

Smoking Effect on Lipid Profile and Erythrocyte Sedimentation Rate (ESR) in Old Age Males

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ABSTRACT

Objectives: To find out changes in ESR and serum lipid profile in old age male smokers and non-smokers and risk of development of atherosclerosis.

Study Design: It is non-interventional and comparative study.

Study Period: 1st January to 1st February, 2011

Setting: This study was carried out at the Department of Pathology, Shaikh Zayed Hospital, Lahore.

Subjects and Methods: Total 60 males of old age (>65 years) were selected, out of which 30 were smokers and 30 were non-smokers. ESR was done by modified Westergren method and lipid profile was done by chemistry analyzer (Microlab 300 MERCK).

Results: A significant increase in serum total cholesterol (TC), low density lipoprotein cholesterol (LDL-c), mean serum triglyceride (TG) and ESR were observed in smokers as compared with non-smokers. While levels of serum high density lipoprotein cholesterol (HDL-c) were significantly lower in smokers as compared with non-smokers.

Conclusion: Smoking has an adverse effect on lipid profile and ESR thus enhancing the risk of atherosclerosis.

Key words: ESR, smoking, cholesterol

INTRODUCTION

Cigarette smoking is a powerful risk factor for atherosclerosis and coronary heart disease.^{1,2} There is direct relationship between number of cigarettes smoked and cardiovascular morbidity and mortality. Rise in serum TC, LDL-c, TG and fall in antiatherogenic cholesterol (HDL-c) have been reported by many authors.^{3,4} Cigarette smoke induces endothelial damage by producing free radicals such as nitric oxide and hydrogen peroxide. This oxidative stress promotes a systemic acute phase reaction thus increasing inflammatory cytokines, C-reactive protein, fibrinogen, blood cell count, whole blood viscosity and rouleaux formation. Eventually this leads to rise in ESR values.⁵⁻⁷ Motivation, advice and regular follow-up visits are as effective as medication, therefore preventive interventions are essential.⁸

Fall in estrogen due to smoking leads to decreased HDL-c, while hyperinsulinaemia in smokers leads to increased cholesterol, LDL-c, VLDL-c and TG due to decreased activity of lipoprotein lipase.⁹⁻¹¹ Nicotine stimulates catecholamines resulting in lipolysis and increased concentration of plasma free fatty acids (FFAs)

which further results in increased secretion of hepatic FFAs and triglycerides along with very low density lipoprotein cholesterol (VLDL-c) in blood.¹²⁻¹³ Tobacco use is widespread in both developed and developing countries and has been associated with mortality from cardiovascular diseases.¹⁴

AIMS AND OBJECTIVES

This study was carried out to see changes in serum lipid profile and ESR in smokers and non-smokers of old age group and their effect on coronary artery disease.

MATERIAL AND METHODS

A total of 60 males in adult age (>65) years were selected, out of which 30 who had been smoking at least five cigarettes daily for the last five years were kept in group I, while other 30 weight matched non-smokers were kept as control group II. Patients with liver disease, endocrine disorders, diabetes, hypertension, renal failure, alcoholism, obesity and those on thiazide diuretics or lipid lowering agents were excluded from the study. A detailed physical examination was carried out in both groups. After an overnight fast of 12 hours, 3

cc blood was drawn, out of which 2 cc was delivered to a tube containing dried ethyle diamine tetraacetic acid (EDTA) in the concentration of 1.5±0.25 mg/dl for estimation of erythrocyte sedimentation rate (ESR) by modified Westergrens method and 1 cc was kept in syringe for lipid profile (TC, TG, LDL-c HDL-c) by chemistry analyzer named Microlab 3000 MERCK.

RESULTS

Most of the smokers had been smoking at least five cigarettes daily for the last five years. The results are given in Tables 1 and 2.

Table 1: Lipid profile in non-smokers and smokers

Lipid Profile values/mg/dl	Non-smokers (N=30)	Smokers (N=30)	P value
Mean TC	177.0±17.0	195.0±22.0	< 0.05
Mean TG	150.0±32.0	195.0±65.0	< 0.001
Mean LDL-c	98.0±15.0	115.0±21.0	< 0.05
Mean HDL-c	46.0±4.0	43.0±5.0	< 0.001

(P value <0.05 significant, P<0.001 Highly significant)

Table 2: Erythrocyte sedimentation rate (ESR) values in mm/first hour in smokers and non-smokers

Mean ESR value mm/First hour	Non-smokers (N=30)	Smokers (N=30)	P value
	3.0±2.0	10.0±1.0	< 0.001

(P value <0.001 Highly significant)

DISCUSSION

The mean total serum cholesterol in non-smokers was 177.0±17.0 mg/dl while it was significant (P<0.05) in smokers i.e. 195.0±22.0 mg/dl. These observations are similar to the findings of Muscat and Harris.¹⁵ The mean serum triglyceride level in non-smokers and smokers were 150.0±32.0 mg/dl and 195.0±65.0 mg/dl respectively (P<0.001). These findings are consistent with Rustogi and Shrivastva.¹² The mean LDL-c in non-smokers and smokers was 98.0±15.0 mg/dl and 115.0±21.0 mg/dl respectively (P<0.05) showing significant rise in smokers similar to Rustogi and Shrivastva.¹² The mean HDL-c in non-smokers was 46.0±4.0 mg/dl and in smokers 43.0±5.0 mg/dl (P<0.001). This finding is consistent with the study of Rosenson¹¹ who reported that there is a fall in HDL-c level in smokers. The erythrocyte sedimentation rate values given in Table 2 show a highly significant rise of ESR (P<0.001) in smokers as compared to non-smokers indicating a strong association of markers of systemic inflammation with smoking. These findings are in agreement with Bennudez et al.⁶

showing greater risk of development of atherosclerosis in smokers as compared to non-smokers in old males.

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CONCLUSION

A significant increase in total cholesterol, TG, LDL-c and ESR was observed in smokers, while lowering of HDL-c was seen in same group,

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