

A PROSPECTIVE STUDY OF THYROID FUNCTION TEST IN GERIATRIC POPULATION AND ITS CLINICAL CORRELATION IN A TERTIARY TEACHING CARE CENTER

General Medicine

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ABSTRACT

Aim: The objective of the present investigation was to investigate the clinical relationship between hypothyroidism and hyperthyroidism in the elderly population as well as the demographics of thyroid dysfunction in this population. **Materials and Method:** An extensive clinical examination and thyroid function (T3, T4, and TSH) testing were performed on 100 patients older than 60 who were believed to have thyroid problems as part of a prospective study in our tertiary care center. Other pertinent examinations, such as USG & FNAC neck, were carried out when thyroid swelling or nodules were present in order to obtain an accurate diagnosis. As necessary, further analysis was conducted using PS for expert opinion and 2DECHO. The determination of serum T3, T4, and TSH levels using the chemiluminescence assay method served as the basis for the laboratory evaluation of thyroid functioning. **Result:** In this investigation, it was discovered that 28% patients had thyroid function tests that were abnormal, and 18% of these patients also showed clinical signs of thyroid problems. 22% of cases had hypothyroidism, and 6% had hyperthyroidism. The prevalence of thyroid disorders rises with advancing age. **Conclusion:** In the elderly, thyroid dysfunction is more common. Older people should have their thyroid function checked, and long-term follow-up should be advised. Thyroid diseases in older individuals should be treated gradually and carefully, as they always need lifelong monitoring.

KEYWORDS

Free triiodothyronine, free thyroxine, Thyroid stimulating hormone, Geriatric population.

INTRODUCTION

Thyroid disorders can affect anyone at any age, but older people are significantly more likely than younger people to have hypothyroidism. As people get older, the prevalence of hypothyroidism continuously rises. Among patients older than 60 years, 10% of females and 2% of males experience hypothyroidism¹, primarily as a result of an increasing prevalence of autoimmune thyroiditis (Hashimoto's).² According to estimates, hyperthyroidism affects 0.5% to 4% of elderly persons.³

Doctors must have a high level of suspicion to make the diagnosis even though thyroid disorders are more common in older persons since they commonly mimic difficulties with other physiological systems. Elderly thyroid disorder patients need to be treated with more care and caution and always need to be followed up for the rest of their lives.⁴

Acute or chronic non-thyroidal illnesses and the use of medications that alter thyroid function tests are other prominent confounders in determining thyroid status in the elderly. Early detection and treatment of overt thyroid dysfunction are crucial in this population due to the noticeable effects of abnormal circulating thyroid hormone levels on a number of organ systems, including the heart, the bones, and the neurological system. There is continuous debate regarding the clinical importance of mild thyroid over- and underactivity as well as whether subclinical thyroid dysfunction requires treatment.⁵

In order to initiate treatment early and avoid complications of disease and linked other commodities, the current study aims to analyze thyroid function tests in the senior population and to correlate clinical symptoms with abnormal thyroid function. This is because elderly patients have non-specific symptoms and other commodities, as well as multiple treatment histories.

MATERIALS AND METHOD

An extensive clinical examination and thyroid function (T3, T4, and TSH) testing were performed on 100 patients older than 60 who were believed to have thyroid problems as part of a prospective study.

Inclusion Criteria:

Patients older than 60 year who were believed to have symptoms and sign suggestive of thyroid problems.

Exclusion Criteria:

Patients with known thyroid disorders, those taking thyroid medications or supplements, those who have had thyroid surgery or radioactive iodine therapy, those taking iodine-containing vitamins or minerals, and people undergoing radiological exams using contrast material were all disqualified from the study.

Chest x-ray, CBC, RBS, lipid profile, ECG, LFT, and KFT were performed as biochemical tests. Other pertinent examinations, such as USG & FNAC neck, were carried out when thyroid swelling or nodules were present in order to obtain an accurate diagnosis. As necessary, further analysis was conducted using PS for expert opinion and 2DECHO.

The laboratory assessment of thyroid function was based on the determination of serum T3, T4, and TSH levels using the chemiluminescence test technique. Three milliliters of blood were obtained, centrifuged, and the serum (500 microliters) extracted were combined with the reagent (separate for T3, T4, and TSH) and incubated for an hour at room temperature. The thyroid gland was sampled for FNAC using a 10 ml sterile syringe and a 22–24 G needle at two distinct locations, all while using aseptic precautions. The glass slide was covered with aspirates and a cover slip with a thickness of 0.4 mm. The slide was submerged in the 90% ethanol fixative container. The slide was afterwards examined using a high-power microscope. The pathologist completed the reporting. Using a GE (General Electronics) Pro machine and a linear probe frequency of 5–10 MHz, a thyroid USG was done. The statistical study made use of the Chi square and Student t tests.

