

## Clinical Biochemistry

## KEYWORDS:

THE PRESENT STUDY WAS TO DETERMINE THE LIVER FUNCTION TEST IN PATIENTS WITH HYPOTHYROIDISM AND TO FIND THEIR POSSIBLE CORRELATION WITH TSH [THYROID STIMULATING HORMONE]



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## ABSTRACT

To evaluated the effect of thyroid dysfunction on liver function tests and if there is any correlation between them. Thyroid dysfunction may perturb liver function. Knowledge of the association between hypothyroidism and deranged biochemical markers of liver function is important for the clinician, to consider an evaluation of thyroid function in the work up of the patient with altered liver function tests. This may emphasize the need for monitoring liver function in hypothyroid patients and vice versa. The present study was undertaken to study the influence of thyroid hormones on liver function in hypothyroidism

**Aim and Objective** The present study was to determine the liver function test in patients with hypothyroidism

## Materials and Methods

An analytical cross-sectional study still going in the Department of Biochemistry, Dr BSA Medical college and Hospital Rohini Delhi. Total no of 100 patients with diagnosed subclinical hypothyroidism and patients with diagnosed overt hypothyroidism each, coming for thyroid function test were enrolled in the study. In our study

## Results and observation

We find a significant correlation with increased TSH to liver function parameters like SGOT [P<0.011], SGPT [0.020], ALP [0.068] and p value found to be extremely significantly (p<0.0001) Showing positive correlation with increased TSH and hepatocytes enzymes. On observing correlation using Pearson's correlation coefficient, we found that TSH levels showed highly significant positive correlation with AST, ALT, ALP in subjects with overt hypothyroidism.

## Introduction:

The liver is fundamental in metabolizing thyroid hormones, and hepatocytes are often affected in thyroid disease. Thyroid disorders often accompany abnormal serum enzyme levels and disturbances in liver functions [1]. These thyroid-liver associations may cause diagnostic confusions. Neglect of these facts may result in over or under diagnosis of associated liver or thyroid diseases and thereby cause errors in patient care [2]

**Aim and Objective** The present study was to determine the liver function test in patients with hypothyroidism

## Materials and Methods

An analytical cross-sectional study still going in the Department of Biochemistry, Dr BSA Medical college and Hospital Rohini Delhi.

Total no of 100 patients with diagnosed subclinical hypothyroidism and patients with diagnosed overt hypothyroidism each, coming for thyroid function test were enrolled in the study.

**Inclusion criteria** Study conducted on hypothyroid cases irrespective of duration of disease and treatment in the age group of 20-50 years. Healthy adults in the age group of 20-50 years are considered as control.

**Exclusion criteria** History of liver diseases, chronic alcoholism, individuals with an active infection or a recent infection including liver disease, bone and muscle disease, cardiac disease, pancreatic disease, Hepatobiliary disease, diabetes, hypertension, malignancy, oral contraceptive pills (OCP), pregnancy, and drug abusers were excluded. Sample collection 5 ml of venous blood was collected from the selected patients in a plain test tube. Blood collected in plain tube was allowed to clot at room temperature and then centrifuged at 2,500 rpm for 5 min. Serum so obtained was used to determine the thyroid hormones (TSH, FT3, FT4) and serum enzymes (ALT, AST, and ALP). If parameters not estimated early, serum stored at deep freezer at a temperature of -40 c. T3, T4 and TSH were determined by CLIA METHOD By CL 9000i Serum AST, ALT and ALP were estimated by using fully automated BS 600 autoanalyzer. Thyroid profile tests (FT3, FT4 and TSH) were estimated to categorize subclinical hypothyroidism and overt hypothyroidism.

## Statistical analysis

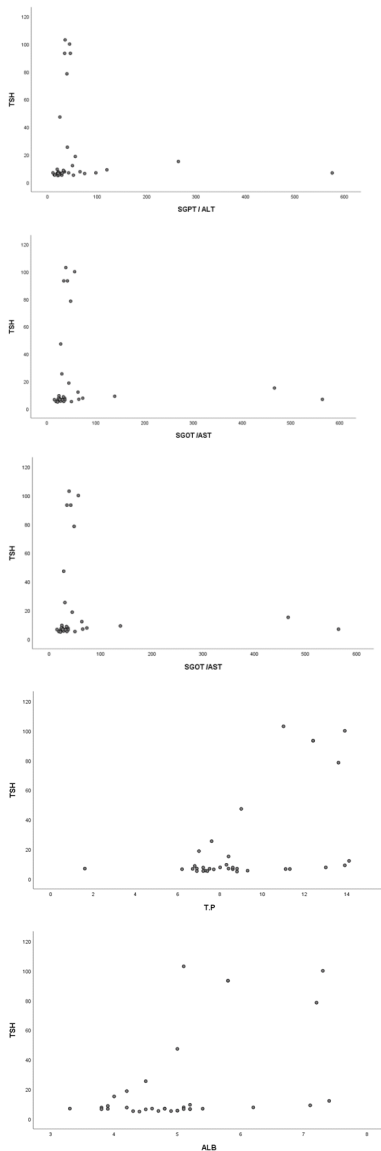
All the statistical analysis were performed using SPSS version 17.0 and Microsoft excel 2007. Data were expressed as mean  $\pm$  SD. ANOVA tests were used to analyze differences in biochemical parameters between the control and the test groups. Correlations were observed by using Pearson's correlation coefficient and probability (p value) < 0.05 was considered significant.

