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ANALYZING THE CONNECTION BETWEEN THYROID DYSFUNCTION AND THE DEGREE OF RENAL FAILURE

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Abstract

The amounts of creatinine "in the blood ranged from 3 to 14 mg/dl, with the mean being 7.34 mg/dl. The serum calcium level was found to be low in ten patients, normal in twenty-eight patients, and elevated in twelve individuals. Twelve individuals had low serum phosphorus levels, whereas the other 38 patients had levels that were within normal range. T3 levels were measured between 0.2 and 2.0ng/ml, with the mean being 0.67 (normal range 0.6 – 2.1ng/ml), T4 levels were measured between 0.9 and 8.4g/dl, with the mean being 5.65 (normal range 5-135g/dl), and serum TSH levels were measured between 0.6 and 37 IU/ml, with the mean being 6.49 (normal range 0.4-7 IU/ml). We found that 29 patients had low T3 syndrome, 12 individuals had low T4 syndrome, and four patients had hypothyroidism in our research. The signs of hypothyroidism were seen in 34 individuals who made up the study group. In this paper, the incidence of Low T3 syndrome increased in tandem with the progression of age. We discovered that the frequency of patients with low T3 rises as the severity of chronic renal disease increases, according to our research. Patients with low T4 syndrome have a higher risk of developing kidney failure than those without the condition. The serum T3 level was shown to be reduced in individuals with poor GFR. There is no connection between mean TSH levels in patients with low T3 syndrome and GFR levels in patients with different stages of renal illness in patients with low T3 syndrome. The low T3 condition of chronic kidney disease (CKD) may be considered protective, since it promotes protein conservation.

Keywords: Chronic "kidney, pathos physiological, hypo-reflexia, TSH, ESRD, asthenia,

1. INTRODUCTION

Thyroid and kidney "functions are intertwined and interdependent. 3-6. besides being necessary for the growth and development of the kidney, thyroid hormones are also required for the maintenance of electrolyte and water balance. The kidney, on the other hand, plays a critical role in the metabolism and disposal of thyroid hormones, among other things.

Patients with chronic kidney disease (CKD) have changes in the synthesis, secretion, metabolism, and clearance of thyroid hormone, among other things. Furthermore, therapeutic techniques for one organ have an impact on the other organ.

The kidney contributes to the elimination of iodine in the body mostly through glomerular filtration. As a result, the excretion of iodine decreases in severe renal failure. A decrease in iodine clearance by the kidneys results in increased blood concentrations of inorganic

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iodide that has the potential to interfere with thyroid hormone synthesis, leading in the “Wolff Chaikoff” effect.

Chronic renal illness is related with thyroid function abnormalities, which result in low blood total and free T3 concentrations, as well as normal reverse T3 and free T4 levels, in addition to other complications. The TSH levels in the majority of patients are virtually normal, and they are determined to be in a condition of euthyroidism.

In addition to cold intolerance, dry coarse skin, sallow complexion, lethargy, tiredness, edoema, alopecia, hyporesponsiveness, and asthenia, individuals with chronic kidney disease (CKD) may also have other symptoms and indicators of hypothyroidism, including alopecia, hyporeflexia, and asthenia. In individuals with chronic renal illness, it is often difficult to rule out thyroid function abnormalities based only on their clinical history.

In order to investigate thyroid function anomalies in chronic renal disease patients, a number of research have been undertaken. All thyroid disorders, such as hypothyroidism, hyperthyroidism, and euthyroidism, have been" documented in prior research conducted on humans.

It is unclear what the relationship is between the degree of renal failure and thyroid dysfunction. In patients with end-stage renal illness, hypothyroidism is predicted to affect 0-9 percent of the population. It has also been shown that the prevalence of thyroid enlargement (goitre) is higher in patients with end-stage renal disease.

A prospective biochemical and "clinical research on thyroid function has been conducted at the Department of Medicine, Coimbatore Medical College and Hospital, Coimbatore, India, in light of the heterogeneity of thyroid profiles in chronic renal disease patients in previous studies.

Only individuals with chronic kidney disease who were receiving conservative treatment were included in the study. This is owing to the fact that dialysis causes alterations in the thyroid profile that are distinct from those caused by chronic renal disease. In individuals with renal failure, dialysis also has the additional effect of altering the prior serum thyroid hormone level. According to Ramirez79 and Kayimaet al80, a number of studies have been conducted in which CKD patients on conservative management were compared to CKD patients on HD.

