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Association of serum urea and serum cholesterol level in patients of thyroid dysfunction in Mullana Ambala range (Haryana)

Sanjay[1], Qazi Najeeb Ahmed[2], Neha Sharma[3], Arindam Basu[4], Aneesa Fatima[5]

[1] Demonstrator, Department of Biochemistry, Government medical college & Associated Hospital Rajouri ,(J&k) India.
[2] Assistant Professor, & Head, Department of Biochemistry, Government medical college & Associated Hospital Rajouri ,(J&k) India.
[3] Demonstrator, Department of Microbiology, Maharishi Markandeshwar, Deemed to be University, (Haryana), India.
[4] Associate Professor, Department of Biochemistry, Government medical college & Associated Hospital Rajouri, (J&k) India.
[5] Demonstrator, Department of Biochemistry, Government medical college & Associated Hospital Rajouri ,(J&k) India.

***Corresponding Author: Aneesa Fatima**
Demonstrator, Department of Biochemistry, Government medical college & Associated Hospital Rajouri, (J&k) India.
Email: 9622aneesa@gmail.com
Mob. No: 7973072271

Background:- Thyroid dysfunction is the most common endocrine disorder. Both hypothyroidism and hyperthyroidism cases changes in serum urea and serum cholesterol.

Objectives: To determine the influence of thyroid hormone profile in the serum cholesterol and serum urea.

Material & method:-Serum T3, T4 & TSH , serum urea , serum cholesterol were estimated.

Result and conclusion: Both hypothyroidism and hyperthyroidism raised serum urea level. No significant difference was found in serum cholesterol levels of cases and controls.

Keywords: urea, cholesterol, T_3, T_4, TSH, hypothyroidism, hyperthyroidism.

INTRODUCTION

The thyroid is one of the largest endocrine gland in the body associated with of many metabolic functions.[1] It is a commonest endocrine disorder all over the world.[2] Hypothyroidism is more commonly found in women and has a total prevalence of 1- 2%.[3] and hypothyroid increases with age.[4] Iodine deficiency remains the most common cause of hypothyroidism worldwide.[5]

Hypothyroidism is defined as the deficiency of thyroid hormone action and secretion[6,7].Hypothyroidism is the commonest endocrine disorder all over the world. In this endocrine disorder, there occurs a decrease in the production of thyroid hormones by the thyroid gland. The prevalence of hypothyroidism is 2% for mild and 15% for severe form in the patient with hypothyroidism.[8]

Cholesterol and Hyperthyroidism

Cholesterol is present in throughout all cells of the body. 6% of cholesterol is found in adrenal gland. Cholesterol is the precursor for both adrenal and sex hormone. The brain and spinal cord contain 2% cholesterol.[9]

Two carbon unit (Acetyl-CoA) is precursor for cholesterol synthesis in many body tissues, particularly liver, skin, intestine. The large amount of cholesterol are excreted from the body via bile for digestion and absorption of food, liver cells oxidize the molecule by adding hydroxyl and carboxyl group to from cholic acid.[10]

The total cholesterol, High Density Lipoprotein levels were found to be low in hyperthyroid patient and low density lipoprotein level rises. The decreased levels of total cholesterol and triglycerides in hyperthyroidism due to increase action of HMG-CoA reductase. Total cholesterol and LDL-C levels tend to increase hyperthyroidism. This might be due to augmented excretion of cholesterol by bile together with enhanced receptor mediated catabolism of LDL particles.[11] Variations found in TG levels due to the activity of thyroid hormone on very low density lipoprotein. Catabolism of very low density lipoprotein is accelerated in hyperthyroid patient whom is due to change in the activity of hepatic TG lipase and lipoprotein lipase.[12]

Cholesterol and Hypothyroidism

Thyroid hormone plays an important role in the lipid metabolism which has effects on synthesis, mobilization of lipids. Hypothyroidism increases the circulation of total low density lipoprotein cholesterol resulting to coronary artery disease. Hypercholesterolemia is due to the hormone deficit and to the inhibit the activity of lipoprotein lipase .[13]

Urea and hypothyroidism

Serum Urea levels were elevated in hypothyroidism. Hypothyroid state is associated with hemodynamic changes like filtration rate, and reduction in renal plasma flow. This causes increase in the levels of serum urea. Purine metabolism is also affected by the thyroid hormones.

