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RESEARCH ARTICLE
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SERUM ELECTROLYTES IN SUBCLINICAL HYPOTHYROIDISM

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Abstract
Back ground: Thyroid hormones have various functions in the human body. They regulate body metabolism, hemodynamics, thermoregulation, and electrolyte balance. Hypothyroidism is accompanied by remarkable Changes in the metabolism of water and electrolytes. Hyponatremia is the commonest electrolyte imbalance in hypothyroid patients.
OBJECTIVE: The aim of our study is to find out electrolyte imbalance in subclinical hypothyroid patients.
MATERIAL And METHODS: This study was performed in 50 subclinical Thyroid Patients attending Endocrine OPD and 50 euthyroid Patients attending general OPD in Government Mohan kumaramangalam medical college and hospital and 5ml of venous blood sample will be collected and analysed TSH, FT4 in fully automated hormone analyser (Eclia) and serum sodium and potassium was analysed in medica electrolyte analyser The statistical analysis was performed using SPSS version 16.
Results: The distribution of Sodium values is not the same between normal and subclinical groups .90% of Subclinical cases has hyponatremia compared to 16% of normal cases. This strongly indicates that there is a statistically significant association between Thyroid status and Sodium levels. The distribution of Potassium values is not the same between normal and subclinical groups .80% of Subclinical cases has hypokalemia compared to 10% of normal cases. This strongly indicates that there is a statistically significant association between Thyroid status and potassium levels.
Conclusion: In our study we found there is a decrease in serum sodium and serum potassium levels in subclinical hypothyroid patients when compared to healthy controls. Routine Screening of subclinical hypothyroid patients will be more helpful during the management of thyroid patient's prevention of further complications.

Key words: Subclinical Hypothyroidism; Serum Electrolytes (Na+/K+)

INTRODUCTION

Thyroid hormones play key role in basic metabolic rate and whole metabolism in general[1.] Thyroid hormones have different functions in the human body. They regulate body hemodynamics, body temperature, and metabolism. Thyroid hormones are necessary for the maintenance of electrolyte balance[2,3]. Sodium and potassium are components of the enzyme Na+ -K+ ATPase, this enzyme is present on the cell membrane which helps in the transport of water and nutrients across the cell membrane[4]. Thyroid hormones regulate sodium-potassium pumps in most of the tissues[5.]
Hypothyroidism is accompanied by remarkable alterations in the metabolism of water and electrolytes[6,7]. It has been shown in different studies that the frequency of hyponatremia increases in hypothyroidism[8].

Present study is taken up to assess and compare the alterations in the levels of serum electrolytes in subclinical Hypothyroidism (SHO). Also to find out the correlation between TSH and serum electrolyte levels.

MATERIAL & METHODS

This study was performed in 50 subclinical hypothyroid Patients attending Endocrine OPD and 50 euthyroid Patients attending general OPD in Government Mohan kumaramangalam medical college and hospital and 5ml of venous blood sample will be collected and analysed TSH, FT4 in fully automated hormone analyser (Eclia) and serum sodium and potassium was analysed in medica electrolyte analyser The statistical analysis was performed using SPSS version 16.

Inclusion Criteria

1. Subclinical hypothyroid based on laboratory investigations, in the age-group of 18–65 years, are included in the study.
2. Euthyroid cases are 18-65 years are included in the study.

Exclusion Criteria

1. Patients on mineral supplementation, diuretics,pregnancy, renal disease, hepatic disease are excluded from the study.
2. Cardiovascular disease, stroke, or other neurological disorders are excluded from the study.

