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A COMPARITIVE STUDY OF HAEMATOLOGICAL MANIFESTATIONS AMONG MODERATE, SEVERE AND NON-ALCOHOLIC SUBJECTS

General Medicine

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ABSTRACT

Introduction: Alcoholism is defined as a person's dependency on alcohol, its misuse or uncontrollable drinking habits, which later-on badly affects the individual's biological system, social setup and mental / psychiatric health.1 It is also categorized by physical dependence and pathological organ changes, or even both2. Alcohol dependence influences various blood cell system indirect to in direct way. Various type of blood cells i.e. red Blood Cells (RBC), white bloodcells (WBC), and Platelet are adversely affected directly due to the insult to bone marrow. Various indirect effects are due to physiologic or changes related with metabolism due to various hepatic diseases and abnormal diet related changes3. Timely intervention, detection and start of early diagnosis & treatment of haematopoietic parameters prevent various adverse effects and can reduce the mortality. **Material And Method:** It was an observational and comparative study done in outdoor patient Department (OPD) and Indoor patient Department (IPD) at a tertiary care hospital over a period of one and half year. A total of 90 study subjects were included in the study in which 30 were non-alcoholics, 30 were moderate alcoholics (< 2 drinks/day) and the remaining 30 were severe alcoholics (>14 drinks/week) and a complete Haemogram using an automated counter and peripheral blood smear was done. **Results:** Mean Hb in group I was 15.13±0.73mg/dl, 13.67±1.89 in group and 11.65±0.71in group III ($p<0.001$). On PBF examination, all the participants in group I was normocytic-normochromic (NN), in group II, 10(33.33%) was NN, 9(30%) was Dimorphic (DP), 7(23.33%) were macrocytic (MA) and 4(13.33%) were microcytic (MI). Similarly, in group III, 14(46.66%) was Dimorphic (DP), 11(36.66%) were macrocytic (MA) and 5(16.66%) were microcytic (MI). The difference between moderate alcoholic and severe alcoholic found to be statistically significant ($p<0.01$). MCV(fl) was 87.66±4.66,89.5±7.89 and 96.99±4.47 in group I, II & III respectively ($p>0.05$,$p<0.001$and<0.001). Mean MCH (pg) was 29.53±1.59, 28.63±4.94 and 31.39±2.18 ($p>0.05$, <0.001 and <0.001), MCH was 33.6±1.49, 30.26±4.54, 30±4.58 ($p<0.001$, $>0.05$and<0.001) in group I,II & III, respectively. The difference among group II vs. III was found to be statistically significant of all these parameters. The mean platelet count (/ul) was 189300±30398.6, 187866.66±25458.19 and 139600±36913.31 in group I, II and III, respectively ($p >0.05$ NS, $p <0.001$ & $p <0.001$) **Conclusion:** The study showed a decrease in Hb (predominant macrocytic anaemia) with increased mean corpuscular volume and mean corpuscular hemoglobin and a decrease in total platelet count as the most common hematological abnormalities in patients with severe alcoholism.

KEYWORDS

INTRODUCTION

Alcoholism is a chronic, progressive, and potentially fatal disease. The major health risk of alcoholism includes liver disease, heart disease, pancreatitis, central nervous system disorders, disorders of hematopoietic system, and certain forms of cancer. The effects on haemopoietic system are both direct and indirect, with anemia being commonly seen in alcoholics. These hematological changes are commonly missed resulting in morbidity and mortality. Alcoholism has been defined as an individual's dependence on alcohol, alcohol misuse or uncontrolled drinking habit, which adversely affects biological, social and mental well-being. It is characterized by tolerance and physical dependence or pathologic organ changes, or both-all of which are the direct or indirect effect of alcohol consumption.[2]

It is estimated that 3.5% of the global burden of disease is attributable to alcohol, which accounts for as much death and disability as tobacco and hypertension. Alcohol has various adverse effects on the blood cells and their functions. Heavy drinking can cause generalized suppression of blood cell formation and also result in the production of structurally abnormal blood cell precursors that cannot develop into functional cells.[4]

The impact of alcohol on hematopoietic system can be direct or indirect. Red Blood Cells, White Blood Cells, and Platelet lines are directly affected in the bone marrow. Indirect effects are attributable to metabolic or physiologic changes due to liver disease and dietary abnormalities like folate deficiency.[3]

Early detection and treatment of haematological changes can prevent complications and reduce the mortality. To the best of our knowledge, limited number of studies had been done in India and particularly in Haryana regarding comparison of haematological parameters among alcoholics and non-alcoholics. Keeping in view these facts, present study was conducted to assess and compare the blood parameters among these two groups, which helped in some way to early detection in preventing complications due to alcohols.

MATERIAL AND METHODS

It was an observational and comparative study conducted at outdoor patient Department (OPD) and Indoor patient Department (IPD) at a tertiary care hospital over a period of one and half years.