Urea and Hyperthyroidism

Serum urea is decreased in the hyperthyroidism due to increase in renal blood flow or GFR.1

AIM & OBJECTIVES

1)Association of serum urea and serum cholesterol level in patients of thyroid dysfunctions.

MATERIALS AND METHODS

INCLUSION CRITERIA

1. Patients with hypothyroidism and hyperthyroidism& subclinical hypothyroid and hyperthyroid patients.
2. Either sex (male or female) of any age.

EXCLUSION CRITERIA

1. Renal dysfunction
2. Diabetes mellitus

RESULTS AND OBSERVATION

Table 1: Comparison of T3, T4, and TSH in Cases and Controls.

Parameters	Cases		Controls		P Value
	Mean		Mean		
T3(ng/ml)	1.37		1.21		0.311(NS)
T4(ụg/dl)	7.38		8.16		0.19(NS)
TSH(ụIU/ml)	29.81		2.39		<0.01*

Table 2: Comparison mean of Serum Urea and Serum Cholesterol in Cases and Controls.

Parameters	Cases		Controls		P Value
	Mean		Mean		
Serum Urea mg/dl	36.50		22.58		<0.01*
Serum Cholesterol mg/dl	174.99		176.09		0.81(NS)

Table 3: Comparison of Serum Urea, Serum Cholesterol and BMI in Hypothyroid Cases and Controls.

Parameters	Cases(70)		Controls(100)		P Value
	Mean		Mean		
Serum Urea Mg/dl	35.69		22.58		<0.01*
Serum Cholesterol Mg/dl	178.31		176.09		0.644(NS)
Serum BMI	23.39		22.31		0.081(NS)

Table 4: **Correlation between Serum TSH with Serum Urea, Serum Cholesterol and BMI of Hypothyroid Cases.**

Parameters	N	Mean			P Value
Serum TSH uIU/ml	70	42.559			0.305*
Serum Urea mg/dl	70	35.689			
Serum TSH uIU/ml	70	42.559			0.182*
Serum Cholesterol mg/dl	70	178.314			
Serum TSH uIU/ml	70	42.559			0.353*
Serum BMI	70	23.386			

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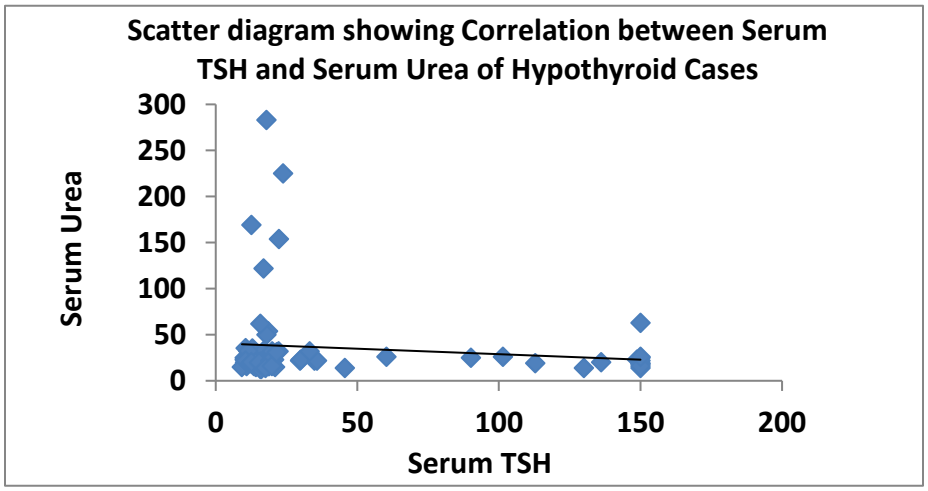
Table 5: Comparison of Serum Urea, Serum Cholesterol and BMI in Hyperthyroid Cases and Controls.

