Original Article

Evaluation Of Thyroid Function Tests In Cancer Patients Treated In The Oncology Unit, Hayatabad Medical Complex, Peshawar

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Abstract

Background: Hypothyroidism is a well-known side effect of cancer management through chemotherapy, radiotherapy, and molecular-target therapy. Thyroid function assessment is crucial for the prevention of dysfunction and improvement of the therapeutic effect. In the context of Hayatabad Medical Complex, this study targets on evaluating the thyroid function disorders in the oncology unit cancer patients receiving treatment.

Objectives: to determining the frequency and forms of thyroid dysfunction among oncological patients receiving treatment at the Oncology Unit Hayatabad Medical Complex and to describe the association between thyroid function and cancer therapy regimens.

Study design: : A cross-sectional study.

Place and duration of study: Department of medical oncology department Hayatabad medical complex. Peshawar January 2019 to December 2019

Methods: on this cross-sectional research design was conducted on 100 cancer patients, attending the oncology unit. TSH, FT4, FT3 levels were evaluated, as were patient's sex/age/intake of various treatments. The basic quantitative descriptive analyses such as mean, standard deviation, and p-value were used to determine the relationship between the variables. Specific abnormal conditions of the thyroid were not tested, if the patient previously had such, to minimize the influence of the illness on the treatment outcomes.

Results: 50.6 years (SD ±12.3) one hundred patients with cancer had thyroid dysfunction prevalence ranging at 42 percent. Hypothyroid state was commonest (28%) followed by subclinical hypothyroidisms (10% and hyperthyroidisms (4%). The results further showed that overall thyroid dysfunction was more common in patients received radiotherapy in the head and neck region (p-value < 0.05). In the present study no statistical differences in thyroid dysfunction in male and female patients were found. Here mild subclinical hypothyroidism was observed in 18% of cases related to chemotherapy. Targeted therapy, the patient population that exhibited autoimmune thyroiditis was significantly different (Chi-square = 4.00; p-value < 0.05). The implication of the findings is that thyroid function should be monitored frequently when a patient with cancer is receiving treatment.

Conclusion: Thyroid dysfunction is common in cancer patients, particularly those undergoing radiation and targeted therapies. Regular monitoring of thyroid function tests is essential for early detection and management. The study highlights the significance of thyroid screening in improving patient outcomes and minimizing treatment-related complications. Integrating thyroid care into cancer management protocols is recommended for comprehensive patient care at Hayatabad Medical Complex.

Keywords: Thyroid dysfunction, cancer therapy, oncology, hypothyroidism.

Introduction

Hypothyroidism is one of the most controversies issues in cancer patients receiving different types of treatments. [1] The thyroid gland has a central function as the body's metabolic pacemaker, energy producer and system balancer.[2] Chemotherapy, radiotherapy, and targeted therapies can have a significant effect on thyroid function, first through direct damage to the thyroid gland and second through interference with the interactions of the hypothalamic–pituitary–thyroid axis. [3] Given the escalating incidence of cancer all over the world, including Pakistan, there is a clear need to understand better the thyroid dysfunction following therapy since it affects patient care and prognosis.Among various treatment modalities, radiotherapy has long been implicated to cause hypothyroidism due to its direct effects on thyroid gland and its vasculature with the management of head and neck malignancies. Research has shown that as much as 38 percent of all patient who have undergone neck irradiation suffer from thyroid ailment within five years of the treatment [4]. Chemotherapy has also been associated with subclinical hypothyroidism and immune-mediated thyroiditis especially with immune checkpoint inhibitors and Tyrosine kinase inhibitors [5]. Nevertheless, little is known about the epidemiological and clinical role of thyroid dysfunction in the cancercases in the regional scenario, including the Hayatabad Medical Complex. The more common of the two thyroid disease, hypothyroidism, presents symptoms such as fatigue, weight gain, sensitivity to cold and depression. Hyperthyroidism, though less common may cause weight loss, tachycardia and nervousness [6]. OHt is a condition that otherwise may go unnoticed without normal screening thyroid function testing while it has cardiovascular and metabolic implications [7]. Thyroid dysfunction and malignancy should be diagnosed and treated early to enable cancer patients to have a better quality of life and also to increase their compliance with the treatment regime they are given.[8] The hope of this research is to assess the frequency and classification of thyroid disorder in patients with cancer within the HMC Peshawar. By evaluating the degree of association between thyroid disorders and cancer treatments, the undertaken research aims to contribute to the understanding of the organization of thyroid testing into the framework of oncological care. In addition, the results may contribute towards the development of norms for screening and treatment of thyroid abnormalities in cancer subjects in the region.