A total of 90 study subjects were included in the study in which 30 was non-alcoholics, 30 was moderate alcoholics (less than or equal to two drinks per day) and the remaining 30 were severe alcoholics (more than 14 drinks in a week).

Inclusion criteria of the subjects were - All alcohol dependent male patients with history of severe alcohol drinking. All male patients of age group more than 18 years and male patients with moderate alcohol drinking pattern. All male patients according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) criteria for alcohol dependence, at least three out of seven criteria

Patients with hematological malignancies hepatic diseases, Chronic illnesses such as diabetes, hypertension, TB etc., and patients taking hepatotoxic drugs were excluded from study

OBSERVATIONS AND RESULTS

The present observational and comparative study was conducted in Faculty of Medicine & Health Sciences, SGT Medical College, Hospital & Research Institute (a Tertiary care Hospital) Budhera, Gurgaon, Haryana**.** This study was conducted over a period of one and

half year in which a total of 90 study subjects were included out of which 30 were non-alcoholics (Group I), 30 were moderate alcoholics (less than or equal to two drinks per day) (Group II) and the remaining 30 were severe alcoholics (more than 14 drinks in a week) (Group III) from Outdoor patient Department (OPD) and Indoor patient Department (IPD).

Table I:

Investigations	Non alcoholic (n=30)	Moderate alcoholic (n=30)	Severe alcoholic (n=30)	Statistical analysis		
	Group I	Group II	Group III	Group I vs. II	Group II vs. III	Group I vs. III
Hb (mg/dl)	15.13±0.73	13.67±1.89	11.65±0.71	<0.001	<0.001	<0.001
RBC	5.24±0.51	4.93±0.69	4.40±1.37	<0.5	<0.001	<0.001
HCT	45.95±5.35	44.26±8.20	42.72±4.26	0.348	0.366	<0.01
TLC (u/L)	9135.33±1178.43	8913.33±1340.28	8453.33±4154.90	0.498	0.566	0.390
Platelet count (/ul)	189300±30398.6	187866.66±25458.19	139600±36913.31	0.843	<0.001	<0.001
PBF NN DP MA MI	 0 0 0 0	 10(33.33%) 9(30%) 7(23.33%) 4(13.33%)	 0 14(46.66%) 11(36.66%) 5(16.66%)	-	0.007 (<0.01 Sig.)	-
MCV (fl)	87.66±4.66	89.5±7.89	96.99±4.47	0.277	<0.001	<0.001
MCH (pg)	29.53±1.59	28.63±4.94	31.39±2.18	0.346	<0.001	<0.001
MCHC	33.6±1.49	30.26±4.54	30±4.58	<0.001	0.821	<0.001
ESR	15.43±4.32	18.86±5.16	20.73±2.94	<0.001	0.09	<0.001

Mean Hb in group I was 15.13±0.73 mg/dl, 13.67±1.89 in group II and 11.65±0.71 in group III. On statistical analysis, the difference between all groups found to be statistically significant ($p < 0.001$).

On PBF examination, all the participants in group I was normocytic-normochromic (NN), in group II, 10(33.33%) was NN, 9(30%) was Dimorphic (DP), 7(23.33%) were macrocytic (MA) and 4(13.33%) were microcytic (MI). Similarly, in group III, 14(46.66%) was Dimorphic (DP), 11(36.66%) were macrocytic (MA) and 5(16.66%) were microcytic (MI). On statistical analysis, the difference between moderate alcoholic and severe alcoholic found to be statistically significant ($p < 0.01$).

Mean MCV (fl) was 87.66±4.66, 89.5±7.89 and 96.99±4.47 in group I, II and III respectively ($p > 0.05$, $p < 0.001$ and < 0.001). Mean MCH (pg) was 29.53±1.59, 28.63±4.94 and 31.39±2.18 ($p > 0.05$, < 0.001 and < 0.001), MCHC was 33.6±1.49, 30.26±4.54, 30±4.58 ($p < 0.001$, > 0.05 and < 0.001) in group I, II and III, respectively. On statistical analysis, the difference among group II vs. III was found to be statistically significant of all these parameters (Table I).

DISCUSSION

Alcohol has numerous adverse effects on the various types of blood cells and their functions. Heavy alcohol consumption can cause generalized suppression of blood cell production and the production of structurally abnormal blood cell precursors that cannot mature into functional cells[5]. Alcoholics frequently have defective red blood cells that are destroyed prematurely, possibly resulting in anemia. Alcohol also interferes with the production and function of white blood cells, especially those that defend the body against invading bacteria. Consequently, alcoholics frequently suffer from bacterial infections. Finally, alcohol adversely affects the platelets and other components of the blood-clotting system.

