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LEVEL HOMOCYSTENE NON-ALKOHOLIC LIVER DISEASE

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ABSTRACT

Introduction: Homocysteine (HCY) is a methionine metabolism intermediate product. Disturbances in liver function are likely to impair methionine and HCY metabolism, resulting in elevated blood HCY levels. In addition to its established function in cardiovascular disorders, hyperhomocysteinemia may be a risk factor for cirrhotic individuals. HCY levels are higher in those who have low folate levels and a mutant methylene tetrahydro folate reductase. Hyperhomocysteinemia is caused by a reduction in Vitamin B12 and folic acid levels in the cells, which raises HCY levels in the blood.

Aim: Effect of Non-Alcoholic Liver Disease in Homocysteine Level

Material and Method: This study included total 40 patients 20 NAFLD Patients and 20 normal subjects were comes from OPD and IPD. Patients went to the Directly Observed Treatment Short-course focus in the Dept. of General Medicine

Result: To the comparison between both groups Homocysteine level are elevated in patient group as a compare to control group. The value is statistically significant ($p < 0.01$).

Conclusion: Because they act as coenzymes in methionine-HCY conversion, HCY is linked to Vitamin B12 and folic acid. When this vitamin is deficient, HCY builds up in the body and circulates more freely. As a result, hyperhomocysteinemia is a major risk factor for CLD, particularly alcoholic liver disease, in addition to being a risk factor for coronary artery disease.

Keywords: Homocysteine, Liver disease, methionine, Vit-B12, CLD.

Introduction

Homocysteine (HCY) is a sulfur-containing amino acid produced as a byproduct of the methionine metabolism.1

Homocysteine (HCY) is a nonprotein sulfur-containing amino acid that is produced through the metabolism of methionine, an essential amino acid obtained from dietary protein. Mild hyperhomocysteinemia has been linked to a variety of cardiac pathological disorders, including coronary heart disease, acute myocardial infarction, arrhythmogenesis, and sudden cardiac death. However, it is unclear if HCY is a causal risk factor or simply a CVD biomarker. Despite the fact that hyperhomocysteinemia and insulin resistance (IR) syndrome are both linked to CVD, research on the link between homocysteine levels and IR syndrome has produced mixed results.2

Hyperhomocysteinemia can be caused by mutations in homocysteine-metabolizing genes, dietary deficiencies such as vitamin B6, B12, or folate, or persistent alcohol usage. Homocysteine is a by product of methionine metabolism, which is mostly carried out in the liver.3

Homocysteine (HCY) is a methionine metabolism intermediate product. Disturbances in liver function are likely to impair methionine and HCY metabolism,

resulting in elevated blood HCY levels. In addition to its established function in cardiovascular disorders, hyperhomocysteinemia may be a risk factor for cirrhotic individuals. B complex vitamins, notably folate and vitamin B12, are required for HCY metabolism. HCY levels are higher in those who have low folate levels and a mutant methylenetetrahydrofolate reductase. Hyperhomocysteinemia is caused by a reduction in Vitamin B12 and folic acid levels in the cells, which raises HCY levels in the blood. The goal of this study was to determine HCY levels in individuals with Chronic Liver Disease (CLD).4

Metabolism of homocysteine is a complex process which involves several enzymes and folate and vitamin B as co-enzymes. Improper Functioning or deficient supply of any of these supplements can effect the homeostasis. The extend by which Hyc is raised depends on the severity of underlying defect and it can be controlled by dietary intervention to some extend . When there is a deficiency of these vitamins, HCY levels in the blood rise. High levels of HCY have been associated with atherosclerosis and ischemic heart disease.5 Alcoholics have elevated HCY levels and increased vascular risk HCY gets accumulated in cells and reaches the circulation either due to deficiency of some cofactors or any defect in the enzyme. Factors like renal failure, impaired catabolic liver function, and hypoalbuminemia influence genesis of homocysteinemia, in case of liver cirrhosis. A previous study reported that majority (85%) of the infected patients develops chronic infection, 10-20% of which progress to cirrhosis. And of these cirrhosis patients around 7% develop Hepatocellular Carcinoma (HCC). Dietary folate and B vitamins are negatively related to total HCY, whereas alcohol intake is favourably related.6

Non-alcoholic fatty liver disease (NAFLD) is currently the most prevalent liver disease in the Western world, afflicting 15-40% of the general population. Non-alcoholic fatty liver disease is becoming more well-known as a leading cause of liver-related morbidity and death. 24 Interest in this illness is growing among academics and clinicians in the relevant fundamental and clinical scientific disciplines because to its propensity to develop to cirrhosis and liver failure.7

Non-alcoholic fatty liver disease is thought to affect roughly one billion people globally (NAFLD). Patients with Non-alcoholic Steatohepatitis, an advanced form of NAFLD, develop progressive fibrosis, cirrhosis, hepatocellular cancer, and liver-related morbidity and death (NASH).8

Aim

Effect of Non-Alcoholic Liver Disease in Homocysteine Level

Material and Method

This study included total 40 patients 20 NAFLD Patients and 20 normal subjects were comes from OPD and IPD. Patients went to the Directly Observed Treatment Short-course focus in the Dept. of General Medicine, Datta Meghe Medical College and Shalinitai Meghe Hospital and Research Center, Nagpur in collaboration with JNMC & ABVRH (Datta Meghe Institute of Medical Sciences Deemed To Be University), Sawangi, Wardha, Maharashtra.

Sample Collection

5ml of blood sample were taken from each patient and divided into Plain Vial. Sample were used for the estimation of the plain sample were used to estimate the level of lipid profile and LFT, serum Homocysteine level, Vit-B12, etc.

