Volume 4, issue 6, 2015 • e-ISSN: 1857-8187 • p-ISSN: 1857-8179

Review Article

Thyroid Gland and Thyroid Disorders in Shkodra Region (Albania)

Healthcare

Keywords: Thyroid gland, hyperthyroidism, hypothyroidism, goiter, cancer, thyroxine (T4) triiodothyronine (T3), TSH.

Donalda Laçej

Department of Biology – Chemistry, Faculty of Natural Sciences
University of Shkodra (Albania)

Abstract

This paper presented thyroid gland and thyroid disorders.The gland produces thyroid hormones, which regulate metabolic rate (how fast calories are consumed to produce energy) (Docter, R,et al 1993).Thyroid hormones are important in regulating body energy, body temperature, the body's use of other hormones and vitamins, and the growth and maturation of body tissues.Thyroid disease occurs when the thyroid gland doesn't supply the proper amount of hormones needed by the body. Diseases of the thyroid gland can result in either production of too much (overactive thyroid disease or hyperthyroidism), too little (underactive thyroid disease or hypothyroidism) thyroid hormone, goiter and cancer).

Introduction

The thyroid gland is located on the front part of the neck below the thyroid cartilage (Adam's apple). Thyroid is an endocrine gland, located immediately below the larynx on either side of and anterior to the trachea. The principal hormones of thyroid gland are Thyroxine (T4) and Triiodothyronine (T3) and their concentrations are 93% and 7% respectively. The principal hormones of thyroid gland are Thyroxine (T4) and Triiodothyronine (T3) and their concentrations are 93% and 7% respectively. The normal total plasma T4 1evel is approximately 8 μg/dL (103 ηmol/L), and the plasma T3 level is 0.15 μg/dL (2.30 ηmol/L). The free T4 in plasma is important in the metabolic control of human body and therefore free T4 (FT_4) is believed to be a direct indicator of thyroid status in an individual. Free T3 (FT_3) like free T4 (FT_4) measurement also reflects the thyroid status of individual accurately.

The gland produces thyroid hormones, which regulate metabolic rate (how fast calories are consumed to produce energy). Thyroid hormones are important in regulating body energy, body temperature, the body's use of other hormones and vitamins, and the growth and maturation of body tissues (Bunevicius, R et al 1999)

The process of hormone synthesis begins in a part of the brain called the hypothalamus. The hypothalamus releases thyrotropin-releasing hormone (TRH). The TRH travels through the venous plexus located in the pituitary stalk to the pituitary gland, also in the brain. In response, the pituitary gland then releases thyroid-stimulating hormone (TSH, also called thyrotropin) into the blood (Figure 1). The TSH travels to the thyroid gland and stimulates the thyroid to produce the two thyroid hormones, L-thyroxine (T4) and triiodothyronine (T3). The thyroid gland also needs adequate amounts of dietary iodine to be able to produce T4 and T3, the molecules of which contain four and three atoms of iodine, respectively. To prevent the overproduction or underproduction of thyroid hormones, the pituitary gland senses how much hormone is in the blood and adjust the production of hormones accordingly (Watt G,et al 2008) .

When there is too much thyroid hormone in the blood, TRH and TSH production are both decreased. The sum effect of this is to decrease the amount of TSH released from the pituitary gland and to reduce production of thyroid hormones from the thyroid gland, to restore the amount of thyroid hormone in the blood to nor If the thyroid is overactive, it releases too much thyroid hormone into the bloodstream, resulting in hyperthyroidism**.** ("Hyper" is from the Greek, meaning "over" or "above.")

Hyperthyroidism causes the body to use up energy more quickly than it should, and chemical activity (like metabolism) in the cells speeds up. An underactive thyroid produces too little thyroid hormone, resulting in hypothyroidism. ("Hypo" means "under" or "below.") When the amount of hormone released into the bloodstream is below normal, the body uses up energy more slowly, and chemical activity (metabolism) in the cells slows dow (Bunevicius, R, et al 1999). Although they are two different conditions, in both hypothyroidism and hyperthyroidism the thyroid can become larger than normal. An enlarged thyroid gland is a lump that can be felt under the skin at the front of the neck.

