included in the study. Patients with multinodular or solitary thyroid enlargements with ultrasonogram, fine-needle aspirate proven benign thyroid nodule were excluded from the study. Informed written consent was obtained, and these patients were given surgical resections based on hospital protocol and the thyroidectomy samples were sent for histopathological evaluation. The clinical, operative, cytological, and histological data were tabulated and statistically analyzed.

## 3. Results

Of the 386 patients analyzed, 350 patients (91.57%) were females and 36 patients were males (9%) ($P < 0.001$) which shows high significant difference between genders at 0.1% level. Nearly 300 patients (77%) of the patients were between 21 and 40 years, 18 patients (5.6%) were less than 20 years, 50 patients (12%) were between 41 and 60 years, and 18 patients (5.6%) were above 60 years. $P < 0.001$ shows high significant difference between age groups at 0.1% level. 8 patients had dyspnoea 2 patients had dysphagia and 12 patients were suffering from hoarseness of voice. All the patients had Goitre, size on presentation of goiter was 4±3.5 and median duration was 5 years and 36 patients were found with cervical lymph nodes. On Ultrasonographic evaluation solitary lesions were found in 200 patients, multiple nodule


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in 186 patients and calcification in 28 patients. FNAC showed Papillary ca thyroid in 350 patients, Hashimotos thyroiditis in 10 patients, Nodular colloid goiter in 10 patients, suspicious of malignancy in 8 patient, follicular neoplasm in 3 patients, and poorly differentiated thyroid carcinoma in 5 patients. Final Histopathology showed papillary thyroid carcinoma in 340 patients, poorly differentiated thyroid carcinoma in 8 patients, anaplastic thyroid carcinoma in 18 patients, 300 patients had done radio iodine ablation and EBRT done in 25 patients.

## 4. Discussion

Kalra et al., 2013, highlighted the lack of attention to thyroid disorders and included thyroid diseases in the list of non communicable diseases.[7] Thyroid enlargement, which is a common disorder in our region, commonly presents as multinodular thyroid swelling (48.80%). The most common presenting complaint in this study was swelling in the neck (100%), while Tarrar et al. [8] reported a finding of 100%. Solitary and multinodular goiters were more common in women (91.51%). Similarly, Hanumanthappa et al. [9] reported a striking female predominance in their study. Age distribution in this study showed a preponderance of patients in the second and third decades of life (77%) for both solitary and multinodular goiters. The mean age of our patients with carcinoma thyroid was 36.7 years. This is in variance to the other Indian reports, namely Hanumanthappa et al. [9] who reported a majority of patients in the third (35%) and fourth (30%) decades of life and Nikhil Nanjappa et al. [10] who reported a mean age of 47.4 years. Autopsy studies suggest a frequency of >50% for thyroid nodules; with high-resolution ultrasonography, the value approaches 40% of patients with nonthyroidal illness. In the Wickham study[2] from the United Kingdom, 16% of the population had a goiter. In the Framingham study, ultrasonography revealed that 3% of men older than 60 years had thyroid nodules, while 36% of women aged 49–58 years had thyroid nodules.[3] In the United States, most goiters are due to autoimmune thyroiditis (i.e., Hashimoto disease). The incidence of thyroid cancer has been rising worldwide. The reasons are unclear, but this trend may be related to better detection and diagnostic methods.[5] Worldwide, the most common cause of goiter is iodine deficiency. It has been estimated that goiters affect as many as 200 million of the 800 million people who have a diet deficient in iodine. No racial predilection exists. The female-to-male ratio is 4:1.

In the Wickham study, 26% of women had a goiter, compared to 7% of men.[3] Thyroid nodules are less frequent in men than in women, but when found, they are more likely to be malignant. The frequency of goiters decreases with advancing age. The decrease in frequency differs from the incidence of thyroid nodules, which increases with advancing age.

Papillary carcinoma was the most common cancer in our series 88% of total thyroid cancers. This finding is comparable with findings of other authors (Burgress et al., 2000; Bal et al., 2001; Levi et al., 2002; Verkooijen et al., 2003; Burgess; 2002). In general this cancer is often not associated with iodine deficiency. There are reports in which thyroid cancers are associated with iodine deficiency; however they are from countries in which the populations were also exposed to radiation (Szybinski et al., 2003; Niedziela et al., 2004).

Multi-nodular goitre also termed nodular hyperplasia has been cited in the literature as an associated factor of thyroid cancer, particularly papillary carcinoma (Sachmechi et al., 2000; Gandolfi et al., 2004). In a study involving consecutive thyroid specimens removed for long standing multi-nodular goitre, Madhavan and Othman (1996) found microcarcinoma in 34% ; much higher than what is cited in the literature. A subsequent study by Omar et al from the same laboratory using RET and p53 by immunohistochemistry found 22.7% of nodular hyperplasia expressed RET protein, indicating a role in the genesis of thyroid cancer (Omar and Othman, 2003; Omar et al., 2004). It is a known fact that goitre prevalence is high in iodine-deficient areas.

Is iodine deficiency an associated factor in thyroid malignancy? Animal experiments have demonstrated a clear increase in incidence of thyroid epithelial cell carcinomas after prolonged iodine deficiency (FeldtRasmussen, 2001). Since prevalence of goitre is high in iodine-deficient states and goitres have been known to be a risk factor in thyroid malignancy. This equation is not straight-forward. It cannot be assumed that iodine deficiency alone is a risk factor for cancer development. In certain other iodine-deficient countries such as Poland and Belarus, the population were also exposed to nuclear radiation (Szybinski et al., 2003; Mahoney et al., 2004; Niedziela et al., 2004) In these countries, children who are chronically deficient in iodine are at greater risk to develop thyroid malignancies if they are further exposed to radiation. On the other hand, high thyroid cancer incidence is also reported in localities where there are no exposures to radiation (Larijani et al., 2003). Where there is no exposure to radiation, our series has demonstrated that thyroid cancer is high. In Iran, a country described as endemic for iodine deficiency, a high number of thyroid cancers was recorded in one year from 1998-1999 (Larijani et al., 2004). The excess relative risk of thyroid cancer was significantly associated with increasing thyroid radiation dose and was inversely associated with urinary iodine excretion levels (Shakhtarin et al., 2003). In those countries where iodine supplementation was given, the cancers are more of the differentiated type.

As PDTC is a rare thyroid malignancy,only eight cases of 386 cases of thyroid cancer within 6 years duration in our institution,The proportion of PDTC in our series was lower than seen in Romania[11] and higher than the report from Nigeria.[12] In our series, our patients were younger with the mean age of 48.12 compared to other series, between 55 and 63 years.[13] It is generally accepted that PDTC may develop through three pathogenetic pathways: (i) by partial dedifferentiation of PTC,(ii) by partial dedifferentiation of FTC (including oncocytic type) and (iii) *de novo*, without a preexisting well-differentiated carcinoma precursor.[14]

## 5. Conclusion

This study concludes that the incidence of rate of Thyroid Malignancy is higher than the existing Indian data. The most


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common thyroid cancer is papillary thyroid cancer. So all thyroid nodule either solid or multinodular should be evaluated clinically, radiologically and cytologically to rule out malignancy.

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