

Comparative Study of Thyroid Profile in Patients Having Diffuse Goiter from RHTC and UHTC, SMHRC

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ABSTRACT

Introduction:

The thyroid gland is a highly vascular endocrine gland located anteriorly in the throat, stretching from the fifth cervical to the first thoracic vertebrae. Researchers discovered that in cases of moderate hypothyroidism, serum TSH levels were also elevated, while T3 and T4 levels remained within normal limits. Diffuse goiter is characterized by the enlargement of the entire thyroid gland and is seen in patients who have hypothyroidism or hyperthyroidism at puberty, while poisonous diffuse goiter, also known as grave's disease, is seen in hyperthyroid patients. It has been claimed that Diffuse Goiter (Simple) or physiological goiter is the most common thyroid disorder in various groups of people. They also discovered that while diffuse goiter has equivalence with diffuse radioactive iodine uptake, multinodular goiter does not have equivalence with irregularity in uptake and activity in the thyroid gland.

Aim: Comparative study of thyroid profile in patients having diffuse goiter from RHTC and UHTC, SMHRC

Material and Methods: The study was conducted in Dept. of Biochemistry, Datta Meghe Medical College and Shalinitai Meghe Hospital and Research Center, Nagpur. This study included 150 subjects and was distributed in two groups. Group I included 75 diffuse goiter patients as study group and group II included 75 normal healthy individual as control group.

Result: In both the research and control groups, the mean level of T3 and T4 was (0.950.20, 0.800.17); it was markedly higher in the study group than in the control group (p 0.0001 and 0.0015, respectively). Goiter was more common in normal patients than in the research group (p 0.0001). TSH concentrations in the blood were higher in the research group than in the control group, and mean FT4 levels were higher in affected people than in healthy people.

Conclusion: According to the findings, goiter prevalence may be influenced by the degree of hormonal dysfunction, notably normal and abnormal TSH levels. In addition, the increased risk of goiter is linked to female gender and lower TSH levels, according to this study. For possible systematic review, an epidemiological profile of patients with diffuse goiter is required. look into it

Key words:hyperthyroidism; hypothyroidism; thyroid stimulating hormone; diffuse goiter, RHTC & UHTC

INTRODUCTION :

The thyroid gland is a highly vascular endocrine gland located anteriorly in the throat, stretching from the fifth cervical to the first thoracic vertebrae. Researchers discovered that in cases of moderate hypothyroidism, serum TSH levels were also elevated, while T3 and T4 levels remained within normal limits.¹

Diffuse goiter, also known as physiological goiter, is characterized by the enlargement of the entire thyroid gland in patients with hypothyroidism or hyperthyroidism at puberty, while toxic diffuse goiter, also known as grave's disease, is common in hyperthyroid patients have reported that Diffuse Goiter (Simple) or physiological goiter is the most common thyroid disorder among different thyroid diathesis. They also discovered that while diffuse goiter has equivalence with diffuse radioactive iodine uptake, multinodular goiter does not have equivalence with irregularity in uptake and activity in the thyroid gland.²

Thyroid hormone (TH) is a hormone that regulates metabolic processes that are important for normal growth and development as well as adult metabolism. Thyroid hormone levels are linked to body weight and energy spending, according to research. Excess thyroid hormone causes hyperthyroidism, which results in increased resting energy spending, weight loss, lower cholesterol levels, increased lipolysis, and gluconeogenesis. Hypothyroidism, or low thyroid hormone levels, is linked to hypometabolism, which includes low resting energy spending, weight gain, and high cholesterol. Lipolysis and gluconeogenesis are both suppressed. Although TH promotes both lipogenesis and lipolysis, the net effect of increased TH levels is fat loss. TH regulates energy storage and spending, influencing vital metabolic pathways that control energy balance. The hippocampus, white fat, brown fat, skeletal muscle, kidneys, and pancreas all play a role in metabolic regulation.³

After being converted from the prohormone thyroxine (T4) to the active form triiodothyronine (T3), thyroid hormone regulates a wide range of genes. Because of the expression of cell and tissue-specific thyroid hormone transporters, various thyroid hormone receptor (TR) isoforms, and interactions with co repressors and coactivators, the signaling pathway is complex and heavily regulated. ⁴

Thyroid hormone is produced by the thyroid gland, which is made up of follicles in which tyrosine residues in the glycoprotein thyroglobulin are iodinated to make thyroid hormone. Hormone that stimulates the thyroid (TSH), TSH-R is expressed on the thyroid follicular cell basolateral membrane and is secreted by the anterior pituitary in response to input from circulating thyroid hormone.⁵

