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EFFECTS OF SMOKING ON LIPIDS PROFILE

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ABSTRACT

Introduction: Smoking is an escalating public health problem in a developing country like India. WHO has recently introduced as fourth global health threat ⁽¹⁾. Cigarette smoking is a dominant annually risk factor for premature or accelerated peripheral, coronary and cerebral atherosclerosis vascular disease. In the present study an attempt has been made to find out the effect of smoking on lipids profile in healthy smokers. Results are compared with that of same age groups healthy non smokers.

AIMS

1. To study alteration in lipid profile in healthy smokers and compare the same with lipid profile of non-smokers.
2. To find out correlation between the numbers of cigarette smoked to the degree of alteration in profile in different age group.
3. To relate lipid profile alteration with duration of smoking.
4. To find risk stratification on the basis of dyslipidemia in smokers.

Material and Method: The present study was carried out at B .J. Medical College, Civil Hospital Ahmedabad. The period of study was June 2012 to December 2012. Healthy smokers were selected mainly from hospital staff and relatives of patients of civil hospital Ahmedabad. A total 130 cases were studied for estimation of lipid profile.

Conclusion: In the present study age wise prevalence of smoking is maximum in 30- 39 years group. Smoking causes alteration in lipid profile and risk of cardiovascular diseases. Amount and duration of smoking also influence dyslipidemia. The rapid reduction in risks of cardiac events after cessation of smoking implies that policies that prevent and reduce smoking will have large benefits for reducing cardiovascular mortality.

Keywords: Lipid profile, Smokers, Non smokers

INTRODUCTION

Smoking is an escalating public health problem in a developing country like India WHO has recently introduced as fourth global health threat ⁽¹⁾

Tobacco smoking is one of the most potent and prevalent addictive habits, influencing behaviour of human beings. Smoking is now increasing rapidly throughout the developing world and is

one of the biggest threats to currents and future world health. Furthermore, while the prevalence of tobacco use has declined among men in some high income countries, it is still increasing among young people and women. Cigarette smoking is the most common type of tobacco use. Tobacco continues to be the second major cause of death in the world. ⁽²⁾ By 2030, if current trends continue

smoking will kill more than 9 million people annually.⁽³⁾

Cigarette smoking is a dominant annually risk factor for premature or accelerated peripheral, coronary, and cerebral atherosclerotic vascular disease. A one to three fold increase in risk of myocardial infarction has generally been noted among current cigarette smokers .several possible explanations have been offered for this association including arterial blood coagulation ,impaired of arterial wall ,changes in blood lipid and lipoprotein concentration.⁽⁴⁾

Plasma lipoprotein abnormalities are said to be the underlying major risk factor and may even be essential for the common occurrence of atherosclerotic vascular disease. Most of the epidemiological studies indicated a rise in plasma cholesterol, low density lipoprotein (LDL), very low density lipoprotein (VLDL), and triglyceride .While high density lipoprotein in significantly reduced. Most of the studies indicate a definite correlation between smoking and lipid profile in which there is definite dose response relationship between the numbers of cigarette smoking as well as the duration of smoking and changes in the lipid profile noted Tobacco smoke contain many constitutes ;nicotine is one of the main constitutes. Nicotine causes increase in triglyceride, cholesterol and VLDL levels and decrease in High density lipoprotein (HDL) levels .It has been described that nicotine increase the circulatory pool of atherogenic LDL via accelerated transfer of lipids from HDL and impaired clearance of LDL from plasma compartment therefore it increases the deposition of LDL cholesterol in the arterial wall⁽⁵⁾ High density lipoprotein (HDL) appears to have an inverse relation to the risk of coronary heart disease, the lower concentration have higher risk of coronary artery disease.⁽⁶⁾

In the present study an attempt has been made to find out the effect of smoking on the lipid profile in healthy smokers. Results are compared with that of same age groups healthy non smokers. Exclusively healthy smokers are selected to rule

out the effects of any other parameters on alteration in lipid profile.

MATERIAL AND METHOD

The present study was carried out at civil hospital Ahmedabad. The period of study was June2012 to December 2012.healthy smokers were selected mainly from hospital staff and relatives of civil hospital Ahmedabad. A total 130 cases were studied for estimation of lipid profile.

Criteria for selection of cases (healthy smokers):

Age: ≥ 15 and ≤ 50 years

Body mass index (BMI) : < 30 (Non obese)

Healthy: Non diabetics, non hypertensive, not taking any medicine

No any other illness

Those with family history of dyslipidemia were excluded.

