

## “STUDY OF SERUM TRANSAMINASES IN HYPOTHYROIDISM”

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**ABSTRACT: BACKGROUND:** Thyroid hormones regulate Basal Metabolic Rate (BMR) and calorogenesis in tissues, including hepatocytes and thereby modulate hepatic function. The liver in turn metabolizes the thyroid hormones and regulates their systemic endocrine effect. Raised serum transaminase activities in absence of any overt liver dysfunction can therefore be attributed to primary thyroid dysfunction. The aim of this study is to assess the impairment in liver function by estimating serum Aspartate Transaminase (AST) and Alanine Transaminase (ALT) in patients with hypothyroidism. **MATERIALS AND METHODS:** 50 patients diagnosed with thyroid disorders irrespective of duration of the disease and treatment were taken as cases and 50 healthy adults were taken as control. Estimation of T3, T4, TSH, serum AST and serum ALT were carried out. **RESULTS:** Serum AST and serum ALT were within reference range in both cases and controls. **CONCLUSION:** The likelihood of abnormal serum transaminases levels in hypothyroid patients is minimal. Early detection and better management of the thyroid diseases in recent times might be attributed as one of the factors for the same.

**KEY WORDS:** Hypothyroidism, Transaminases.

**INTRODUCTION AND NEED FOR THE STUDY:** Thyroid diseases are among the commonest endocrine disorders worldwide. India too, is no exception. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases. Thyroid disorders are broadly classified into hypothyroidism and hyperthyroidism.

Hypothyroidism is the common thyroid disorder with the prevalence of 3.9% in India; subclinical hypothyroidism is more common than overt hypothyroidism with the prevalence of 9.4%<sup>1</sup>. Females are more prone to hypothyroidism than males.

Thyroid hormones regulate the basal metabolic rate of all cells including hepatocytes, and there by modulate hepatic function. The liver in turn metabolizes the thyroid hormones and regulates their systemic endocrine effects. Thyroid dysfunction may perturb liver function.

# ORIGINAL ARTICLE

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The aim is to study the influence of thyroid hormones on liver function (transaminases) in hypothyroidism.

**REVIEW OF LITERATURE:** Hypothyroidism may have features that mimic liver disease (pseudo-liver disease). There is also evidence that hypothyroidism may directly affect the liver structure or function<sup>2,3</sup>. There are mental changes in hypothyroidism and the bradycardia may be of central origin. Therefore one cannot eliminate the possibility that cells of different organs may contribute to an increased serum enzyme activity<sup>4</sup>.

Hypothyroid patients may have myalgias, fatigue, muscle cramps, and an elevated aspartate transaminase as a result of myopathy<sup>5</sup>. A specific central congestive fibrosis of the liver has been described, particularly in cases with myxoedema ascites<sup>2,6</sup>. ALT may also be elevated occasionally and cholesterol elevation is a rule due to hypometabolism. The latter may result in fatty liver causing mild but prolonged AST and/or ALT elevation<sup>7</sup>.

Recent studies have shown that hepatic abnormalities associated with hypothyroidism can be reversible over a matter of weeks with thyroxine replacement, with no residual liver damage<sup>2</sup>.

A complex relationship exists between the thyroid gland and the liver in both health and disease<sup>2</sup>. The thyroid status depends not only on thyroxine secretion but also on normal thyroid hormone metabolism.

Normal thyroid function, which is essential for normal growth, development and regulation of energy metabolism within cells is dependent on a normal functioning thyroid and liver axis.

There are 20 transaminases in the body. Among them Aspartate transaminase (AST) and Alanine transaminases (ALT) are of clinical significance.

AST is found primarily in heart, liver, skeletal muscle and kidney. ALT is found primarily in liver and kidney. Liver disease is the most important cause of increased transaminase activity in serum. Reference range for AST is up to 0-35 U/L and ALT is up to 0-40 U/L.

**MATERIALS AND METHODS:** This study was done in Rajarajeshwari Medical College and Hospital, Bangalore.

## **OBJECTIVES OF THE STUDY:**

1. To study the AST and ALT enzyme activities in cases and controls.
2. To study the correlation of above parameters in hypothyroidism.

**SOURCE OF DATA:** 50 controls and 50 cases of hypothyroidism irrespective of the duration of the disease and treatment attending medical OPD, Rajarajeshwari Medical College and Hospital, Bangalore.

**STUDY GROUP:** Patients with hypothyroidism attending medical OPD of RRMCH, Bangalore.

**INCLUSION CRITERIA:** Hypothyroid cases irrespective of duration of disease and treatment in the age group of 18-50 years.

Healthy adults in the age group of 18-50 years.

## EXCLUSION CRITERIA:

History of liver diseases, chronic alcoholism.

History of any other medical or surgical illness.

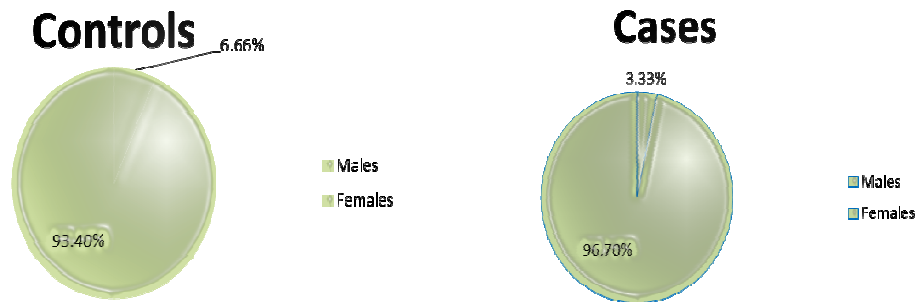
## METHOD OF COLLECTION OF DATA:

Blood samples from the control and cases will be drawn under full aseptic precautions after obtaining informed consent.