RESULTS:

During evaluation of 100 geriatric patients suspected of having thyroid illness in accordance with inclusion and exclusion criteria, the

following findings were noticed/discovered:

In this investigation, it was discovered that 28 patients had thyroid function tests that were abnormal, and 18 of these patients also showed clinical signs of thyroid problems.

22% of cases had hypothyroidism, and 6% had hyperthyroidism. Among those, 8 had sub-clinical hypothyroidism and 14 had overt hypothyroidism. Four people were found to have overt hyperthyroidism, while two patients had subclinical hyperthyroidism. (Figure 1)

60 of the 100 patients in the current study were female and 40 were male. We discovered that females (20%) had a higher prevalence of thyroid dysfunction than males (8%), with a ratio of 5: 2 indicating a female preponderance. Thyroid diseases were more common in men and women in the current study, respectively, at 33.33% and 20%. The prevalence of thyroid disorders rises with advancing age. Yet the prevalence is significant between the age groups of 66 to 70 and 60 to 65. (Figure 2) All of the individuals who were suspected of having thyroid issues displayed easy fatigability (100%) and weight gain with decreased appetite. 82% had hoarse voices, and 50% reported feeling cold. Constipation and difficulties focusing were reported by 50% of people. (Table 1) Bradycardia and goiter are common symptoms of hypothyroidism, although other symptoms including edema in the feet and ankles and pallor are only found in 14% of cases. (Table 2) Those who were in a subclinical stage lacked common hypothyroidism symptoms including bradycardia and thyroid enlargement. All four of the patients had clinical hyperthyroidism, which was characterized by symptoms like palpitations, heat intolerance, sweating, and weight loss with increased appetite. (Table 3) Six patients had hyperthyroidism, three of whom had overt symptoms and two of whom had subclinical hyperthyroidism. Clinical indicators of overt hyperthyroidism are extremely clear, however some early symptoms, such as tremors, are also present in the subclinical form when thyroid nodules or swelling are absent. (Table 4) 9 hypothyroid patients and 3 hyperthyroid patients both had lipid problems. In 50% of hypothyroid cases, sinus bradycardia is present. In 3 cases, hypothyroidism is also linked to ischemic heart disease. The most typical rhythm abnormality, sinus tachycardia, is present in 75% of hyperthyroid patients. Atrial fibrillation is also present in one patient with hyperthyroidism. Six thyroid swollen individuals had USG and FNAC performed. One multinodular goiter's FNAC resulted in hypothyroidism and granulomatous thyroiditis. In one patient with thyromegaly, we found a malignancy that was a follicular tumor, and their thyroid function was hyperthyroid.

Table 1: Symptoms of Hypothyroidism

Symptoms of Hypothyroidism	Clinical (In %) (n=14)	Subclinical (In %) (n=8)
Easy fatigability	14(100)	8(100)
Weight gain with poor appetite	10 (82)	3(37)
Hoarseness of voice	7(50)	2(25)
Feeling cold	7(50)	2(25)
Difficulty concentrating and poor memory.	3(24)	0
Constipation	2(14)	1(13)
Dyspnea	2(14)	0

Table 2: Signs of Hypothyroidism

Signs of Hypothyroidism	Clinical(In%) (n=14)	Subclinical (In%) (n=8)
Bradycardia (50_60HR)	7(50)	-
Dry coarse skin	7(50)	2(25)
Goiter/thyroid swelling	4(40)	-
Edema	2(14)	-
Sluggish ankle reflex	2(14)	-
Pallor	2(14)	-

Table 3: Symptoms of Hyperthyroidism

Symptoms of Hyperthyroidism	Clinical (In %) (n=4)	Subclinical (In %) (n=2)
Palpitations	4(100)	-
Heat intolerance with Sweating	4(100)	-
Weight loss with increased appetite	4(100)	1(50)
Diarrhea	2(50)	-
Irritability	2(50)	-

Table 4: Signs of Hyperthyroidism

Signs of Hyperthyroidism	Clinical (In %) (n=4)	Subclinical (In %) (n=2)
Tachycardia (110-120/mi n)	3(75)	-
Tremors	2(50)	1(50)
Warm moist skin	1(25)	-
Cubbing	1(25)	-
Thyroid nodule	1(25)	-
Goiter/thyroid swelling	1(25)	-

Table NO5-The normal references range for the laboratory values in elderly are⁴:

TSH	0.5-6mIU/ml
Serum T4	4.6 -12 mcg/dl
FreeT4	0.7-1.9 ng/dl
Serum T3	80-180ng/dl
FreeT3	230-619pg/dl