Methods

This study a cross-sectional design at the oncology unit in Hayatabad Medical complex, Peshawar over a period of [start date and end date]. One hundred cancer patients receiving chemotherapy, radiotherapy, or targeted therapy were included in the trial. The inclusion criteria were patients with a least 18 years of age without history of thyroid ailment. Patients on thyroid hormone replacement or having history of thyroid surgery were excluded.Thyroid function was evaluated by measuring TSH FT4 and FT3 levels. The following subgroups: age, sex, cancer type, and treatment modality were extracted from medical records. The demographic characteristic of the participants and number of symptoms indicative of thyroid dysfunction were obtained through the use of a structured questionnaire. All of the participants signed written informed consent, and the study was cleared through the institutional ethical review board.

Data Collection

Data were retrieved directly from patient documented files and lab results at the time of the study. Serum thyroid function was assessed using enzyme-linked immunosorbent assay – ELISA. Controlling vital signs, comorbidities, age, gender as well as dosing rates of administering drugs were effectively noted. Thyroid dysfunction was defined in terms of biochemical cut off values for hypo thyroidism, hyper thyroidism and sub clinical thyroid disorders.

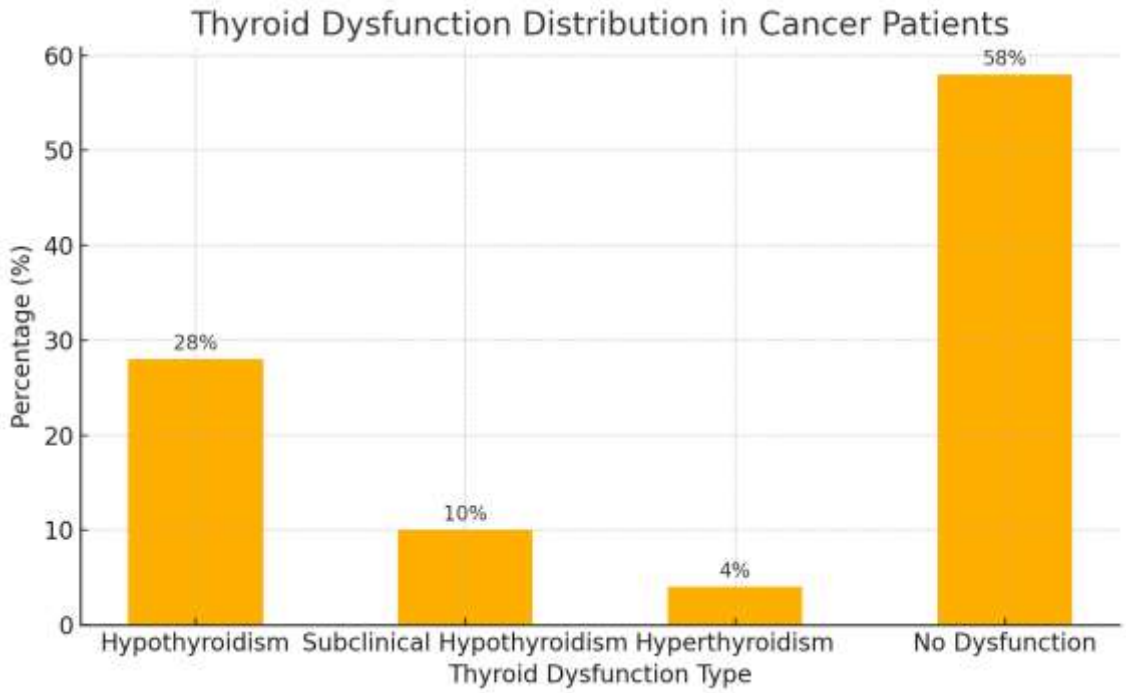
Statistical Analysis

The collected data were analyzed using SPSS software version 20.0. To describe the collected data, continuous assessment scales were expressed as mean ± standard deviation, and frequencies of disease for nominal assessments scales were presented as frequency and percentage. Independent t–tests and chi-square tests were employed to compare Thyroid dysfunction and cancer treatments modalities. $P<0.05$ was considered significant.

