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Original Research Article

Assessment of plasma Alanine Aminotransferase, Aspartate Aminotransferase and Alkaline Phosphatase activity among Sudanese Cannabis abuse People

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Background: Hepatotoxicity is a potential complication from the usage of various illicit drugs, but information on this scare in the medical literature
Objective: The aim of this study was to study the assessment of Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST) and Alkaline Phosphatase (ALP) in chronic Marijuana abusers.
Methodology: This is a case control study, conducted in Khartoum State at Alribat Hospital, during May to August 2015.A 120 blood sample was collected, 60 samples of abuse people as case study, 60 samples as control group. The age and sex was matched, which ranged between 18-60 years. Plasma concentration of ALT, AST and ALP were estimated using PS MINDRAY full automation 380.
Results: (The means SD) of plasma ALT, AST, and ALP in marijuana abuse people respectively, were (31.1±17.5), (26.9±8.2), (77.1±32.8) IU/ml while in the control group, respectively were (59.7±10.5), (63.7±12.4), (169.4±14.2).
Conclusion: This study concludes that chronic abuse of marijuana cause liver hepatotoxicity, because all liver enzymes were highly significant increase when compared with the control group.

Key words: Marijuana, Hepatotoxicity, Liver enzyme, Sudanese.

INTRODUCTION

Hepatotoxicity is a potential complication from the usage of various illicit drugs, possibly consequent their liver metabolism, but information on this is scarce in the medical literature [1] studies on liver damage due to chronic usage of marijuana are rare. [1] Cannabinoids are a group of psychoactive compounds found in marijuana cannabis is the most commonly consumed illegal drugs and self-reported consumption has continued grow through 1990 [3]. THC is the most potent and abundant. Marijuana, its processed product Hashish can be smoked or ingested [2]. The effect of chronic use has not been well established [2]. THC is a lipophilic substance which is rapidly removed from circulation by passive distribution into hydrophobic compartment, this result in slower elimination as a result of redistribution back into circulation of subsequent hepatic metabolism [2]. Hepatic metabolism of THC produces several products that are primarily eliminated urine [2]. Some studies reported that Cannabinoids can induce some side effect, including inhibition of hepatic drug metabolism [4]. Marijuana usage in the form of cigarettes made from dried leaves, flowers and stalks of female cannabis sativa plants [1].

In general marijuana is the first drug to be used subsequently, other drugs with a stranger may substitute for it or other legal or illicit drugs may start to be taken in association with its adverse effect of chronic marijuana usage have been described upon the respiratory [6] and cardiovascular system [7] . Question remains regarding its effects upon the reproductive system [8] and cellular and humeral immune systems [9] cannabis smoke is mutagenic. Invitro and invivo, thus also suggesting carcinogenicity [10].The present study is one of the few studies in our country for evaluating the hepatotoxicity of marijuana. Data presented here relate the occurrence of clinical laboratory alteration to the liver among chronic marijuana users. This study was done to assess hepatic alteration of marijuana on ALT, AST and ALP.

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Table 1: shows the level of ALT, AST and ALP in study group and control group:

Measured units	Means ± SD		p- value
	Patients N =(60)	Control N =(60)	
ALT	31.1±17.5	59.7±10.5	0.010
AST	26.9±8.2	63.7±12.4	0.000
ALP	77.1±32.8	169.4±14.2	0.001

*ALT, AST and ALP were significantly increased

Table 2: shows the ALT level in patients and control according to age groups

Age group	compare	N	Mean	Std. Deviation	Minimum	Maximum	P-value
18-29 yrs	Patients	14	28.7	11.5	13.0	53.0	0.000
	Control	12	57.9	11.2	45.0	87.0	
30-50 yrs	Patients	34	29.8	16.3	12.0	91.0	0.000
	Control	32	60.4	10.1	45.0	87.0	
51-70 yrs	Patients	12	37.6	25.3	12.0	106.0	0.004
	Control	16	59.8	11.2	48.0	85.0	

Table 3: shows the AST level between patients and control according to age groups

Age group	compare	N	Mean	Std. Deviation	Minimum	Maximum	P-value
18-29 yrs	Patients	14	26.6	7.5	17.0	41.0	0.000
	Control	12	66.3	13.1	47.0	88.0	
30-50 yrs	Patients	34	26.2	5.4	18.0	40.0	0.000
	Control	32	62.5	12.8	45.0	95.0	
51-70 yrs	Patients	12	29.2	14.2	9.0	64.0	0.000
	Control	16	64.1	11.3	48.0	85.0	