Spectrum of thyroid disorder inelderly

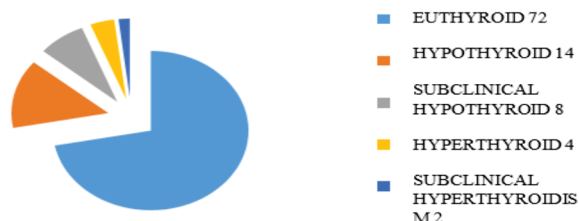


Figure No1: Spectrum of Thyroid Disorder In Elderly

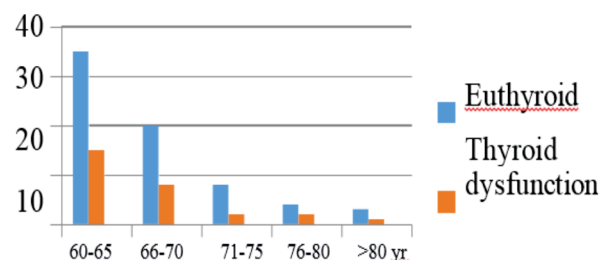


Figure No.2: Age Distribution of Thyroid Disorders

DISCUSSION

The goal of the current study was to analyze thyroid function tests in the senior population, to link clinical complaints to aberrant thyroid function, and to determine the best time to begin therapy in order to avoid illness-related consequences and other comorbidities. Elderly thyroid disease patients need to be treated with more care and caution and always need to be followed up on for the rest of their lives.

60 of the 100 senior patients in the current study were female, and 40 were male. We discovered that thyroid problems are present in 28% of individuals. We have observed that the prevalence of thyroid dysfunction rises with age (p value significant). Due to the autoimmune nature of the condition, we found that females had a higher prevalence of thyroid dysfunction, which is almost similar to earlier studies like those by Madhuvan, H.S.⁶ and Natasha.⁷

When compared to prior studies like Madhuvan, H.S.,⁶ which showed more overt hypothyroidism than subclinical hypothyroidism, the current study likewise found greater overt hyperthyroidism (4%), compared to subclinical hyperthyroidism (2%). This might be explained by the symptoms' delayed onset. However, Lakshmi narayana GR⁸ study found that overt hyperthyroidism was more common than subclinical hyperthyroidism.

Our investigation has found that widespread weakness and easy fatigability are the most common characteristics. All patients with hypothyroidism have easy fatigability. In 40% of hypothyroid patients, the symptoms of feeling cold and hoarseness, which are good indicators of hypothyroidism, were present. In contrast to a research by Madhuvan, H.S.,⁶ where they detected ankle reflex and edema in 45% of patients, dyspnea, a sluggish ankle reflex, and edema were not frequently observed. In our research More than 2/3 of individuals with

hyperthyroidism experienced palpitations, weight loss with increased appetite, and heat sensitivity, which are good indicators of hyperthyroidism.

Due to the patients advanced disease states when compared to those of Madhuvan, H.S.,⁶ all of the traits are more obvious. Findings from our study could not be compared to those from Natasha⁷. In this study, the percentage of individuals with subclinical hypothyroidism whose TPO levels were positive was 50%, which suggests an increased likelihood of these patients developing overt thyroid failure. Similar findings were made by Madhuvan, H.S.⁶ in their study.

In contrast to the work by MRabet-Bensalah K,⁹ where subjects were more, we discovered that the frequency of anemia in patients with subclinical hypothyroidism is as high as that in patients with overt hypothyroidism.

Despite the fact that anemia and thyroid problems frequently co-occur, the connection between the conditions' causes is still unclear. As a result, thyroid insufficiency may lead to a variety of anemias Mehmet E¹⁰ reported anemia in patients with overt hypothyroidism. In our study, hypothyroidism was associated with higher lipid problems than hyperthyroidism. Higher TG, T. Cholesterol, and LDL readings were shown to be statistically significant (p value 0.05) in patients with thyroid dysfunction. Waled Alsalmi¹¹ in their study also found that patients with thyroid dysfunction had an increase in lipid abnormalities, and that hypothyroidism was associated with a greater number of lipid abnormalities.

CONCLUSION

The prevalence of thyroid dysfunction is higher among the elderly. Thyroid function testing in geriatric patients showed changes in more than one-fourth of cases. Females (20%) had higher thyroid problems than males (8%). In the older population, subclinical states (10%) and clinical states (18%) are both prevalent. More people had hypothyroidism (22%) than hyperthyroidism (8%). The prevalence of TPO AB was higher (93%) in hypothyroid individuals, pointing to an autoimmune cause of thyroid failure. Patients with anomalies of the thyroid gland have dyslipidemia. Also typical with thyroid dysfunction is anemia. Whereas sinus tachycardia is virtually always present in patients with hyperthyroidism, sinus bradycardia is a frequent finding with hypothyroidism. Older people should have their thyroid function checked, and long-term follow-up should be advised. Thyroid diseases in older individuals should be treated gradually and carefully, as they always need lifelong monitoring.

Conflict of interest

The Authors have no conflicts of interest that are directly relevant to the content of this clinic-pathological case

Financial Resources

There are no financial resources to fund this study

Informed Consent

Informed Consent was obtained from the patient.

Author's Contribution

All the authors contributed equally to the case report.

Data and materials availability

All data associated with this study done at PCMC'S PGI YCM hospital are present in the paper.

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