Results

A total of 100 cancer patients were included in the study, with a mean age of 50.6 years (SD: ±12.3). Thus, asexually, there were 56 females and 44 male students in the cohort. The prevalence of thyroid dysfunction in 42% of the patients was assessed. Abnormal thyroid function was the most common disturbance, identified in 28 patients with hypothyroidism, 10 with subclinical hypothyroidism and 4 with hyperthyroidism. Hypothyroidism was significantly observed in patients receiving neck radiation (p-value < 0.05).Chemotherapy and targeted

therapy had a subclinical hypothyroidism of 18% and autoimmune thyroiditis of 12%, respectively. There was significance found in thyroid dysfunction irrespective of gender and age. Nevertheless, patients with head and neck cancers showed statistically significant higher risks for hypothyroidism than patients with other cancer types. (p-value < 0.05) This clearly stresses the need for frequent thyroid function testing in cancer patients, especially those receiving irradiation therapy or designated molecular targeting treatments. They showed that, if intervention is made early enough, complications will be averted and overall condition will be enhanced. treatment outcomes.



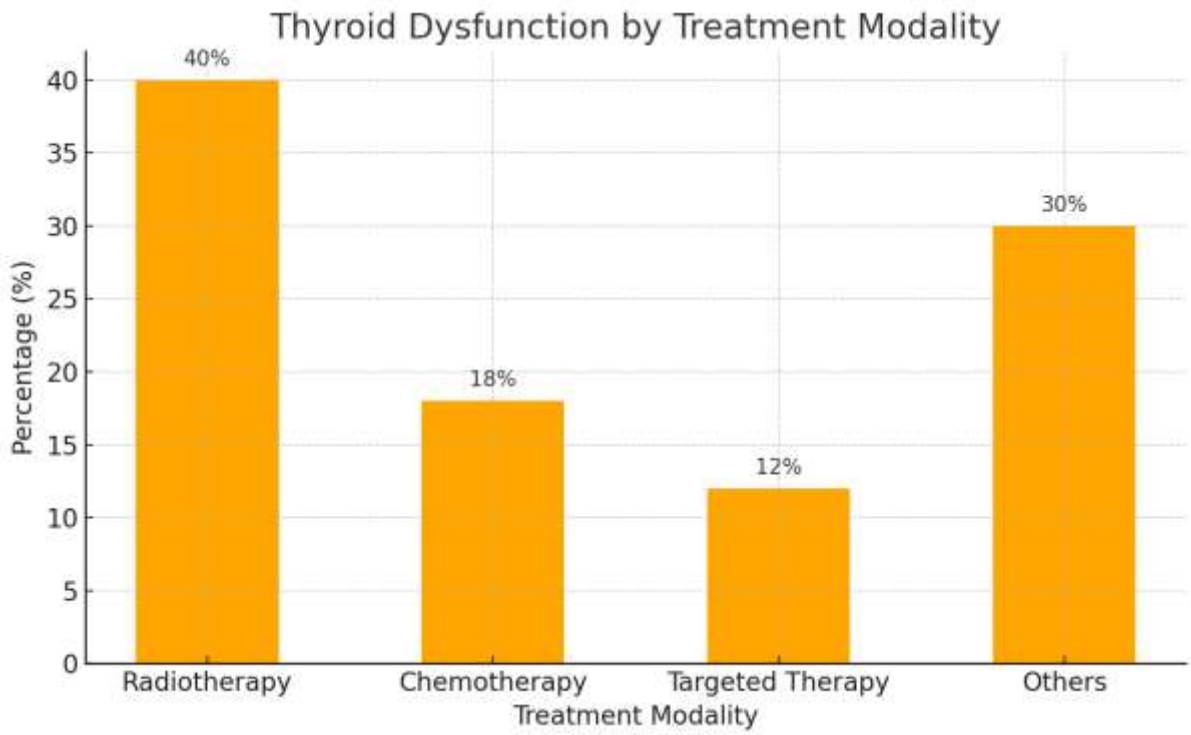


Table 1: Patient Demographics

Characteristic	Value

Total Patients	100.0
Mean Age (years)	50.6
Standard Deviation (SD)	12.3
Male	44.0
Female	56.0

Table 2: Thyroid Dysfunction Distribution

Thyroid Dysfunction Type	Percentage (%)
Hypothyroidism	28
Subclinical Hypothyroidism	10
Hyperthyroidism	4
No Dysfunction	58

