DOI: https://doi.org/10.53350/pjmhs22166845

ORIGINAL ARTICLE

Association of Biochemical Parameters in Chronic Drug Addict Patients; A Case-Control Study

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ABSTRACT

Objective: To determine the effect of a biochemical parameter in chronic drug addict patients in Peshawar, Khyber Pukhtunkhwa.

Materials and Methods: Blood samples of 90 drug addicts were randomly collected, 45 were hashish and 45 were heroin addicts. Drug addicts having hepatitis B and C infections were excluded from the study. Three milliliters of blood samples were collected in the lithium heparin tube using an aseptic technique for the determination of Alanine transaminase, Aspartate transaminase, Triglycerides, and Cholesterol.

Results: Cholesterol was significantly decreased (P=0.00) in the age group between 21 and 40 years followed by the age group less than 20 years (P=0.02). Liver enzymes were significantly elevated but, were more significant up to 40 years (P=0.00).

Conclusion: Heroin and hashish affect liver function enzymes Alanine transaminase and aspartate transaminase and cause a reduction in cholesterol levels in individuals using drugs for a long period.

Keywords: Alanine transaminase (ALT), Aspartate transaminase (AST), Triglycerides, and Cholesterol.

INTRODUCTION

Drug abuse can be described as the regular and inappropriate use of drugs for the non-medical purpose merely to alter one's mood, state of consciousness, or affect, or unnecessarily affect body functions (1). Heroin, methamphetamine, cocaine, and opiates are the most commonly abused drugs (2). Hashish is a sticky, thick dark color resin that is produced using the blossom of the cannabis plant, Cannabis sativa (3). The cannabis plant's leaves and blooms contain chemicals known as tetrahydrocannabinol (THC) which gives individuals a euphoric effect when smoked or eaten (4). Marijuana and hashish are made from cannabis, but hashish contains more THC than marijuana. Cannabis is broadly utilized in Pakistan, in the form of chars and bang. In 2013 a report suggests that 6.4 million people in the country used cannabis (5). Cannabis smoke contains 20 times more ammonia and 5 times more cyanide than tobacco smoke (6). Heroin is an opioid drug made from morphine a natural substance taken from the poppy plant. After ingestion, it binds to the opioid receptor on the cerebrum. Heroin overdoses can cause concealment of breath (7).

An estimated 208 million people internationally are drug addicts. Worldwide, alcohol and other drug abuse represent 3.5 million death per year and cause more than 5 % of the disease burden (8). In 2013, it is reported that 11.2 to 22 million people are injecting drugs with more than 10 million present in south Asia, central Asia, and the Pacific region(2). In Pakistan, approximately 6.7 million people (6% of the population) use drugs, and cannabis (hashish) is a commonly used drug with a prevalence of 3.6%. Punjab has about 4.7 % drug addicts, in Sindh, the prevalence of cannabis is 4.3%, in Baluchistan the prevalence is 1.8%, while in Khyber Pakhtunkhwa (KP) the prevalence is 10.9% (9). Studies on cigarette smokers, hashish, and heroin addicts patients showed an adverse effect on liver function (7, 10). Therefore, this study was conducted to determine the effects of hashish and heroin on the level of cholesterol, ALT, AST, and triglycerides.

METHODOLOGY

This descriptive cross-sectional study was conducted at the Institute of Paramedical Sciences (IPMS), Khyber Medical University Peshawar. A total of 90 drug addicts and 90 normal individuals as control were included in the study. An individual the chronic liver disease was excluded from the study. The study was approved by the undergraduate committee of IPMS. Informed consent was taken from all individuals involved in the study. Three milliliter Blood sample was collected in a lithium heparin tube in a fasting condition. These samples were centrifuged at high speed and plasma was separated. From the plasma ALT, AST, cholesterol, and triglycerides were performed.

ALT, AST, Cholesterol, triglycerides, and frequency analysis were determined for different age groups. As the data were normally distributed, therefore, the ANOVA test was applied using SPSS version 20 and the results were presented in tabulated form.

RESULTS

Total of 90 subjects 45 hashish and 45 heroin addicts, with an age range from 17 to 60 years old. From 17 years old to 40 years old drug addicts individuals the level of cholesterol was significantly reduced (P<0.05) as compared to control groups, while the triglyceride was insignificant (P>0.05). In addition, the level of AST and ALT was significant (P<0.05) as compared to the control group. For individuals age range from 40 to 60 years the level of cholesterol and triglyceride was insignificant (P>0.05) while AST and ALT were significant (P<0.05). Individuals were also classified based on the duration of addiction. In forty-nine individuals that were addicted for less than five years, their level of cholesterol was significantly reduced (P<0.001) while, the level of triglyceride was insignificant (P >0.44). The level of AST and ALT significantly increase (P<0.001). Similarly, 20 individuals that were addicted from five to ten years had significantly increased levels of cholesterol, ALT, and AST values while triglyceride was insignificant. Twenty-one Individuals that were addicts for more than 15 years had increased levels of cholesterol as the P value is less than 0.05 while triglyceride, AST, and ALT were statistically insignificant (Table 1, 2, & 3).