TSH controls iodide uptake through the sodium/iodide symporter, which triggers a series of events that lead to normal thyroid hormone synthesis and secretion. Thyroid hormone is necessary for amphibian metamorphosis and is necessary for normal development, growth, neural differentiation, and metabolic regulation in mammals.⁶

Thyroid hormone deficiency during development, such as maternal iodine deficiency or untreated congenital hypothyroidism, manifests as deep neurologic deficits and growth retardation. When ligand deficiency occurs in adults, there are more subtle and reversible defects.⁷

The set point, or relationship between serum T4 and serum TSH, is stable for an individual when measured prospectively, but it varies markedly between individuals. ⁸

This population-wide variability in set point indicates a genetic impact involving one or more genes in the thyroid hormone pathway. D2 polymorphisms have been linked to a change in TSH pituitary set point.^{9,10}

after a thyrotropin-releasing hormone–stimulated (TRH-stimulated) acute increase in serum TSH, and with a blunted increase in serum T4.¹¹ Specific D2 polymorphisms have been linked to a better response in hypothyroid patients to combined T4 and T3 replacement therapy rather than T4 alone.

These patients may have a decreased tissue conversion of T4 to T3 and benefit from T3 substitution. All three deiodinases require selenium to function properly.¹²

The hypothalamus secretes thyrotropin-releasing hormone (TRH), which travels through the hypophyseal portal circulation to enter the anterior pituitary. TRH receptors are activated, which causes TSH to be released, which activates its own receptors on thyroid follicular cells. The enzyme thyroid peroxidase is activated, which results in increased cellular uptake of iodine from the blood, increased synthesis of thyroglobulin, and secretion of triiodothyronine (T3) and thyroxine (T4) into the bloodstream (TPO). The serum levels of thyroid hormones and TSH have an inverse relationship as a result of feedback circuits. Low T4 levels (as seen in hypothyroidism) and high T4 levels (as seen in hyperthyroidism) are linked to elevated and low TSH levels, respectively. The important element of thyroid function regulation in terms of thyroid disorder diagnosis is the relationship between the magnitude of changes in serum TSH and the resulting magnitude of changes in circulating thyroid hormones. The exact nature of the relationship is still debated, but for most people, the TSH-T4 relationship approximates an inverse log-linear relationship, and this relationship becomes clearer for a given person as more data points are available to identify it.¹³

TSH has a reference and therapeutic target range of 0.4–4.0 mIU/mL, which is used to identify normal thyroid function in adults [9]. TSH levels above the reference range and normal thyroid hormone levels characterize subclinical hypothyroidism; on the other hand, T4 and T3 levels within the normal range and low TSH describe subclinical hyperthyroidism. In most labs, FT4 is only measured when TSH is abnormally high. A substantial observational study from Australia found that limiting free T4 (FT4) measurements to patients with serum TSH levels that were obviously outside the reference range (0.2 mIU/L or >6 mIU/L) had little or no effect on the TSH test's diagnostic usefulness.¹⁴

During pregnancy, the size of the thyroid gland, thyroid hormone production, and iodine requirements all increase significantly, with a corresponding drop in the TSH level. Current thyroid disease management guidelines recognize the need for a lower upper limit of the reference range during various stages of pregnancy, but differences in the magnitude of the impact of pregnancy on thyroid hormone levels have been noted between populations. As a result, these guidelines emphasize the importance of using locally derived reference ranges when managing pregnant women.¹⁵

Aim :Comparative study of thyroid profile in patients having diffuse goiter from RHTC and UHTC, SMHRC

Material and method:The population sample is comprised of 150 individuals. The whole population was categorized into two major groups, one is experimental group and other is control group. The blood tests reports showing normal values of Thyroid Functions Tests (TFTs) were designated as normal while patients having not normal values of TFTs were designated as abnormal. The experimental group constituted 75 patients of diffuse goiter and 75 individuals as control group.

