

Original Research

Assessment of thyroid function in geriatric population: A biochemical study

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ABSTRACT:

Background: Thyroid disorders are highly prevalent, most frequently afflicting aging women. It is crucial to advance the means of diagnosing thyroid diseases, especially overt and subclinical hypothyroidism in elderly people, because thyroid-associated symptoms are very similar to symptoms of the normal aging process. Hence; the present study was undertaken for assessing the thyroid profile in geriatric patients. **Materials & methods:** A total 100 geriatric subjects of age more than 60 years were enrolled. Cases were drawn from general medicine ward, general outpatient department were enrolled. A detailed clinical history was taken of all the patients regarding symptoms of hypothyroidism and hyperthyroidism. Patients were examined for goiter, hypothyroidism, hyperthyroidism. Thyroid Function Test (T3 FT4 TSH) were evaluated. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. **Results:** Mean T3 levels was found to be 1.48 ng/ml while mean T4 and TSH levels was found to be 6.13 µg/dL and 9.36 µIU/ml respectively. 12 percent of the patients had clinical hypothyroidism while 8 percent and 1 percent of the patient had subclinical hypothyroidism and hyperthyroidism respectively. **Conclusion:** Biochemical testing of thyroid function is fundamental to establish a diagnosis of thyroid dysfunction.

Key words: Geriatric, Thyroid

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INTRODUCTION

Thyroid disorders are highly prevalent, most frequently afflicting aging women. It is crucial to advance the means of diagnosing thyroid diseases, especially overt and subclinical hypothyroidism in elderly people, because thyroid-associated symptoms are very similar to symptoms of the normal aging process.¹⁻³

Up till the early 1980s, laboratory diagnosis of thyroid dysfunction was made using radioimmunoassay for thyroid stimulating hormone (TSH); however, this method did not detect decreased TSH values, and is not a good test for the diagnosis of hyperthyroidism. After the 1980s, immunometric assays for TSH emerged as the most cost-effective test for thyroid disease screening. The second-generation immunoassays can detect TSH values of 0.1 mIU/L and the third-generation assays are able to detect TSH values of 0.01 mIU/L.⁴⁻⁶

Thyroid gland hormone production is directly stimulated by TSH, which is synthesized and secreted

in the anterior pituitary under stimulation of thyrotropin-releasing hormone produced in the hypothalamus. In patients with an intact hypothalamic-pituitary-thyroid axis, a negative feedback regulatory mechanism controls thyroid gland metabolism. The pituitary serves as a biosensor of thyroid hormone levels and regulates TSH levels according to the feedback of free-thyroxine (FT4) and free-triiodothyronine (FT3) levels. Decreases in thyroid hormone production stimulate more TSH secretion. The control system has a relatively slow response time and during periods of non-equilibrium, as occurs in the beginning of hypothyroidism, it is possible to find some discordance between the plasma thyroid hormone concentrations and the levels of TSH.⁶⁻⁹ Hence; the present study was undertaken for assessing the thyroid profile in geriatric patients.

MATERIALS & METHODS

The present study was undertaken for assessing the thyroid profile in geriatric patients. A total 100

geriatric subjects of age more than 60 years were enrolled. Cases were drawn from general medicine ward, general outpatient department were enrolled. A detailed clinical history was taken of all the patients regarding symptoms of hypothyroidism and hyperthyroidism. Patients were examined for goiter, hypothyroidism, hyperthyroidism. Thyroid Function Test (T3 FT4 TSH) were evaluated. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi-square test and student t test were used for analysis of level of significance.

RESULTS

57 percent of the patients belonged to the age group of 60 to 65 years while 14 percent and 12 percent of the patients belonged to the age group of 66 to 70 years and 71 to 75 years respectively. 9 percent of the patients belonged to the age group of 76 to 80 years. Mean age of the patients was 67.36 years. 63 percent of the patients were males while the remaining were males. Mean T3 levels was found to be 1.48 ng/ml while mean T4 and TSH levels was found to be 6.13 µg/dL and 9.36 µIU/ml respectively. 12 percent of the patients had clinical hypothyroidism while 8 percent and 1 percent of the patient had subclinical hypothyroidism and hyperthyroidism respectively.

