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HAEMATOLOGICAL PROFILE IN CHRONIC ALCOHOL CONSUMERS

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ABSTRACT

Background: Problem drinkers conceal the fact that they are chronic alcoholics, when giving a medical history. Laboratory studies on those who abuse alcohol in this environment are scarce as most studies are behavioural research. Routine haematological indices were studied in problem drinkers to help in the diagnosis of alcohol related disorders.

Methodology: The subjects were got from an indigenous community that has farming and the brewing of a local alcohol, BURUKUTU as the main source of livelihood. The CAGE questionnaire was used to classify the subjects into problem drinkers, social drinkers and those who abstained from alcohol. Parameters measured were haemoglobin, packed cell volume, red blood cell court, white blood cell court and platelet count. The mean corpuscular volume (MCV) was calculated using wintrobe's formula.

Results: It was found that the haemoglobin, packed sell volume, red blood cell count and the white blood cell count were within the reference range for all groups. The platelet count was reduced for the problem drinkers while the MCV was increased.

Conclusion: A look at the hematological profile especially MCV, platelet count, can alert a physician if the patient is a chronic alcoholic, even when there is no anemia.

KEY WORDS: Problem drinkers, Alcoholism, Hematological profile. Jos.

INTRODUCTION:

There are variations in the biological response of different ethnic groups to alcohol consumption attributed mainly to genetic differences[1,2]. These variations may be found at low levels of alcohol consumption. When alcohol intake becomes excessive and chronic it affects the metabolism of many tissues and organs of the body. The organs most affected are the livers, bone marrow and the brain. Biochemical markers of alcohol abuse are mostly enzymes of the liver such as gamma glutamyltransferase (GGT), aspartate amiontransferase (AST) and alkaline phosphatase (ALP). Of these the GGT is the most sensitive[3].

The prevalence of macrocytosis in alcoholics (50%-60% in both males and females) is lower than of a raised plasma GGT[3]. In population studies there is a good correlation between the mean corpuscular volume (MCV) and alcohol intake, an increase of approximately 1.7fl accompanying each 10g increment in daily ethanol consumption[3]. It makes about 2-3 months for MCV to return to normal after cessation of drinking[4].

Although folate deficiency is the normal cause of megaloblastic anaemia in alcoholic patients, alcohol can result in macrocytic and megaloblastic changes by a direct toxic effect on developing erythroblasts[5]. The earliest abnormality observed in the marrow is nuclear and cytoplasmic vacuolation of erythroblasts and early myeloid precursors which disappear on withdrawal on alcohol.[4] The type of alcohol ingested is also important, as beer contains considerable amounts of folate but whisky contains none[5].

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An acute transient thrombocytopenia may occur in alcoholics without cirrhosis, related to drinking bouts[6]. The platelet count usually rises within a few days of cessation of alcohol. In chronic alcoholics chronic thrombocytopenia do occur[7]. Studies on the laboratory aspect of alcohol abuse are scarce in this environment, as most of the studies are descriptive and intervention studies. It is hoped that findings in this study will help in the diagnosis of alcohol related diseases.

SUBJECTS AND METHOD

A predominantly Christian Berom community in Kugiya, Plateau State was used for the study. The people of Kugiya apart from farming, brew a local beer, called BURUKUTU, by fermentation of guinea corn. Obembe and assiociates[8] reported that the alcohol content of BURUKUTU is about 7% while that of industrial beer is between 3-5% depending in the make. One unit of alcohol is about 8g of alcohol[3]. One bottle of beer and one medium calabash of BURUKUTU contain about 2 units of alcohol[8]. Like the palm wine of Southern Nigeria, BURUKUTU is consumed by the natives without prejudice to age, sex, class.

Consent for the studies was obtained from the traditional ruler of Kugiya and also from the individual subjects. There were 320 families in the community. Subjects between 16-54 years were selected from every other family giving 160 subjects. Eighteen were excluded from the study because they were either pregnant or had constitutional symptoms. Out of the 142 used for the study, 72 males and 70 were females.

The GAGE screening questionnaire[9] which had been applied locally[10], was used to select the problem drinkers. They had to score 2 and above. Apart from the GAGE score those classified as problem drinkers had to take alcohol above

21 units per week for men and 14 units per week for females[11]. Using both criteria the subjects were classified into.

Group A.- 50 problem drinkers (27 males and 23 females)
Group B - social drinkers (22 males and 25 females)
Group C - abstainers (23 males and 22 females)

Two milliliters of venous blood was taken into a sequestrene bottle for the estimation of hemoglobin (Hb), packed cell volume (PLC), red blood cell count (RBC), white blood cell count (WBC) and platelet count (PLC). The Hb was estimated using the cyanmethaemoglobin photometric method[12]. The PCV was estimated using the microhematocrit centrifuge.

The RBC, WBC and PLC counts were estimated with Neubauer haemocytometer and the corresponding dilution fluids and methods[13]. The mean corpuscular volume (MCV) was calculated using the wintrobe's formula[13]. The student's test was used as a test of significance between the means of the various groups. The Spearman's coefficient was used as a test of the association between the GAGE score and the values of the hematological indices.

