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Serum electrolytes in thyroid patients

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Abstract
The Haemodynamic, thermoregulation and metabolism is regulated by the thyroid which is inturn regulated by the pituitary and the hypothalamus. Thyroid hormones perform a wide array of metabolic functions including regulation of lipid, carbohydrate, protein and electrolyte and mineral metabolisms. While the effect of thyroid hormones on lipid metabolism is well known, the effect on electrolytes and minerals has not been well established and also the underlying mechanisms not well understood. Therefore the present study was undertaken to assess the levels of serum electrolytes in patients with thyroid disorders.

Keywords: thyroid, electrolyte, patients, hormone, sodium

Introduction
The Haemodynamic, thermoregulation and metabolism is regulated by the thyroid which is inturn regulated by the pituitary and the hypothalamus [1, 2, 3]. According to Christoph Schwarz *et al*. electrolyte abnormalities are relevant only in marked hyper and hypothyroidism [4]. Study done by Murgod *et al*. observed electrolyte changes and lipid abnormalities in hypothyroidism. In their study they found decreased sodium and decreased potassium levels along with lipid abnormality in hypothyroidism. Hyponatraemia was recently shown to be associated with an increased risk of falls and fractures, making the subject more relevant for patients prognosis, especially the elderly [5]. Sodium and chloride are interdependent and changes in sodium ions will also be reflected in the chloride ions. it is postulated that hormones which are involved in ECFV (Extracellular Fluid Volume) regulation act on renal sodium transporters may also modulate the renal chloride transporters [6]. Besides the classic hormones, such as aldosterone, that are known to be involved in the regulation of NaCl transport by the kidney other hormones, such as thyroid hormone, are also capable of regulating the ECFV via modulation of nephron ion and fluid transport [7]. Importantly, thyroid hormone modulates the expression of Na+/K+ ATPase mRNA and protein, and hence regulates the activity of this critical component of renal sodium transport. In proximal tubule, thyroid hormone acts on the Na+/H+ exchanger to change intratubular acidification dynamics. Thus, the thyroid hormones act by regulating the expression of different sodium and chloride transporters in the kidney is plausible in the light of its involvement in increasing renal fluid reabsorption. Therefore there is increased chloride level in hypothyroidism patients. Therefore the present study was undertaken to assess the levels of serum electrolytes in patients with thyroid disorders.

Aims and Objectives
To study the serum electrolyte levels in thyroid patients

Materials and Methods
This study is done in the Department of Biochemistry, srinivas Institute of Medical Sciences, Mangalore.
This study was done from August 2018 to July 2021.
This study is a descriptive study.
This study was done in sixty patients who were having hypo/hyper thyroidism.

Inclusion Criteria
- Thyroid pathology atleast since 1 year

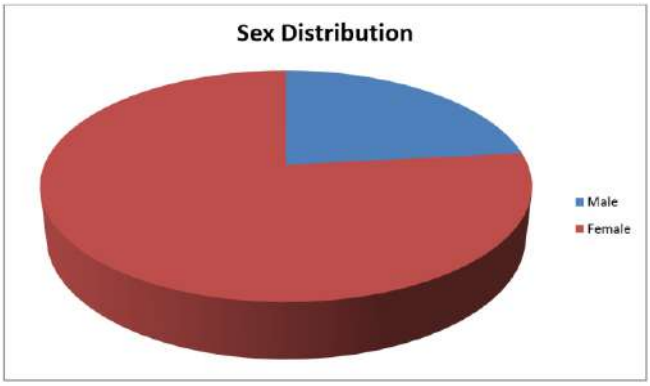
Exclusion criteria

- Cancer patients were excluded.
- Other metabolic disorders were discarded.

Results

Table 1: Age

Number	Mean age	Std Deviation
60	31.42	±8.48



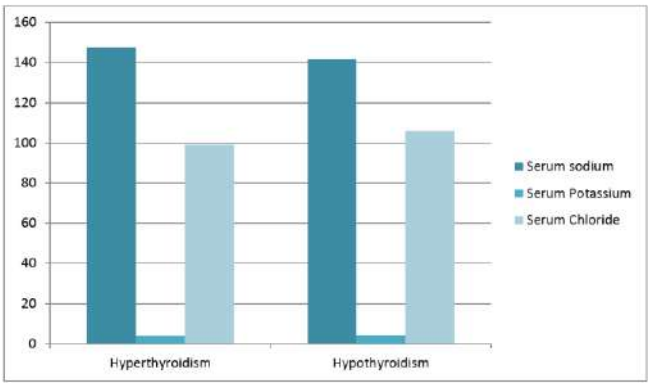
Graph 1: Sex Distribution

Table 2: Hypothyroidism vs Hyperthyroidism

Hypothyroidism	**34**
Hyperthyroidism	**26**
Total	**60**

Table 3: Serum electrolytes in Hyperthyroidism and Hypothyroidism

Status	Serum sodium	Serum Potassium	Serum Chloride
Hyperthyroidism	147.44 ± 1.21	4.03 ± 0.94	98.92 ± 0.84
Hypothyroidism	141.62 ± 0.94	4.39 ± 0.15	105.98 ± 0.97



Graph 2: Serum electrolytes in Hyperthyroidism and Hypothyroidism

Discussion

Hypothyroidism is a condition in which the body suffers from insufficient thyroid hormone. Since thyroid hormones are involved in controlling various metabolisms, more importantly lipid metabolism and that of various electrolytes [2]. The hypothyroid patient generally suffers from a slow metabolism resulting in dyslipidemias and electrolyte disturbances. Hypothyroidism is a very common condition and seen more in women than in men. Earlier statistics also have suggested that hypothyroidism is six times more common in women than in men. The higher prevalence of thyroid disease in women suggests that estrogen might be involved in the pathophysiology of thyroid dysfunction. Estradiol has an antagonistic effect on the hormones T3 and T4. The reason being, estradiol competes with T3 and T4 for binding sites on the receptor proteins [4]. Estradiol also limits the thermogenic action of T4 and promotes storage of fat. Hypothyroidism is one of the most prevalent endocrine diseases. It can lead to a variety of clinical situations, including congestive heart failure, electrolyte disturbances and coma. Hyponatremia is the most common electrolyte abnormality encountered in clinical practice [6]. According to Saruta T *et al*. Plasma Renin Activity (PRA) and Plasma Aldosterone (PA) may be suppressed in hypothyroidism probably due to dysfunction of juxtaglomerular cells and glomerulosa cells respectively and the possibility that suppression of PRA and PA in patients with hypothyroidism is related to exaggerated sodium excretion and decrease in potassium excretion [5]. Study done by Christoph Schwarz *et al*. observed association between thyroid hormones and electrolyte disorders. In his study there was decreased sodium and increased potassium levels in hypothyroidism.

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