In our study, we looked at 50 patients with chronic kidney disease (CKD) who were on conservative treatment and met the criteria for CKD. Of the 50 patients, 34 were males and 16 were females, and their ages ranged from 20 to 68 years, respectively. Patients between the ages of 30 and 60 were represented by 9, patients between the ages of 31 and 60 were represented by 35, and patients above the age of 60 were represented by 6.

The study included 50 patients, with 68 percent of the participants being men and 32 percent being girls.

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We found that the duration of CKD symptoms varied from 4 months to 2 years in our research participants.

The mean duration was 9.84 months, and the" creatinine clearance ranged from 6 mL/minute to 32 mL/minute throughout the course of 30 months.

2. LITERATURE REVIEW

Hypothyroidism is characterized" by a decrease in the production of thyroid hormones. Cretinism in children and myxedema in adults are the results of this condition. Hypothyroidism can be classified as either primary or secondary in nature. Primary hypothyroidism is caused by an inherent abnormality in the thyroid gland, whereas secondary hypothyroidism is caused by a malfunction in the hypothalamus or pituitary hormone production.

It is believed that insufficient iodine level in the diet is the most prevalent cause of hypothyroidism. The most frequent cause of hypothyroidism in nations with enough iodine in the diet is autoimmune Hashimoto's thyroiditis. Other factors to consider are certain medications, past thyroid surgery, previous therapy with radioactive iodine, and damage to the hypothalamus or anterior pituitary gland, among others.

The following are some of the signs and symptoms of hypothyroidism:

Tiredness, weakness, cold sensitivity, constipation, dry coarse skin, poor memory, difficulty concentrating, hair loss, weight gain, breathlessness, hoarseness of voice, paresthesia, and reduced hearing are all symptoms of hypothyroidism.

Diffuse alopecia Delayed tendon reflex relaxation Carpal tunnel syndrome serous cavity effusions Puffiness of the face, hands, and feet Bradycardia Peripheral edoema.

The TSH level is the most significant single biochemical marker in the screening for hypothyroidism. TSH levels in the normal range rule out the potential of primary hypothyroidism, but not the chance of secondary hypothyroidism. A TSH level more than 20 IU/ml, or greater than 10 IU/ml if there is a high degree of clinical suspicion, is required for the diagnosis of primary hypothyroidism. A low free T4 level should be present in conjunction with a high TSH level in order to validate the diagnosis of hypothyroidism. Despite the fact that free T3 is decreased in many hypothyroid individuals, it cannot be used as a reliable indication because it is normal in 25% of hypothyroid people As a result of increased free thyroid hormone levels in the bodily tissues, hyperthyroidism is a disease that can occur. Graves' disease, toxic multi nodular goitre, and" solitary thyroid nodule are the most common causes of thyroiditis.

Symptoms:

Fatigue and weakness are common symptoms of menopause, as is heat intolerance and sweating. Other symptoms include: hyperactivity and irritability, dysphonia and palpitation, fatigue and weakness, weight loss despite increased hunger, oligomenorrhea, loss of libido, and diarrhoea.

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Signs:

Proximal Myopathy is characterized"by muscle weakness, tremors, warm wet skin, atrial fibrillation in the elderly, goiter, and proximal myopathy.

It is common in the elderly, especially in those who are frail, when the signs and symptoms of thyrotoxicosis are mild or nonexistent. Patients with apathetic thyrotoxicosis typically complain of weight loss and fatigue.

Hyperthyroidism is characterized by a decrease in thyroid stimulating hormone (TSH) levels, as well as a rise in total and free T3 and T4 levels. T3 Thyrotoxicosis occurs in 2 to 5% of patients, whereas total and free T4 rise" in the presence of normal T3 is referred to as "T4 Thyrotoxicosis" in the majority of patients.

3. RESEARCH GAP

In this paper, thyroid dysfunction "was investigated in individuals with chronic kidney disease regardless of the etiology of the disease, therefore an individual link between the etiology of CKD and thyroid dysfunction was not possible.

Thyroid dysfunction was not investigated in individuals undergoing dialysis since dialysis alters the thyroid profile independently of chronic kidney" disease.

