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LIPID PROFILE IN ALCOHOL DEPENDENCE

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ABSTRACT

Fifty three patients of alcohol dependence were studied for lipid profile at Drug Dependence Treatment Centre, A.I.I.M.S. Statistically significant differences were observed on most of lipid profile indicators when compared to control group. Ratio of Apo A-1 & Apo B appeared to be better indicator than Apo A1 or Apo B. The findings of the study are discussed in context of other studies from India and other countries.

Key words : lipid, alcohol dependence, specialised setting

Influence of alcohol use on lipid metabolism is well recognised. Investigations had been carried out in the earlier period on abnormal lipid profile as a risk factor for CHD (Hopkein & Williams, 1981). Low to moderate alcohol use over prolonged periods has been linked to have protective influence for development of coronary heart disease (CHD), through increase in high density lipoprotein cholesterol (HDL-C) levels (Rohan, 1984; Lieber, 1984). More detailed studies have been carried out in the recent past on subfractions of HDL. Most studies have reported an increase in HDL_2 fractions (Marmot, 1984; Moore & Pearson, 1986; Veenstra et al., 1990), while some studies have found that moderate alcohol consumption primarily affects HDL_3 fraction (Moore et al., 1988; Huang et al., 1992). As such, the available information on the effects of longterm moderate alcohol use on subfractions of HDL are inconsistent.

Alcohol causes alteration in various parameters of lipid metabolism including those which predispose to CHD. A protective effect of moderate alcohol consumption on the development of CHD has been observed in many studies (Moore & Pearson, 1986; Marmot, 1984) but it has not yet been accepted (Shaper et al., 1988; Stampfer et al., 1988). Increase in high density lipoprotein cholesterol (HDL-C) on moderate alcohol consumption is one of the possible mechanism that has been put forward to explain the beneficial effect. Thus recognition of an association between alcohol and CHD has led to increasing interest in alcohol induced changes in lipids & lipoproteins (Rohan, 1984; Lieber, 1984). Cross sectional population studies have also shown that amount of alcohol consumption correlates positively with HDL-C (as is evident in chronic alcoholics) which is inversely related to CHD (Barrett Gorden & Suarez, 1982 : Taskinen et al., 1987). The evidence for serum levels of Apolipoproteins A-1 & B as well as the ratio of Apo A-1 to Apo B being better indicators of CHD has been emerging and is increasingly accepted. The levels of Apo-B the major component of LDL are positively correlated with development of CHD and the levels of Apo A-1 the major component of LDL are inversely correlated (Kukita et al., 1984 : Moore et al., 1988; Moorjani & Lupien, 1990 ; Huang et al., 1992). The one available Indian study has reported increased levels of very low density lipoprotein cholesterol (VLDL-C) & low density lipoprotein cholesterol (LDL-C) and raised levels of Apo B in alcohol users with average daily consumption of 21 to 62 gm of ethanol. Within the sample, subjects were classified as moderate and heavy drinkers (Vasisht et al., 1992).

Patients of alcohol dependence usually have a consumption pattern of more heavy use. Therefore it is useful to study the lipid profile in patients of alcohol dependence, to understand the effects of increasing levels of consumption.

Changes in lipid profile can also be due to the liver dysfunction, and hepatocellular damage is known to occur with longterm alcohol use (Sabesin, 1981 ; Devenyi et al., 1981 ; Duhamel et al., 1984).

This interaction is more likely to occur in patients of alcohol dependence who are long term regular users of very heavy amounts of alcohol.

AIMS

The study was carried out with the following objectives :

1) To examine the lipid profile in patients of alcohol dependence.
2) To examine the relationship between lipid profile and liver function, if any.

MATERIAL & METHOD

The experimental group (N=53) male subjects were drawn from the outpatient and inpatient facility of the Drug Dependence Treatment Centre, AIIMS, New Delhi with the inclusion criteria of :

i) Diagnosis of alcohol dependence of DSM-III-R.
ii) Age range between 18 and 60 yrs.