RESULT

Descriptive Statistics

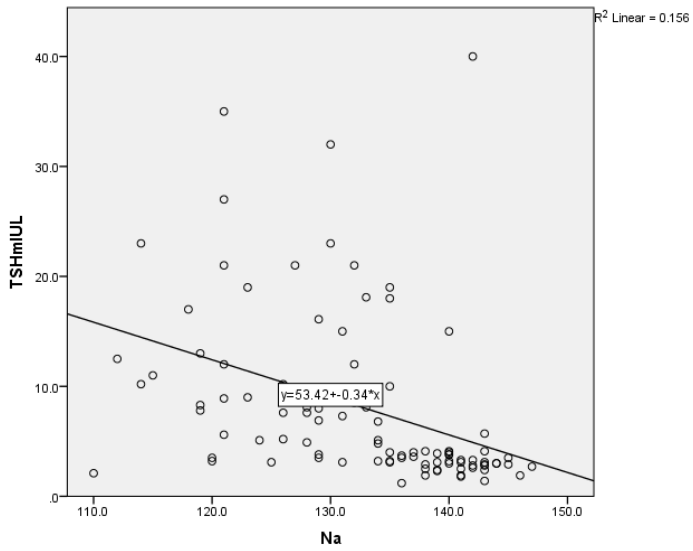
	Mean	Std. Deviation	N
Na	132.700	8.8071	100
TSHmIUL	8.078	7.6280	100

Correlations between Na & TSH

		Na	TSHmIUL
Na	Pearson Correlation	1	-.394**
	Sig. (2-tailed)		.000
	N	100	100
TSHmIUL	Pearson Correlation	-.394**	1
	Sig. (2-tailed)	.000	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

•There is a moderate negative correlation between sodium (Na) and TSH (TSHmIU/L) levels.This means that as TSH levels tend to increase, sodium level will decrease with a significant p-value of 0.0001.



Status * Nacat

			Sodium levels		Total	P value
			Hyponatremia	Normal		
Status	Normal	Count	8	42	50	0.0001
		% within Status	16.0%	84.0%	100.0%	
	Subclinical	Count	45	5	50	
		% within Status	90.0%	10.0%	100.0%	
Total		Count	53	47	100	
		% within Status	53.0%	47.0%	100.0%	

- The distribution of Sodium values is not the same between normal and subclinical groups .90% of Subclinical cases has hyponatremia compared to 16% of normal cases. This strongly indicates that there is a **statistically significant association between Thyroid status and Sodium levels**.

Status * Kcat

			Potassium		Total	P value
			Hypokalemia	Normal		
Status	Normal	Count	5	45	50	
		% within Status	10.0%	90.0%	100.0%	
	subclinical	Count	40	10	50	
		% within Status	80.0%	20.0%	100.0%	0.0001
Total		Count	45	55	100	
		% within Status	45.0%	55.0%	100.0%	

- The distribution of Potassium values is not the same between normal and subclinical groups .80% of Subclinical cases has hypokalemia compared to 10% of normal cases. This strongly indicates that there is a **statistically significant association between Thyroid status and potassium levels**.