Alcohol is the most commonly used drug whose consequences include the suppression of blood cell production, or hematopoiesis. Because its toxic effects are dose dependent, however, significantly impaired hematopoiesis usually occurs only in people with severe alcoholism, who also may suffer from nutritional deficiencies of folic acid and other vitamins that play a role in blood cell development. Chronic excessive alcohol ingestion reduces the number of blood cell precursors in the bone marrow and causes characteristic structural abnormalities in these cells, resulting in fewer-than-normal or non-functional mature blood cells. As a result, alcoholics may suffer from moderate anemia, characterized by enlarged, structurally abnormal RBC's; mildly reduced numbers of WBC's, especially of neutrophils; and moderately to severely reduced numbers of platelets[6]. Although this generalized reduction in blood cell numbers (i.e., pancytopenia) usually is not progressive or fatal and is reversible with abstinence, complex aberrations of hematopoiesis can develop over time that may cause death. Many bone marrow abnormalities occurring in severe alcoholics affect the RBC precursor cells

In addition to interfering with the proper absorption of iron into the hemoglobin molecules of red blood cells (RBC's), alcohol use can lead to either iron deficiency or excessively high levels of iron in the body. Because iron is essential to RBC functioning, iron deficiency, which is commonly caused by excessive blood loss, can result in anemia[7].

Megaloblasts occur frequently in the bone marrow of alcoholics; they are particularly common among alcoholics with symptoms of anemia, affecting up to one-third of these patients[8]. These alcoholics generally also have reduced folic acid levels in their RBC's. The most common cause of this deficiency is a diet poor in folic acid, a frequent complication in alcoholics, who often have poor nutritional habits. In addition, alcohol ingestion itself may accelerate the development of folic acid deficiency by altering the absorption of folic acid from food.

Hemolysis can be an underlying cause of anemia, and several types of hemolytic anemia may be caused by chronic heavy alcohol consumption. Two of these disorders are characterized by the presence of malformed RBC's— stomatocytes and spur cells—whereas one alcohol-related hemolytic anemia is caused by reduced phosphate levels in the blood (i.e., hypophosphatemia). Diagnosing hemolysis in alcoholic patients is not easy, because these patients frequently exhibit confounding conditions, such as alcohol withdrawal, abnormal folic acid levels, bleeding, or an enlarged spleen.

Alcohol can interfere with these processes at several levels, causing, for example, abnormally low platelet numbers in the blood (i.e., thrombocytopenia), impaired platelet function (i.e., thrombocytopathy), and diminished fibrinolysis[8]. These effects can have serious medical consequences, such as an increased risk for strokes. The exact mechanisms underlying alcohol-related thrombocytopenia remain unknown. Some researchers have suggested that alcohol intoxication itself, rather than alcohol-related nutritional deficiencies, causes the decrease in platelet numbers[9]

CONCLUSION

Alcohol consumption has existed since ancient times. The quantity of alcohol, its usage type and further problems had substantial changes last two to three decades. Due to this, various concerns raised about the public health and social consequences. The study showed a decrease in Hb (predominant macrocytic anaemia) with increased mean corpuscular volume and mean corpuscular haemoglobin and a decrease in total platelet count as the most common hematological abnormalities in patients with severe alcoholism.Timely screening and detection of various hematological parameters in moderate alcoholics and severe alcoholics followed by psychological as well as psychiatric counseling and treatment for alcohol dependence can decrease the complications like liver cirrhosis, kidney diseases, liver diseases etc. Our study recommends awareness among the population, proper rehabilitation, self-help programs that will help to bring down the prevalence of alcoholism.

REFERENCES:

1. Reuben AA. Alcohol and the liver. Curr Opin Gastroenterol 2007;23:283-91.
2. Seixas FA, Blume S, Cloud LA, Lieber CS, Simpson RK. Definition of alcoholism. Ann Intern Med 1976;85:764.
3. Sanvisens A, Zuluaga P, Pineda M, Fuster D, Bolao F, Juncà J, et al. Folate deficiency in patients seeking treatment of alcohol use disorder. Drug Alcohol Depend 2017;180:417-422.
4. Ballard HS. The haematological complications of alcoholism. Alcohol Health Res World 1997;21:42-52.
5. Ballard H.S. Hematological complications of alcoholism. Alcoholism: Clinical and Experimental Research 1989;13(5):706–20.
6. Ballard H.S. Alcohol, bone marrow, and blood. Alcohol Health & Research World 17(4):310–315, 1993.
7. Deitrich, R.A, Erwin V.G. Pharmacological Effects of Ethanol on the Nervous System. Boca Raton, FL: CRC Press, 1996;383–408.
8. Douglas C.C, Twomey J.J. Transient stomatocytosis with hemolysis: A previously

unrecognized complication of alcoholism. Annals of Internal Medicine 1970;72:159–64
9. Duarte A.P.T, Dong, Q.S, Young, J, Abi-Younes J, Myers A.K. Inhibition of platelet aggregation in whole blood by alcohol. Thrombosis Research 1995;78(2):107–115