In study group more than 5 years of smoking.

Group I (Control):

Healthy male non smokers or those left the smoking at least before 2 years (n=30)

Group II (Smokers):

Healthy male who smoking 5 or more cigarettes and or biddies per day for at least 5 or more years they classified as:

- 1) Light smokers (n =40) : subjects smoking 5 to 10 cigarette and / or biddies per day
- 2) Moderate smokers (n=40): subjects smoking 10-15 cigarettes and/or biddies per day
- 3) Heavy smokers (n=20): subjects smoking more than 15 cigarettes and /or biddies per day

DATA ANALYSIS AND RESULTS

For the purpose of simplification and convenience, this topic is dealt with under two separate headings:

Data analysis and results for the “control group”

Data analysis and results for the: “study groups”

Age (20-50 years)

The age range in the control group is 15-50 years. (Table no -1) while in study group (Table no -2) number of subjects in study group of 30-39 years

of age group. These all cases are normal healthy persons.

All these subjects are analysed for lipid profile and other routine investigations. The results are noted and analysed.

Table no 3 showing in control group, the lowest cholesterol value is 150 mg/dl, it is in age group of 15-19 years. The highest cholesterol value is 187 mg/dl which is in the age group of 40-50 years. Thus, as the age is increasing, the cholesterol value is also increasing in normal healthy subjects. There is comparative increase in serum cholesterol level smokers as compared to non smoker. The rise is progressive from light to moderate to heavy smoker. In age group of 40-50 years is maximum raised above the normal limit. Thus, smoking has significant effect on serum cholesterol level in this age group.

Table no 4 shows lowest triglyceride value is 129 mg/dl and it is in age group of 15-19 years of age. The highest value is 150mg/dl. It is in the age group of 40-50 years healthy non smokers. All the values are within normal range .Number of cigarette smoked also plays a role in increasing the triglyceride level in blood. Thus, there is markedly rise in serum triglyceride value in all the three age group mainly in moderate and heavy smokers.

Table no 5 show lowest LDL value in control group is 84 mg/dl which is in the age group of 15-19 years. The highest value is 118.0 mg/dl which is in the age group of 40-50 years. Thus, as the age increase the serum LDL level also increase. There is a progressive increase in the level of LDL in light, moderate and heavy smokers. The lowest value is 102.5 mg/dl which is in age group of 15-19 years in light smokers. In 20-29 years and 30-39 years age group heavy smokers are having borderline high level. While in 40-50 years rise is maximum progressing from light to moderate to heavy. Serum LDL level in heavy smokers than light, moderate and non smokers.

Table no 6 shows, in control group, the lowest VLDL value 25 mg/dl and it is in the age group of 15-19 years. The highest VLDL value is 30 mg/dl.

It is in the age group of 40-50 years. Thus, there is little effect of age on VLDL level. All the values are within normal range in non –smokers. There is considerable increase in level of VLDL in heavy and moderate smokers than in light smokers. There is significant rise of VLDL in heavy smokers as compare with light, moderate and non –smokers.

Table no 7 shows- In control group, the lowest HDL value is 38.1 mg/dl which is in the age group of 40-50 years and the highest value is 48.7 mg/dl which is in age group of 15-19 years. These are within normal range in healthy subjects. There is definite decrease in the level of HDL in moderate and heavy smokers than in light smokers .All the heavy smokers are smoking >20 cigarette /biddi smoking and age also play important role in the HDL level in the blood of healthy smokers. There is significant decreased in serum HDL level in heavy smokers as compare with light, moderate and control group.

Table no 8 showing mean values of lipid profile analysis in smokers and non smokers.

Table no 9 shows comparison of lipid profile in smokers. Anova test was applied to find the significance of effect of chronicity of smoking on dyslipidemia .Results shows significant difference in lipid profile in between those who smoked for about 5-14 years, 15-19 years and more than 20 years. ($P < 0.05$)

DISSCUSION

1. In the present study age wise prevalence of smoking is maximum in 30 -39 groups. Cigarette smoking during adolescent has also increased.
2. In the present study, serum cholesterol values are found to be higher in healthy smokers compared to non smokers. In the 15-19 years values are within the normal range but towards the higher side. Maximum rise is in 40 -50 years age group. It is also affected by number of cigarettes smoked. These finding are in

accordance with the finding of the other workers.

