e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2024; 14(7); 103-105

Original Research Article

Study of Blood Indices in Severe Alcoholics and Non Alcoholic Subjects

Annu Kumari[1], Sruthi Parayil Kizhakkevalappil[2], Hemali Jha[3], Arun Chandran Nhattuvalappil[4], Prabhat Kumar[5]

[1]Assistant Professor, Department of Physiology, RDJM Medical College and Hospital, Muzaffarpur, Bihar, India

[2]Assistant Professor, Department of Physiology, Sree Narayana Institute of Medical Sciences, Chalakka, Kuthiathode PO, Ernakulam, Kerala, India

[3]Associate Professor, Department of Internal Medicine, Integral Institute of Medical Sciences and Research, Lucknow, Uttar Pradesh, India

[4]Assistant Professor, Department of Anaesthesiology, Sree Narayana Institute of Medical Sciences, Chalakka, Kuthiathode PO, Ernakulam, Kerala, India

[5]Associate Professor, Department of Forensic Medicine, RDJM Medical College and Hospital, Muzaffarpur, Bihar, India

Received: 01-07-2024 / Revised: 12-07-2024 / Accepted: 26-07-2024

Corresponding Author: Dr. Arun Chandran Nhattuvalappil

Conflict of interest: Nil

Abstract

Alcoholism is one of the most serious global public health problem. Regarding disease Burden Alcohol is the world's third largest risk factor. It is estimated that the total number of the population classified as alcohol consumers in the world goes up to 2 billion, while 76.3 million people develop alcohol use disorder. Alcoholism is characterised by increased tolerance and physical dependence on alcohol, affecting an individual's ability to control alcohol consumption safely. Impact of alcohol on haematopoitic system divided into direct and indirect effects. Direct effect seen in bone marrow and involves red cell, white cell and platelet lines. Indirect effect due to metabolic or physiologic alterations resulting in liver disease and nutritional abnormality such as folate deficiency. Objective of study was to compare haemoglobin, RBC counts PCV, Blood Indices changes in severe alcoholics as compare to non-alcoholics. 50 patients who are severe alcoholics and 50 adults patients who are non-alcoholics are included in study. Present study shows mean haemoglobin content and RBC count was less than normal values which tells that most of alcoholics are anemic. Mean values of MCV was more than normal range, which shows anemia seen in alcoholics was macrocytic.

Keywords: Severe alcoholics, Blood Indices, Hemoglobin, RBC count.

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] Studies reported the effect of substance use on various red cell parameters. According to national council of alcoholism and drug dependence, alcoholism is a primary chronic disease with genetic, psycho social and environmental factors influencing its developmental manifestations. As per figures released by World health organisation in 2011 have shown that alcohol is responsible for causing almost 2.5million deaths per annum. 4% of all deaths worldwide. Worldwide 6% all male deaths are related to alcohol, just over 1% deaths in women. Almost 1 in 10 deaths among young people age 15-29 yr is from alcohol [6]. Hence alcohol consumption is known for morbidity and mortality, being a serious health hazard of the world. Multiple organs can be involved like Hepatobiliary system, cardiovascular system, Central nervous system, Haematopoietic system. Impact of alcohol on haematopoitic system divided into direct and indirect effects. Direct effect seen in bone marrow and involves red cell, white cell and platelet lines. Indirect effect due to metabolic or physiologic alterations resulting in liver disease and

nutritional abnormality such as folate deficiency [7]. Anaemia is a predominant feature among chronic alcoholics. A look at the haemoglobin levels can alert a physician if the patient is a chronic alcoholic, even when there is no anemia [8]. Need of the study is early detection and treatment of haemoglobin changes in alcoholics, so can prevent complications and reduce the mortality. Objective of study was to compare haemoglobin, RBC counts PCV, Blood Indices changes in alcoholics as compare to non-alcoholics.

Material and Methods

A retrospective medical chart review 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 was noted. General and systemic examination was done.

A. Samples Size:

1. 50 patients who are severe alcoholics and

2. 50 adults patients who are non alcoholics

B. Inclusion Criteria:

1. All adult patients who are severe alcoholics that is who consume more than 80 to 90 mg alcohol or more than 11 drinks per day.

2. 50 adult patients who are non-alcoholics taken as control.

C. Exclusion Criteria

1. All patients who are less than 18 years

2. Patients with other hepatic disorders

3. Patients receiving hepato- toxic drugs

Following hematological parameters, information of all subjects under the study was collected: Red blood cell (RBC) count, hemoglobin content (Hb), packed cell volume (PCV), mean corpuscular hemoglobin (MCH), MCH concentration (MCHC). These hematological parameters were compared between alcoholic and non-alcoholic subjects. All data were entered and analyzed using SPSS. Mean and standard deviation were derived for all parametric variables. Chi-square tests were applied for comparing discrete variables and ANOVA was applied for comparing continuous variables and $P < 0.001$ was considered as statistically highly significant and >0.05 as non significant.