Table 4: shows the ALP level between patients and control according to age groups

Age group	compare	N	Mean	Std. Deviation	Minimum	Maximum	P-value
18-29 yrs	Patients	14	76.2	37.2	37.0	187.0	0.000
	Control	12	171.5	15.6	153.0	200.0	
30-50 yrs	Patients	34	74.5	32.6	37.0	213.0	0.000
	Control	32	168.0	13.7	151.0	198.0	
51-70 yrs	Patients	12	85.5	28.9	58.0	149.0	0.000
	Control	16	170.8	14.8	152.0	201.0	

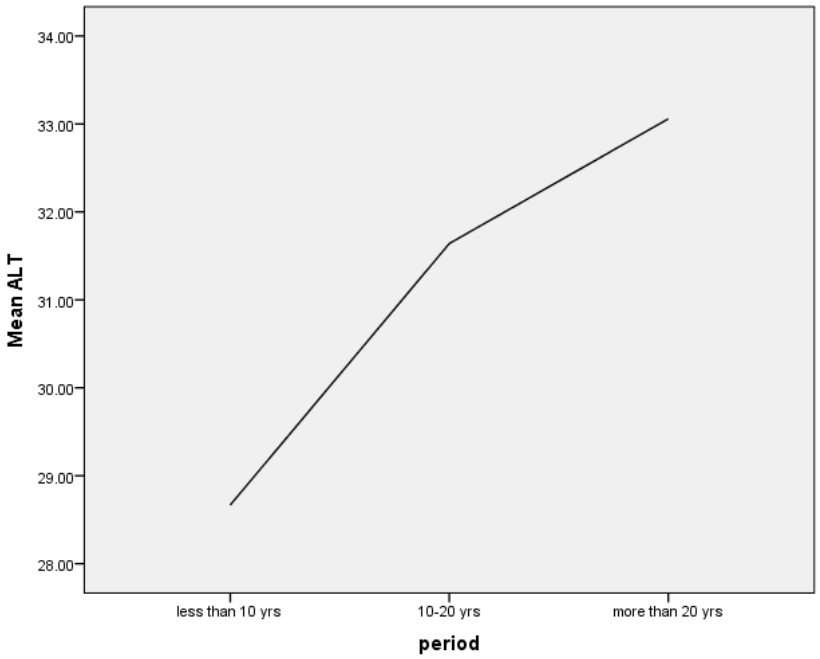

Fig 1: shows the correlation between the period of Marijuana use and levels of ALT

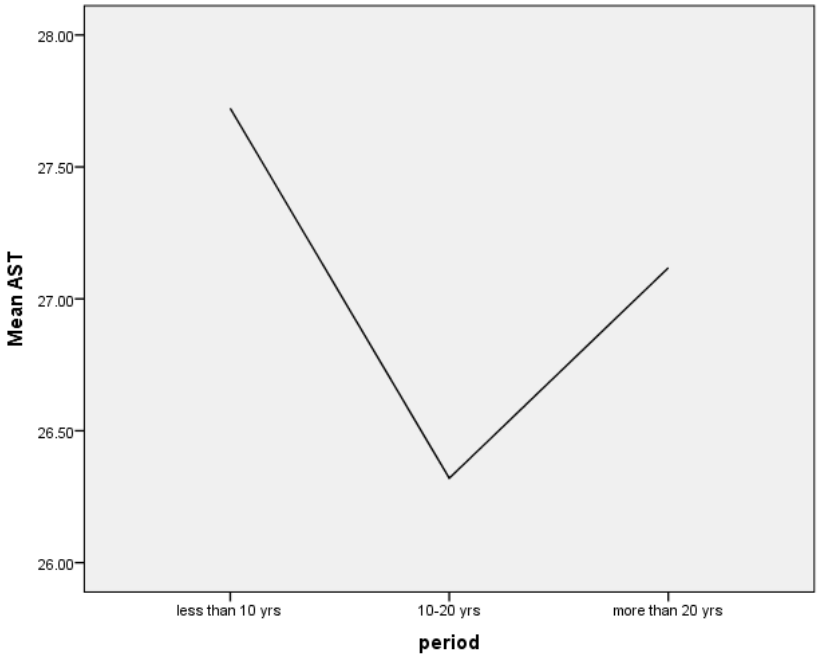

Fig 2: shows the correlation between the period of Marijuana use and levels of AST