4. RESEARCH OBJECTIVE & METHODOLOGY

1. Determine the relationship between thyroid function abnormalities and the degree of renal failure.

All of the patients gave "their informed permission before taking part in the study. Design of the study: An observational, cross-sectional investigation Patients with chronic renal disease meet the eligibility requirements. Patients who met" the criteria for chronic kidney disease and were receiving conservative treatment.

Criteria for the diagnosis of Chronic Kidney Disease

1. The presence "of uremic symptoms for a period of three months or more.
2. Increased levels of urea in the blood and serum, as well as a decrease in creatinine clearance.
3. Evidence of chronic renal disease seen on an ultrasonogram
4. Bilaterally constricted kidneys with a circumference of less than 9 cm.
5. There is a lack of cortico-medullary differentiation.
6. Laboratory evidence of chronic kidney disease, such as anemia, changes in serum electrolytes, and so on.

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Criteria for exclusion

1. Patients who are undergoing peritoneal dialysis or hemodialysis.
2. Proteinuria within the nephrotic spectrum.
3. Hypoalbuminemia.
4. Other conditions, such as
5. Illness that is sudden and severe.
6. Diabetes mellitus is number six on the list.
7. You've recently had surgery.
8. Trauma.
9. Burns.
10. Diseases of the liver.
11. Drugs that affect the" thyroid profile, such as amiodarone, phenytoin, beta-blockers, dopamine, steroids, oestrogen tablets, and iodine-containing medications.

Patients with chronic "kidney disease (CKD) who were on conservative treatment, with a predilection for renal and thyroid disorders, had a thorough medical history and clinical examination. The following investigations were carried out by the team.

1. A regular urine examination and microscopic examination.
2. A peripheral smear is performed to check for anemia.
3. Urea in the blood.
4. Creatinine levels in the blood.
5. Creatinine clearance (as calculated by the Cockcroft — Gault formula).
6. Electrolytes in the serum.
7. Calcium, phosphorus, and uric acid levels in the blood.
8. Cholesterol levels in the blood.
9. Urinary protein analysis for 24 hours.
10. Protein in the blood (10th) (total protein / albumin / globulin).
11. Abdominal ultrasound to check for signs of chronic renal dysfunction.

Following the identification of patients who meet the aforementioned criteria, about 5 mL of blood is drawn and placed in a non-heparinized serum vial before being submitted for a thyroid profile test.

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Components of the thyroid profile that were included in our research

1. Triiodothyronine levels in the blood (T3).

2. Thyroxine levels in the blood (T4).

3. TSH (thyroid stimulating hormone) in the serum (TSH).

The Enzyme Linked Immunosorbent Assay (ELISA) is used to determine the quantitative levels of T3, T4, and" TSH.

5. DATA ANALYSIS & FINDINGS

A total of 34 patients (68 percent) "experienced the symptoms in our research, which included 50 individuals. Tiredness, weakness, cold sensitivity, and dry skin are all signs of hypothyroidism, as are other symptoms.

Coarse skin, constipation, hoarseness of voice, hair loss, and other symptoms are common.

Out of 29 patients with low T3 syndrome, 19 patients exhibited symptoms indicative of hypothyroidism, accounting for 65.5 percent of the total. Of the four patients with primary hypothyroidism, all four patients had symptoms suggestive of hypothyroidism, accounting for 100 percent of the total.

In a study of 50 patients with chronic kidney disease, 17 individuals did not have any thyroid function abnormalities, but 11 of them exhibited symptoms indicative of hypothyroidism, accounting for 64.7 percent of the total.

Hypothyroidism-related symptoms such as delayed ankle jerk were seen in two individuals, one of whom had hypothyroidism as a diagnosis. One patient with hypothyroidism was found to have papilloedema, while another patient with hypothyroidism was discovered to have goitre. All of the individuals in our research had urine protein excretion less than 1 g/day over the course of 24 hours.

Fourteen individuals had anemia in our research out of fifty participants, with 34 patients having normal-cytic normochromic anemia as shown by peripheral smear examination and the remaining eight patients having microcytic hypochromic anemia.

In our research, all patients had an ultrasound abdomen performed, which revealed characteristics of constricted kidney in 46 patients (92 percent), and lack of cortico-medullary distinction in the remaining four patients (92 percent).

58 percent of the patients in the research had low T3 syndrome, and 24 percent had low T4 syndrome and 8 percent had primary hypothyroidism, according to the data.

