<u>Original Research Article</u>

Study of Effect of Alcohol Intake on Blood Indices

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Abstract:

Alcoholic beverages have been associated with human civilisation since time immemorial, and today, alcohol is ubiquitous, with constantly changing patterns of alcohol intake around the world. This study was undertaken to assess and compare the blood parameters in form of Blood Indices among these two groups, which would help when detected earlier in preventing serious complications due to alcoholics. 30 adult patients who are alcoholics and 30 adult's patients who are non-alcoholics are included in this study. Haemoglobin Estimation, RBC counts and MCV, MCH, MCHC was done in all alcoholics and non-alcoholics subjects. Hemoglobin, Red blood cell counts, MCH, MCHC was less in alcoholic subjects as compared to non-alcoholic subjects and this difference was highly significant. MCV was more in alcoholic subjects as compared to non-alcoholic subjects and this difference was highly significant. This shows alcoholic subjects had megaloblastic anemia.

Keywords: Blood Indices, Alcoholics, Anemia.

Introduction

Alcohol consumption is one of the leading causes of death.[1] It contributes to 3.5% of the global burden of disease and is causally related to more than 60 different medical conditions.[2] A large epidemiological study observed a significant rise in health-related problems among alcohol users in India.[3] Regular excessive alcohol consumption may affect a wide variety of hematological parameters. The principal well-known abnormality is an increase in erythrocyte mean cell volume (MCV).[4]

The exact mechanism responsible for the increase is still unknown, but it is evidently due to the direct toxic effect of alcohol on the developing erythrocyte.[5,6] Studies reported the effect of substance use on various red cell parameters. Alcoholism is one of the most serious global public health problems. Regarding disease Burden Alcohol is the world's third largest risk factor. Alcohol consumption is one of the leading causes of death. [7] It contributes to 3.5% of the global burden of disease and is causally related to more than 60 different medical conditions.[8] A large epidemiological study observed a significant rise in health related problems among alcohol users in India.[9] Regular excessive alcohol consumption may affect a wide variety of hematological parameters. According to the National Council on Alcoholism and Drug Dependence, alcoholism is a primary chronic disease with genetic, psychosocial, and environmental factors influencing its developmental manifestations. Health Organization

in 2011, it has been shown that alcohol is responsible for causing about 2.5 million deaths per annum that accounts to 4 percent of all deaths worldwide. Worldwide, 6% of all male deaths are related to alcohol, just over 1% of deaths in women. Almost 1 in 10 deaths among young people aged 25–29 years from alcohol.[10] Hence, alcohol consumption is known for morbidity and mortality, being a serious health hazard of the world. Multiple organs can be involved such as hepatobiliary system, cardiovascular system, central nervous system, and hematopoietic system. Impact of alcohol on hematopoietic system divided into direct and indirect effects. Direct effect seen in bone marrow and involves red cell, white cell, lines. Indirect effect due to metabolic or physiologic alterations resulting in liver disease and nutritional abnormality such as folate deficiency. [11]As of today only very few studies had been done in India to compare the hemotological manifestations among alcoholics and non-alcoholics, so this study was undertaken to assess and compare the blood parameters in form of Blood Indices among these two groups, which would help when detected earlier in preventing serious complications due to alcoholics. The aim of the study was to study the blood indices among alcoholics based on the duration of alcohol intake and compare them with non-alcoholics.

Material and Methods

This study was conducted for patients who sought treatment for alcohol use problems for a period of 1

year and healthy non-alcoholic subjects who visited laboratory for routine hematological investigations. A detail history was taken in alcoholics about quantity, type of alcohol, and number of years of alcohol consumed. Name, age, gender, occupation, and socioeconomic status were noted. General and systemic examination was done.

A. Samples Size: 30 adult patients who are alcoholics and 30 adults patients who are non-alcoholics

B. Inclusion Criteria: All adult patients who are alcoholics that is who consume alcohol 80 to 90 mg alcohol which is about 11 drinks per day. 30 adult patients who are non-alcoholics taken as control

C. Exclusion Criteria: All patients who are less than 25 years and Patients with other hepatic disorders Haemoglobin Estimation, RBC counts and MCV (Mean corpuscular volume), MCH (Mean corpuscular haemoglobin), MCHC (Mean corpuscular haemoglobin concentration) was done in all alcoholics and non-alcoholics subjects. These parameters were compared between alcoholic and non-alcoholic. Mean, standard deviation and p value was calculated. P value<0.001 was highly significant.

