

PATTERN OF THYROID PROFILE IN ELDERLY PERSONS

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ABSTRACT

Background: Thyroid hormones, tri-iodothyronine and thyroxin are produced by thyroid gland and regulated by the hypothalamic-pituitary-thyroid axis. In old age this regulatory function may be altered. The aim of this study was to observe the pattern of thyroid profile in elderly persons in our setup.

Material and methods: This descriptive study was carried out in the Department of Reproductive Physiology /Health, National Institute of Health, Islamabad, from March 2005 to March 2006. Data of thyroid profile, tri-iodothyronine, thyroxin and thyroid stimulating hormone was analyzed in elderly men and compared with normal young men.

Results: Serum levels of thyroid profile including tri-iodothyronine, thyroxin and thyroid stimulating hormone were evaluated in 127 elderly men aged 53.23 ± 1.00 years with 47 (37%) normal and 80 (63%) abnormal thyroid profile, as compared to 47 young men aged 28.6 ± 0.02 years. Increase in the mean levels of thyroid stimulating hormone ($p < 0.001$) and decrease in tri-iodothyronine and thyroxin ($p < 0.05$) was observed in normal elderly persons.

Conclusion: Normal elderly persons have different levels of thyroid hormones as compared to young. Normal range of thyroid hormones for elderly persons should be separately established for proper assessment of their thyroid function in our setup.

Key words: Thyroid function, Thyroid profile, Elderly.

INTRODUCTION

Thyroid hormones, tri-iodothyronine (T3) and thyroxin (T4) are secreted by the thyroid gland under the influence of its physiological regulator, the hypophysial thyrotrophic hormone, thyroid stimulating hormone (TSH).¹ Under normal physiological conditions T4 is the main secretory product of the thyroid gland and about 80-90 μg of it is secreted per day. On the other hand the normal human thyroid secretes only 8 μg per day of T3.^{2,3} T3 is more active as compared to T4 because it has a very high affinity to enter the cellular thyroid hormone receptors.⁴ Normally about 93% of T3 is produced by the peripheral conversion from T4 and only 7% is secreted by the thyroid gland itself.⁵ Low T3 syndrome is a condition with impaired peripheral conversion of T4 to T3.⁶

Inappropriate secretion of thyroid hormones may occur in many thyroid disorders. In primary hypothyroidism T3 and T4 is suppressed while TSH concentration is high. While in primary hyperthyroidism T3 and T4 concentration is high while TSH is suppressed.⁷ In men the deficiency and excess of these hormones may cause decreased libido

and impotence.⁸ Many studies have shown that the prevalence of thyroid dysfunction was high in the elderly as compared to the younger population.^{9,10,11}

In elderly individuals the nonspecific clinical manifestations of hypo and hyperthyroidism also cause confusion in the clinical setup. On the other hand the values of thyroid profile may move outside the normal ranges applicable to younger age groups.⁹ In sub-clinical hyperthyroidism the levels of T3 and T4 are normal but TSH is low.¹² Similarly high TSH with normal T3 and T4 indicates hyperactivity of TSH as a result of defective negative feedback mechanism.^{13,14} Therefore it is important to separately establish the normal range values of thyroid profile for elderly persons in our set-up.

The aim of this study was to observe the pattern of thyroid profile in elderly persons in our setup.

MATERIAL AND METHODS

This descriptive study was carried out in the Department of Reproductive Physiology /Health,

National Institute of Health, Islamabad, for a period of thirteen months from March 2005 to March 2006. Data of thyroid profile T3, T4 and TSH was collected for analysis. Blood samples were allowed to clot for half an hour at room temperature. Clotted blood was spun at 3000 rpm for 15 minutes and serum carefully separated avoiding hemolysis. It was then placed in eppendorf tubes properly labeled. The samples were either directly analyzed or preserved at -20°C till analysis. Each sample was homogenized by vortex, after proper thawing in case of preserved samples. For determination of the thyroid profile, T3, T4 and TSH, Roche Elecsys 2010, electro-chemiluminescence methodology was used. Quality control samples representing the normal and pathological levels of the analytes were used and batches with controls being within permissible range were accepted.

The data was analyzed statistically, by application of Student's t test as described by Steel and Torrie.¹⁵

RESULTS

Serum levels of thyroid profile T3, T4 and TSH were determined in 127 elderly men, with 47 (37%) normal and 80 (63%) abnormal thyroid function. Average age of elderly men was 53.23 ±1.00 years. Forty seven normal young men with mean age of 28.6 ±0.02 years were taken as controls.