In 20 of the patients, creatinine clearance was found to be less than 15 mL/minute.

Individuals with low T3 syndrome had blood flow rates ranging from 15 to 30 mL/minute in eight patients and more than 30 mL/minute in one" patient.

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Thirteen individuals with low T4 syndrome had creatinine clearance less than 15 ml/minute, three patients had creatinine clearance between 15 and 30 ml/minute, and no patients had creatinine clearance more than 30 ml/minute.

The age incidence of CKD "patients with low T3 syndrome in our research revealed that 44.44 percent of CKD patients with low T3 syndrome were less than 30 years of age, 60 percent were between 30 and 60 years of age, and 66.66 percent were older than 60 years of age. It indicates that the number of patients with low T3 syndrome rises in tandem with the increase in age.

In our research, the incidence of low T3 syndrome in CKD patients was found to be 58.82 percent in men and 56.25 percent in females, with males accounting for the majority of cases.

The T3 level in our research ranged from 0.2 to 2.0 ng/ml, with the mean value being 0.2 ng/ml. 0.67. With a mean value of 5.65 micro g/dl, the T4 level varies from 0.9 to 8.5 micro g/dl.

It is normal for the TSH level to vary between 0.6 and 38 micro IU/ml, with a mean of 6.49.

Thirty-three out of fifty patients included in our research had low T3 levels, with the other patients having normal T3 levels.

Which 4 patients' low T3 levels were caused by primary hypothyroidism, and which 29 patients' low T3 levels were not?

Patients exhibited low T3 levels mostly" as a result of the impact of chronic kidney disease (CKD), which was particularly significant statistically ($P<0.05$).

6. CONCLUSION

As a result, the diagnosis of "hypothyroidism in chronic kidney disease is based mostly on the TSH level, which should be extremely high (>20 IU/dl) in conjunction with low blood T4. There were no clinical or biochemical signs or symptoms of hyperthyroidism among the participants in this research.

According to our findings, the age incidence of CKD patients with low T3 syndrome was higher in our research than in the general population. 44.44 percent of those polled were under the age of 30, 60 percent were between the ages of 30 and 60, and 66.66 percent were above the age of sixty-four. It indicates that the number of patients with low T3 syndrome rises in tandem with the increase in age.

58 percent of the patients in the research had low T3 syndrome, 24 percent had low T4 syndrome, and just 8 percent had intrinsic hypothyroidism, according to the findings.

A total of 20 patients with low T3 syndrome had creatinine clearance less than 15 mL/minute, eight patients had creatinine clearance between 15 and 30 mL/minute, and one patient had creatinine clearance more than 30 mL/minute.

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Thirteen individuals with low T4 syndrome had creatinine clearance less than 15 ml/minute, three patients had creatinine clearance between 15 and 30 ml/minute, and no patients had creatinine clearance more than 30 ml/minute.

As has been seen in previous research, the mean T3 level in our study was lower among participants with a GFR of less than 15 ml/min. It was discovered that the T3 level was decreased in patients with low GFR, and it was discovered that there was a direct linear connection between T3 level and GFR, which is consistent with the Avinashi et al research.

Goiter:

Patients with chronic kidney disease" (CKD), particularly those on dialysis, were shown to have a significant prevalence of goiter, according to Ramirez et al.17. It was discovered that the incidence was higher in patients with end-stage renal illness. The buildup of iodides in the thyroid gland as a result of reduced renal clearance in individuals with chronic kidney disease (CKD) is one potential reason. In addition to goiter, a research published by Hegeduset al37 found that the thyroid gland volume was substantially increased in individuals with chronic kidney disease. One of the hypothyroid patients in our research developed goiter.

Dialysis:

As previously mentioned, HD "and continuous ambulatory peritoneal dialysis have both been demonstrated to have an impact on the thyroid profile irrespective of kidney disease. Additionally, medications such as heparin and furosemide that are taken during dialysis will have an effect on the thyroid profile.

Kayimaet a180 and Giordano et al. presented a total of 90 research on the impact of dialysis on patients with chronic kidney disease (CKD) and thyroid dysfunction.

According to these investigations, there was no substantial improvement in the thyroid profile following repeated hemodialysis sessions. However, among patients who have had kidney transplant surgery, the majority of thyroid function parameters have recovered to normal, with TSH remaining below the normal range in" most cases.

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