



## Estimation of Serum Electrolytes in Hyperthyroid Patients

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### Abstract

**Introduction:** Various metabolic pathways clearly indicate how importantly thyroid and kidney are interrelated; any alteration of thyroid gland leads to change of thyroid hormone levels and modifies the renal function and any disorder in renal function can retard the normal pathway of thyroid hormone. So, the present study is planned to estimate the level of serum electrolytes in hyperthyroid patients.

**Material and Methods:** The study was undertaken in subjects of age group 20-65 years. Subjects were taken from outpatient department of medicine in Government Medical College, Jammu. Detailed explanation of the purpose and methodology of the tests was given to all subjects and all eligible subjects were requested to participate in the study. Subjects were divided into two groups.

Group A Euthyroid and Group B Hyperthyroid.

**Conclusion:** The present study shows that there is no significant difference in mean serum sodium and serum potassium between euthyroid and hyperthyroid subjects as this study was planned to show abnormalities of renal function in thyroid dysfunction.

**Keywords:** Serum electrolytes, hyperthyroidism.

### Introduction

Water and electrolyte balance of various tissues of human body is partly regulated by T<sub>4</sub> and T<sub>3</sub> and the metabolism of thyroid hormones are accentuated by renal function and kidney is considered to be one of the vital tissues for thyroid hormones as well. Various metabolic pathways clearly indicate how importantly thyroid and kidney are interrelated; any alteration of thyroid gland leads to change of thyroid hormone levels and modifies the renal function and any disorder in renal function can retard the normal pathway of thyroid hormone. In either case, human metabolism is adversely affected and it will be

accompanied by serious adverse effects resulting into various metabolic disorders<sup>[1,2,3,4]</sup>. Thyroid disorders adversely influence the kidney structure and function.<sup>[5,6,7,8]</sup> It is believed that kidney deviation from its normal function, eventually affect thyroid gland and lead to thyroid malfunction<sup>[9]</sup>. So, the present study is planned to estimate the level of serum electrolytes in hyperthyroid patients.

### Material and Methods

The present study was conducted in the Department of Physiology in collaboration with the Department of Medicine and Department of

Biochemistry, Government Medical College, Jammu.

### Selection Procedure

The study was undertaken in subjects of age group 20-65 years. Subjects were taken from outpatient department of medicine in Government Medical College, Jammu. Detailed explanation of the purpose and methodology of the tests was given to all subjects and all eligible subjects were requested to participate in the study. Subjects were divided into two groups.

Group A Euthyroid and Group B Hyperthyroid

### Eligibility Criteria

**Inclusion Criteria:** Fresh cases of hyperthyroidism were detected by their clinical presentation and biochemical parameters. Patients of both sexes and 20 years of age were included.

**Exclusion Criteria:** Pre-existing diseases like diabetes mellitus, renal disorders, liver disorders or any other chronic inflammatory medical condition were excluded from the study. Weight

and height were recorded as per standards recommended by WHO.

### Biochemical measurements

Thyroid function tests (T3, T4 and TSH) were performed by chemiluminescent microparticle immunoassay for the quantitative determination of thyroid hormones in human serum and plasma<sup>[10,11]</sup>. Renal function tests (Sr. urea, creatinine, uric acid, sodium and potassium) were estimated on fully automated analyser (Siemens Dimensionsxp and Plus). Handling and storage of blood samples were done as per criteria furnished by National Committee for Clinical Laboratory Standard (NCCLS).

### Statistical Analysis

Data was subjected to one way analyses of variance (ANOVA). In all cases, means are used as units of analyses are represented as mean  $\pm$  SD. Individual values for each subject were taken as replicate and for each parameter 40 replicates were used in total. A p-value of less than 0.05 was considered statistically significant.

## Results

Comparison of mean serum sodium of group A and group B subjects

Classification of subjects	Seum sodium (meq/L)	Statistical inference F-value	Statistical inference p-value	Significant difference
Euthyroid	141.03 $\pm$ 2.02	F=2.0447	P=0.1567	Not significant as p>0.05
Hyperthyroid	140.38 $\pm$ 2.05			

Comparison of serum potassium of group A and group B Subjects

Classification of subjects	Serum potassium (meq/L)	Statistical inference F-value	Statistical inference p-value	Significant difference
Euthyroid	3.98 $\pm$ 0.23	F=0.0095	P=0.924	Not significant as p>0.05
Hyperthyroid	3.98 $\pm$ 0.22			

Table shows there is no significant difference in mean serum potassium between euthyroid and hyperthyroid subjects.

### Discussion

Thyroid hormones influence renal development, kidney structure, renal hemodynamics, glomerular filtration rate (GFR), function of many transport systems along the nephron and sodium and water

hemostasis<sup>[12]</sup>. The physiologic effects of hyperthyroidism may create increased hepatic oxygen consumption without an equal increase in blood flow, causing focal hypoxaemia and hepatic dysfunction<sup>[13]</sup>. It has also been hypothesised that these abnormalities are in part related to congestive heart failure and venous congestion caused by hyperthyroidism, although features of

congestive hepatopathy were not evident in our patients liver biopsy<sup>[14]</sup>.

### Conclusion

The present study shows that there is no significant difference in mean serum sodium and serum potassium between euthyroid and hyperthyroid subjects as this study was planned to show abnormalities of renal function in thyroid dysfunction.

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