

ASSESSMENT OF THYROID DYSFUNCTION AMONG CRITICALLY ILL PATIENTS ADMITTED IN THE INTENSIVE CARE UNIT AT TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Thyroid disorders are reported in higher magnitude among the general population, although its prevalence is also high reported among critically ill patients. Thyroid disorders are endocrine in nature and various studies were conducted to find out the correlation between the severity of illness. **Material & Methods:** All critically ill patients admitted to the intensive care unit at our tertiary care hospital with Acute Renal failure, Congestive cardiac failure, Acute Respiratory failure, Diabetic Ketoacidosis, and Sepsis were enrolled in the present study. Patients were enrolled from the intensive care unit by simple random sampling. **Results:** Among the 29 (58%) patients who had low T3 levels, 4 (8%) patients had acute renal failure, 4 (8%) patients had Congestive cardiac failure, 5 (10%) patients had respiratory failure, 14 (28%) patients had sepsis and 2 (4%) patients had diabetic ketoacidosis. Among the 7 (14%) patients who had low T4 levels, 1 (2%) patient had acute renal failure, 2 (4%) patients had Congestive cardiac failure, 1 (2%) patient had respiratory failure, 2 (4%) patients had sepsis and 1 (2%) patient had Diabetic ketoacidosis. Among the 2 (4%) patients who had high T4 levels, 1 (2%) patient had Congestive cardiac failure and 1 (2%) patient had respiratory failure. Among the 5 (10%) patients who had high TSH levels, 1 (2%) patient had acute renal failure, 1 (2%) patient had Congestive cardiac failure, 2 (4%) patients had respiratory failure and 1 (2%) patient had Diabetic ketoacidosis. Among the 2 (4%) patients who had low TSH levels, 1 (2%) patient had sepsis and 1 (2%) patient had Diabetic ketoacidosis. **Conclusion:** A low T3 level was the most common finding in 58% of patients. We recommend the thyroid profile of all patients admitted with critical illness in the intensive care unit to treat the thyroid dysfunction early.

Keywords: Thyroid dysfunction, critically ill patients, intensive care unit.

INTRODUCTION

Chronic It is well established various researches that thyroid hormones function a very important role in the development, regulating metabolism, protein synthesis, and functioning of other hormones (1). The thyroid gland is a butterfly-shaped endocrine gland that is situated anatomically in the anterior aspect of the root of the neck and comprises two bulky lateral lobes which are connected by a thin isthmus (2). The thyroid gland secretes several hormones such as triiodothyronine (T3), thyroxine (T4), and calcitonin. The prevalence and magnitude

of all thyroid disorders are associated and dependent on numerous risk factors and confounding factors (3).

The thyroid hormones control the metabolism of macromolecules, oxygen consumption, and the basal metabolic rate (BMR) of body cells and are essential for normal growth and maturation of the body as well as they are essential for proper development of the peripheral and central nervous system (4). Peripheral metabolism of thyroid hormones and pituitary-thyroid axis reported to be affected in

various diseases and characterized by the Low T3 levels which are followed by subclinical hypothyroidism findings (5).

Thyroid disorders are reported in higher magnitude among the general population, although its prevalence is also high reported among critically ill patients. Thyroid disorders are endocrine in nature and various studies were conducted to find out the correlation between the severity of illness (6). We conduct the present study to assess the thyroid dysfunction among critically ill patients admitted to the intensive care unit at our tertiary care hospital.

MATERIALS & METHODS

The present cross-sectional, retrospective study was conducted at the department of general medicine of our tertiary care hospital. The study was an observational study conducted during a period of six months. The study was done at 95% confidence interval at 5% of maximum allowable error. The sample size of 50 patients was calculated by epi info software. All critically ill patients admitted to the intensive care unit at our tertiary care hospital with Acute Renal failure, Congestive cardiac failure, Acute Respiratory Failure, Diabetic Ketoacidosis, and Sepsis were enrolled in the present study. Patients were enrolled from the intensive care unit by simple random sampling. Clearance from the hospital ethics committee was taken before the start of the study. Written informed consent was taken from each study participant.

