A STUDY OF LIPID PROFILE IN CHRONIC ALCOHOLICS

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ABSTRACT

BACKGROUND
There are about 2 billion people worldwide who consume alcoholic beverages. Alcohol causes 1.8 million deaths worldwide. Alcohol consumption has both health and social consequences via intoxication, alcohol dependence and other biochemical effects of alcohol. There is increasing evidence that both volume of alcohol and pattern of drinking is relevant for health outcomes. Alcohol is known to cause various types of malignancies (including oesophageal, liver), cirrhosis of liver, homicide, epileptic seizures and motor vehicle accidents.

There is increasing research in the past decades about the role of alcohol both as a risk and as a protective factor for cardiovascular disease. Beneficial effects of alcohol in coronary heart disease is seen at low to moderate levels of average volume of alcohol consumption.

The concept nowadays is that average volume of drinking and coronary artery disease shows a J shaped relationship with detrimental effects compared with abstainers at higher levels of alcohol intake. Lower levels of alcohol consumption appear to protect against coronary artery disease by favorable lipid profile i.e. an increase in HDL level and decrease in LDL level. The present study aims to study the relationship between levels of alcohol consumption and fasting lipid levels.

The aim of the study is to compare and correlate values of fasting lipid levels in moderate and heavy alcohol consumers with non-alcohol consumers.

MATERIALS AND METHODS
This study is a case-control study. The study is done over a 2-year period. Total 150 subjects were taken, both cases (100) and controls (50). Subjects are divided into 3 groups, moderate and heavy alcohol consumers and non-alcohol consumers. Detailed history was taken, and clinical examination done as per proforma. They underwent fasting lipid profile. These lipid values were compared with each other in all the 3 groups using standard statistical methods.

RESULTS
Average level of total cholesterol was lowest in moderate alcohol consumers (169) when compared to non-alcohol consumers (185) and heavy alcohol consumers (217). Serum Triglyceride levels and LDL levels were also lowest in moderate alcohol consumers when compared to both abstainers and heavy alcohol consumers.

Average value of Serum HDL levels was highest in moderate alcohol consumers (45), when compared to non-alcohol consumers (40) and heavy alcohol consumers (34). Moderate Alcohol consumption showed a favourable lipid profile when compared to abstainers and more so when compared with heavy alcohol consumers.

CONCLUSION
Moderate alcohol consumption is associated with favourable lipid profile (low LDL, Low Total cholesterol and Triglyceride levels and high HDL levels), which is a protective factor for coronary artery disease.

KEYWORDS
Alcohol/LDL/HDL/Abstainers/Moderate/Heavy/Coronary Artery Disease.

BACKGROUND
World health organization estimates that there are about 2 billion people worldwide consume alcoholic beverages and 76 million people suffer from alcohol use disorders. Alcohol consumption has health and social consequences via intoxication (drunkenness), alcohol dependence and other biochemical effects of alcohol. Alcohol use is related to wide range of physical, mental and social harms. Some diseases are fully attributable to alcohol whereas for some diseases alcohol plays a significant role along with many other factors that contribute to disease. There is increasing evidence that Alcoholic injury or disease is determined by both volume of alcohol and pattern of drinking. Overall there is a causal relationship between alcohol consumption and more than 60 types of disease and injury. Alcoholic consumption is the leading risk factor for disease burden in developing countries.

Diseases which are by definition alcohol related-
- Alcoholic psychosis
- Alcoholic polyneuropathy
- Alcoholic cardiomyopathy
- Alcoholic liver cirrhosis
- Alcoholic gastritis
- Fetal alcohol syndrome.
- Diseases with a contributory role of alcohol-
- Various malignancies in oesophagus, liver, breast, stomach, pancreas, ovarian, endometrial and bladder.
- Ischaemic stroke.
- Haemorrhagic stroke.
- Depression.
- Hypertension
- Cardiac arrhythmias
- Heart failure.

Alcohol and Coronary Heart Disease
There is increasing research in the past decades about the role of alcohol both as a risk and as a protective factor for cardiovascular disease. Coronary artery disease is one of the leading causes of death in the world. Alcohol has both harmful and beneficial consequences on coronary artery disease. Important health benefits of alcohol seen in the area of coronary artery disease is seen at low to moderate levels of average volume of alcohol consumption.