Serum AST and ALT will be estimated by kinetic spectrophotometric method using fully automated Erba analyzer EM 360.

## RESULTS:

Sex: majority of the cases and controls were females



**Fig 1: pie diagram showing male and female distribution in controls and cases AST levels in cases and controls**

In cases females were 97% and in controls 93 %.

In our study majority (92%) of the hypothyroid cases were within 1 year of duration. Majority of them were on treatment (92%).

AST levels in cases and controls

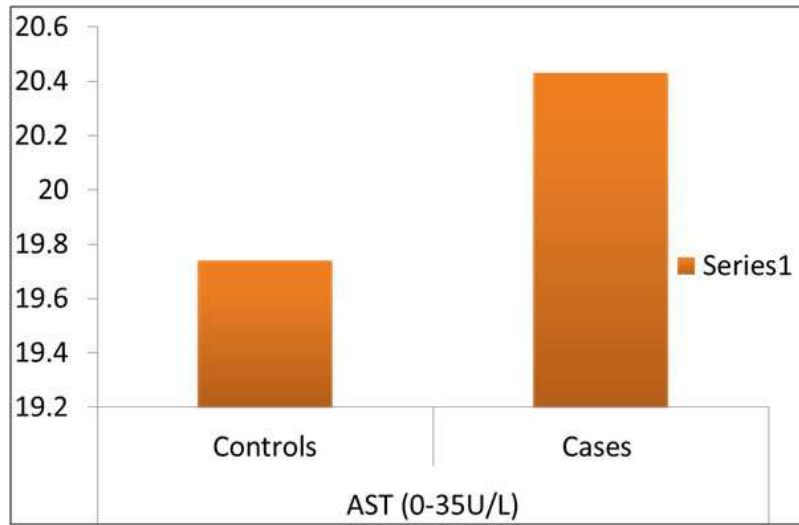


Fig 2: Graph showing ALT levels in controls and cases

ALT levels in cases and controls

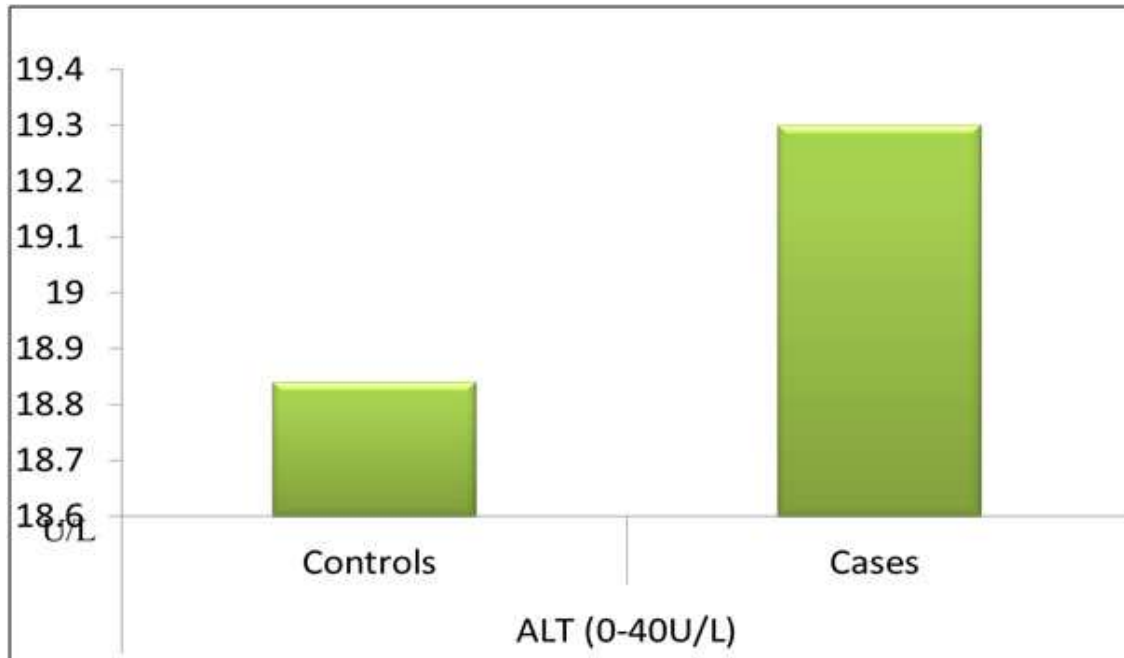


Fig 3: Graph showing ALT levels in controls and cases

**DISCUSSION:** In a similar study done by Dr. D.V. Krishnaveni, they observed significant elevation in AST levels and ALT levels were in higher limit of reference range.

Same observations were seen in the separate studies done by P.D. Griffiths, Chertow BS and Burnett JR.

In a study done by Burnett JR, the serum AST levels were 2-6 times the reference range in 3 cases of hypothyroidism. This elevation was considered due to myopathy in hypothyroidism.

In our study AST and ALT were within normal reference range.

**CONCLUSION:** The likelihood of abnormal serum transaminases levels in hypothyroid patients is minimal.

Early detection and better management of thyroid diseases in recent times might be attributed as one of the factors for the same.

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