Monitoring of Zinc in Liver Cirrhosis Patients

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Research Article

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ABSTRACT :

In the Cirrhosis healthy liver tissue is changed with scar tissue. The blood flow is affected through the liver. This is responsible for the decrease circulation of nutrients, hormones, drugs, and naturally produced toxins. Zinc is a micronutrient that plays an important role in the function of liver. Significant decrease in zinc levels were observed in liver cirrhosis patients.

The study was conducted in 30 liver cirrhotic patients. The blood samples were obtained from the patients. The samples were then sent to the pathological findings of zinc. The zinc estimation was done using Atomic Absorption Spectrophotometer.

The revealed that there is lower the zinc level in the liver cirrohotic patients. This work is an attempt to understand the important role that the zinc plays in the pathogenesis and therapy of liver cirrhosis.

Keywords: cirrhosis of liver, zinc .

INTRODUCTION:

Cirrhosis is a slowly progressing disease in which healthy liver tissue is replaced with scar tissue, eventually preventing the liver from functioning properly. The scar tissue blocks the flow of blood through the liver and slows the processing of nutrients, hormones, drugs, and naturally formed toxins. It also slows the production of proteins and other substances made by the liver [1].

In the Cirrhosis healthy liver tissue is changed with scar tissue. This process of the development of the scar tissue is slow process. In the cirrhosis of the liver is not functions normally. The blood flow is affected through the liver. This is responsible for the decrease circulation of nutrients, hormones, drugs, and naturally produced toxins.

The following are the important functions which liver performs:

- Manufacturing blood **proteins** which are responsible for the clotting, oxygen transport, and immune system function,
- Storing additional nutrients **and returning some of the** nutrients **to the bloodstream**,
- Manufacturing bile, a substance needed to help digest food,
- Serving the body store sugar (glucose) in the form of glycogen,
- Elimination the body of harmful substances in the bloodstream, including drugs and alcohol,
- Conversion of saturated fat **and producing** cholesterol.

Chronic hepatitis B (CHB) is an important global health problem, with more than 350 million individuals affected worldwide. Its prevalence in India is quite high. More than 1,000,000 Indian children run a lifetime risk of becoming chronic carriers and about 100,000 Indians die from HBV complications annually. During the course of hepatitis B virus (HBV) infection, an estimated 15-40% of CHB patients would develop complications such as acute exacerbation, liver cirrhosis and hepatocellular carcinoma (HCC) [2].

Zinc is the vital element. It is responsible for various physiological role. Zinc is most important for the tissue growth and repair. Zinc is having specific role in the function of the 300 enzymes. It has protective role against the fibrosis. Zinc prevents the cellular damage mainly caused by the oxidative stress.

The non-vegetarian food has rich amount of zinc. The organ meat contains the highest concentration of zinc. In the globe over 2 million peoples are having zinc deficiency. Hence the zinc supplements are given to overcome the de-

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ficiency. This is terms is responsible for many side effects. This side effect includes slow wound healing. In children side effects includes undersized growth and acute diarrhoea.

Zinc is also considered to have role in enhancing the immune system. It has role in treating the common cold and recurrent ear infections, and preventing lower respiratory infections. Zinc is also having important effect in malaria and other diseases caused by parasites.

The liver cirrhosis is showing zinc deficiency due to following reasons:

- Anorexia
- Decrease intake of animal proteins
- Increase in cytokines
- Increase in hormones responsible for the zinc metabolism
- Increase in renal loss
- Mal absorption of nutrients due to portal hypertension

The proteins synthesis is reduced in the live cirrhosis patients. The important element in the zinc binding to proteins is 'metallothionein'. This protein is involved in the zinc metabolism, homeostasis and its release in number of oxidants. The released zinc then inhibit the activity of the enzymes involved in fibrogenesis (fibrosis) in the liver8. Impaired synthesis of this protein may decrease the availability of Zn. The reduced synthesis of this protein may decrease the availability of Zn.

The following are the clinical indication in the cirrhosis of the liver may be due to the Zinc deficiency.

- Loss of appetite
- Night blindness
- Testicular atrophy
- Susceptibility to infection
- Body hair loss
- Poor wound healing
- Decreases neurocognitive performance
- Decreased smell & taste
- Enhanced sensitivity to drugs

There for zinc supplements were given to patients. These suppliments were shows reduction the inflammations.

Hence the study was planned to assess the zinc level in serum in liver cirrhosis patients. As the zinc is important marker in the liver cirrhosis [3].

Methodology:

The study was conducted in 30 liver cirrhotic patients. All the patients are informed consents. The age group of the patients are from 20-50 years. 30 normal healthy group is also selected as control.

Inclusion Criteria:

- Liver cirrhotic patients
- Age group 20-50 years.

Exclusion Criteria:

- Renal failure patients
- Diabetes patients
- Pregnant women's

Required permission was obtained from the concerned authorities for the study. The all the subject were informed about the aim of the study.

The blood samples were obtained from the patients. The samples were then sent to the pathological findings of zinc. The zinc estimation was done using Atomic Absorption Spectrophotometer.

Result & Discussion:

The normal range of serum zinc is 700-1500 µg/L. The value less than 700µg/L are considered as low. The table 1shows the age group of the enrolled patients.

Table 1 : Age group of the patients

Age Group	I: Liver Cirrhotic patient	II: Normal Control group
20-30 years	7	9
31-40 years	12	11
40-50 years	11	10

There is no significant difference in age of the in both groups of the patients.

Table 2 : Serum Zinc level:

Age Group	I: Liver Cirrhotic patient	II: Normal Control group
20-30 years	620.5 ± 105.3 µg/L	810.5 ± 110.9 µg/L
31-40 years	590.6 ± 105.8 µg/L	840.6 ± 90.8 µg/L
40-50 years	610.4 ± 118.4 µg/L	830.8 ± 115.3 µg/L

The table 2 indicated the difference in the zinc level in the two groups of the patients.

Excess and fatty food intake leads to fatty liver which may progress to cirrhosis in the long run.

The consumption of adulterated foods, fruits, edible oils etc. may be causative factors for long-term inflammation of the liver leading to chronic liver diseases, cirrhosis and hepatocellular carcinoma in a vicious cycle.

Liver is the most important regulator of the zinc balancing in the body.

In present study the 70% liver cirrhotic patients are having low level of zinc in serum as compared to normal healthy study group. This results are in line with the previous findings. The study of Soomro et al. who evaluated the cirrhotic patients in a tertiary care hospital in Pakistan and found low level of zinc in 69% of cirrhotic patients [4]. Triwikatmani et al. [5] found 66.7% and Stamoulis et al. [6] found 65.3% of cirrhotic patients with hypozincemia which are consistent with our findings.

Some researcher assumed that serum zinc measurement in zinc deficiency is relatively less sensitive, because mild zinc deficiency can occur even with normal serum zinc concentration. The estimation of zinc concentration in granulocyte and lymphocyte give more sensitive information of marginal zinc deficiency compared to serum zinc concentration [14].

Conclusion:

Cirrhosis of liver reflects irreversible chronic injury of the hepatic parenchyma and include extensive fibrosis in association with the formation of regenerative nodules. Since many of the clinical features of cirrhosis of liver simulates zinc deficiency.

From our study it can be hypothesized that some of the clinical features of liver cirrhosis may be contributed by zinc deficiency.

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