All the study participants were subjected to general physical and clinical examination and detailed history was recorded from all of them. We exclude the patients from the present study who had a family history of thyroid disorder, patients who had a history of any treatment for thyroid disease, had a history of any operative procedure or any radiological intervention for thyroid gland disorders. All the study participants were subjected to routine blood investigation for complete blood count and thyroid function test. All the recorded data was entered in an Excel spreadsheet on Microsoft Excel 2016. The statistical analysis was done using the Statistical software package SPSS v22 and Epi Info v7.2. A p-value <0.05 with 95% confidence intervals was considered statistically significant.

RESULTS

In the present study, we enrolled a total of 50 critically ill patients admitted to the intensive care unit at our tertiary care hospital with Acute Renal failure, Congestive cardiac failure, Acute Respiratory Failure, Diabetic Ketoacidosis, Sepsis, and their presenting signs, symptoms, and laboratory findings were recorded. All the study participants were above the age of 18 years of age and the age of study participants was ranged from 26 to 68 years with the mean age of 49.45 ± 6.8 years. Out of the total majority of the study, participants were in the age group of 40-50 years 32% which was followed by 28% in the 50-60 years of age group and 20% in the age group of 30 to 40 years. 12% of study participants were in the age group of more than 60 years and 8% of study participants were in the age group of fewer than 30 years. In the present study males, 59% were more common than females 41%. In the present study males to female ratio was 1.44:1. (Table 1)

Table 1: Distribution of study subjects according to age and gender.

Parameters	No. of patients	
Age (years)	<30	8%
	30-40	20%
	40-50	32%
	50-60	28%
	>60	12%
Gender	Male	59%
	Female	41%

In the present study, out of total study participants, based on the thyroid function test status, 29 (58%) patients had low T3 levels, 7 (14%) patients had low T4 levels, 2 (4%) patients had high T4, 5 (10%) patients had high TSH levels and 2 (4%) patients had low TSH. Among the 29 (58%) patients who had low T3 levels, 4 (8%) patients had acute renal failure, 4 (8%) patients had Congestive cardiac failure, 5 (10%) patients had respiratory failure, 14 (28%) patients had sepsis and 2 (4%) patients had diabetic ketoacidosis. Among the 7 (14%) patients

who had low T4 levels, 1 (2%) patient had acute renal failure, 2 (4%) patients had Congestive cardiac failure, 1 (2%) patient had respiratory failure, 2 (4%) patients had sepsis and 1 (2%) patient had Diabetic ketoacidosis. (Table 2)

Table 2: Thyroid dysfunction among critically ill patients

	low T3 levels	low T4 levels	high T4 levels	high TSH	low TSH
acute renal failure	4 (8%)	1 (2%)	0	1 (2%)	0
Congestive cardiac failure	4 (8%)	2 (4%)	1 (2%)	1 (2%)	0
respiratory failure	5 (10%)	1 (2%)	1 (2%)	2 (4%)	0
sepsis	14 (28%)	2 (4%)	0	0	1 (2%)
Diabetic ketoacidosis	2 (4%)	1 (2%)	0	1 (2%)	1 (2%)
Total	29 (58%)	7 (14%)	2 (4%)	5 (10%)	2 (4%)

In the present study, out of the total study participants, based on the thyroid function test status, Among the 2 (4%) patients who had high T4 levels, 1 (2%) patient had Congestive cardiac failure and 1 (2%) patient had respiratory failure. Among the 5 (10%) patients who had high TSH levels, 1 (2%) patient had acute renal failure, 1 (2%) patient had Congestive cardiac failure, 2 (4%) patients had respiratory failure and 1 (2%) patient had Diabetic ketoacidosis. Among the 2 (4%) patients who had low TSH levels, 1 (2%) patient had sepsis and 1 (2%) patient had Diabetic ketoacidosis. (Table 2)