Parameters	Cases(30)		Controls(100)		P Value
	Mean		Mean		
Serum Urea mg/dl	38.40		22.58		<0.01*
Serum Cholesterol mg/dl	167.23		176.09		0.124(NS)
Serum BMI	22.57		22.31		0.669(NS)



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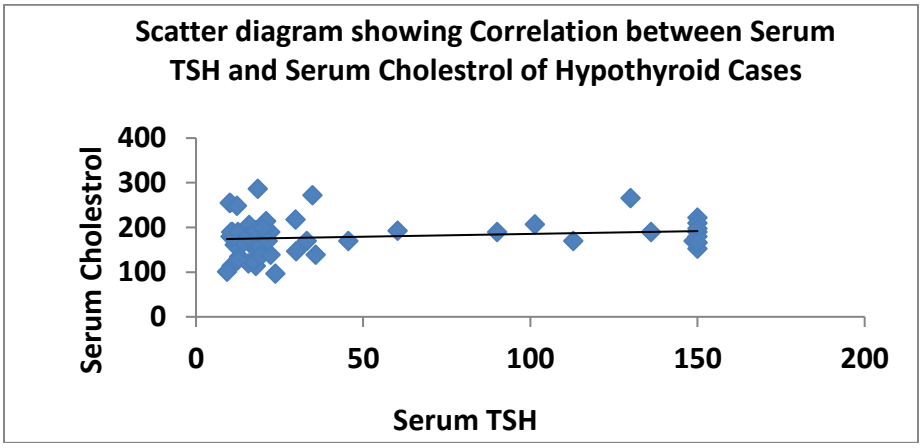

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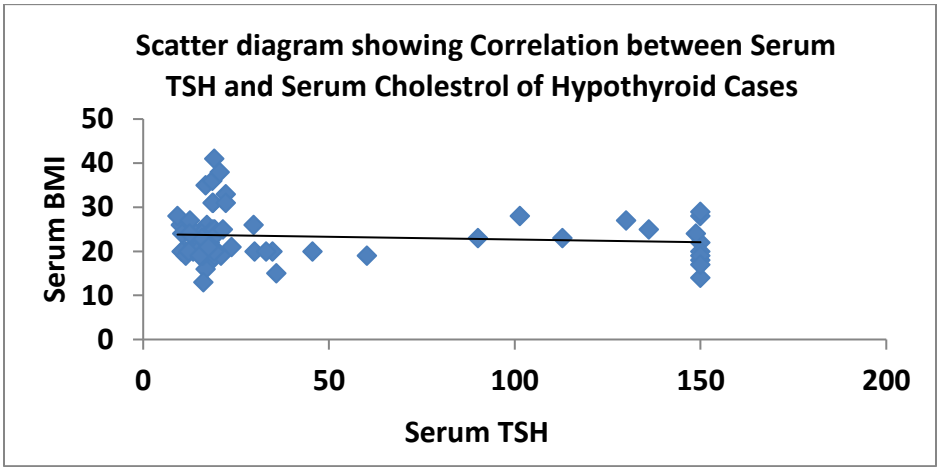
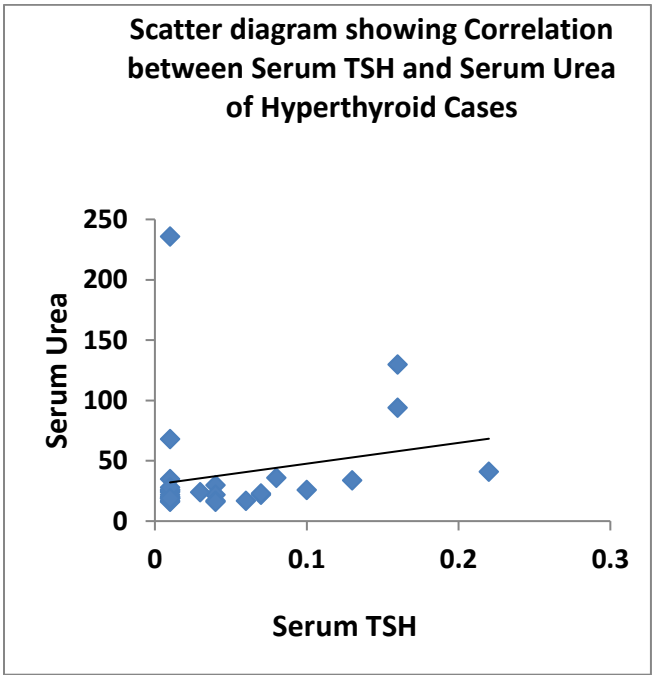


