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Consequences of alcohol use among the HIV positive patients who are on antiretroviral therapy: A prospective study

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Abstract
Background: Alcohol use among HIV-positive individuals is associated with decreased adherence to antiretroviral therapy (ART) and consequently poorer HIV treatment outcomes.
Aims and Objective: To study and compare the clinical and biochemical spectrum of people living with HIV/AIDS (PLHA) on Anti- Retroviral Therapy with special reference to alcohol.
Materials and Methods: Hundred patients who were on Anti-Retroviral Therapy were studied in the Department of Medicine G.R. Medical College, Gwalior from February 2016 to September 2017. Patients were divided as cases (n=50; with alcohol abuse) and control (n=50; without alcohol abuse). Hemoglobin, total leukocyte count (TLC), peripheral smear examination, random blood sugar, liver function tests, serum bilirubin, serum protein and serum albumin were estimated.
Results: Mean age between both the groups were comparable (35.42±9.38 vs 39.30±9.39; p=0.089). Body weight was significantly increased from 49.27±7.33kg to 53.75±6.85 kg before and after ART therapy respectively among Cases and 44.04±6.18 kg to 52.56±8.12 kg before and after ART therapy among control group (p<0.001). CD4 count was significantly increased from 238.96±110.81 before ART to 353.24±127.15 after ART in Cases and 227.22±111.98 before ART to 493.08±117.42 after ART in Control (p<0.001). Due to alcohol, among Cases less weight gain (4.48 kg in Cases vs. 8.52 kg in Control) and less increase in CD4 count (114.28 in Cases vs. 265.86 on Control) was observed as compared to Control group who do not consumed alcohol.
Conclusion: HIV positive subject with alcohol use along with ART therapy can have detrimental effects of clinical as well as biochemical parameters which can further deteriorate the disease condition.

Keywords: CD4 count, HIV, weight gain, anti-retroviral therapy, alcohol abuse

1. Introduction

Consumption of alcohol among People Living with HIV/AIDS (PLWHA) has been recognized as an important public health problem [1]. Several studies have examined the prevalence of alcohol abuse and its associated factors among PLWHA. Alcohol use disorders among PLWHA seem to be 2–4 times higher than those disorders in the general population [2].

Alcohol abuse among PLWHA results in higher disease burden. The negative effects of alcohol abuse in PLWHA are ability to interfere with the immune system, increased occurrence of bacterial infections mainly tuberculosis, enhancing the liver damage possibly due to co-infection with Hepatitis C Virus and altering the metabolism of antiretroviral drugs [3, 4].

Although, not always conclusive, several studies have suggested that alcohol consumption is also related to a lower adherence to highly active antiretroviral therapy (HAART)with consequent inadequate viral suppression, the potential emergence of viral resistance and treatment failure [5].

The alcohol abuse can have detrimental effect on certain clinical and laboratory parameters, which may be important in the evaluation of PLWHA and disease progression. Studies suggest that in these individuals, alcohol consumption may be associated with lower CD4 cell counts; however, this finding is not consistent in the literature [6].

Hence, present study was performed to study and compare the clinical and biochemical spectrum of PLWHA on Anti-Retroviral Therapy with special reference to alcohol.

Materials and methods

Present prospective study was conducted on 100 patients with HIV at Anti-Retroviral Therapy Centre, Department of Medicine G.R. Medical College, Gwalior from February 2016 to September 2017. Present study included all the out patients and in patients who were on Anti- Retroviral Therapy with special reference to alcohol consumption. All the patients were randomly divided into cases (n=50; with alcohol abuse) and control (n=50; without alcohol abuse)

Detailed history, clinical examination and investigations like total hemogram including hemoglobin, TLC, DLC and

peripheral smear examination, ESR, random, fasting and postprandial blood sugar, liver function tests, serum bilirubin total and direct, SGOT, SGPT, serum protein and serum albumin were estimated. Ultrasound whole abdomen to look for any anatomic abnormalities of liver and chest X-ray PA view were also done.

The patients who were visiting ART OPD, medicine OPD or admitted in JAH; who weresero-positive for HIV infection and on Anti- Retroviral Therapy and were alcoholic or non-alcoholic were included. All consecutive adult patients (>18 years) enrolled in the ART programme with existing information of ART were also included.

Patients with previous history of liver disease / Diabetes/ Renal disease, not initiating treatment or death prior to ART initiation and transferring out were excluded from the present study.

Statistical Methods

Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented as Mean ±SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. Unpaired t -test has been used to find the significance of study parameters between two groups of patients. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two groups.