The concept nowadays is that average volume of drinking and Coronary artery disease shows a J-shaped relationship,[1,2] with detrimental effects compared with abstainers at higher levels of alcohol intake. Light to moderate drinking is associated with lower Coronary artery disease risk than abstaining or heavy drinking. Alcohol appears to protect against CAD by favourable lipid profile (By far the major effect), especially by an increase in HDL cholesterol, favorable effects on insulin resistance and may mediate fibrinolysis.

Some clinicians have opined that moderate ingestion of alcohol has produced beneficial effect on coronary circulation. Other clinicians suggest from their studies, that regular alcohol ingestion even in small doses may be harmful to cardiovascular system.

A protective mechanism has been suggested by alcohol's ability to produce changes in plasma lipoproteins especially elevation of HDL and reduction of LDL lipoproteins. Increase in plasma level of HDL is found to be associated with decrease in the prevalence of coronary artery disease. It is believed by several group of investigations based on the epidemiological studies that daily ingestion of low doses of alcohol may enhance the level of HDL. Such findings have generated a great deal of interest in the probably protective effect of alcohol against atherosclerotic disease. The coronary artery disease has been reported to reduce with low to moderate drinking in both sexes, but such benefit disappears with heavy consumption.

Lipids and Coronary Heart Disease
Elevated LDL cholesterol is a major cause of coronary artery disease as indicated by many studies. In addition, recent clinical trials robustly show that LDL lowering therapy reduces the risk for coronary heart disease. Small increments in HDL cholesterol significantly reduces the risk of coronary artery disease. (2-4% of decrease of CAD by HDL raise of 1 gm/dl)[3]

Various clinical trials revealed that elevated LDL cholesterol is a major cause of coronary artery disease. Therapeutic life style changes are the foundation for reducing cholesterol levels. In the present study an effort has been made to know the effect of moderate and high dose alcohol consumption on plasma level of lipoproteins.

Aim
To compare and correlate values of serum total cholesterol and serum lipoproteins in moderate and heavy alcohol consumers and Non-alcohol consumers (Abstainers), to determine the risk/ benefit of alcohol in coronary artery disease.

MATERIALS AND METHODS
This study is a case control study, in which both cases and controls been taken from inpatients and outpatients of NRIGH. Detailed history was taken, clinical examination been done as per proforma and investigations will be done for both cases and controls. The study is done over a 2-year period.

100 Alcohol consumers and 50 non-Alcohol consumers were studied for their fasting lipid profile. The alcohol consumers were further divided into two groups based on quantity of alcohol consumed per day into moderate alcohol consumers (n=50) and heavy alcohol consumers (n=50).

Inclusion Criteria
The subjects are divided into three groups.
- a. Non-Alcohol consumers (controls): Subjects who have never consumed alcohol.
- b. Moderate alcohol consumers: Taking less than 30 grams of alcohol per day or less than 210 grams per week.
- c. Heavy alcohol consumers: Taking more than 30 grams of alcohol per day or more than 210 grams per week.

The subjects are chosen between the age groups of 30 to 65 years of age. Only males are taken as subjects for logistic reasons.

Exclusion Criteria
Subjects who are having the following diseases or conditions are excluded.
1. Diabetes mellitus
2. Nephrotic syndrome
3. Smoking
4. Hypertension
5. Hypothyroidism
6. Chronic renal failure.

Subjects who are on the following drugs are excluded.
1. Statins.
2. Fibric acid derivatives.

3. Nicotinic acid.
4. Beta blockers.
5. Diuretics.

All the subjects underwent fasting lipid profile and values of these lipid levels were compared between all the 3 groups. They were analysed statistically using P value.

RESULTS

In the present study 100 alcohol consumers and 50 Non-alcohol consumers were studied for their lipid profile.

