

Study of Cardiac Status and Lipid Profile in Young Asymptomatic Cigarette Smokers and Tobacco Chewers

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ABSTRACT

Objective

The aim of this study was to know the effect of cigarette smoking and tobacco chewing on cardiac status and lipid profile in young asymptomatic adults and to compare the findings with socioeconomically and age matched controls. Also we compared the cardiac status and lipid profile between smokers and tobacco chewers.

Method

Cardiac status parameters like Systolic BP (Blood Pressure), Diastolic BP, Mean BP and Lipid profile parameters like HDL, LDL, VLDL, Triglycerides and Total cholesterol were studied on 30 young asymptomatic smokers, 30 young tobacco chewers and 30 nonsmokers and non tobacco chewers.

Results

The means of our studied parameters SBP, DBP, MAP, HDL, LDL, VLDL, Triglycerides and Total Cholesterol in smokers are 135.4 mmHg, 85.3 mm Hg, 102 mmHg, 29.4mg/dl, 161.8 mg/dl, 33.6 mg/dl, 167.8 mg/dl and 224.8 mg/dl respectively. For the tobacco chewers the means for above parameters respectively are 135.7 mmHg, 83.1 mm Hg, 100.6 mmHg, 31.7mg/dl, 158.9 mg/dl, 33.5 mg/dl, 167.6 mg/dl and 224.1 mg/dl and for the non smoker non tobacco chewers the means are 127.1 mmHg, 81.1 mm Hg, 97 mmHg, 41.2mg/dl, 112.6 mg/dl, 21.6 mg/dl, 107.9 mg/dl and 175.4 mg/dl respectively.

Conclusion

The young asymptomatic smokers and tobacco chewers had consistently higher blood pressure values and higher lipid profile values except for HDL levels which were lower as compared to the non smokers and non tobacco chewers. The smokers showed relatively more adverse effect on cardiac status and lipid profile when compared to tobacco chewers.

Key words: smokers, tobacco chewers, blood pressure, lipid profile.

INTRODUCTION

Smoking is an escalating public health problem, especially in a developing country like India. Cigarette smoke is a dominant risk factor for premature or accelerated peripheral, coronary and cerebral atherosclerotic vascular diseases. One to three fold increases in risk of myocardial infarction has generally been noted among current cigarette smokers.¹

Tobacco chewing is also very common in our country with tobacco chewers numbering equivalent to cigarette smokers.²

Tobacco cigarette smoking and tobacco chewing are clearly toxic to vessels causing endothelial injury by inducing impairment in prostaglandin biosynthetic capability and enhanced platelet activation.³

Smoking is also found to be associated with increased levels of low density lipoprotein cholesterol, triglycerides and decreased level of high density lipoprotein cholesterol. This directly increases the risk of coronary artery diseases.²

Various cigarette smoke products such as cotinine, polyaromatic hydrocarbons, cadmium, benzopyrene, polonium-210 and so many others are proved to be mutagenic and carcinogenic.⁴

A combine study of cardiac status and lipid profile in chronic smokers and tobacco chewers is not done till now.

Most of workers have studied the effect of cigarette smoking on lipid profile. But, in present study, we tried to evaluate correlation among cigarette smokers, tobacco chewers with altered lipid profile and controls. We also analyzed whether tobacco chewing causes same degree of alteration in lipid profile as cigarette smokers does.

METHODS

The present study is conducted in department of physiology SRTR medical college and hospital, Ambajogai. The subjects for study were the volunteers from the society. A total of 90 subjects divided in three Groups were studied. The Groups are as follows:

- ' Group A → 30 Current Smokers (> 10 years)
- ' Group B → 30 Current Tobacco chewers (>10 years)
- ' Controls → 30 Non smokers – Non tobacco chewers

The subjects were normal healthy volunteers without any current clinical complains in age Group of 20 – 40 years. A detailed history, clinical examination and routine lab investigation were done to exclude diseases. Alcoholics and patients on lipid lowering drugs, Beta blockers and thiazide diuretics were also excluded from the study. History of smoking, duration and number of cigarette smoked per day, and also history of tobacco chewing duration and number of tobacco packets per day were evaluated in each subject. Subjects smoking more than 10 cigarettes per day currently and for more than 10 years were labeled as smokers (Group

A). Subjects chewing tobacco more than 5 tobacco packets per day currently for more than 10 years were labeled as tobacco chewers (Group B). Controls are non smokers and non tobacco chewers. Informed written consent was taken from all the subjects.