Age has an effect on the concentration of T3, T4 and TSH. It is studied that gradual increase in autonomous tissue with age makes individual more susceptible to thyroid problems. Higher frequencies of thyroid problems are noted in people above 40 yrs of age.(Kapil U, 1998). Sex has also an effect on the concentration of thyroid hormones.(Hyska J,et al 2012). Asian women have more economic and domestic responsibilities than men. Poor and illiterate women and their children are more prone to nutritional problems such as goiter, anemia and other disorders.The concentration of hormones decreases with age in both sexes but the drop is more in female than males(Razzak, MA, 1992).

The mean value of TSH is elevated in females than males while T4 is slightly higher in males and T3 remained almost same in both genders. The concentration of hormones decreases with age in both sexes but the drop is more in female than males. The effect of season on T3, T4 and TSH has also been noted. Higher levels of T3 and T4 are noted in autumn and winter than in spring and summer.(Khan A, et al 2001). The effects of age, sex and seasons on the levels of thyroid hormones had been scarcely researched in western part of India. So, this study was done to further explore the previous researches on these aspects of thyroid hormones.

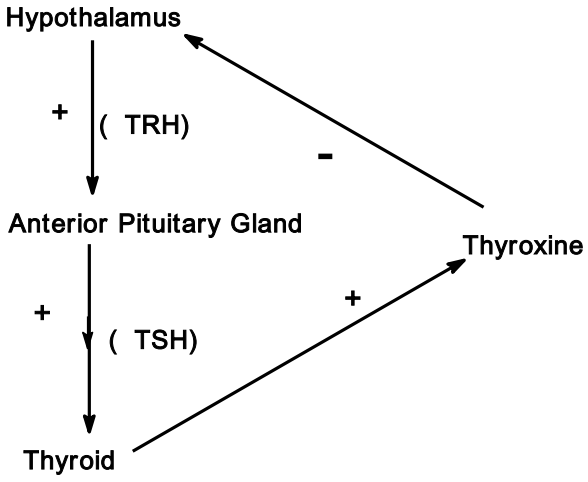

Figure. 1. The hypothalamus releases thyrotropin-releasing hormone, or TRH, which acts on the anterior pituitary gland, releasing thyroid-stimulating hormone, or TSH, or thyrotropin, a glycoprotein that binds to TSH receptors on the thyroid gland. This binding initiates thyroid activity, resulting both in hypertrophy and hyperplasia, as well as the production of thyroid hormones.

Materials and Methods

A cross sectional study was done with patients hospitalized in the regional hospital of Shkoder, patients examined in the central Polyclinic of Shkoder, the examined patients that are presented, for a 3 year period from September 2013 to September 2015 in the biochemical laboratories of Shkoder. A number of 276 patients are examined for thyroid disorders. Other data were analyzed respecting to the age, gender, TSH, T_3 and T_4.

Tests are taken prepared from individual chart of the patients. Diagnoses are determined by doctors. There is Also made a distinction regarding to the status of the thyroid hormone (hypo, hyper, goiter and cancer).

Clinical characteristic: The analyzed of clinical characteristic have been: sex and age of patients.

Biochemical parameters: The analyzed of biochemical parameters have been: TSH, Triiodothyronine (T3) and thyroxine (T4).

Statistical parameters used: Mean values (M) standart deviation (st.dev), Percentage (%), and prevalence were determined for each parameters using MINITAB 16. A p-value of ≤ 0.05 was considered statistically significant.

Results and Discussion

In this study, there are estimated 2726 patients. Table1 demonstrates demographic characteristics and disease patterns among patients with hypothyroidism, hyperthyroidism, other diagnoses of the thyroid gland in Shkodra region, from 2012 to 2015 for both sex . Man values ± standard deviations. † Numbers and column percentages (in parentheses).

The patients that we have been examining 15,4 % of men had thyroid diseases and females were 85 % respectively. The age in the overall sample of patients thyroid disorders (N=2726) was 50.72 +/- 10.6 years. Females were somehow younger than males (48.57 years vs. 52.87 years, respectively). The hypothyroidism included 1635(59.98%) of the patients, hyperthyroidism 409 (15% of the patients, whereas 682 (25.02%) of the patient exhibited other diagnoses of the thyroid gland (goiter and, cancer).

Table 1. Presents the distribution of demographic characteristics and disease patterns among patients with hypothyroidism and hyperthyroidism.