When mean values of thyroid profile in normal elderly men were compared with the young ones, it showed increase in the level of TSH and decrease in T3 and T4 with age (p<0.05). (Table-1 & Figure-1)

Table-1: Comparison of thyroid profile in normal young and elderly men.

Group	Number	Age (years)	T3 (ng/ml)	T4 (µg/ml)	TSH (µIU/ml)
Normal Young men	47	28.60 ±0.02	0.98 ±0.02*	8.32 ±0.24*	0.90 ±0.05*
Normal Elderly men	47	53.23 ±1.00	0.93 ±0.02	8.12 ±0.24	1.40 ±0.09

Values are Mean ± SEM, *Significant

Reference values:

T3 = 0.8-1.8 ng/ml **T4** = 4.5-12.0 µg/ml **TSH** = 0.32-3.80 µIU/ml

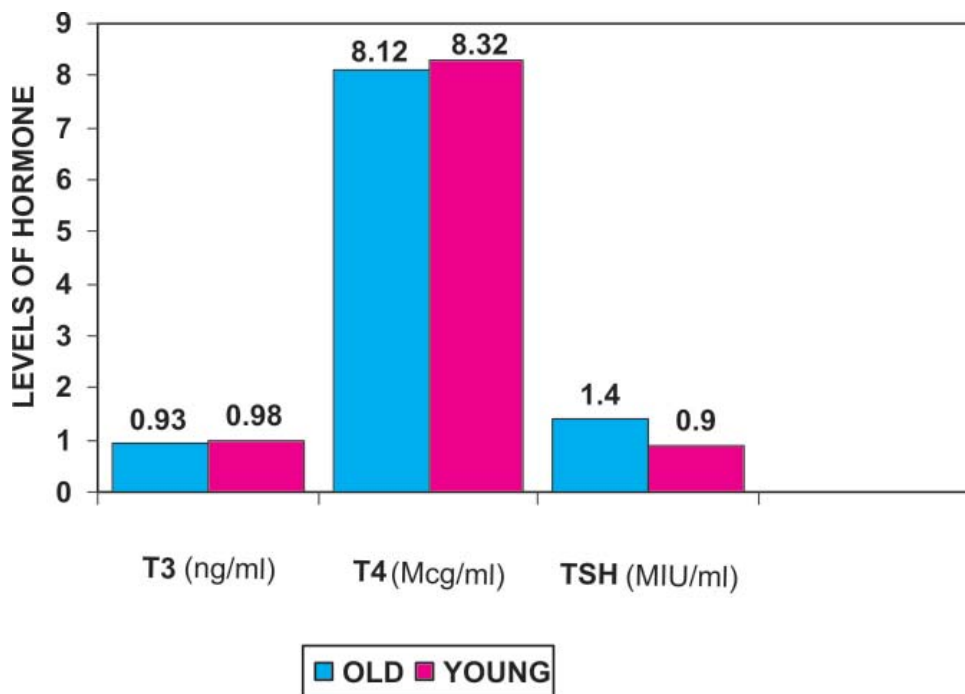


Fig. 1: Comparison of thyroid profile of normal elderly and young men.

DISCUSSION

In our study thyroid profile was performed in the elderly male patients. Among 127 patients, the laboratory reports of 63% patients exhibited abnormal levels while 37% were having normal thyroid profile. The mean age of these patients was 53.23 ± 1.00 years. Forty-seven normal young men with mean age of 28.6 ± 0.02 years were taken as controls.

difference was observed in thyroid profile when compared with normal young age group. Increased levels of TSH and decreased T3 and T4 levels in the elderly men were observed as compared to young ones in our study. These results are similar to those observed by Harman.¹⁶

of concentrations of these hormones in different abnormal situations showed a diverse picture of the combinations which were not further analyzed.

This study was not large enough to draw conclusions regarding the normal range of thyroid profile in elderly people. Another shortcoming of this study was that it was performed on men only. Further larger studies including persons from both the sexes are required to draw conclusions regarding the normal levels of thyroid profile in our set-up.

CONCLUSION

Normal elderly persons have different levels of thyroid profile as compared to young. Normal range of thyroid hormones for elderly persons should be separately established for proper assessment of their thyroid function in our set up.

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