Results

Table 1: Age groups of Non-alcoholic and Alcoholic subjects

Age groups (years)	Non-alcoholic subjects (n=30)	Alcoholic subjects (n =30)
25-35	04	05
36-45	08	07
46-55	10	11
55-60	05	06
>60	03	01

Table 2: Duration of Alcohol consumption

Duration of Alcohol consumption (in Years)	Number of Alcoholic subjects (n =30)
5-10	08
11-15	10
16-20	07
>20	05

Table 3: Signs and Symptoms in Alcoholic subjects

Signs and Symptoms	Number of Alcoholic subjects (n =30)	Percentage
Pallor	22	73.33 %
Icterus	18	60 %
Ascitis	17	56.66 %
Pedal oedma	25	83.33 %
Hematemesis	05	16.66 %
Melena	09	30 %

Table 4: Blood Indices in Non-alcoholic and Alcoholic subjects

Blood Indices	Non-alcoholic subjects (n=30)	Alcoholic subjects (n =30)	p value
Hb (gm%)	11.40±2.6	9.02±1.2	<0.001
RBC Count (millions/mm^3)	4.12±1.02	3.26±0.82	<0.001
MCV (fl)	83.46± 6.03	94.26±12.14	<0.001
MCH (pg)	30.46±2.4	24.36±1.24	<0.001
MCHC (%)	36.42±1.16	30.12±1.34	<0.001

Table 4 shows Hemoglobin, Red blood cell counts, MCH, MCHC was less in alcoholic subjects as compared to non-alcoholic subjects and this difference was highly significant. MCV was more in alcoholic subjects as compared to non-alcoholic subjects and this difference was highly significant. This shows alcoholic subjects had megaloblastic anemia.

Discussion

Alcohol abuse is a growing epidemic in India, especially among men and now a day it is becoming a major problem among young adults. The clinical manifestations of alcohol induced hematologic disorders are profoundly influenced by the patient's social and economic status, and the presence or absence of other factors, such nutritional deficiency or alcoholic cirrhosis.

Most of these changes result, either directly or indirectly, in anemia and when extensive liver disease is present, the patient may develop an abnormally functioning fibrinogen or other coagulation disorders, which may initiate or exacerbate bleeding. Studies had shown that even before anemia appears, approximately 90 percent of

alcoholics have a macrocytosis, mean corpuscular volume [MCV] between 100 to 110 femtoliters [fL]) and it was almost in par with our study among alcoholics and it was very high in comparison with non-alcoholics.[12-14]   Alcohol-induced macrocytosis occurs even though patients are folate and cobalamin replete and do not have liver disease. The mechanism is unknown, but it takes two to four months for the macrocytosis to disappear after the patient becomes abstinent. Alcohol as well as alcohol induced cirrhosis lead to decreased RBC production. Hypersplenism can cause premature RBC destruction. Folic acid deficiency impairs RBC production and results from decreased ingestion, decreased absorption, and abnormal metabolism of folic acid. Hypersplenism, blood loss, liver disease, folic acid deficiency, and reduced RBC production are causes of low hemoglobin levels in alcoholics.[15]The results of the present investigation indicate that hematological parameters i.e Hb, RBC count , MCV,MCH,MCHC are altered in individuals with alcohol intake. It is observed that anemia is more common in alcoholics. In the present study, alcoholic subjects had low hemoglobin level, low RBC counts, low MCH, MCHC, and high MCV which were normal among the non-alcoholic group.

Conclusion

The results of the present investigation indicate that hematological parameters i.e Hb, RBC count, MCV, MCH, MCHC are altered in individuals with alcohol intake. It is observed that anemia is more common in alcoholics. Detection of hematological changes in alcoholics and giving psychiatric counselling and treatment for alcohol dependence will decrease the future complications like cirrhosis liver, cardiac and renal disease, cerebellar degeneration, neuropathy, pancreatitis, etc. and reduce the morbidity and mortality in alcoholics.

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