Variable	Male(N= 422)	Female (N= 2325)	Overall (N= 2726)
Age (Years)	52.87±12.2	48.57±11.8	50.72 ±10.6
Age- group:			
>35	86 (20.3 %)	345 (14.9 %)	431 (15.8 %)
35-54	152 (36 %)	1239 (53.7 %)	1391 (51%)
≥55	184 (43.7 %)	720 (31.4 %)	904 (33.16 %)
Years:			
2012	95 (22.5 %)	558 (25.5 %)	653 (23.9%)
2013	151 (35.7 %)	697 (30.2 %)	848 (31.1%)
2014	176 (41.8 %)	1049 (44.3 %)	1225 (44.9 %)
Thyroid hormone status N(%)	240 (60%)	1395 (60 %)	1635 (60%)
Hypothyroidism	61 (15 %)	348 (15 %)	409 (15%)
Hyperthyroidism			
Others thyroid disorders	121 (25%)	561 (25%)	682 (25%)

Thyroid hormone symptoms are different in different genders and sex (Stephen, A. 1992.). The gender and sex impact observed in the current study is shown in (TABLE 1. As shown previously, regions of Shkodra are currently in a transition phase from iodine deficiency to iodine sufficiency. Abnormalities of the thyroid gland are common and affect 1-5% of the population (Watt G,et al 2008). All thyroid disorders are much more common in women than in men. Because of the widespread use of iodized salt and bread, lack of iodine is longer a cause of thyroid disease. (Stephen, A. 1992)

Conclusions

Our study informs about the epidemiology of the thyroid gland in Shkodra region.The introduction of sensitive thyrotropin assays and free thyroid hormone measurements has simplified the interpretation of thyroid function tests. However, important pitfalls and difficult cases still exist. In this review, thyroid function test results are grouped into six different patterns. We propose that if assays for thyrotropin, free T3 (FT3), (Dayan CM, 2001)) and free T4 (FT4) are all done, knowledge of these patterns coupled with clinical details and simple additional tests allow a diagnosis to be made in almost all cases.

The prevalence is mainly defined from gender (Stephen, A. 1992., Bhowmick et al. 2007). The occurrence of hypothyroidism prevalence is 8.8 % among men and 51 % among women . It shows that the prevalence of hyperthyroidism is 2.2 % in males and 12.7 % among women. 3.1 % of men under age 35 were screened thyroid disease, while 12.6 % of female under age 35 were screened thyroid diseases. Almost half of our patients (51%) belong to te age group of 35-54 years. This study offers a very important evidence over the epidemiology of the thyroid gland in the region of Shkodra.

References

1. Bunevicius, R, Kazanavicius., R, Zalinkevicius., R, and Prange, AJ Jr.,1999: Effects of thyroxine as compared with thyroxine plus triiodothyronine in patients with hypothyroidism.N Engl J Med 340: 424–429
2. Bhowmick S., Dasari G., Levens K., Rettig K. (2007) The prevalence of elevated serum thyroid stimulating hormone in childhood/adolescent obesity and of autoimmune thyroid diseases in a subgroup. J Natl Med Assoc 99: 773–776.
3. Dayan CM, (2001) Interpretation of thyroid function tests, *Lancet* 357(9256), 619-24
4. Docter, R, Krenning., EP, de Jong, M, and Hennemann, G.,1993: The sick euthyroid syndrome: changes in thyroid hormone serum parameters and hormone metabolism.
5. Ezzat S, Sarti DA, Cain DR, Braunstein GD.Thyroid incidentalomas. Prevalence by palpation and ultrasonography. Arch Intern Med. 1994;154(16): 1838–40. Clin Endocrinol. 39: 499–518
6. Hyska J, Bushi E, Luzati A, Bizhga J. Nutritional knowledge of primary care physicians in Tirana, Albania. Medicus. 2012;17:200–206
7. Khan A, Akhter S. Effect of age, sex and seasons on the concentration of thyroid and thyroid stimulating hormones The Sciences 2001;1(4):224-227.
8. Kapil U. Goitre in India and its prevalence. J Med Sci Fam Welf. 1998;3:46–50.
9. Razzak, MA Effect of Age and Sex on Thyroid Function Tests Established of norms for the Egyptian Population in Development in Radioimmunoassay and Related Procedures International Atomic Energy Agency, 1992. P.353-8.
10. Stephen, A. 1992. A Woman, her family and her animals. Proceddings of the sixth AAAP Animal Science Conference, Vol 1, Bankok.
11. Watt G, Haarburger D, Berman P., July 2008: Euthyroid patient with elevated serum free thyroxine. Clin.Chem.54(7): 1239-41.