METABOLIC EFFECTS OF ALCOHOLISM AND ITS RELATIONSHIP WITH ALCOHOLIC LIVER DISEASE

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Background. Chronic and excessive ethanol consumption is associated with cellular proliferation, fibrosis, cirrhosis and cancer of liver. It was planned to study the effect of alcohol on different biochemical parameters as distribution of these parameters may lead to several complications in gastrointestinal tract, liver, kidney, brain etc. *Methods:* 50 alcoholic males and 20 normal subject (with no history of alcohol) with an age ranges 30-45 years were included in the study. Biochemical parameters related to liver were estimated.by standard kit. Besides, ions and electrolytes were also determined by standard kit and flame photometer). *Results:* It was observed that level of alkaline phosphatase, alanine transferase, protein and globulin were significantly increased as compared to normal subjects. Besides, ions like calcium and phosphate were significantly decreased. On the other hand, the level of potassium and magnesium was significantly decreased as compared to normal subjects. Electrophoresis shows a protein of 100 Kda is present in the patient's sample as compared to control subjects. *Conclusion:* It is therefore concluded that abnormal biochemical function of liver in alcoholism can lead to several complications, hence further research is needed to reach a definite conclusion.

INTRODUCTION

Alcoholic chronic hepatitis can be considered as an independent entity. Chronic and excessive ethanol consumption is associated with cellular proliferation, fibrosis, cirrhosis and cancer of liver. Cortical event in early alcohol induced hepatic injury is an alcohol induced activation (cell proliferation and increased fibro genesis of hepatic stellate cell. However, the mechanism by which alcohol causes proliferative activation in hepatic stellate cell have not been identified[1'2]. Alcohol promotes accumulation of fat. The pathogenesis of alcoholic fatty liver is unknown, but several cases have been proposed based on biochemical findings. These include the metabolism of alcohol leading to shift in cytosolic NAD/NADH ratio to reduction. There is also chronic effect of ethanol on hepatic enzyme activities[3].

It is known that regular consumption of alcohol causes hyponatremia, hypokalemia, hypomagnesemia, and hypophosphatimia[3].

Excessive alcohol ingestion disturbs the mechanism of most nutrients. It leads to negative nitrogen balance[5]. This work was done to study effect of alcohol on different biochemical parameters as distribution of these parameters may lead to several complications in gastrointestinal tract, liver, kidney, brain etc.

MATERIALS AND METHODS

Diagnosis was made on clinical ground. 50 alcoholic males and 20 normal subjects (with no history of alcohol) with an age range 30-45 years were included in the study. Serum protein, alkaline phosphatase, alanine transaminase, bilirubin, albumin, globulin, A/G ratio, cholesterol, triglyceride, calcium, phosphor magnesium, sodium and potassium were analyzed by standard kit/flame photometer[6,7]. Electrophoresis of serum of both patient and normal subjects was run on 12% polyacrylamide gel[8].

Table-1: Biochemical Parameters in Patients and Normal Subjects (Mean± SEM)

Parameters	Patients (50)	Normal subjects (25)
Total protein (g/dl)	9.32±0.28	6.99±0.08
Albumin (g/dl)	3.57±3.70	4 60±0.02
Globulin (g/dl)	5.75±2.50	2.34± 0.04
A G ratio	1 30±0.14	1 98±0.04
Alkaphos (KAU)	10.65 1 1 35	7.00±0.50
Alanine trans (U/l.)	18.64±3.27	4.00±1 44
Bilirubin (mg/dl)	0 78±0.11±	0 42±0.04
Calcium (mg/dl)	6.44±0.51	9.0±0.28
Magnesium (mg/dl)	5.59±0.50	1.90±0 30
Phosphate (mg/dl)	3.84±0.28	2 50±0.60
Sodium (meq/l)	135.33 ±1.33	135 84±1.40
Potassium (meg/l)	8.64±0.40	4.50±0.50
Cholesterol (mg/dl)	145.10±10.76	185.01±5.91
Triglyceride (mg/dl)	158.79±31.37	125.25±12 83