## RESULTS AND OBSERVATION

In our study We find a significant correlation with increased TSH to liver function parameters like SGOT [P<0.011], SGPT [0.020], ALP [0.068] and p value found to be extremely significantly (p<0.0001)

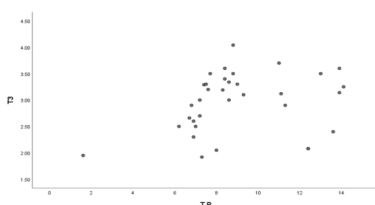
Showing positive correlation with increased TSH and hepatocytes enzymes. On observing correlation using Pearson's correlation coefficient, we found that TSH levels showed highly significant positive correlation with AST, ALT, ALP in subjects with overt hypothyroidism.

Variable 1	Variable 2	Correlation Coefficient	p-value
TSH	SGOT	0.433	0.011
TSH	SGPT	0.398	0.020
TSH	ALP	0.317	0.068
TSH	TP	0.435	0.010
TSH	ALB	0.364	0.034



Variable 1	Variable 2	Correlation Coefficient	p-value
T3	SGOT	0.194	0.270
T3	SGPT	0.257	0.142
T3	ALP	0.163	0.357
T3	TP	0.375	0.029
T3	ALB	0.220	0.211
Variable 1	Variable 2	Correlation Coefficient	p-value
T4	SGOT	-0.211	0.232
T4	SGPT	-0.080	0.653
T4	ALP	-0.021	0.904
T4	TP	0.190	0.281
T4	ALB	0.103	0.564

**Descriptive Statistics**



**DISCUSSION**

Thyroid dysfunction is found to be common across all age groups. The terminology subclinical hypothyroidism is gaining importance, based on evidence that potentially important tissue abnormalities can occur during progressive thyroid failure before the serum T4 concentration becomes clearly subnormal. [3,4]The major concern with subclinical hypothyroidism has been risk of progression to overt hypothyroidism. Liver abnormalities in thyroid diseases or thyroid abnormalities in liver diseases were known in the Past. However, the cause and effect relationship between the two is now becoming clear. In the present study an attempt is made to assess liver functions (AST, ALT and ALP) in patients with subclinical and overt hypothyroidism and compare with healthy euthyroid controls.[5,6] Our data showed a significant increase in AST, ALT and ALP levels in hypothyroid patients and overt hypothyroid patients were compared with subclinical hypothyroid patients The findings of our study is in corroboration with findings of the study by Kalita N et al, Yadav A. et al.[7] , p.d Griffiths et al[8 and Pandey R. et al.1 Malik and Hodgson ,mentioned that thyroid hormones T3 and T4 are essential for the growth, development and function of all organs of the body. [8,9]They regulate BMR of all cells of the body including the hepatocytes and thereby modulate hepatic function. The liver in turn metabolises thyroid hormones and regulates their systemic endocrine effects.[10] Therefore thyroid dysfunction may disturb liver function and liver disease affects thyroid hormone metabolism and a variety of systemic diseases affect both organs. It highlights a close relationship between thyroid and liver in health and disease.[11] In our study TSH level showed significant positive correlation with AST, ALT and ALP levels in subclinical and overt hypothyroidism. The significant positive correlation of TSH levels with AST and ALT levels in both subclinical and overt hypothyroid subjects (p<0.0001 and p <0.05) may be because of myopathy associated with hypothyroidism.[12] The significant positive correlation of serum TSH levels with ALP in both subclinical and overt hypothyroidism (p<0.0001) may be explained on the basis observations of Klion F et al.[14] that in hypothyroidism there is an increase in membrane cholesterol phospholipid ratio and diminished membrane fluidity, which affect a number of canalicular membrane transporters and enzymes, including the Na+, K+-ATPase resulting in the change of ALP enzymes.[13] Hypothyroidism may be associated with deteriorating liver function. The liver function should, therefore, be regularly monitored for evaluation of patients presenting with hypothyroidism and vice versa.

**Conclusion**

To conclude, the present study indicates that thyroid disorder might cause significant effect on metabolism of various cells including hepatocytes reflected by increase in biochemical parameters of liver function test AST ALT and ALP in both subclinical and overt hypothyroid subjects. This suggests that hypothyroid patients should be regularly checked for biochemical parameters of liver and kidney function tests. Early detection and treatment can prevent the further complications related to the disorder and will be helpful during the management of thyroid patients.

**Limitations**

Further studies are required to be carried out in large sample size to confirm our findings. Future studies are also needed to evaluate the general population and to trace the subjects under risk for development of multi organ dysfunction due to thyroid alteration.

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