Results

Mean age between both the groups were comparable 35.42±9.38 vs 39.30±9.39; p=0.089). Most of the subjects were female [40 (80%)] in control groups whereas in Cases all the patients were male [50 (100%)]. Most of the patients were married in cases [47 (94%)] and control [47 (94%)] (p=1.00). Most of the subjects were house wife (37%) followed by farmers (27%) and labour (15%).

Appetite was decreased in 8 (16%) and 25 (50%) patients in control and cases respectively (p<0.001). Among cases, 3 (6%) patients had albumin in urine whereas in control none of the patients showed urine albumin (p=0.121).Urine Sugar was absent in all the subjects in both the groups. Chest infiltration/infection was significantly higher among cases [14 (28%)] compared to control [2 (4%)] (p<0.001).

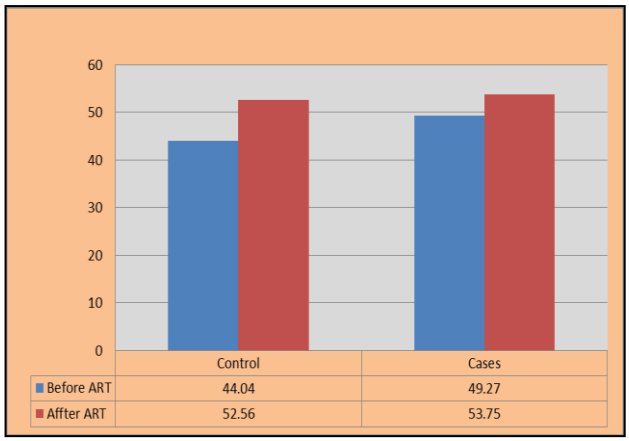

Fig 1: Comparing body weight between cases and control before and after ART therapy

Table 1: Comparing different parameters among study groups

Parameter	Control (n=50)	Cases (n=50)	P value
SBP (mmHg)	117.38±7.96	120.64±8.87	0.023
DBP (mmHg)	74.94±3.41	75.16±3.48	NS
PR	80.24±6.33	85.34±6.83	<0.001
RR	13.96±0.90	14.88±1.23	<0.001
Hb (%gm)	11.57±12.65	10.64±16.62	NS
TLC	6718.00±925.97	7976.00±1290.95	0.049
Platelet count (lacs)	1.90±0.30	1.42±0.49	0.003
RBS (mg/dl)	88.02±14.15	92.20±26.07	0.002
S Bilirubin (total)	0.72±0.01	1.13±0.24	0.021
S Bilirubin (Direct)	0.24±0.012	0.88±0.33	0.004
SGOT	4.80±6.54	53.02±13.18	<0.001
SGPT	23.80±7.68	39.31±11.91	<0.001
SAP	130±29.79	192.77±40.76	<0.001
Serum protein	7.90±0.56	6.94±0.48	0.025
Serum albumin	4.90±0.31	3.98±0.52	0.015
TC	174.14±39.73	268.74±45.82	<0.001
TG	121.90±32.92	197.58±53.66	<0.001
HDL-C	67.44±9.13	41.52±5.36	<0.001

Data is expressed as mean ± standard deviation (SD), SBP; systolic blood pressure, DBP; diastolic pressure, PR; pulse rate, RR; respiratory rate, Hb; hemoglobin, TLC; total leukocyte count, RBS; Random blood sugar, SGOT; serum glutamic oxaloacetictransaminase, SGPT; serum glutamic pyruvic transaminase, TC; total cholesterol, TG; triglyceride, HDL-C; high density lipoprotein cholesterol, NS; not significant, p value <0.05 is considered as significant.

Table 2: Comparing Weight and Cd4 count between groups before and after ART therapy

Parameters	Control		Cases		P value
	Before ART	After ART	Before ART	After ART	
Weight	44.04±6.18	52.56±8.12	49.27±7.33	53.75±6.85	<0.001
CD4 Count	227.22±111.98	493.08±117.42	238.96±110.81	353.24±127.15	<0.001

Data is expressed as mean ± standard deviation (SD), ART; antiretroviral therapy, NS; not significant, p value <0.05 is considered as significant.

Discussion

People who consume alcohol are at increased risk of contracting the human immune deficiency virus (HIV) than people who never consume [1]. In HIV patients who are on ART therapy and consume alcohol, observation for lack of adherence or discontinuance of medical treatment programs is noted [7, 8].

Kalichman *et al*. [9]. studied 145 patients with HIV and reported male preponderance which is in agreement with the present study among cases where all the patients were males (100%).

The mean age reported by Kalichman *et al*. [9]. in patients with HIV was 44.9±6.3 years, in agreement to Kalichman *et al*. mean age in present study was 39.30±9.397 years which was comparable with the mean age of control group. Woolf-king *et al*. in a similar study of 356 HIV men reported mean age of 45.5±10.0 years which is in agreement with the present study [10].