3. In the present study, these are definite and significant
4. rise in serum triglyceride value in all the four age groups of healthy smokers, highest values (282.6 mg%) being in heavy smokers group, and in those who smoked for more than 15 years (262mg%). This established a direct relationship between the amount and duration of smoking and triglyceride level. The triglyceride levels among smokers are beyond normal range in 92% of smokers. Also very similar are given by other authors for triglycerides in smokers.
5. In the present study, serum LDL values are in the normal range in 15-19 years group. The increase in the LDL in 40-50 years age group is maximum and beyond normal range. While in middle age group it is borderline high. The LDL level also increased with numbers of cigarette smoked show direct dose response relationship. Thus age and chronicity of smoking effect on serum LDL level. And these observations are in agreement with those of other workers.
6. Serum VLDL concentration is found to be progressively increasing with increase in cigarettes consumption, highest being in heavy smokers in all the three age groups in present study.
7. Serum HDL concentration in smokers, a very consistent observations are made by all the workers establishing an inverse relationship. It is markedly decreased in old age increasing atherogenic risk.
8. Looking to the complete lipid profile, very significant observations are made in triglyceride and LDL values which are significantly high in smokers, with increasing values in light to moderate heavy smokers as compared to non smokers. Cholesterol values are definitely higher than control group but as significant as triglyceride and LDL. The HDL

concentration show remarkable decreased in smokers as compared to non smokers, making it a very valuable observation and effect of smoking on lipid profile.

CONCLUSION

In the present study age wise prevalence of smoking is maximum in 30 - 39 years group. Cigarette smoking during adolescent has also increased. Smoking causes alteration in lipid profile and increased risk of cardiovascular diseases. Amount and duration of smoking also influence dyslipidemia. Increased amount of smoking causes more of dyslipidemia. The rapid reduction in risks of cardiac events after cessation of smoking implies that policies that prevent and reduced smoking will have large benefits for reducing cardiovascular mortality.

REFERENCES

1. Soleiman M, Haji Mahmoud, Jalali F – Lipid profile and morbidity risk in smokers and non smokers. *Casp Journal Internal Medicine*.2010;1(4):128-33.
2. Yanbaeva DG, Dentener MA, Creutzberg E. Systemic Effects of Smoking. *Chest journal of the American College of Chest Physician*.2007;131:1557-66.
3. Kshitisk K, Sinha R, Bhattacharjee J A study of smoking on lipid and vitamin C metabolism *International Journal of pharma and Bio Sciences*.2010;1(4):106-13.
4. Criag WY, Palomaki GE, Haddow JE. Cigarette smoking and serum and lipoprotein concentration analysis of published data. *British medical journal*. March 1989;298:784-8.
5. Akbari Z A, Bhatti M, Shakoore M. Lipid Profile in smoking. *Journal of American coll cardiology*.2000;12.
6. Afrin L, Rahman MR, Sultana M. Lipid profile in smoking. *Journal of American coll cardiology*,2000;12

7. Agrawal OP .Text book on biochemistry 15ed 1950.
8. Henry's CLINICAL diagnosis and management By Laboratory Methods.21 ed.
9. Harrison 's principle of Internal Medicine.17 ed 2005
10. Robbins and Contran Pathologic basis of Disease.8 ed2010.
11. Rami M ,Bonu s, Jha p, Jamjoum L. Tobacco use In India : Prevalence and predictors of smoking and Chewing in a national cross sectional household survey.2003
12. Jha et al. World conference on tobacco or health. Smoking and death in India, Mumbai March 2009.
13. Ambrose J ,Baruar. The pathophysiology smoking cigarette smoking and cardiovascular disease. Journal of American coll cardiology 2004;43: 1731-7.
14. Meenkshisundaraum R. Rajendiran C, Thirumalikulundusbramanian p. Lipid and lipoprotein profile among middle aged male smokers.2010;8(1):11.
15. Hellerstein MK, Benowitz NL ,Neese R.. Effects of cigarette smoking and its cessation on lipid metabolism and energy expenditure in heavy smokers. January 1994 ; 93(1):265-72.
16. Freeman, Packard c. smoking and plasma lipoprotein metabolism ,clinical Science 1995;89:333-42.
17. Bielicki JK, Lee BC, Knoff LJ, Forte TM. Gas -phase cigarette smoke inhibits platelet -activating factor acetyldrolase activity.1997;96:1-168.
18. Ingo S, Jan E, Peter N. High -density lipoprotein concentration increase after stopping smoking. British Medical Journal May 1982;284: 1511-3.
19. Fielding CJ, Fielding PE .Molecular Physiology of reverse cholesterol transport.1995;36:211-28.
20. Karvonen M ,Orma E, Flaminio F.cigarette smoking, serum -cholesterol, blood -pressure ,and body fatness observations in finland. THE LANCET.MARCH 1959; 273(7071):492-4.
21. Kumar K, Sinha R , Bhattacharjee J.A study of effects of smoking on lipid and vitamin catabolism. International Journal of pharma and bio sciences Dec -2010;1(4)