*P<0.05 = Significant difference P<0.0l= Highly significant difference

RESULTS

Observations in human liver have shown that liver damage is associated with disturbed metabolism of different nutrients, enzymes as well as the level of different ions. It was observed that the level of total protein and globulin was abnormally increased in the patients as compared to normal subjects and it shows a highly significant difference (P<0.01). On the other hand, the level of albumin was non-significantly decreased in the patients as compared to control subjects level of enzymes like alkaline phosphates alanine transaminase were non-significantly increased in patients as compared to controls Serum bilirubin was also significantly (P<0 05) increased as compared to controls lons like potassium, calcium, magnesium and phosphate increased in the patients, but significant difference *(P*<0.01; only observed in case of potassium, calcium and magnesium Level of serum

triglyceride was markedly increased when compared to control but u shows no significant difference electrophoresis of serum of both patients and normal subjects was run on 12% polyacrylamide gel shows the protein bands *of* different molecular weight. It was observed that electrophoretic pattern in both normal and patient was same but a protein of approximately n<r- 70 Kda is very dense in patient samples comp ta to normal. It was also observed that fi protein of approximately 100Kda is present in patient's sample as compared to normal. A 12% gel with different levels of alanine transferase ([12, 13, 2.3, 45 u/l]) was also run that shows an increased ALI level decreased the number of protein bands

DISCUSSION

Alcohol may induce | variety of changes in the live! None of the features. ire diagnostic, but some are relatively specific. usually, simultaneous occurrence of one or more non-specific lesions, in combination with other more specific changes lead to the correct diagnosis of alcoholic liver disease

Present study shows an abnormal level of protein in alcoholic patients. Electrophoretic pattern shows a dense protein band of approximately 60-70 Kda This band may abnormally increase the level of protein. Normally liver converts protein and fat into glucose. Reason of abnormal protein level may be liver dysfunction. In contrast a worker reported that ethanol intake leads to negative nitrogen balance and an increased protein turnover.

Level of enzymes like alkaline phosphatase and alanine transferase were increased in alcoholic patients as compared to control subjects. There is a strong association between incidence rate of increased liver derived enzyme values and self-reported alcohol consumption[10] There is also a fourfold increase in serum ALT level in alcoholics".

Mild increase in serum bilirubin level in patients as compared to control subjects, was noted. A number of groups[4] observed that decreased bilirubin secretion from hepatocytes in liver disease leads to back up of bilirubin in the blood. Decreased level of cholesterol and increased level of triglyceride was observed in our study. Mechanism for this was suggested by a group of workers' that microbial damage due to chronic alcohol consumption might cause alteration of mitochondria Mitochondrial *damage* perpetuates fatty acid accumulation Alcohol facilitate* esterification of accumulated fatty acids to triglyceride. phospholipids and cholesterol esters. all of which accumulate in the liver The accumulated lipids are disposed of in part as serum lipoprotein, resulting marked hyperkinemia It was suggested[1] that decreased level *of* cholesterol might lie associated with neoplasm.

level of serum calcium and phosphorous were decreased in patients as compared to control subjects It was observed that affluence of a non- skeet disease, with increased connective tissue synthesis or degradation the collagen markers of bone turnover in patients with primary biliary cirrhosis, a disease with increased hepatic fibrosis, is often associated with osteoporosis

Abnormally high level of magnesium was also observed in patients This is in contrast to a study[14] in which hypomagnesemia in alcoholic patterns was observed

No change in level of serum sodium was seen but a marked increase in level of serum potassium was there. Both ions play an important role in nerve and muscle function Ethanol dependency induces maladaptive derangement of neurotransmitters.

CONCLUSION

Abnormal biochemical function of liver in alcoholism can lead to several complications that may lead to hepatic stellate cell proliferative activation and hepatic fibro genesis.