4(C)

Graph



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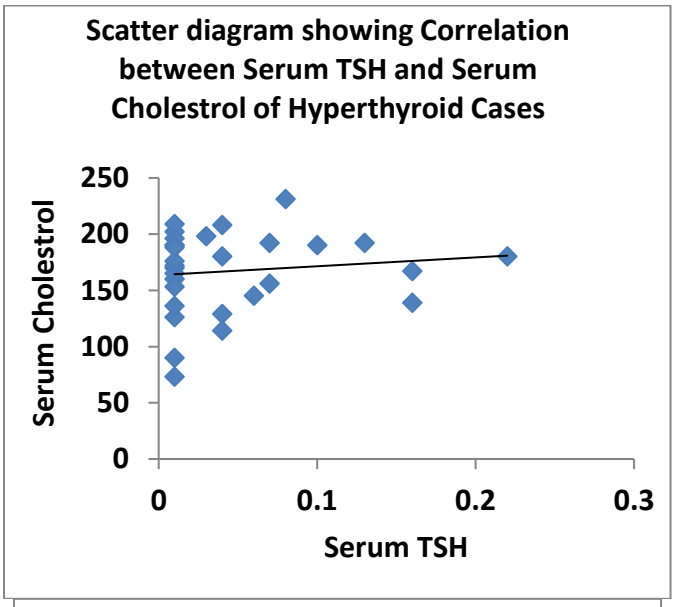

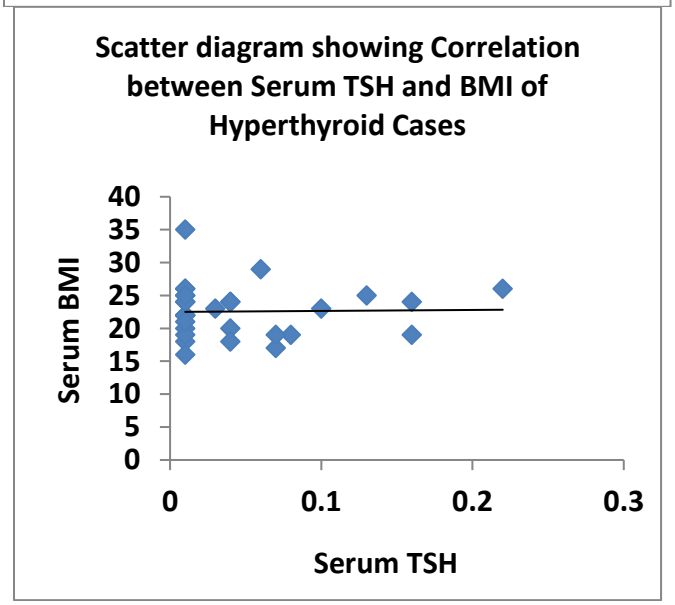

5(B) **5(C)**

Discussion

In the present time, explanation of various impacts of hypothyroidism and hyperthyroidism towards impaired health attains a special importance in modern medicine. Thyroid dysfunction have an impact on various organ

system of the body. Present study was carried out to see the impact of thyroid disorder on serum cholesterol and blood urea.

Following are the finding of this study:

3). Majority of the cases and control were females.

5). There was a significant difference in the mean value of TSH of cases and control (P<0.01)

7). There was no significant difference between cases and control with regards to BMI (P value 0.137).

8). There was a significant difference between serum urea of hypothyroid and control with p value <0.01. Serum cholesterol and BMI did not show any such significance.

10). There was a significant correlation between serum urea of hypothyroid cases and controls with P value <0.01. Serum cholesterol and BMI did not show any such significance.

11). There was a significant correlation between serum level and serum urea and, cholesterol and BMI of hyperthyroid patient as P value 0.01.

SUMMARY AND CONCLUSION

The present study shows

That is a significant correlation between blood urea level and thyroid disorder (both hypothyroidism and hyperthyroidism). There is no significant difference in the serum cholesterol of the cases and controls.

Their findings may be due to the change in the hemodynamic of the kidney. In Hypothyroidism there is decrease in renal blood flow and decrease in GFR. Hyperthyroidism may increase blood urea by catabolic effects on the body.

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