Table 1: Age wise distribution of control group

SR.NO	AGE IN YEARS	MALE	
		NO	PERCENTAGE
1	15-20	8	23
2	20-29	8	27
3	30-39	7	23
4	40-50	8	27

Table 2: Age wise distribution of study group

AGE	MALE SMOKERS			TOTAL
	LIGHT	MODERATE	HEAVY	
15-20	8	3	23	17
20-29	8	11	27	22
30-39	7	15	23	38
40-50	8	11	27	25
TOTAL	40	40	20	100

Table 3: Age wise analysis of total cholesterol in control group and in light, moderate and heavy smokers

SR NO	AGE GROUP	CONTROL GROUP		LIGHT SMOKERS		MODERATE SMOKERS		HEAVY SMOKERS	
		NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl
1	15-19	7	150	14	173	3	198	-	
2	20-29	8	171.6	7	181.7	11	197.5	4	222.5
3	30-39	7	174	9	187	15	207	11	255
4	40-50	8	187	7	219.7	11	246.6	5	288

Table 4: Age wise analysis of triglyceride in control group and in light, moderate and heavy smokers

SR NO	AGE GROUP	CONTROL GROUP		LIGHT SMOKERS		MODERATE SMOKERS		HEAVY SMOKERS	
		NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl
1	15-19	7	129	14	154.2	3	215.3	-	
2	20-29	8	127	7	175	11	237	4	258
3	30-39	7	145	9	199	15	261	11	274.4
4	40-50	8	150	7	209	11	278	5	282.6

Table 5: Age wise analysis of ldl in control group and in light, moderate and heavy smokers

SR NO	AGE GROUP	CONTROL GROUP		LIGHT SMOKERS		MODERATE SMOKERS		HEAVY SMOKERS	
		NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl
1	15-19	7	84	14	102.5	3	118	-	
2	20-29	8	105	7	109	11	113	4	142
3	30-39	7	105.4	9	109.5	15	119	11	171.7
4	40-50	8	118	7	143.3	11	158.3	5	204.6

Table 6 : Age wise analysis of vldl in control group and in light, moderate and heavy smokers

SR NO	AGE GROUP	CONTROL GROUP		LIGHT SMOKERS		MODERATE SMOKERS		HEAVY SMOKERS	
		NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl
1	15-19	7	25	14	30	3	43	-	
2	20-29	8	25.5	7	35	11	47.7	4	49
3	30-39	7	29	9	39.8	15	52.3	11	54.8
4	40-50	8	30	7	41.8	11	55.6	5	56.5

Table 7 : Age wise analysis of serum hdl in control group and in light, moderate and heavy smokers

SR NO	AGE GROUP	CONTROL GROUP		LIGHT SMOKERS		MODERATE SMOKERS		HEAVY SMOKERS	
		NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl	NO OF CASES	MEAN VALUE mg/dl
1	15-19	7	48.7	14	39.9	3	36.6	-	
2	20-29	8	41.0	7	37.5	11	35.8	4	30.0
3	30-39	7	40.0	9	37.5	15	35.5	11	31.3
4	40-50	8	38.1	7	34.6	11	32.6	5	26.8

Table 8: Showing mean values of lipid profile analysis in smokers and non smokers

TESTS	NON SMOKERS	SMOKERS	P VALUE
TOTALCHOLESTEROL	172.5	212.3	< 0.001
TRIGLYCERIDE	138	228.8	< 0.001
LDL	104	131.4	< 0.001
VLDL	27.6	45.7	< 0.001
HDL	40.8	35.14	< 0.001

P value < 0.05 is considered statistically significant.

Table 9: Shows comparison of lipid profile in smokers

LIPID PARAMETER	MILD (5-14 YEARS)	MODERATE (15-19 YEARS)	HEAVY (>20 YEARS)
TC	201.7	231	252
TG	219	254.5	262
LDL	121.8	147.25	167.9
VLDL	43.8	50.9	52.4
HDL	36.14	32.8	31.6