In present study increase in CD4 count was less among Cases (114.28) compared to Control (265. 86) which may be due to alcohol intake by all male population. Similar to present study Henrich *et al.* as well as Malbergier, observed that the number of CD4 cells was smaller, and the viral load was greater in individuals who drink than those who do not. The patients that receive HAART treatment and consume alcohol have a CD4 cell count significantly lower than those that do not drink [8, 11].

Dusingize *et al.* studied ART-naive HIV-infected patients who were alcoholic and observed a significant association of low serum albumin with HIV infection. Similar to that in present study also serum protein and albumin were lower among cases compared to control (P<0.05) [12].

Studies from developed countries reported higher prevalence of elevated liver enzymes in HIV infection. [13, 14] A study from San Diego while studying prevalence and factors associated with liver test abnormalities in HIV-infected persons reported that 27% had abnormal liver test results during a 6-month study period after ART initiation [14].

However, the excess elevated liver enzymes observed in their study might be due to the presence of only male population among Cases who were alcohol addicts. Contrary to studies conducted in developed countries, a prospective study from Uganda found that the risk of clinically significant hepatotoxicity was low, even in patients on ART [15]. Similarly in present study liver function test parameters such as SGOT, SGPT and SAP was significantly higher in cases compared to control respectively. A possible mechanism of the pathogenesis of liver damage in our study is that when HIV infection progresses and the CD4 count falls the whole body protein turnover is increased. The whole-body protein turnover is markedly increased in stage IV HIV infection despite normal protein balance [16].

Alcohol use also has an effect on the metabolism of ARVs by the liver. Alcohol is metabolized by the liver which is also responsible for metabolism of most of the ARV drugs [17]. Dusingize *et al.* found no association between alcohol consumption and serum liver enzyme activities [12]. The possible reason is that HIV-infected persons in study of Dusingize *et al.* were informed about the risk factors for HIV disease progression (that drug and alcohol use can interfere with their treatment or impair judgment and lead to risky behaviors) and thus avoided taking alcohol. Another possible reason is that having Dusingize *et al.* study subjects consisting only of women could have decreased the effect of alcohol consumption as a recent study found that male gender was associated with liver enzyme elevations [12]. Similarly in present study among cases there were only male subjects in which serum bilirubin total and serum bilirubin direct, SGOT, SGPT, SAP, were significantly higher (p<0.05), whereas serum protein and serum Albumin levels were significantly lower (p<0.05). Also among cases (male subjects only) ART therapy significantly involved in increasing weight (p<0.001) and CD4 count (p=0.007).

De Silva *et al*. studied 343 HIV positive patients and reported that the hypothesis that alcohol can alter laboratory parameters was confirmed by observing that the number of CD4 cells decreased linearly as the AUDIT risk zone increased. Supporting this hypothesis, the linear regression by da Silva *et al*. revealed that every increase of one unit on the AUDIT score reduced the CD4 cell count by more than five cells/mm3 [18].

Studies evaluating the effects of alcohol consumption on these HIV markers have not shown consistent results. Among PLWHA not using HAART, some researchers have found an inverse association between alcohol consumption and CD4 cell counts [19, 20] whereas others have failed to show such results [21, 22] or have only found it for heavy drinkers [23]. The same effect occurred when individuals receiving HAART were evaluated. Although some researchers have shown lower CD4 cell counts [20, 23] others have found no significant differences. [21] This inconsistency in findings therefore underscores the need for further studies on the subject. If we consider as valid the hypothesis that there is an inverse relationship between alcohol consumption and CD4 cell counts, the reasons for this phenomenon occurring appear to be multi-factorial and related to immunological, toxic, nutritional and behavioral effects [24].

The limitations of this study include its cross-sectional design because this does not allow establishing a causal relationship, particularly between alcohol use and HIV markers. Another limitation is the selection of only male alcoholic and female non alcoholic subjects which should be consider while considering the results of the present study. A large clinical trial is needed to strengthen the present study findings.

Conclusion

In present study among subjects with alcohol abuse, they were married male and with decrease appetite. Alcoholic subjects have shown the presence of urine albumin, infiltration/infection in chest x-ray PA view, fatty liver. Body weight was significantly increased in subjects with alcohol abuse after ART therapy. SBP, pulse rate, RR, TLC were higher whereas hemoglobin and platelet count was lower among alcoholic patients. Body weight was increased after ART therapy in both the group, but proportionallyhigher increased in control group compared to cases.

Serum total bilirubin, direct serum bilirubin, SGOT and SGPT was increased after ART therapy among alcoholic patients and CD4 count increases in both groups after ART but CD4 count proportionally higher increased in control group compared to cases.

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