Following parameters were selected for present study:

Lipid Profile

- ' Low Density Lipoproteins
- ' Very Low Density Lipoproteins
- ' High Density Lipoproteins
- ' Triglycerides
- ' Total Cholesterol

Blood pressure

- ' Systolic Blood Pressure
- ' Diastolic Blood Pressure
- ' Mean Blood Pressure

For lipid profile blood samples were taken in morning after 14 hour fast and estimation was done by enzymatic method using Beacon Kits.

Blood pressure was recorded by using sphygmomanometer by auscultatory method in supine position under basal conditions.

The obtained data was analyzed using statistical software SPSS 10.

RESULTS

The Mean, Standard Deviation, t-test and statistical significance (P value) of lipid profile parameters in Group A, Group B and Controls is as shown in Table 1. The lipid profile parameters were significantly increased in Group A and Group B when compared with controls (P < 0.001) except for HDL which was decreased significantly (P < 0.001) as compared to controls. On comparing Group A with Group B, there was no difference in lipid profile parameters except for HDL which shows significant decrease in Group A as compared with Group B (P < 0.05)

The mean of blood pressure parameters, t-test and statistical significance in Group A, Group B and Controls is as shown in Table 2. There is

significant increase in systolic blood pressure of Group A and Group B when compared with controls ($P < 0.001$). Diastolic blood pressure is increase but not significantly in Group A and Group B when

compared with controls. The mean blood pressure is increased significantly in Group A compared with controls but not significantly in Group B compared with controls. There is no difference in blood

Table 1: Comparison of lipid profile amongst cigarette smokers, tobacco chewers and control

Lipid Profile	Stats	Group-A N=30	Control N=30	Group-B N=30	Control N=30	Group-A N=30	Group-B N=30
Totalchol.	Mean(mg/dl)	224.8	175.4	224.1	175.4	224.8	224.1
	± SD	49.6	23.6	61.1	23.6	49.6	61.1
	t – test	t = 4.920		t = 4.07		t = 0.046	
	p-value	p < 0.001		p < 0.001		p > 0.05	
TG	Mean(mg/dl)	167.8	107.9	167.6	107.9	167.8	167.6
	± SD	54.2	46.1	75.1	46.1	54.2	75.1
	t – test	t = 4.612		t = 3.712		t = 0.0073	
	p-value	p < 0.001		p < 0.001		p > 0.05	
HDL-C	Mean(mg/dl)	29.4	41.2	31.7	41.2	29.4	31.7
	± SD	1.1	7.5	5.5	7.5	1.1	5.5
	t – test	t = 8.536		t = 5.602		t = 2.202	
	p-value	p < 0.001		p < 0.001		p < 0.05	
LDL-C	Mean(mg/dl)	161.8	112.6	158.9	112.6	161.8	158.9
	± SD	44.5	20.6	59.3	20.6	44.5	59.3
	t – test	t = 5.493		t = 4.041		t = 0.2149	
	p-value	p < 0.001		p < 0.001		p > 0.05	
VLDL-C	Mean(mg/dl)	33.6	21.6	33.5	21.6	33.6	33.5
	± SD	10.8	9.2	15.0	9.2	10.8	15.0
	t – test	t = 4.612		t = 3.712		t = 0.0073	
	p-value	p < 0.001		p < 0.001		p > 0.05	

Table 2: Comparison of blood pressure amongst cigarette smokers, tobacco chewers and control