Group	No. of Subjects	Percentages
Moderate alcohol consumers (21 gm or 26 ml)	50	50%
Heavy alcohol consumers (62 gm or 78 ml)	50	50%
Total	100	100%

Table 1. Distribution of Alcohol Consumers Based on Quantity of Alcohol Per Day

| Lipid Profile	Non-alcohol Consumers n=50	Alcohol Consumers n=100	P Value
Total cholesterol	185.5	193.4	<0.05
Serum Triglycerides	125.9	138.1	>0.05
Serum LDL	128.6	130.4	<0.05
Serum VLDL	20.4	22.1	<0.05
Serum HDL	40.1	40.0	>0.05

Table 2. Lipid Profile in Alcohol Consumers and Non-Alcohol Consumers
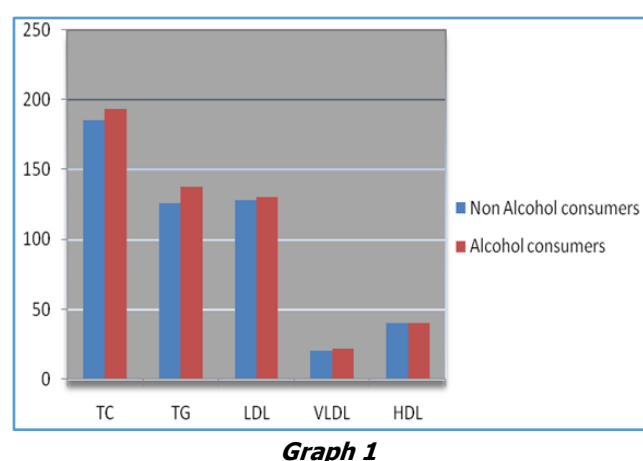
Graph 1

Lipid Profile (mg/dl)	Non-alcohol consumers n=50	Moderate alcohol n=50	Heavy alcohol consumers n=50	P Value
Total Cholesterol	185.5	169	217.8	<0.05
Serum Triglycerides	125.9	111.6	164.8	<0.05
Serum LDL	128.6	101.3	159.5	<0.05
Serum VLDL	20.5	19.9	24.2	>0.05
Serum HDL	40.1	45.8	34.2	<0.05

Table 3. Lipid Profile in Relation to Quantity of Alcohol Consumed Per day as Compared to Non-Alcohol Consumers.
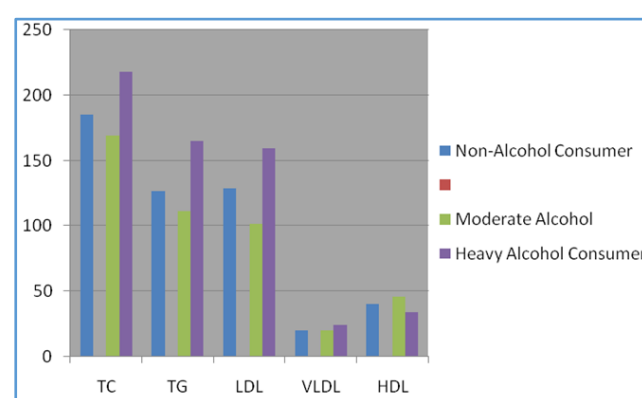
Graph 2

According to Table 3, Alcohol consumers were further subdivided into moderate and heavy alcohol group based on quantity of alcohol consumed per day and the values of each group were compared with Non-Alcohol Consumers group.

The Interpretations are-

1) Total cholesterol levels were highest in heavy alcohol consumers, moderate in non-alcohol consumers and lowest in moderate alcohol consumers. This difference is statistically significant.
2) The Triglyceride levels were highest in heavy alcohol consumers, less in non-alcohol consumers and lowest in moderate alcohol consumers. This difference is statistically significant.
3) The serum LDL levels were highest in heavy alcohol consumers, less in non-alcohol consumers and lowest in moderate alcohol consumers. This difference is statistically significant.
4) The serum VLDL levels were highest in heavy alcohol consumers, less in non-alcohol consumers and lowest in moderate alcohol consumers. This difference is statistically not significant.
5) The serum HDL levels were lowest in heavy alcohol consumers, moderate in non-alcohol consumers and highest in moderate alcohol consumers. This difference is statistically significant.