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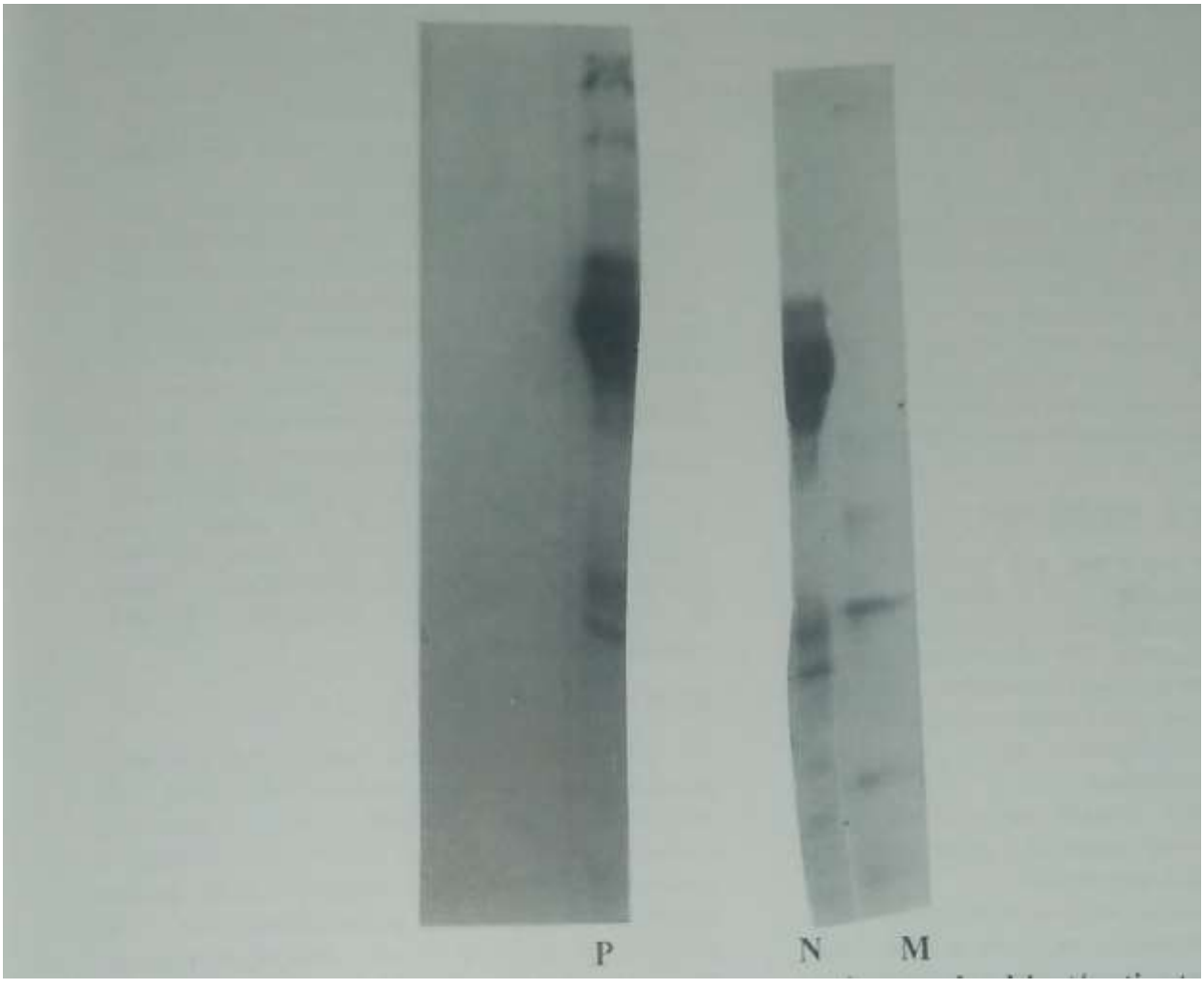

Figure -1: Electrophoresis of serum of normal subject/patient.

M = Standard number of molecular weight 160-14 Kda, N = Normal, P = Patient