Descriptive Statistics

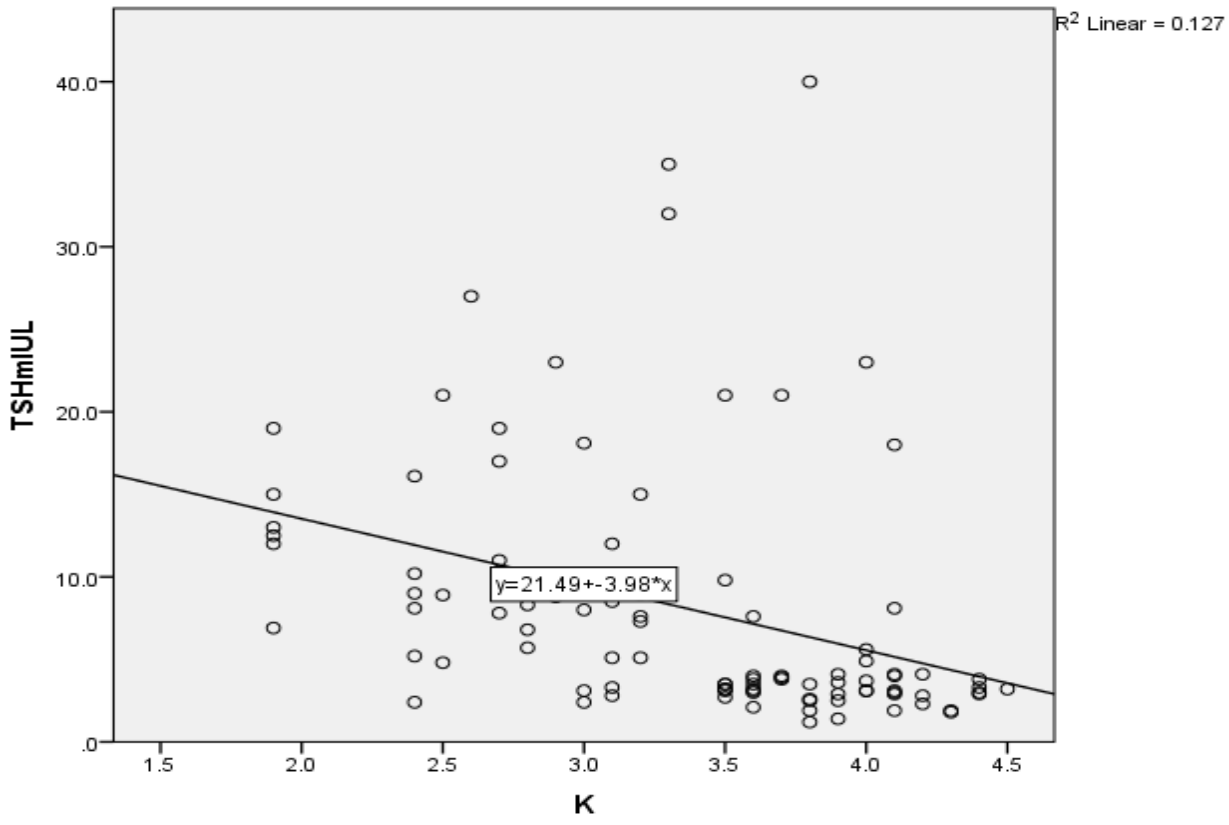
	Mean	Std. Deviation	N
TSHmIUL	8.078	7.6280	100
K	3.366	.6826	100

correlation between TSH& K

		TSHmIUL	K
TSHmIUL	Pearson Correlation	1	-.356**
	Sig. (2-tailed)		.000
	N	100	100
K	Pearson Correlation	-.356**	1
	Sig. (2-tailed)	.000	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

There is a **moderate negative correlation** between potassium(K) and TSH (TSHmIU/L) levels.This means that as TSH levels tend to increase potassium levels decreases with a significant p-value of 0.0001



DISCUSSION

The thyroid hormone acts as a central regulator of various body mechanism. Disorders of thyroid function lead to electrolyte imbalance. Subclinical Hypothyroidism is a condition in which the body suffers from insufficient thyroid hormones, the patient suffer from slow metabolism resulting in electrolyte imbalance.

There is a moderate negative correlation between sodium (Na) and TSH (TSHmIU/L) levels. This means that as TSH levels tend to increase, sodium level will decrease with a significant p-value of 0.0001.

The distribution of Sodium values is not the same between normal and subclinical groups .90% of Subclinical cases has hyponatremia compared to 16% of normal cases. This strongly indicates that there is a statistically significant association between Thyroid status and Sodium levels. The distribution of Potassium values is not the same between normal and subclinical groups .80% of Subclinical cases has hypokalemia compared to 10% of normal cases. This strongly indicates that there is a statistically significant association between Thyroid status and potassium levels. Our findings states that hyponatremia and hypokalemia was frequently common in patients with elevated TSH compared to those with normal TSH. Thyroid hormones regulate the activity of sodium potassium pumps in most of the tissues. In hypothyroidism because of low potassium levels and deficiency of thyroid hormones sodium-potassium ATPase is affected, resulting in accumulation of water in the interstitial space causing edema[9].

In the present study we found that significant decrease in the levels of serum sodium and potassium levels in Subclinical hypothyroid patients when compared to controls ($p < 0.0001$).

Conclusion

In our study it concluded that there significant decrease in the levels of serum sodium & potassium levels in Subclinical hypothyroidism compared to controls. There is a negative correlation between TSH and serum sodium and potassium. This suggests that subclinical hypothyroid patients to be regularly monitored for serum electrolytes imbalance and electrolyte profile should be routinely done along with thyroid profile. Early detection and treatment can prevent the further damage associated with these electrolytes.

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