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DISCUSSION

In the present study plasma total cholesterol, serum LDL and Serum Triglycerides were significantly low in moderate alcohol consumer group compared to other two groups (Heavy alcohol consumers and non-alcohol consumers). This finding is similar in tune with observation made by other workers.[4]

Serum HDL level was significantly lower in heavy alcohol consumer group when compared to moderate alcohol consumer group, as well as abstainer group. Similar observation is also made by other workers[5]

Thus, there is inverse relationship between alcohol consumption and HDL level. Also, this inverse relationship is dose dependant,[6] i.e. it is dependent on the quantity of alcohol consumed per day as in the present study. Serum HDL was lowest in heavy alcohol consumer group when compared to moderate alcohol consumer group. Similar inverse dose dependant relationship is also seen by other workers.[7]

The present study also showed that LDL levels were highest in Heavy alcohol consumers, lowest in moderate alcohol consumers and in between in non-alcohol consumers. Serum Triglyceride levels were also higher in Heavy alcohol consumers. Thus, Heavy alcohol consumption is associated with significant higher levels of serum Triglycerides, Total cholesterol and LDL cholesterol and decreased levels of serum HDL. Whereas moderate alcohol consumption is associated with lower levels of serum Triglycerides, Total cholesterol, LDL cholesterol and high levels of serum HDL.

It is a clinical axiom that Hypertriglyceridemia patients invariably have lower HDL level. But in the present study Heavy alcohol consumers showed significantly low HDL levels without significant increase in serum Triglyceride level. This observation is also made by other workers. It is thus unlikely that alcohol consumption related decrease in serum HDL level is secondary to increase in serum Triglyceride level. The mechanism by which alcohol causes decrease in serum HDL level is still not clear.

Thus, it is shown that moderate alcohol consumers have significantly favourable lipid profile (Low plasma total cholesterol, serum LDL and serum triglycerides and high HDL levels) when compared to heavy alcohol consumers. Moderate alcohol consumers also have slightly favourable lipid profile when compared to non-alcohol consumers.[8]

CONCLUSION

The present study provides a detailed profile of the plasma lipid and lipoprotein levels according to alcohol consumption. The conclusion of the present study is that heavy alcohol consumption is associated with significantly higher levels of serum Triglycerides, Total cholesterol and LDL cholesterol and decreased level of serum HDL, which is at greater risk of development of coronary artery disease. A high HDL, low LDL, low total cholesterol and low triglycerides are considered to be favourable lipid profile[9,10] (Reducing risk of cardiovascular disease), which is found in low to moderate consumers of alcohol. Abstainers have better lipid profile in relation to Heavy alcohol consumers; but have unfavourable lipid profile when compared to moderate alcohol consumers.

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REFERENCES

[1] Corrao G, Rubbiati L, Bagnardi V, et al. Alcohol and coronary heart disease: a meta-analysis. Adiiction 2000;95(10):1505-1523.

[2] Ronskley PE, Brien SE, Turner BJ, et al. Association of alcohol consumption with selected cardiovascular disease outcomes: a systematic review and meta-analysis. BMJ 2011;342:d671.

[3] Champe PC, Harvey RA. Metabolism of dietery lipids. Lippincott's illustrated reviews: Biochemistry 2013.

[4] Zakhari S. Alcohol and the cardiovascular system: molecular mechanisms for beneficial and harmful action. Alcohol Health Res World 1997;21(1):21-29.

[5] Trevisan M, Ram M, Hovey K, et al. Alcohol drinking patterns and myocardial infarction. Am J Epidemiol 2001a;153:S97.

[6] Svardsudd K. Moderate alcohol consumption and cardiovascular disease: is there evidence for a preventive effect? Alcoholism Clinical and Experimental Research 1998;22(S7):307s-314s.

[7] Corrao G, Bagnardi V, Zambon A, et al. Exploring the dose-response relationship between alcohol consumption and the risk of several alcohol related conditions: a meta-analysis. Addiction 1999;94(10):1551-1573.

[8] Hart CL, Smith GD, Hole DJ, et al. Alcohol consumption and mortality from all causes, coronary heart disease and stroke: results from a prospective cohort study of Scottish men with 21 years of follow up. British medical J 1999;318(7200):1725-1729.

[9] Britton A, Mckee M. The relation between alcohol and cardiovascular disease in Eastern Europe: explaining the paradox. J Epidemiol Community Health 2000;54(5):328-332.

[10] Chadwick DJ, Goode JA. Alcohol and cardiovascular diseases: Novartis foundation symposium 216. New York: John Wiley & Sons Ltd. 1998.