DISCUSSION

In the present study, we enrolled a total of 50 critically ill patients admitted to the intensive care unit at our tertiary care hospital with Acute Renal failure, Congestive cardiac failure, Acute Respiratory Failure, Diabetic Ketoacidosis, Sepsis, and their presenting signs, symptoms, and laboratory findings were recorded. All the study participants were above the age of 18 years of age and the age of

study participants was ranged from 26 to 68 years with the mean age of 49.45 ± 6.8 years. Out of the total majority of the study, participants were in the age group of 40-50 years 32% which was followed by 28% in the 50-60 years of age group and 20% in the age group of 30 to 40 years. 12% of study participants were in the age group of more than 60 years and 8% of study participants were in the age group of fewer than 30 years. In the present study males, 59% were more common than females 41%. In the present study males to female ratio was 1.44:1. Similar results were obtained in a study conducted by Kumar K et al among 100 critically ill patients admitted to the intensive care unit with Acute Renal failure, Congestive cardiac failure, Acute Respiratory Failure, Diabetic Ketoacidosis, and Sepsis. They reported Out of 100 patients 62 were male and 38 were female. The mean age of the patients was 54 years. Out of 100 patients, 34 patients had sepsis, 20 patients had Congestive cardiac failure, 26 patients had respiratory failure, 8 patients had Diabetic ketoacidosis and 12 patients had an acute renal failure (7).

In the present study, out of total study participants, based on the thyroid function test status, 29 (58%) patients had low T3 levels, 7 (14%) patients had low T4 levels, 2 (4%) patients had high T4, 5 (10%) patients had high TSH levels and 2 (4%) patients had low TSH. Among the 29 (58%) patients who had low T3 levels, 4 (8%) patients had acute renal failure, 4 (8%) patients had Congestive cardiac failure, 5 (10%) patients had respiratory failure, 14 (28%) patients had sepsis and 2 (4%) patients had diabetic ketoacidosis. Among the 7 (14%) patients who had low T4 levels, 1 (2%) patient had acute renal failure, 2 (4%) patients had Congestive cardiac failure, 1 (2%) patient had respiratory failure, 2 (4%) patients had sepsis and 1 (2%) patient had Diabetic ketoacidosis. Similar results were obtained in a study conducted by Bhat K et al among critically ill patients admitted to the intensive care unit. They reported 59% of subjects among critically ill patients admitted in ICUs showed abnormality in one or more than one parameter of the thyroid function test. Low T3 levels were the most common abnormality reported in these patients. Low T4 levels and High

TSH levels were the other common findings (8). Similar results were obtained in a study conducted by Vaibhav A et al among critically ill patients admitted to the intensive care unit. They reported low free T3 levels in 60% of the patients, 35% showing raised T4 values, and 5% showing normal values (9).

In the present study, out of the total study participants, based on the thyroid function test status, Among the 2 (4%) patients who had high T4 levels, 1 (2%) patient had Congestive cardiac failure and 1 (2%) patient had respiratory failure. Among the 5 (10%) patients who had high TSH levels, 1 (2%) patient had acute renal failure, 1 (2%) patient had Congestive cardiac failure, 2 (4%) patients had respiratory failure and 1 (2%) patient had Diabetic ketoacidosis. Among the 2 (4%) patients who had low TSH levels, 1 (2%) patient had sepsis and 1 (2%) patient had Diabetic ketoacidosis. Similar results were obtained in a study conducted by Sasi S et al among critically ill patients admitted to the intensive care unit. They reported 59% of patients had low T3 levels, 31 patients had low T4 levels and TSH levels were low in 11 patients and 14 patients had slightly high TSH levels. There was a significant association found between T3 and mortality p-value-0.0001) (10). Similar results were obtained in a study conducted by Inturi B et al among critically ill patients admitted to the intensive care unit. They reported similar findings to the present study (11).

CONCLUSION

We concluded from the present study that thyroid dysfunction suggesting euthyroid sick syndrome among critically ill patients admitted to the intensive care unit with Acute Renal failure, Congestive cardiac failure, Acute Respiratory Failure, Diabetic Ketoacidosis, and Sepsis. Low T3 levels were the most common finding in 58% of patients. We recommend the thyroid profile of all patients admitted with critical illness in the intensive care unit to treat the thyroid dysfunction early.

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