

(4) DOES THE NUMBER OF CIGARETTES SMOKED PER DAY AFFECT THE AGE OF ONSET OF ACUTE MYOCARDIAL INFARCTION AND SERUM TOTAL CHOLESTEROL?

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ABSTRACT

INTRODUCTION : The habit of Smoking is uniquely human and is indulged in almost all over the world in different forms. It is done solely for personal pleasure and satisfaction. Tobacco is smoked by people in various forms and variable quantities wherein some people are just 'Casual smokers' while many others are 'Chain smokers'.

OBJECTIVE : The present study was conducted with a motive to compare and evaluate the effects of moderate and heavy smoking on serum cholesterol levels and the age of onset of Acute Myocardial Infarction (AMI).

METHOD : The study was conducted on 16 moderate smokers (smoking < 15 cigarettes/day) and 20 heavy smokers (smoking ≥ 15 cigarettes/day) who were admitted in the cardiology unit of J.J. Hospital Mumbai. Patients thus admitted were checked out for their cholesterol levels and age of onset of AMI and further compared with their smoking history.

RESULTS : On analysis it was revealed that Heavy smokers had a highly significant ($p < 0.001$) increase in serum total cholesterol levels than moderate smokers. Further it was also found that heavy smokers presented with AMI at a much earlier age than the moderate smokers ($p < 0.001$).

CONCLUSION : Heavy Smoking habit thus shown to be a higher contributor to cardiovascular disease than moderate smoking should definitely be prevented and avoided.

KEY WORDS : Moderate smokers, Heavy smokers, Age, Myocardial Infarction Serum total Cholesterol

INTRODUCTION :

Worldwide tobacco consumption is considered as a major health concern. Tobacco use is done mainly in two forms 1) smokeless tobacco and 2) smoked tobacco. Khaini, jarda, gutkha, etc. are examples of smokeless tobacco where the tobacco is consumed without the burning process. The smoked variety of tobacco is consumed in the form of cigarettes, bidis, cigars, hookas, etc. As the variability exists with the mode of tobacco intake, similarly different persons are addicted to tobacco in variable quantities. Some people are just 'casual' smokers who smoke a few cigarettes per day, while others are 'chain' smokers smoking quite a sizeable number of cigarettes daily.

Smoking tobacco has come to be recognized as a major contributor in the mortality and morbidity of Ischaemic heart disease. Carbon monoxide and nicotine are some of the toxic byproducts of smoking. The increased carbon monoxide in the blood of cigarette smokers damages the endothelium and facilitates the entry of cholesterol into the wall of the artery. Harmful effects like atherosclerosis, tissue anoxemia, platelet aggregation and vasospasm in the blood vessels of smokers also seem to be carried upon by nicotine and carbon monoxide which are released in the blood due to smoking. Smoking also seems to affect the plasma lipids and lipoproteins including Serum Total Cholesterol as hinted upon by many recent studies. The practice of smoking hardly has any age bars, with increasing incidence seen in the form of children too getting addicted to this deadly habit. Early onset of this habituation is also leading to an early onset of various cardiac and pulmonary diseases. Amongst the cardiac diseases IHD and Myocardial Infarction seems to be the priority of investigation amongst various studies.

The present study was thus carried out with intent to determine the effect of intensity of smoking on the serum cholesterol level and the age of onset of AMI.

MATERIALS AND METHODS

Patients admitted in the Intensive cardiac care unit under the cardiology department of Grant Government Medical College and J.J. Hospital were included in the present study. A detailed history was taken regarding their smoking habits which included the information about the number of cigarettes smoked per day. On the basis of the above history taking patients were classified as Heavy smokers who smoked 15 or more cigarettes per day and moderate smokers who smoked less than 15 cigarettes per day. 20 heavy smokers and 16 moderate smokers thus comprised the present study.

Diagnostic criteria for acute myocardial infarction were established by the treating clinicians on the basis of the presence of at least two of the following criteria:

- 1) Characteristic Chest pain
- 2) ECG changes with appearance of Q waves(transmural infarction)
- 3) Characteristic elevation of Serum aspartate aminotransferase or serum creatinekinase.
- 4) Non-Transmural infarction was diagnosed by typical ST segments and T wave changes accompanied by at least criteria No. 3

The selection of the patients as subjects for the present study was done on the basis of the following Criteria:

EXCLUSION CRITERIA:

Certain diseases as mentioned below were looked for and excluded to avoid them interfering with the present study.

- 1) **Hypertension** : Subjects were excluded if they had hypertension or were receiving antihypertensive medication.
- 2) **Diabetes Mellitus** : Patients with Fasting Blood Sugar (FBS) less than 120 mg/dl were chosen.
- 3) **Obesity** : Patients who were not overweight for their height and age were selected.
- 4) **Hypothyroidism** : Serum T3, T4 and TSH levels were seen to exclude hypothyroidism.
- 5) **Nephrotic syndrome**: This was excluded on the basis of the clinical judgment and acumen of the clinicians.
- 6) **Obstructive Liver Disease** : This was excluded on the basis of serum bilirubin(Total and Direct).

