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A Comparative Study ofLipid Profile between Chronic Smokers and Non-SmokersinDhanbad, Jharkhand, India

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Abstract: *Smoking is one of the major risk factors for coronary heart disease and peripheral vascular disorders, may lead to alter the normal plasma lipoprotein level. This study was done to evaluate lipid profile in chronic cigarette smokers and compare with non-smokers.The study was done on 50 chronic cigarette smokers and 50 healthy non-smokers of same age and weight. It was concluded thatincrease in total cholesterol, triglycerides and low density lipoproteins were noted with history ofchronic smoking. Increased amount of smoking causes more of dyslipidaemia. Policies that prevent and reduce smoking will have absolute benefits for reducing cardiovascular mortality.*

Key Words:*lipid profile, chronic smokers, non-smoker.*

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I. Introduction

Smoking is now increasing rapidly throughout world and is one of the majorproblemsfor world health. By 2030, if these trendscontinue, smoking will kill more than 9 million people per annum.Smoking is the well-known modifiable risk factor for atherosclerosis, coronary heart diseases, peripheral vascular disorderslung& chronic obstructive pulmonary diseases. Recently it has been suggested that smoking adversely affects the concentration of plasma lipids and lipoprotein levels. It has been estimated that 1% increase in plasma concentration is associated with a 2.7% increase in risk. Cigaretteleads to increase in the concentration of serum total cholesterol, triglycerides, LDL-cholesterol, VLDL-cholesterol and fall in the levels of HDL cholesterol, as reported in various studies.

Nicotine is one of the toxins present in tobacco smoke. It is found to have effect on person's catecholamine & cortisol secretion. Elevated catecholamine and cortisol alter carbohydrate and lipid metabolism lead to dyslipidemic changes which is a predisposing factor for atherosclerosis and ischemic heart disease leading to increased morbidity and mortality in smokers.

The aimof this study was to find out differences in the serum lipid profile between chronic smokers and non-smokers.

II. Materials& Methods

50 chronicsmokers (those who had smoked at least 10-15 cigarettes per day for last three years)in the age group of 18- 45 years were included in the study after obtaining written informed consent (group I). 50 healthy non-obese, non-smokers, of same age and weight selected from the patients attendants and hospital staff were included as controls (group II).Study was done among the peoples of Dhanbad, Jharkhand, India. A detailed physical examination ofthe subjects of both groups was done. Persons who are having history of Diabetes and endocrine disorder,Hypertension,Renal Disorder,Coronary Artery Disease,History of Drug intake: β-blockers, Lipid lowering drugs, Steroids; chronic Alcohol Intake/Drug abuser are excluded from the study.

3 ml of venous blood was taken in plain vial after 12 hours overnight fasting. Serum was separated by centrifugation and used for the estimation of serum lipid profile estimation. Serum lipid profile was determined by using analytical kit from ERBA Diagnostics Mannheim GmbH in semi-autoanaylzer (CHEM-5 plus V2, Erba Mannheim). Determination of serum triglycerides (TG) was done by Enzymatic glycerol phosphate oxidase – PhenolAminophenazonemethod (GPO-PAP); serum total cholesterol (TC) by Enzymatic cholesterol oxidase – Phenol Aminophenazonemethod (CHOD-PAP) & serum high density lipoprotein (HDL) by Phosphotungstic acid and CHOD-PAP method. Serum low density lipoprotein (LDL) and very low density lipoprotein (VLDL) concentration was calculated by Friedwald's formula. The significance level of different parametersbetween the studies groups were carried out usingstudents "t" test.

III. Results

The present study was composed of 50 healthy non-smokers as controls and 50 chronic smokers of age group of 18 to 45 years as the test group.

It is evident from the table-1 shows a significant increase in levels of cholesterol, triglyceride, LDL-C, VLDL-C and reduction in level of HDL-C in the groups of cigarette smokers as compared to non-smokers. There was significant increase in the mean levels of total cholesterol, LDL-C, VLDL-C, and triglycerides; while there was significant fall in mean HDL-C in smokers as compared to that in non-smokers.

Table 1shows that the mean levels of serum TG, TC, LDL & VLDL were significantly higher while mean level of serum HDL were significantly lower in cases when compared with controls. ($p<0.001$)

Parameters(in mg/dL)	Cases (Mean ± S.D.)	Controls (Mean ± S.D.)	p value
Serumtotal cholesterol	185.65 ± 36.15	160.86 ± 26.97	< 0.001
Serum triglycerides	163.86 ± 42.16	115.14 ± 39.34	< 0.001
Serum HDL	38.26 ± 7.86	47. 89 ± 7.94	< 0.001
Serum LDL	113.49 ± 26.54	88.78 ± 21.97	< 0.001
Serum VLDL	33.11 ± 8.34	24.28± 7.88	< 0.001

IV. Conclusion

This study clearly shows a strong relationship between elevation of serum lipids and cigarette smoking. The risk of increase in serum cholesterol with an increase in LDL-C and decrease in serum anti-atherogenic HDL-C has great significance. The low level of serum anti-atherogenic HDL-C in cigarette smokers and the increased exposure of the vascular endothelium to potentially atherogenic lipoproteins as a consequence of impaired clearance of triglyceride rich lipoproteins may provide a mechanism whereby smoking predisposes to greater risk of developing atherosclerotic plaques and CHD.

V. Discussion

It is revealed that triglycerides, LDL-C, VLDL-C, and TC were significantly higher in smokers as compared to non-smokers .The mean serum total cholesterol in non-smokers was 160.86 ± 26.97mg/dl while it was significantly higher in smokers, i.e., 185.65 ± 36.15mg/dl. These findings are in similar with the other study. Cigarette smoking substantially increases the risk of coronary heart disease and ischaemic stroke. The mean serum triglycerides levels in non-smokers and smokers were 115.14 ± 39.34mg/dl and 163.86 ± 42.16 mg/dl respectively. These findings are similar to those observed by Wynderet al[16] and Rustogiet al[11]. The mean LDL-C and VLDL-C values in nonsmokers were 88.78 ± 21.97mg/dl and 24.28± 7.88mg/dl respectively. But these values were significantly higher in smokers. These observations are also similar to those of Rustogiet al[11]. The mean HDL-C in non-smokers and smokers was 47.89 ± 7.94 and 38.26 ± 7.86 respectively. Similar findings have been reported by Brischettoet al[2]. Smoking causes an increase in oxidised LDL-cholesterol level which plays the key role for atherosclerotic process. A high level of LDL-C, VLDL-C and triglyceride are strongly associated with development of coronary artery disease while a low level of HDL-C is a significant independent predictor of coronary artery disease.

Cigarette smokers have a high risk of coronary heart disease than nonsmokers. Several explanations likealtered blood coagulation, impaired integrity of the arterial walls, changes in the blood lipid and lipoproteinconcentration offered by different author. Smoking promotes CHD and atherosclerosis. This may be due to nicotine in cigarette smoke causes an increase in myocardial oxygen requirement byincreasing the use of free fatty acid and also smoking by an unknown mechanism lowers the antiatherogenic factor HDL– C, remains a significant independent predictor of coronary artery disease. In our study the mean value of serum total cholesterol,serum LDL-C and VLDL-C and serum triglyceridesin cigarette smokers is significantly higher as compared to nonsmokers(Table -1.)The P values obtained with regards to all fractions of serum lipid profile are found to be highlysignificant in smokers who smoked more number of cigarettes as compared to nonsmokers. On the whole, asignificant reduction in the level of HDL-C is observed in cigarette smokers smoking for longer duration.

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