Biochemical Analysis

The sample was used to estimate the levels of LFT, Homocysteine level and Vit-B12 were estimated on AU480 Analyser.

Result:

Table 1: To comparison between patients and control groups

parameters	Patients (n-20)	Control (n-20)	p-valve
Bilirubin T (mg/dl)	0.76±0.39	0.68±0.30	P = 0.4716
SGOT (IU/L)	66.4±16.7	27.9±6.8	P < 0.0001
SGPT (IU/L)	67.38±18.6	23.7±3.7	P < 0.0001
Albumin (g/dl)	4.6±0.4	4.9±0.2	P = 0.0047
Total Protein (g/dl)	6.3±1.0	5.8±1.1	P = 0.1408
Alkaline Phosp (IU/L)	151.2±24.3	87.5±18.9	P < 0.0001
Homocysteine level (mcmol/L)	18.2±3.4	9.2±1.4	P < 0.0001
Vit-B12 (pg/mL)	289.3±112.0	378±127.0	P = 0.0245

Table 1 shows that liver function test in patient group serum SGOT, SGPT, ALKALINE Phosphatase are in elevated in patients as a compare to control groups. The values are statistically significant p-value are ($p < 0.01$).

Also compare to patients groups to control groups serum bilirubin, Total protein, Albumin are normal in both groups. The comparisons between both groups values are statistically not significant p-value are ($P > 0.047$).

To the comparison between both groups Homocysteine level are elevated in patient group as a compare to control group. The value is statistically significant ($p < 0.01$).

To the comparison between both groups Vit-B12 level are decreased in patient group as compare to control group to the valve are statistically not significant ($P > 0.024$).

Discussion

In the present our study shows that non-alcoholic liver disease patient show that elevated serum Homocysteine level in patient and study shows that significant result.

Gill JS et al.9, found that hyperhomocysteinemia, associated with chronic alcohol abuse, is a result of alcohol or its metabolites which interferes with the metabolism of vitamins like folic acid, vitamin B12. The lack of correlation between serum HCY and vitamins- folic acid and B12 studied is due to multiple deficiencies occur simultaneously, each of them contributing individually to the homocysteinemia in the alcoholics.

In a research by Blasco C et al.10, HCY levels in chronic alcoholics with liver damage were significantly higher than in normal livers and controls (9.66±8.1 vs 6.932.33 mumol/l, p0.025). Hyperhomocysteinemia was also substantially greater in alcoholics with liver impairment (12.17±10.14 mumol/l) than in individuals with normal livers and controls. Raised serum HCY can cause liver illnesses and has a function in hepatic disorders, according to Halifeoglu I et al.11.

Gulsen et al.12 also discovered a negative association between homocysteine and B12, which they attribute to the decreased consumption of important vitamins like folate and vitamin B12 in these NAFLD patients. HCY can be caused by a lack of vitamin cofactors (B6, B12, folic acid) needed for HCY metabolism, as well as genetic abnormalities affecting its metabolism. These findings back up the theory that high homocysteine levels in the blood are linked to hepatic fat formation.

Finally, the findings revealed that NAFLD is linked with increased plasma HCY in individuals from Northeast Brazil. NAFLD appears to be linked to other known host characteristics such as BMI, HOMA, and blood lipid levels.13

Hepatic lipid accumulation was produced in diverse types of hyperhomocysteinemia, according to many experimental investigations. Pastore et al.14 discovered that homocysteine was highly associated with the

degree of liver damage in a study of juvenile NAFLD. Previous research indicated that homocysteine was linked to the development of NAFLD. Meanwhile, growing data shows that homocysteine is an independent risk factor for cardiovascular illnesses including stroke and ischemic heart disease, implying that homocysteine may mediate the link between NAFLD and cardiovascular disease. As a result, homocysteine might be a good target for reducing NAFLD development and its associated cardiovascular problems.15

H. Dai, W. Wang, et al.16 and others Homocysteine was found to be substantially linked to the incidence of NAFLD, especially in female, obese, or non-smoking individuals. More research is needed to evaluate if the correlations reported in this study are causative, and whether homocysteine-lowering treatment can be utilised to prevent developing NAFLD and its associated cardiovascular problems, particularly in females, obese adults, and nonsmokers.

HCY levels were shown to be higher in individuals with liver cirrhosis and HCC, according to Ben-Ari Z et al.17. This might be because some tissue damage is caused directly by increased HCY leakage, while others are caused indirectly by started cell repair. HCY levels in chronic alcoholics were found to be 21.28.0 mol/L in another research, which was twice as high as controls (p0.05). The mean HCY content was considerably greater for all cirrhotics (14.11.3 mol/L) than for the control group (8.10.9 mol/L, p0.03), according to Garca Tevijano ER et al.18. It's been proposed that in cirrhosis, impaired HCY metabolism is linked to a reduction in the availability or utilisation of vitamins B6, B12, and folates.

Blasco C et al.19 found that chronic alcoholics with liver damage had significantly higher HCY levels than normal livers and controls (9.66±8.1 vs 6.93±2.33 mumol/l, p0.025). Hyperhomocysteinemia was also substantially greater in alcoholics with liver impairment (12.17±10.14 mumol/l) than in individuals with normal livers and controls. Raised serum HCY can cause liver illnesses and has a role in hepatic disorders, according to Halifeoglu I et al.20

Conclusion

Because they act as coenzymes in methionine-HCY conversion, HCY is linked to Vitamin B12 and folic acid. When this vitamin is deficient, HCY builds up in the body and circulates more freely. As a result, hyperhomocysteinemia is a major risk factor for CLD, particularly alcoholic liver disease, in addition to being a risk factor for coronary artery disease.

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