The control group (N=19) male subjects were recruited from amongst the hospital employees & the relatives of patients admitted to the Psychiatry Ward.

Inclusion criteria were

i) age within 18 to 60 yrs
ii) Normotensive
iii) Non-alcohol user

Exclusion criteria were

i) family history of alcohol dependence
ii) past history or family history of CHD.

A single point estimation of lipid profile & liver function parameters were carried out on venous blood sample drawn in fasting state.

Serum Total Cholesterol (TC) and Serum Triglycerides (TG) were estimated by commercially available kits from Boehringer Mannheim (B.M.). LDL-C and HDL-C fractions of cholesterol were chemically separated from serum by the method of Wilson & Spiger (1973) and Burstein et al. (1970) respectively. The cholesterol content was then estimated using Boehringer Mannheim (BM) Kits.

The liver enzymes (Serum aspartate aminotransferase, Serum alanine aminotransferase, Gamma Glutamyl Transferase (GGT)) and total serum bilirubin (T.Bil) were also estimated by commercially available kits from B.M.

VLDL-C was calculated by substracting sum of HDL-C & LDL-C from total cholesterol (TC). Concentrations of Apolipoprotein A1 (Apo A1) & Apolipoprotein B (Apo B) were analysed by immunoturbidimetric method using commercially available kits from Boehringer Mannheim (catalogue No. 1378686, 1378694). All biochemical & immunoturbidimeteric analysis were done on autoanalyser (Hitachi 704).

Wilcoxon's rank sum test was used for comparing the two groups on the measures of lipid metabolism & liver enzyme, the significant cut off was taken at $p < 0.05$.

Correlational analysis was used for correlating lipid parameter and liver function tests in the alcohol dependence group.

RESULTS

The subject in the experimental group were all regular users of very heavy amounts of alcohol. All the subjects had an average daily ethanol intake of over 100 gm with a mean of 138.7±22.6 gm, the mean duration of alcohol use was 14.25±7.8 years and the mean duration of dependence was 5.7±5.3 years. Subjects in both the groups were in the age range of 18 to 60 years. There was no difference in the dietary intake between patients and control groups.

TABLE 1

LIPID PROFILE AND LIVER FUNCTION TESTS IN ALCOHOL DEPENDENCE AND CONTROL SUBJECTS

	Experimental	Contorl	Significance
TC	202.5±38.9	156.1±36.9	p<0.001
TG	196.5±126.1	151.1±52.0	N.S
HDL	67.6±32.1	39.8±10.2	p<0.001
LDL	79.6±38.3	90.1±28.8	N.S
VLDL	57.7±39.2	29.8±9.1	p<0.01
Apo A1	113.2±34.9	93.4±18.8	p<0.05
Apo B	67.3±16.1	86.8±36.7	p<0.05
ApoA1/ Apo B	1.83±0.71	1.30±0.22	p<0.01
T Bil	0.85±0.6	0.63±0.2	p<0.05
SGOT	92.9±58.6	19.6±3.3	p<0.001
SGPT	49.2±39.0	17.7±3.1	p<0.001
SGGT	198.9±303.1	33.1±8.2	p<0.001

TABLE 2

CORRELATION OF LIVER FUNCTION TEST (LFT) WITH LIPID PROFILE IN ALCOHOL DEPENDENCE

LFT	Chol.	Tg.	HDL-C	LDL-C	VLDL-C	ApoA1	ApoB
T.Bil	0.14	-0.19	0.22	0.14	0.11	0.16	-0.22
SGOT	0.12	-0.20	0.37*	-0.04	-0.08	0.19	-0.09
SGPT	0.01	-0.12	-0.01	-0.11	-0.11	-0.06	0.09
SGGT	0.21	0.10	0.41*	-0.01	0.02	-0.12	0.13

* $p < 0.05$

Statistically significant differences were observed on most of the lipid profile indicators & liver function tests between the experimental group and the control group (Table 1). Subjects with alcohol dependence had higher levels of total cholesterol, (T.C), HDL-C, VLDL-C and aplipoprotein A-1. They had lower levels of Apoliporotein B. There was no significant difference between the groups on the serum values of triglycerides and LDL-C. Ratio of APo A1 to APo B was significant between experimental and control group ($p < 0.01$).