Blood Pressure	Stats	Group-a N=30	Control N=30	Group-A N=30	Control N=30	Group-A N=30	Group-B N=30
Systolicb P	Mean(mmHg)	135.4	127.1	135.7	127.1	135.4	127.1
	± SD	13.3	6.2	12.7	6.2	13.3	6.2
	t – test	t = 3.107		t = 3.315		t = 0.079	
	p-value	p < 0.01		p < 0.01		p > 0.05	
Diastolicb P	Mean(mmHg)	85.3	81.9	83.1	81.9	85.3	83.1
	± SD	9.3	5.3	8.83	5.3	9.3	8.83
	t – test	t = 1.738		t = 0.6029		t = 0.9673	
	p-value	p > 0.05		p > 0.05		p > 0.05	
Mean blood pressure	Mean(mmHg)	102.0	97	100.6	97	102.0	100.6
	± SD	10.4	4.5	9.6	4.5	10.4	9.6
	t – test	t = 2.446		t = 1.878		t = 0.5524	
	p-value	p < 0.05		p > 0.05		p > 0.05	

pressure parameters in Group A when compared with Group B.

DISCUSSION

Our present study showed significantly increase in all lipid profile parameters except HDL-C which decreased significantly in cigarette smokers and tobacco chewers when compared with controls.

Similar findings were reported by N S Neki *et al.*, (2001)⁵, A Venkatesan *et al.*, (2006)¹, S B Sharma *et al.*, (2005)⁶, K V Pugalendi *et al.*, (1990)⁷, J Whig *et al.*, (1992)⁸, M Khurana *et al.*, (2000)², Micheal H *et al.*, (1980)⁹

One of the major reason for above changes is nicotine stimulates sympathetic adrenal system leading to increase secretion of catecholamines resulting in increased lipolysis, increased concentration of plasma free fatty acid which further result in increased secretion of hepatic free fatty acid and triglycerides along with VLDL-C in blood stream.⁵

Furthermore on comparing the lipid profile between cigarette smokers and tobacco chewers it was seen that there was no statistically significant difference in lipid profile of smokers and tobacco chewers suggesting that though cigarette smoking and tobacco chewing through there gaseous and chemical contents might be having different action at different sites of different organ, but as far as lipid metabolism is concerned both have equal and comparable adverse effect, probably the common culprit is nicotine. This point is worth attention as tobacco chewing is very popular in India and recent studies are showing that coronary heart disease is emerging as major killer in Indians.

Also in our study of blood pressure parameters, we observed significant increase in systolic blood pressure in cigarette smokers and tobacco chewers when compared with controls. Diastolic blood pressure was higher but statistically not significant in cigarette smokers and tobacco chewers when compared with controls. Also mean blood pressure is increased in both smokers and tobacco chewers when compared with controls but the increase is significant in cigarette smokers but

statistically not significant in tobacco chewers.

When comparison was done between cigarette smokers and tobacco chewers we found increase in systolic blood pressure in tobacco chewers than smokers though the difference is not significant. There is no significant increase in diastolic blood pressure in cigarette smokers compared with tobacco chewers. Also there is slightly increase in mean blood pressure in cigarette smokers than tobacco chewers but the difference is statistically not significant.

Our findings are in line with findings of S B Sharma *et al.*, (2005)⁶, Fennessy F *et al.*, (2003)¹⁰, Singh K *et al.*, (2004)¹¹, Wolk R *et al.*, (2005)¹².

Both cigarette smoking and tobacco chewing are forms of physiological stress which stimulates hypothalamo-pituitary-adrenal system which results in increased secretion of catecholamines which increases myocardial activity resulting in increased cardiac output and thus increased systolic blood pressure.

Diastolic blood pressure is a measure of peripheral resistance which does not undergo much fluctuation under slight physiological stressful condition. If stress is for prolonged time diastolic blood pressure may increase but our study is in young subjects. This may be the reason why there is no statistically significant difference among cigarette smokers, tobacco chewers and controls. Although diastolic blood pressure is more in cigarette smokers and tobacco chewers compared with controls.¹³

Mean blood pressure is more towards diastolic blood pressure. As diastolic blood pressure is not significantly different in cigarette smokers, tobacco chewers and controls, the mean blood pressure is also not significant statistically although we found only statistical significant difference between cigarette smokers and controls.

CONCLUSION

Our present study emphasizes the role of cigarette smoking and tobacco chewing in adverse changes on lipid profile and blood pressure. Also

our study showed that tobacco chewing has comparable effect to cigarette smoking on lipid profile and blood pressures. For further evaluation

we recommend a detailed study with a large size sample.

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