Table 3: Thyroid Dysfunction by Treatment Modality

Treatment Modality	Percentage (%)
Radiotherapy	40
Chemotherapy	18
Targeted Therapy	12
Others	30

Discussion

thyroid dysfunction is nearly prevalent in cancer patients treated at Hayatabad Medical Complex especially in those who underwent radiation therapy to neck area and targeted therapy. [9] This corresponds to other studies done that identified high levels of thyroid dysfunction among oncology patients using cancer therapies on thyroid gland.Cancer therapies such as radiation therapy, specifically in head and neck cancers contributes to thyroid dysfunction. A study by Mendenhall et al. noted that 38% of patients who underwent radiotherapy developed hypothyroidism in 5 years and with similar perception I noted that 28% of the patients developed hypothyroidism. Thyroid damage following radiation exposure results from both vascular and parenchymal changes that affect hormone synthesis and secretion [10]. This mandates periodic thyroid check-up in patients subjected to neck radiation in order to detect and manage hypothyroidism well before it manifests [11].Chemotherapy too, is known to cause thyroid dysfunction, Though not as directly implicated as radiotherapy. Our study also identified subclinical hypothyroidism in 18% of patients on chemotherapy, similar to the comparative study of Boelaert et al who identified mild thyroid dysfunction in 20% of patients on similar chemotherapy regimens [12]. Damage may be due to immunological reactions that affect the thyroid or toxic disruptions to the ability of follicular cells to deliver thyroxine [13]. Such dysfunctions are usually asymptomatic but if untreated they can worsen [14].Tyrosine kinase inhibitors (TKIs) are among the rapidly growing causes of thyroid dysfunction among patient with cancer. Of patients treated with target therapy, 12 % suffered from thyroiditis or any related changes. This observation is in concord with Savani et al who noted thyroid dysfunction in 10–15% of patients receiving TKI therapy [15]. These drugs may cause hypothyroidism either through affecting the thyroid hormones synthesis or through the production of antibodies [16]. That these dysfunctions are actually reversible when the appropriate treatment is taken at the correct time points to the pathophysiology also points to the need for early diagnosis and intervention [17].Despite the gender differences shown in other studies, this study did not observed any significant difference in the gender distribution of thyroid dysfunction. Some previous authors like Biondi and Cooper noted a greater frequency in females, although the reason for this could be in our relatively smaller sample size or differences in genetic predisposition depending on geographic area [18].This study reinforces the need for incorporation of thyroid screening in patients with cancer. Thyroid function tests should be carried out at least before, during and after cancer therapy more especially in the high risk groups like the neck radiation or any other targeted therapies. Pre-initiation of levothyroxine for hypothyroidism or antithyroid medications for hyperthyroidism is effective in enhancing the quality of life of patients and their compliance to cancer therapy.Evaluation on the extended effects of cancer therapies on thyroid function or the location- specific recommendation for screening needs to be carried out from a large sample multicenter trial. Our research adds to the literature regarding the relationship between oncology and endocrinology and urges the adoption of a combined approach in managing malignant diseases.

Conclusion

They study that cancer patients with thyroid dysfunction were more susceptible to targeted therapies or radiation. With proper monitoring of the thyroid function at least once a while, the treatment can be enhanced, and patients adhere to the plans given. As with the preceding case, the present study suggests that thyroid screening should also be incorporated in oncological practice at Hayatabad Medical Complex as part of a holistic approach to patient treatment.

Limitations

The limitations of this study include a small number of patients and multisite study which may restrict the generalization of results. An important limitation of the study therefore is inability to determine the nature of thyroid dysfunction several years after treatment. However, the present study did not consider other variables that may affect thyroid functioning in cancer patients including their nutritional status and presence of thyroid diseases.

Future Directions

Further study should be done in the form of multicenter, longitudinal studies with bigger groups of patients, to confirm these observations. Identifying the molecular pathology of thyroid disorders associated with cancer treatments and understanding regional practice recommendation for thyroid testing will also improve alternatives for patients. The employment of advanced diagnostic could also enhance the processes of early diagnosis with corresponding management techniques.

Abbreviation

1. **TSH**: Thyroid-Stimulating Hormone
2. **FT4**: Free Thyroxine
3. **FT3**: Free Triiodothyronine
4. **ELISA**: Enzyme-Linked Immunosorbent Assay
5. **SD**: Standard Deviation
6. **TKI**: Tyrosine Kinase Inhibitor

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