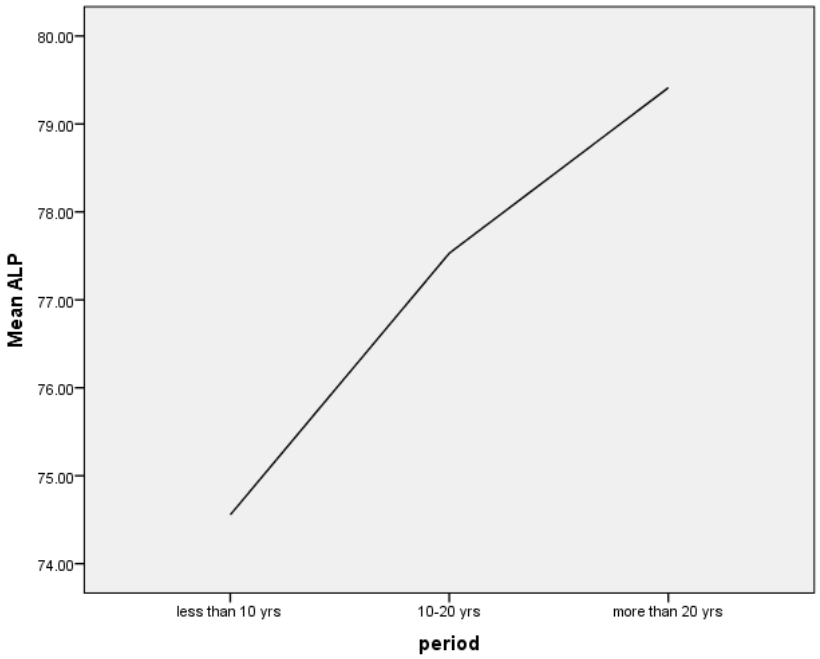

Fig 3: shows the correlation between the period of Marijuana use and levels of ALP

MATERIALS AND METHODS

Study population

This is a case control study, conducted in Khartoum State at Alribat Hospital, during May to August 2015. The population included 60 samples of abuse peoples as case study, 60 samples as a control group. The age and sex were matched, which ranged between 18-60 years. Samples were collected from some Sudanese prisoners of Alhuda prison. Plasma concentration of ALT, AST and ALP were estimated using PS Mindray full automation 380.

Sampling

A five milliliter of heparinized venous bloods was collected under aseptic precaution condition from selected subjects and were being centrifuged in Digital Centrifuge 1500 rpm for 2 min.

Statistical analysis

Statistical analysis was performed using statistical package for social science (SPSS) software, evaluation of patient's data

was performed using the t-test results with P-value <0.05 were considered statistically significant.

Inclusion criteria

Marijuana abuse people.

Exclusion criteria

Liver cirrhosis, hepatitis, jaundice, hepatomegaly, liver carcinoma.

RESULTS

DISCUSSION

Chronic use of marijuana on its own or with other drugs associated with hepatic morphological and enzymatic alteration. This indicates that Cannabinoids are possible hepatotoxic substance [1]. Marijuana users and other illicit drug users showed significant difference in liver enzyme activity and hemoglobin concentration [11]. U.S.A study says that Cannabinoids involved in several aspects of acute and chronic liver disease [12]. Daily use of cannabis is a risk factor for fibrosis progression [13], various authors have reported difficulties in forming groups of patients using only marijuana. Users of marijuana frequently use alcohol and other illicit drugs. Some authors have reported that the patient mentioned that alcohol reduced their usual “high” state reached with the consumption of marijuana in its own [14]. While others have observed the opposite that alcohol increased the hallucinogenic effects [15]. The present study included 60 marijuana abused peoples. Their Biochemical parameters (ALT, AST and ALP), were measured and compared with 60 normal non users persons as control. The mean of (ALT, AST, and ALP) of marijuana users was significantly higher when compared with control. The Value of our samples was respectively (0.010, 0.000, 0.001). Compare with Paolo Brini study (0.002, 0.009, NS) confirms that there is a significant increase in ALT, AST, but our present study confirms significant increase in ALP also. When compared with Kew *et al.,* (14) reported on 12 chronic marijuana users, of whom three (25%) showed evidence of degenerative a processes in biopsy fragments, in eight cases (66.7%) the liver enzymes indicated a significant degree of liver dysfunction. The results point towards the occurrence of possible marijuana hepatotoxicity. This should be taken into consideration along with other organ affection resulting from chronic marijuana use, in discussions on its legalization and therapeutic uses.

CONCLUSION

Chronic marijuana usage was associated with hepatic enzymes alteration. This indicates that Cannabinoids are possible hepatotoxic substance.

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