Table 1: Age-wise distribution of patients

Age group (years)	Number	Percentage
60 to 65	57	57
66 to 70	14	14
71 to 75	12	12
76 to 80	9	9
More than 80	8	8
Total	100	100
Mean ± SD	67.36 ± 7.69	

Table 2: Thyroid profile

Thyroid profile	Mean	SD
T3 (ng/ml)	1.48	0.76
T4 (µg/dL)	6.13	4.69
TSH (µIU/ml)	9.36	14.37

Table 3: Prevalence of thyroid dysfunction

Thyroid dysfunction	Number of patients	Percentage
Euthyroid	76	76
Clinical hypothyroidism	12	12
Subclinical hypothyroidism	8	8
Hyperthyroidism	1	1

DISCUSSION

The thyroid gland is a vital butterfly-shaped endocrine gland situated in the lower part of the neck. It is present in front and sides of the trachea, inferior to the larynx. It plays an essential role in the regulation of the basal metabolic rate (BMR), and stimulates somatic and psychic growth, besides having a vital role in calcium metabolism. Thyroid hormone (TH) regulates metabolic processes essential for normal growth and development as well as regulating metabolism in the adult. It is well established that thyroid hormone status correlates with body weight and energy expenditure. Hyperthyroidism, excess thyroid hormone, promotes a hypermetabolic state characterized by increased resting energy expenditure, weight loss, reduced cholesterol levels, increased lipolysis, and gluconeogenesis.^{9- 12} Hence; the present study was undertaken for assessing the thyroid profile in geriatric patients.

In the present study, 57 percent of the patients belonged to the age group of 60 to 65 years while 14

percent and 12 percent of the patients belonged to the age group of 66 to 70 years and 71 to 75 years respectively. 9 percent of the patients belonged to the age group of 76 to 80 years. Mean age of the patients was 67.36 years. 63 percent of the patients were males while the remaining were males. Chuo AML et al (2003) determined the prevalence of thyroid dysfunction in an elderly in-patient population in a restructured hospital. A total of 184 patients were screened and 62 (33.7%) patients were found to have abnormal thyroid function tests. The mean age was 83.8 years (SD 6.2). Twenty (32.3%) were males and 42 (67.7%) were females. Thirty-three (53.2%) patients had sepsis on admission, 29 (46.8%) were functionally dependent and 22 (35.5%) had hypoalbuminaemia. The prevalence of thyroid disorders were as follows: 1 (0.5%), 4 (2.2%), 9 (4.9%), 15 (8.2%) and 33 (17.9%) patients had hyperthyroidism, subclinical hypothyroidism, primary hypothyroidism, secondary hypothyroidism and sick euthyroid syndrome, respectively. Cross-tabulating

sick euthyroid syndrome against functional dependence, hypoalbuminaemia and sepsis did not reveal any significant association. There was a high prevalence of thyroid dysfunction in the elderly in-patient population.¹⁰

In the present study, mean T3 levels was found to be 1.48 ng/ml while mean T4 and TSH levels was found to be 6.13 µg/dL and 9.36 µIU/ml respectively. 12 percent of the patients had clinical hypothyroidism while 8 percent and 1 percent of the patient had subclinical hypothyroidism and hyperthyroidism respectively. Somwaru LL et al provided estimates of persistence, resolution, and progression of subclinical hypothyroidism over 4 yr, stratified by baseline TSH, anti-thyroid peroxidase antibody (TPOAb) status, age, and sex. Participants were 3996 U.S. individuals at least 65 yr old enrolled in the Cardiovascular Health Study. Persistence of subclinical hypothyroidism was 56% at 2 and 4 yr. At 2 yr, resolution was more common with a TSH of 4.5–6.9 mU/liter (46 vs. 10% with TSH 7–9.9 mU/liter and 7% with TSH ≥10 mU/liter; $P < 0.001$) and with TPOAb negativity (48 vs. 15% for positive; $P < 0.001$). Higher TSH and TPOAb positivity were independently associated with lower likelihood of reversion to euthyroidism ($P < 0.05$). TSH of 10 mU/liter or higher was independently associated with progression to overt hypothyroidism ($P < 0.05$). Transitions between euthyroidism and subclinical hypothyroidism were common between 2 and 4 yr. Age and sex did not affect transitions. Subclinical hypothyroidism persists for 4 yr in just over half of older individuals, with high rates of reversion to euthyroidism in individuals with lower TSH concentrations and TPOAb negativity.¹¹ Pratap A et al observed the thyroid parameter in geriatric age group to contribute to the ongoing debate whether the normal TSH level should be reconsidered in view of the large no of subclinical hypothyroidism cases in elderly. The Total T3 levels, is more in males as compared to females in both geriatric and young population, however the Total T4 and TSH levels were more in females as compared to males. This emphasizes the fact that there should be a separate normal range for elderly population to correctly diagnose an elderly to be hypothyroid and treat accordingly.¹²

CONCLUSION

Biochemical testing of thyroid function is fundamental to establish a diagnosis of thyroid dysfunction.

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