TABLE 3

CORRELATION OF AGE, DURATION OF USE & DEPENDENCE WITH LIPID PROFILE

Parameter	Age	Duration of use	Duration of Dependence
CHOL	0.06	0.29	-0.01
TG	-0.04	0.09	0.21
HDL-C	0.12	0.26	-0.06
LDL-C	0.08	0.05	0.06
VLDL-C	-0.08	0.06	-0.11
Apo A1	0.37 *	0.21	-0.04
Apo B	0.31	0.01	0.01

* $p < 0.05$

The relationship between liver function tests and lipid profile was suggested by correlation coeffecients (Table 2). Statistically significant correlation was observed for the HDL-C with SGOT and SGGT.

DISCUSSION

The findings, in the present study of elevated HDL & Apo A-I and lower levels of Apo B are in agreement with most of the studies on low & moderatae drinkers (Devenly et al., 1981; Taskinen et al., 1987; Moore et al., 1988; Veenstra et al., 1990) as well as alcoholic patients (Duhamel et al., 1984; Huang et al., 1992). Our findings of increased levels of Apo-A1 & decreased levels of Apo-B in alcoholic patients are in agreement to recent research, suggesting that apoliporoteins may be better correlates of cardiovscular risk. Specifically Apo-A1, major protein component of LDL is positively correlated with increased risk (Huang et al., 1992; Moorjani & Lupien, 1990). The present study needs to be seen in the light of earlier studies which appears to confirm the linear relationship between increasing amounts of alcohol use and lipid profile changes known to have protective role for CHD (Taskinen et al., 1987 & Lieber et al., 1984). The relationship between the lipid changes and the liver dysfunction in alcoholics has remained uncertain despite investigations on large sample size (Duhamel et al., 1984). Ratio of Apo A1 or Apo B appeared to be better indicator in our study than Apo A1 or Apo B individually. It is in agreement with Huang et al. (1992) who reported that increased concentration of Apo A1 supports the premise that increased levels of HDL and Apo A1 may be factors mediating the putative protective effects of alcohol in coronary artery disease (CAD). The ratio of Apo A1 to Apo B is an early predictor of coronary atherosclerosis (Van Stiphout et al., 1986; Behl et al., 1994) and may serve as an indication of level of alcohol consumption.

The single study available in the literature from India reported findings similar to these, but also reported increased levels of VLDL in alcohol users of 21 to 68 gm per day (Vasisht et al., 1992). This finding has been confirmed in the present study in a group of alcoholics with much higher levels of the atherogenic lipid VLDL in moderate to very heavy drinkers. This finding is at variance with most of the studies in the west which have found lowering of the atherogenic lipids in alcohol users along with the raise in protective lipids. This difference can be attributed to the dietary habit of high fat content & lifestyle variables which becomes more pronounced with alcohol use (Duhamel et al., 1984; Vasisht et al., 1992). It becomes necessary to consider if the documented higher risk for CHD in Indian patients compounded further by regular alcohol use. If it is so, the cardioprotective role of regular low dose alcohol use reported from the West (Veenstra et al., 1990) and the non linear association between alcohol consumption & HDL (Dai et al., 1985), needs to be examined in larger experimental data before being extrapolated to the Indian subjects. The current study indicated a strong correlation between HDL and SGOT & SGGT (Table 2). It is in complete agreement with Dai et al. (1985). Earlier, Breckeneridge (1975) had suggested that liver enzymes being crude indirect markers of enzyme induction, are most significant predictors of HDL-C.

In conclusion, this study has demonstrated definitive lipid profile changes in patients of alcohol dependence, with some correlation to the liver dysfunction. The atherogenic or cardiprotective role of regular alcohol use in Indian patients requires further study.

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