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Biochemistry

AN OBSERVATIONAL STUDY FOR THE ESTIMATION OF LEVELS OF SERUM ZINC IN ALCOHOLIC LIVER DISEASE PATIENTS AND CONTROLS AT SMS HOSPITAL JAIPUR

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ABSTRACT **Introduction**– Alcoholism is the major dependences for people and responsible for morbidity and mortality and its intake causes metabolic alterations & impairs homeostasis of micro & macro elements in body. Zinc, an essential trace element, plays a vital role in cellular metabolism, and liver is the main organ responsible for its metabolism. Because serum zinc levels are found to be lowered in liver diseases. Therefore, we aim to assess the levels of serum zinc in patients of ALD and healthy controls. **Methodolgy –**The Study was conducted in Department of Biochemistry and Medicine, SMS medical college Jaipur. A total of 35 ALD patients and 35 age and gender matched healthy controls were included in this study. **Result-** The mean levels of Serum zinc in ALD patients was 40.5 ± 10.0 µg/dL and 104.0 ± 9.1 µg/dL in controls. This difference was found to be statistically significant (p<0.0001) **Conclusion-** our study showed significantly lower levels of serum zinc in patients of alcoholic liver diseases therefore it be inferred that supplementation of zinc may help to improve liver functions in patients suffering from alcoholic liver diseases.

KEYWORDS : Serum Zinc, Alcoholic Liver Disease, Alkaline Phosphatase.

INTRODUCTION

Alcoholism remains to be the major cause of morbidity and mortality throughout the world. Consuming alcohol is the potent etiological factor for the development of alcoholic liver diseases (ALD), ranging from fatty liver to hepatocellular carcinoma with varying rates of development in both genders depending on the quality, quantity, and duration of the drink.1 Zinc deficiency is one of the most consistent nutritional/biochemical observations in alcoholic liver disease and it has been documented with the progression of the disease. Zinc is an essential trace element involved in various biological functions. It serves as a catalytic cofactor for hundreds of enzymes like alkaline phosphatase and alcohol dehydrogenase.2 Zinc is also required for stabilizing the zinc figure motif of a large number of zinc proteins, including critical transcription factors. 3 ,4. Several mechanisms underlying alcohol-induced zinc deficiency have been suggested, including reduced dietary zinc intake and intestinal absorption, disturbed hepatic zinc metabolism, and increased urinary zinc excretion.5,6

AIM AND OBJECTIVE

- To assess the levels of serum zinc, serum GGT and alkaline phosphatase in patients of ALD and healthy controls.
- To correlate serum zinc levels with serum GGT and alkaline phosphatase in patients with ALD and healthy controls.

Methodology

This comparative observational study involves group I healthy controls and group II patients diagnosed to have ethanol related decompensated liver disease with or without portal hypertension for more than three years. The study was done after ethical approval. Study was conducted at Department of Biochemistry & General Medicine, SMS Medical College & attached hospitals, Jaipur. A total of 35 ALD patients and 35 healthy controls were included in this study.

Inclusion Criterion

Diagnosed patients of ethanol related decompensated liver disease with or without portal hypertension.

Exclusion Criteria

Patient with non-alcoholic liver disease. Patients on zinc supplementation, Patients with malabsorption syndromes. Patients with co-morbid conditions like diabetes mellitus, malignancy, renal failure.

LAB. ASSESSMENT OF blood parameters

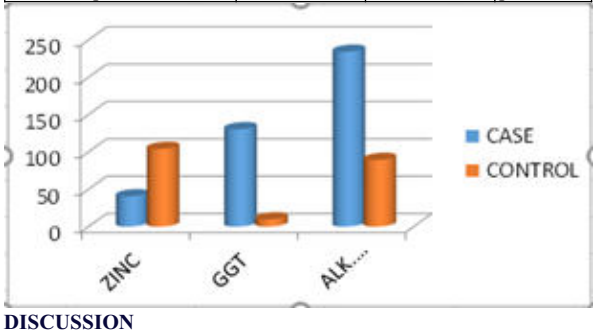
5 ml of venous blood from ante-cubital vein was collected under aseptic conditions. Serum samples were separated by centrifugation at 3000 rpm for I0 minutes. and analyzed on Beckman coulter for both the groups.

OBSERVATIONS & RESULT

The mean levels of Serum zinc in ALD patients was 40.5 ± 10.0 µg/dl and 104.0 ± 9.1 µg/dl in controls. The difference was found to be statistically significant (p<0.005).

OBSERVATION TABLE

Variable	Case (Mean ± SD)	Control (Mean ± SD)	p value
S. Bilirubin	16 ± 7.3	0.5 ± 0.2	p < 0.005
Albumin	2.3 ± 0.8	4.8 ± 6.2	p < 0.005
Globulin	3.2 ± 0.8	2.5 ± 0.4	p < 0.005
AST	160 ± 55.4	18.6 ± 11.1	p < 0.005
ALT	71 ± 62	10.8 ± 5.8	p < 0.005
Zinc	40.5± 10.0	104.0 ± 9.1	p < 0.005
GGT	130.2 ± 112	9.6 ± 5.4	p < 0.005
Alk. Phosphatase	234 ± 191.6	89.2 ± 28.4	p < 0.005



DISCUSSION

The present study results demonstrate that higher percentage of patients with alcoholic liver disease have low serum zinc levels compared to normal subjects. Ferdousi et al .8 has evaluated the zinc status in patient with liver cirrhosis and has shown significant lower plasma zinc levels. A study by Fatia et al .7 also showed data with low serum zinc level which was very significant. Low levels of zinc in alcoholic liver diseases can be attributed to albumin bound zinc fraction, which is decreased in liver disease. In the present study comparison between the parameters of liver function tests like albumin, globulin, show uniform significance between cases and controls. Azam et al9.10 has analysed various enzyme panel in liver disease and has found increase of the liver enzymes in various stages of

liver disease. In our study there is a significant increase in the levels of GGT and ALP among cases. This increase can be related to chronic alcoholism and obstruction. According to Rp Perillo et al 11 patients who consume alcohol for longer duration and present with alcoholic liver disease had marked elevation of serum alkaline phosphatase. It is observed from this study that intrahepatic cholestasis occurs secondary to alcoholic cirrhosis. In the present study there is an increased alkaline phosphatase level in spite of hypozincemia among cases and this can be due to obstruction in the later stages of cirrhotic liver.

CONCLUSION

The study states that there is decrease in serum zinc level and increased alkaline phosphatase & serum GGT activity in patients with ALD. The statistically significant data of correlating zinc with serum GGT and alkaline phosphatase provide us a strong rationale for evaluating the zinc status and thereby supplementing zinc to patients with alcoholic liver disease

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