Results

Table 1 : Age distribution of Severe Alcoholic subjects

Age groups(years)	Number of Alcoholics subjects n=50	Percentage
18-35	04	8 %
36-45	16	32 %
46-55	22	44 %
>55	08	16 %

44 % subjects were in 46-55 years age group and 32% in age groups of 36-45 years .

Table 2 : Gender distribution of Severe Alcoholic subjects

Gender	Number of Alcoholics subjects n=50	Percentage
Female	2	04 %
Male	48	96 %

96% alcoholic subjects were males.

Table 3 : Blood Indices in Severe Alcoholic subjects

Blood Indices	Alcoholics subjects n=50 Mean ±SD	Non Alcoholic subjects n=50 Mean ±SD	p value
Hb gm/dl	9.04±1.4	12.6±2.12	<0.001
MCV fl	96.2±9.4	75.2±6.4	<0.001
MCH pg	30.24±2.1	31.42±2.2	>0.05
MCHC %	31.8±2.8	32.6±2.2	>0.05
PCV %	32.4.86	40.48±6.28	<0.001
RBC millions/mm^3	3.14±0.86	4.5±1.2	<0.001

Table 3 shows MCV was less in severe alcoholics as compared to non-alcoholics and it was highly significant. There was not much difference in MCH, MCHC in severe alcoholics as compared to non alcoholics. Hemoglobin, RBC counts, PCV was less in severe alcoholics.

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 where we found mean MCV was 96.2 fl among severe alcoholics and it was very high in comparison with non-alcoholics.[9-11] 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. Changes of RBC from chronic and heavy drinking have been studied in many respects, not only regarding to changes of the size of RBC (macrocytosis), but even the presence of defectuose RBC in the blood and their production from the bone marrow. As a result of these changes, anemia is a common finding in alcoholics. [12] The above statement was very much supported by our study. Alcohol as well as alcohol induced cirrhosis leads to decreased Red blood cell production. Hypersplenism can cause premature RBC destruction. Folic acid deficiency impairs RBC production and results from decreased ingestion, decreased absorption, and abnormal metabolisn of folic acid [13]. Hypersplenism, blood loss, liver disease, folic acid deficiency, and reduced RBC production are causes of low haemoglobin levels in alcoholics [14].

Conclusion

Present study shows mean haemoglobin content and RBC count was less than normal values which tells that most of severe alcoholics are anemic. Mean values of MCV was more than normal range, which shows anemia seen in alcoholics was macrocytic. MCH and MCHC mean values are almost normal which tells that anemia in alcoholics was of macrocytic normochromic. Detection of hematological changes in alcoholics and giving psychiatric counseling 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.

References

1. World Health Organization. The World Health Report 2002 Reducing Risks, Promoting Healthy Life. Geneva: World Health Organization; 2002. Available from: http://whqlibdoc.who.int/publications/2002/9241562072.pdf.
2. Murray CJ, Lopez AD. Global mortality, disability, and the contribution of risk factors: Global burden of disease study. Lancet 1997; 3 49:1436-42.
3. Gururaj G, Girish N, Benegal V. Alcohol control series 1. In: Burden and Socio-economic Impact of Alcohol the Bangalore study. New Delhi: World Health Organisation, Regional Office for Southeast Asia; 2006.
4. Seppä K, Sillanaukee P, Koivula T. Abnormalities of hematologic parameters in heavy drinkers and alcoholics. Alcohol Clin Exp Res 1992; 16:117-21.
5. Homann C, Hasselbalch HC. Hematological abnormalities in alcoholism. Ugeskr Laeger 1992; 154:2184-7.
6. Berad A, Chand V. Study to compare hematological parameters in alcoholic and non-alcoholic individuals. Natl J Physiol Pharm Pharmacol 2019;9(12):1176-1179.
7. Seppä K, Sillanaukee P, Koivula T. Abnormalities of hematologic parameters in heavy drinkers and alcoholics. Alcohol Clin Exp Res 1992; 16:117-21.
8. Chalmers D M, Rinsler M G, MacDermott S, Spicer C, Levi Biochemical AJ and haematological indicators of excessive alcohol consumption. Gut. 1981; 22:992-996.
9. Savage D, Lindenbaum J. Anemia in alcoholics. Medicine (Baltimore). 1986; 65:322.
10. Girard DE, Kumar KL, McAfee JH. Hematologic effects of acute and chronic alcohol abuse. Hematol Oncol Clin North Am. 1987;1: 321.
11. Seppä K, Sillanaukee P, Saarni M. Blood count and hematologic morphology in non-anemic macrocytosis: differences between alcohol abuse and pernicious anemia. Alcohol. 1993; 10:343.
12. Ballard HS. The hematological complications of alcoholism. Alcohol Health Res World. 1997; 21:4252.
13. Seppä K, Sillanaukee P, Saarni M. Blood count and hematologic morphology in non-anemic macrocytosis: differences between alcohol abuse and pernicious anemia. Alcohol. 1993; 10:343.
14. Latvala J. Effect of alcohol consumption and acetyladehde on blood cells and molecules: Pathogenic and diagnostic implications. Tampere University press Universitaties Tamperensis. 2005. 1035.