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Original Research Article

Importance of hematological and biochemical findings in alcoholics admitted to emergency department

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ABSTRACT

Background: Alcoholism represents one of the most serious worldwide socioeconomic and health problems. An alcoholic is a person who consumes an amount of alcohol capable of producing pathological changes. The amount of alcohol capable of producing disease depends on a variety of factors, including genetic predisposition, malnutrition and concomitant viral infections of the liver. The association of heavy alcohol intake with a significant increase of all cause and non-cardiovascular mortality rates especially by cirrhosis, cancer and violent deaths.
Methods: This study was conducted on 500 patients who were taken from the emergency department over a period of one year, they were divided into two groups as none drinkers and heavy drinkers. 250 subjects were in each group. Frequency, quantity and type of alcohol were noted for each group. Patients presenting to emergency with known history of diabetes, anemia and hepatic encephalopathy were excluded.
Results: In our study there was no significant difference in the bio chemical tests of heavy drinkers and non-drinkers with respect to Glucose, sodium, potassium, chloride, Total Protein, albumin, globulin. But in current study significant difference in the values of GGT, ALT, AST and alkaline phosphatase ($P>0.05$) were noted among non-alcoholics and heavy drinkers.
Conclusions: Some of the Hematological parameters(MCV) and biochemical parameters like GGT, AST, ALT and alkaline phosphatase could be used for the diagnosis and treatment of alcoholism along with clinical examination if history about alcohol is missing.

Keywords: Alcohol, Biochemical, Drinking patterns, Haematological, Parameters

INTRODUCTION

According to a study, Alcohol is consumed in some time or the other by an individual in up to 80% of the population.[1] Heavy repetitive drinking reduces the life span by a decade in all cultural, socio economic groups.[2] Consumption of more than two standard drinks per day is associated with increased rate of health problems.[3] Alcohol contains ethanol with low doses of methanol, butanol, aldehydes, esters, histamine, phenols, tannins, iron, lead and cobalt. Alcohol acts as CNS depressant although some behavioral stimulation is also observed.[4] Alcohol affects almost all organs including CNS, GIT, CVS, Hematopoietic system, genitourinary system.[3] Alcohol is a direct hepatotoxin, but only 10-20% of alcoholics develop alcoholic hepatitis.[5] In India,

alcoholism are associated with stigma, and do not reveal history of alcohol intake. Liver function tests are altered only in the later stages of alcoholic liver disease.[6] Heavy drinking alters some biochemical parameters like gamma-glutamyl transferase or mean corpuscular volume.[7] Though these diagnostic tests are widely used as markers for excessive alcohol intake, their diagnostic accuracy is controversial.

Many scientific papers have been published with regards to biochemical and hematological markers of alcohol consumption in other countries, but not many have been reported in our country. Hence, we have undertaken this study to variations in biochemical and hematological parameters occurring in the abstainers and heavy drinkers in general population presenting to our emergency department.

METHODS

This study was conducted on 500 patients who were taken from the emergency department over a period of one year from 1st August 2015 to 31st July 2016, they were divided into two groups as none drinkers and heavy drinkers. 250 subjects were in each group. Frequency, quantity and type of alcohol were noted for each group, heavy drinkers who consumed More than 3 bottles of beer or equivalent amount of alcohol on daily basis and 250 patents compromised of Non-drinkers were those who had never consumed alcohol before. Patients presenting to emergency with known history of diabetes, anemia and hepatic encephalopathy were excluded.

10 ml of blood was collected from each of the subjects (both cases and controls) into EDTA tubes, plain tubes and fluoride tubes. Blood glucose was determined with fluoride sample. Liver function tests which include albumin, globulin alkaline, gamma glutamyl transferase, aspartate transaminase, alanine transaminase, total protein and alkaline phosphatase were determined in plasm tube sample. Sodium, potassium and chloride were determined in plasma tube sample.

Hemoglobin, Packed Cell Volume, Mean Corpuscular Volume, Mean Corpuscular Hemoglobin and Mean Corpuscular Hemoglobin Concentration were also determined by a cell counter in potassium EDTA sample.

RESULTS

The effect of drinking was categorized into nondrinkers and heavy drinkers. The average value of the 250 cases and controls of every parameter were calculated and tabulated.

Sodium, Potassium, chloride, glucose, total protein, albumin, globulin did not show any drastically significant difference ($p>0.05$) among drinkers and nondrinkers. Other biochemical parameters like GGT. ALT and alkaline phosphatase showed significant difference among heavy drinkers and nondrinkers ($P<0.05$).

Table 1: Comparison of lab parameters in non-alcoholic and heavy alcoholic.

Parameters	Average in non-alcoholic	Average in heavy alcoholic
Random glucose (mg/dL)	106	109
Total protein (g/dL)	7.8	7.9
Albumin (g/dL)	4.5	4.6
Globulin (g/dL)	3.0	3.1
GGT (IU/L)	10.2	20.3
ALT (IU/L)	9.4	128
AST (IU/L)	9.2	13.4
Alkaline aspartate (IU/L)	98	129
Sodium (mmol/L)	134	127
Potassium (mmol/L)	3.7	3.5
Chloride (mmol/L)	100	99

Hematological parameters showed no significant changes among nondrinkers and heavy drinkers. Only MCV showed statistically significant ($P<0.05$) difference among heavy drinkers and nondrinkers, Average value of MCV among heavy drinkers was 90.2% ranging from (85U to 112U). MCV among non-alcoholics ranged from 72 to 96U with average of 83.1U.

Table 2: Comparison of hematological parameters in non-alcoholic and heavy alcoholic.

Hematological parameters	Average in non-alcoholics	Average in alcholics
Hb (g/dL)	12.4	12.8
PCV (%)	37.2	38.4
WBC (mm^3)	5822	5380
Platelet count (mm^3)	2.46 lakhs	2.28 lakhs
MCV (μm^3)	83.1	90.2
MCH (pg/L)	28.1	28.7
MCHC (%)	32.0	32.3

DISCUSSION

In our study there was no significant difference in the bio chemical tests of heavy drinkers and nondrinkers with respect to Glucose, sodium, potassium, chloride, Total Protein, albumin, globulin. In a study conducted by Oduold IT et al, showed similar finding that these tests showed no difference among heavy drinkers and nondrinkers.[8]

In our study significant difference in the values of GGT, ALT, AST and alkaline phosphatase ($P>0.05$) were noted among non-alcoholics and heavy drinkers. In a study conducted by Conigrave et al similar findings were noted

with all these tests showing statistically significant values.[9]

Sodium values were decreased among alcoholics from that of Non-alcoholics. Similar findings were noted in the study done by Marway et al and Chandan Kumar et al.[10,11]

In our study, hematological parameter showed no positive association among non-alcoholics and heavy drinkers (PCV, WBC, Hb, and Platelet count). However, positive association was found in MCV which showed significant higher values(P>0.05) among alcoholics as compared to non-alcoholics. Similar findings were seen in the study conducted by Amitava D et al.[12]

CONCLUSION

Some of the Hematological parameters(MCV) and biochemical parameters like GGT, AST, ALT and alkaline phosphatase could be used for the diagnosis and treatment of alcoholism along with clinical examination if history about alcohol is missing.

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