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The Effect of Alcohol on some Coagulation Factors of Alcoholics in Owerri, IMO State

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Abstract

Participants for this study included 50 alcoholics and 50 non-alcoholics (controls). Platelet count of alcoholics and non-alcoholics was; 76.46 ± 19.09 , 2 and 182.68 ± 75.33 respectively. Platelet count was significantly lower among alcoholics compared to non-alcoholics ($p=0.0001$). We observed a negative correlation between platelet count and duration of alcoholism ($r=-9.46$). The mean prothrombin time (PT) and activated partial thromboplastin time (APTT) values of alcoholics and non-alcoholics was; (29.12 ± 9.67 and 68.08 ± 11.58) and (13.32 ± 3.79 and 31.32 ± 7.65) respectively. Prothrombin time and activated partial thromboplastin time values were significantly lower among alcoholics compared to non-alcoholics ($p=0.0001$). We observed a positive correlation between duration of alcoholism and prolonged prothrombin time and activated partial thromboplastin time ($r = 0.46$ and 0.55 respectively). Our study has shown that alcoholism produces a significant adverse effect on some haematological and haemostatic parameters. Evidenced data generated from this study can facilitate the development of a policy on the effective management of haematological and haemostatic complications associated with alcoholism. There is need to enact laws that regulate the production, sales and consumption of various alcoholic beverages to prevent abuse and protect the health of citizens.

Keywords: Alcohol, Coagulation factors, Alcoholics, Owerri

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Introduction

The WHO estimates that there are 140 million people with history of alcoholism worldwide [1]. In Western countries about 10% of the general public of age not less than 15 years are affected by alcoholism giving rise to poor job performance, legal problems, social and interpersonal problems [2]. In the United States about 63,718 deaths in the year 2000 were attributed to harmful drinking [3]. In Nigeria and other developing countries in the world so many alcohol - related accidents and mortality may have occurred without reliable documentation. Chronic alcoholism is the third leading cause of mortality even though many alcohol related death go unrecorded particularly in developing countries [4]. However, there is paucity of data on the effect of alcohol on haematological and haemostatic parameters of alcoholics in Nigeria. History of a consumption of a locally brewed alcoholic beverage is high in Imo State.

Materials and Methods

Study area

This project was carried out in owerri, Imo state, Nigeria.

Sample collection

A total of 50 samples of blood were collected from alcoholics. EDTA sample bottles were used in collecting blood. The samples collected were transported to the laboratory at different times for analysis.

Prothrombin time

Test method

0.2 ml of the thromboplastin/calcium reagent (plasmascann reagent) was dispensed into a small tube and placed in a water bath at 37° C for about 2 minutes. 0.1 ml of plasma was added using a calibrated capillary pipette the content mixed and the stop watch started. The tube was held in the water bath and the mixture tilted back and forth looking for clot formation and the time when the mixture clotted was recorded in seconds.

Table 1 Result showing the mean \pm S.D of prothrombin time in test when compared with the control.

| Parameter | Test(PT) | Control | t-vale | p-value |
|--------------------|------------------|------------------|--------|---------|
| Prothrombin | 29.12 \pm 9.67 | 13.32 \pm 3.79 | 10.653 | 0.0001 |

Note: Shows a significant increase in the values of prothrombin time in test (29.12 \pm 9.67 sec) when compared with the mean values of the prothrombin time in control (13.32 \pm 3.79) at $p < 0.05$.

Table 2 Result showing the mean \pm S.D of the platelet count in test when compared with the control.

| Parameter | Test (platelet) count | Control | t-value | p-value |
|-----------------------|-----------------------|--------------------|---------|---------|
| Platelet count | 78.46 \pm 19.09 | 182.68 \pm 75.33 | -9.456 | 0.0001 |

Note: Shows a significant decrease in the mean value of the platelet count in the test (78.46 \pm 19.09) when compared with the mean value of the platelet count in control (182.68 \pm 75.33) at $p < 0.05$

Table 3 Result showing the mean \pm S.D of APTT of test when compared with the control.

| Parameter | Test(APTT) | Control | t-value | p-value |
|-------------|-------------------|------------------|---------|---------|
| APTT | 68.08 \pm 11.58 | 31.32 \pm 7.65 | 18.926 | 0.0001 |

Note: shows a significant increase in the mean value of the APTT in the test (68.08 \pm 11.58 sec) when compared with the mean value of the APTT in control (31.32 \pm 7.65)

Activated partial thromboplastin time (APTT) with kaolin

Test Method

0.2 ml of the kaolin/platelet mixture (haemoscann reagent) was dispensed into a small tube. 0.1 ml of the plasma sample was then added and the contents were mixed and incubated for 2 minutes. With the tube being tilted at intervals, 0.1 ml 0.025 M of calcium chloride was then added and the stop watch was started immediately. The tube was tilted back and forth for clot formation. When the clot formed, the stop watch was stopped immediately and the time recorded in seconds.

Statistical Analysis

Data were entered and analysed using statistical package SPSS version 9 (SPSS Inc., Chicago, IL). Statistical analysis included descriptive analysis of mean, standard deviation. A p- value of < 0.05 was considered to be statistically significant in all statistical analyses.

Interpretation

A total of 100 samples were collected comprising of 50 alcoholics (Test subjects) and 50 non-alcoholics (Control).

Discussion

In this present study, we observed that history of chronic alcoholism has a significant effect on the platelet count. The platelet counts of heavy alcoholics were significantly lower than those of non-alcoholics.

Alcohol consumption causes hypocellularity leading anaemia, leukopenia, thrombocytopenia and their relative sequelae [4]. We observed significant negative correlation between history of alcoholism and platelet count. Decrease in the number of

platelets as well as abnormal platelets function seems associated with chronic alcoholism. Previous reports have shown that when blood ethanol concentration rises to 0.10%, platelet production, number and function may be affected [2]. We observed that haemostatic parameters of PT and APTT were significantly higher among heavy alcoholics compared to non-alcoholics. We observed a significant positive correlation between duration of alcoholism and deranged PT and APTT. Alcohol consumption seems to have a negative effect on the liver with attendant negative impact on the synthesis of coagulation factors.

Conclusion

This report has shown that alcoholism has multiple negative effects on platelets and coagulation factors. Evidenced data generated in this study can facilitate the development of a policy on the effective management of alcohol-related effect on platelets and coagulation factors. There is need to enact laws that regulate the production, sales and consumption of various alcoholic beverages to prevent abuse and protect the health of citizens.

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