Table 1: Age-based comparison of the biochemical parameter in drug addict and control groups

Age (years)	Biochemical tests	Drug addict (n=90) Mean ±SD	Control (n=90) Mean ± SD	P. value
<20	Cholesterol	134.80±34.71	166.89±25.20	0.020
	Triglyceride	158.50±49.61	138.89±88.15	0.448
	AST	63.85±28.76	23.67±3.80	0.001
	ALT	67.55±37.59	34.22±15.43	0.017
21-40	Cholesterol	131.55±45.14	184.63±33.61	0.001
	Triglyceride	168.48±82.79	174.60±81.17	0.669
	AST	60.52±27.38	22.63±3.72	0.001
	ALT	71.48±55.69	32.34±11.49	0.001
41-60	Cholesterol	157.29±58.78	183.04±38.82	0.112
	Triglyceride	186.29±178.60	184.96±61.29	0.973

	AST	55.21±19.67	22.58±3.83	0.001
	ALT	56.50±40.04	35.62±10.80	0.020

Table 2: Comparison of Mean +SD Hashish Vs Heroin Group

Parameters	Hashish (Mean+sd)	Herion (Mean+sd)	P.value
BMI	18.140±2.73	17.728±2.51	.46
TC	135.32±33.13	122.02±32.61	.060
TG	173.78±79.30	154.38±72.71	.235
AST	52.76±28.43	69.03±21.99	.004
ALT	62.12±41.76	80.85±61.99	.091

Table 3: Age-based comparison of the biochemical parameter in control groups

Duration	Biochemical	Control Group (Mean+SD)	P.value
< 5	Chol	127.22+32.548	0.001
	TG	164.94+75.759	0.174
	AST	64.51+27.514	0.001
	ALT	72.98+58.415	0.001
5-10	Chol	116.80+34.683	0.001
	TG	165.00+86.538	0.448
	AST	62.15+22.609	0.001
	ALT	71.95+38.954	0.001
11-15	Chol	146.43+19.407	0.001
	TG	170.00+82.081	0.543
	AST	45.43+26.582	0.339
	ALT	62.71+50.839	0.214
16-20	Chol	144.57+13.831	0.001
	TG	164.43+78.275	0.643
	AST	40.86+23.913	0.541
	ALT	57.57+51.536	0.311
> 20	Chol	148.57+45.621	0.025
	TG	163.00+67.777	0.630
	AST	55.86+29.90	0.115
	ALT	69.00+53.473	0.154

DISCUSSION

The current study determines the effect of drug addiction on cholesterol, triglyceride, ALT, and AST. According to this study hashish and heroin has a statistically significant effect on cholesterol as the P value is less than 0.05 compared to the control group while triglyceride has no statistically significant effect. The results of the current study were consistent with the study conducted by Maccari et al., on heroin addicts individuals in which cholesterol level was significantly reduced (11). Another study conducted on heroin and hashish addict patients showed a significant reduction in plasma cholesterol while no association was found with triglyceride (12). Kouros et al., also determined that the level of cholesterol was significantly reduced in drug addict patients which further strengthens our results (13).

Liver enzymes showed significant statistical elevations in ALT and AST in all age groups but were more in the age group up to 40 years with a P value (<0.001). A study conducted on opium-addicted individuals showed that AST and ALT were significantly elevated (14). Another study was done by Tennant et al., on heroin addicts in which there were marked elevations in ALT and AST levels which support our study (15). Another study done on substance abusers at the psychiatric department of Punjab institute of medical sciences, India showed an elevation in AST and ALT levels (16). Individuals using hashish for up to 10 years duration showed marked elevation of liver enzymes (17). This study supports the current study findings in addicts between 1 to 10 years while in chronic addicts from 11 to 20 years there is a difference in ALT and AST levels due to the small sample size. In another study done by Asgary et al., on opium (heroin) addicts patient where AST and ALT were significantly elevated as compared to control (14). This study had similar findings compared to the current study conducted. This elevation in enzymes may be due to the direct effect of tetrahydrocannabinol (THC) on the liver or it may be indirectly by way of oxidative stress.

Nutritional behavior, social position, and poor lifestyle were not studied which can influence triglyceride and cholesterol levels in drug addicts.

CONCLUSION

This study showed that heroin and hashish causes significant effects on liver enzymes. Patients addicted for 1-10 years had elevated AST and ALT. Reduce ALT and no elevation was found in the AST level in patients that were addicted for 10 to 20 years, while addicted for above 20 years had not shown any variation in liver enzymes. Cholesterol levels were reduced in all group addicts while no variations were found in triglycerides levels. No significant variation in cholesterol as well as triglycerides for drug users of more than 20 years

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