RESULTS

Pattern of use

The mean duration of intake was 12.8 years for problem drinkers and 10.2 years for social drinkers. The mean quantities taken were 48.2 units and 11.3 units for problem drinkers and social drinkers respectively (Table 1).

The MCV was significantly increased among problem drinkers as compared to total abstainers and social drinkers. This also significantly differentiated problem drinkers from the other ($P<0.05$). The Hb and PCV were slightly lower among problem drinkers than the other groups studied. However, there was no significant differences ($P>0.05$).

The white blood cell count was within normal limits among the three groups studied. There was no significant difference ($P>0.05$). The platelets were significantly reduced among problem drinkers ($P<0.05$). The GAGE-4 score were significantly correlated with the duration and quantity ($P<0.05$). Other that were significantly correlated included MCV and platelets.

DISCUSSION:

The association of Megaloblastic anemia with excess alcohol ingestion is relatively common. Its prevalence varies widely depending on the general health, nutrition, social and economic status of the alcoholic population. Major heamatologic abnormalities are unusual in alcoholics of higher socio-economic status, the only stigma of excess Alcoho! ingestion being a mild macrocytosis without Anaemia[5]. Surprisingly there was no anaemia in our study population which comprised subjects in the lower socio-economic class, majority of whom are farmers in a rural community. We are not aware of any study carried out on the vitamin content of burukutu, but like the industrial beer it should have some reasonable content of folic and which could partly account for the lack of anaemia. Also access to various vegetables and other farm product could provide the vitamins and other nutrients[12].

The mean MCV of the alcohol abusers at 110.2fl is significantly different from that of the social drinkers (86.32fl) and the abstainers (82.90fl). Thus the problem drinkers had a mean MCV higher than the upper limit of the reference range of 100fl[13]. This implies macrocytosis, but in the absence of anaemia. The change in MCV values often predate serious alcohol-related pathology and so may be a useful indicator of chronic alcohol abuse. A progressive rise in MCV with alcohol intake in the absence of anaemia, but with moderate thrombocytopenia has been reported and is attributed to marrow suppression, folate deficiency, and sideroblastic anaemia associated with chronic alcohol abuse[13,11,12]. The plasma GGT values in our subjects showed the corresponding rise with the MCV values. This agree with an earlier report which suggested that combining GGT and MCV increase the sensitivity in detecting early alcohol abuse in an individual[3]. Furthermore, in this study, the Spearman's correlation coefficient between the CAGE score and the hematological indices was only significant with the MCV. The platelet count of the alcoholics in this study was significantly lower than those of the social drinkers and abstainers. Chronic thrmobocytopenia in chronic alcoholics is usually considered to be due to hypersplenism associated with cirrhosis and congestive splenomegaly, or to developing megakaryocytes is also a cause of the thrombocytopenia[5]. However, the thrombocytopenia in our subject was not marked. But a combination of the platelet count (showing a slight reduction), and raised MCV clearly demarcated the alcohol abusers from the others in this community under study.

Problem drinkers are known to conceal this part of their history. So physicians should study the hematological indices of their patients (obtained from automation or manual methods) and the platelet counts, in combination with the CAGE screening instrument for alcohol abuse to detect problem drinkers at an early stage, before the complications of alcoholism are established.

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Table 1. **Mean Age, Quantity and Duration of Drinking among Problem Drinkers and Social Drinkers**

Characteristics Means (SD)	Problem Drinkers	Social Drinkers	P value
N	50	47	
Age (Years)	33.08(8.43)	35.71(9.90)	0.125
Quantity (Units)	48.2(14.3)	11.30(3.0)	0.001
Duration (years)	12.8(2.8)	10.22(2.1)	0.001

Table 2: **Hematological Data for Problem Drinkers and Non- Problem Drinkers.**

Measurement Mean (SD)	Problem Drinkers N=50	Social Drinkers N=47	Total Abstainers N=45	P
Hb (g/dl)	14.09 (1.47)	14.24(1.007)	13.94(1.49)	>0.05
PCV (1/1)	44.24 (4.94)	44.45(3.93)	43.33(4.93)	>0.05
MCV (F1)	110.22(26.20)	86.21(8.87)	82.90(8.49)	>0.05
WBC ($x10^9$/1)	5.19(0.98)	4.39(0.28)	4.65(1.18)	>0.05
Platelets ($x10^9$/L)	144.84(23.02)	184.4(30.3)	185.9(62.5)	>0.05
CAGE Score	3.06(1.01)	0.05(0.03)	0(0)	0.001
GT (u/L)	31.10(4.84)	8.17(2.02)	7.43(2.93)	S<0.5

Table 3: **Spearman Correlation Coefficients of Total Cage Scores with Hematological Parameter.**

CAGE	r	P value
Duration	0.51	0.0003
Quantify	0.62	0.0003
PCV	0.08	>0.05
HB	0.06	>0.05
MCV	0.47	>0.05
WBC	0.09	>0.05
Platelets	0.33	>0.05

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