The abnormal patients were further categorized into hyperthyroid and hypothyroid according to the values of TSH levels. Hypothyroidism and hyperthyroidism can be accurately diagnosed with laboratory tests performed. The patients having higher concentration of TSH were designated as hypothyroid and patients having low concentration of TSH were designated as hyperthyroid. Individuals having no diffuse goiter are taken as control group but they can have hypothyroidism or hyperthyroidism. The patients having diffuse goiter were diagnosed through Physical examination, clinical examination, Thyroid Scan, and Ultrasound reports. The blood tests reports of thyroid function tests were collected from various laboratories of Nagpur and normal TSH concentration (0.27 to 4.2 μ IU/ml) was kept as criteria for the diagnosis of thyroid dysfunction. Patients went to the Directly Observed Treatment Short-course focus in the Dept. of General Medicine, Datta Meghe Medical College and Shalinitai Meghe Hospital and Research Center, Nagpur

incollaborationwith JNMC & ABVRH (Datta Meghe Institute of Medical Sciences Deemed To Be University), Sawangi, Wardha, Maharashtra.

Sample Collection:

5ml of blood sample were taken from each patients and divided into Plain Vial. sample were used for the estimation of the plain sample were used to estimate the level of Thyroid profile andTSH.

Inclusion Criteria:

All patients having diffused goiter in any age group will be included in the study.

Exclusion criteria

- Pregnant Women
- Liver disease as evidenced by raised ALT level.
- Drugs: Amiodarone, lithium, anti-thyroid medications(neomercazole/procarbizole), thyroxin.

Result :

Table 1comparison of thyroid profile in study or control group

Parameters	Study group N 75	Controlgroup N 75	P-value
T3	0.95± 0.20	0.80± 0.17	P < 0.0001
T4	0.80± 0.10	0.65± 0.39	P = 0.0015
TSH	1.1 ±0.24	0.81± 0.19	P < 0.0001
FT3	0.71 ±0.21	0.50± 0.18	P < 0.0001
FT4	0.19± 0.10	0.15± 0.06	P = 0.0035

In both the research and control groups, the mean level of T3 and T4 was (0.950.20, 0.800.17); it was markedly higher in the study group than in the control group (p 0 0001 and 0.0015, respectively). Goiter was more common in normal patients than in the research group (p 0.0001). TSH concentrations in the blood were higher in the research group than in the control group, and mean FT4 levels were higher in affected people than in healthy people.

Discussion :

Thyroid dysfunction is a common endocrine disorder that affects around 300 million people globally, with more than half of those affected being unaware of their condition. 16 The most common thyroid disorders are hyperthyroidism and hypothyroidism, which affect 1.6 billion people in more than 110 countries. 17 Hypothyroidism was found to be prevalent in 4.6 percent of the US population, but only 0.3 percent of hypothyroidism is clinically evident. Thyroid problems affect women 5 to 8 times more than men. Furthermore, one out of every eight women would develop a thyroid disorder at some point in her life. Thyroid dysfunction, on the other hand, was not evident in patients with diffuse goiter and MNG. TSH, FT3, and FT4 levels were found to have no effect on the onset of goiter in both groups.¹⁸ TSH is a hormone that regulates thyroid cell growth and differentiation, and it may also play a role in the formation of nodules. Iodine may modulate the reaction of thyroid cells to TSH, according to some authors. Others have proposed that iodine suppressive effects may increase the influence of other goitrogenic factors and increase the sensitivity of thyrocytes to TSH in regions where iodine deficiency exists, converting goitrogen to normal TSH levels.¹⁹

Our findings revealed an inverse relationship between TSH and goiter. This link does not appear to be due to TSH's direct effect on the thyroid gland; rather, it may be due to the steady increase in goiter thyroid hormone production or the increased mass of the thyroid itself. Lower TSH levels in bigger thyroids may also be due to the presence of thyroid-stimulating antibodies. Unfortunately, none of our

patients have had these antibodies tested. TSH is a large factor in goiter formation, according to the current studies, and elevated serum TSH is a goiter-dependent risk factor.²⁰

Gender and the prevalence of goiter have been linked. Males had more goiter than females, according to Knudsen et al.²¹, but females were 2 to 10 times more likely than males to have goiter. Women in our sample had higher mean goiter than men, but the overall prevalence of goiter did not differ between genders. Gender differences become noticeable only after puberty, according to some writers, implying that sex hormones may play a role in thyroid volume.¹⁹ In healthy women, the relationship between thyroid volume and parity status was previously investigated.²² Thyroid volume is thought to increase during pregnancy, especially when combined with smoking and iodine deficiency.²²

Conclusion :

According to the findings, goiter prevalence may be influenced by the degree of hormonal dysfunction, notably normal and abnormal TSH levels. In addition, the increased risk of goiter is linked to female gender and lower TSH levels, according to this study. 'The' For possible systematic review, an epidemiological profile of patients with diffuse goiter is required. look into it

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