INCLUSION CRITERIA :

AGE : Male patients in the age range of 35-75 years after noting down their age have been included.

SEX : Only male patients were considered for the present study to avoid the variation in the values due to gender differences.

SOCIOECONOMIC STATUS : all patients chosen belonged to the middle socioeconomic status. Total serum cholesterol was estimated by collecting Fasting blood samples of the subjects and then using the standard CE-CO PAP Enzymatic End point Method. (1,2). Total Cholesterol Values were measured in mgs/dl.

All the results thus obtained by Laboratory analysis were noted down and subsequently used for statistical analysis.

STATISTICAL ANALYSIS

The statistical analysis of the data obtained for heavy and moderate smokers were done using Chi square test and ANOVA. p values < 0.05 was considered significant and the p values < 0.001 was considered highly significant. For the analysis of the data Microsoft Excel Software was also used. Results obtained in the study are expressed as mean \pm SD.

OBSERVATION AND RESULTS

Serum Total cholesterol levels and the age of onset of AMI were compared in the Heavy and moderate Smokers. When Serum Total cholesterol levels were analyzed it was revealed that the heavy smokers had a highly significant ($p < 0.001$) increase in the serum total cholesterol levels as compared to those of the Moderate smokers.

Similarly when Age of onset of AMI was compared it was found that the Heavy smokers had a highly significant ($p < 0.001$) earlier onset of AMI as compared to those of the Moderate Smokers.

Table showing the Serum Total Cholesterol levels and the Age of onset of AMI in the Heavy Smokers and Moderate Smokers.

	Serum Total Cholesterol levels in mg/dl	Age of onset of AMI in Years
Moderate Smokers	199.75±9.34	55.50±9.78
Heavy Smokers	227.50±13.87	43.40±6.00
Significance	$p < 0.001$ (H.S.)#	$p < 0.001$ (H.S.)##

Footnote – all the values in the table are expressed as mean \pm SD

H.S.-Highly Significant

Comparison of Serum total cholesterol levels between heavy smokers and moderate smokers.

Comparison of Age of onset of AMI in heavy smokers and moderate smokers.

DISCUSSION

Smoking has been widely associated with various deleterious effects in the human body. Chiefly among the effects are the atherogenic effects of smoking which has come to be recognized as a formidable risk factor in the morbidity and mortality of coronary heart disease and ischaemic heart disease. The risks associated with the smoking habit are often attributed to the byproducts of smoking like nicotine, carbonmonoxide and the tar content of the cigarettes. Nicotine and carbonmonoxide which are released in the blood during smoking seem to play a major role in producing the lethal effects like enhanced platelet aggregation, damaged endothelium, vasospasm, tissue anoxemia and atherosclerosis in the blood vessels. (3,4)The buildup of carboxyhemoglobin leads to a reduced oxygen carrying capacity of blood which is accompanied by a decreased tissue utilization of oxygen at the myoglobin level. (5)These effects cumulatively does have a dampening effect upon the myocardium.

Different researchers have studied the effects of heavy and moderate smoking on cardiac disease pattern.

Gardon Tavia et al in 1974 (6) had observed a higher rate of coronary heart disease and mortality in smokers smoking more than 10 cigarettes a day as compared to people smoking less.

Similarly Kaffman David et al in 1983(7) has in his study showed a increased risk of myocardial infarction with an increase in the number of cigarettes smoked per day.

Oscar Averbach et al in 1976(8) in his study on 1056 men had observed a increase in percentage of advanced atherosclerosis with an increase in the number of cigarettes smoked per day.

Studies done by some researchers have also highlighted the effect of the number of cigarettes smoked per day on serum cholesterol and lipid levels.

Hijermann ingver et al in 1976(9) had studied the inter correlation between serum cholesterol, cigarette smoking and body weight. This study showed that serum cholesterol increases with increasing daily number of cigarettes.

Cheryl Brischetto et al in 1985(10) had studied the plasma lipid and lipoprotein profiles of cigarette smokers from randomly selected families and had shown that the heavier cigarette smokers had a significantly higher VLDL and Total serum cholesterol than those smoking less. The above findings were consistent with our own study in which it was found that the heavy smokers had a highly significant ($p < 0.001$) increase in the serum total cholesterol levels as compared to those of the moderate smokers.

Relating the effects of smoking on plasma cholesterol a possible mechanism could be attributed to the fact that nicotine released from smoking stimulates the secretion of nor epinephrine, epinephrine as well as other hormones like cortisol (10, 11, 12). Such catecholamines activate the adenylyl cyclase of adipose tissue which causes lipolysis of the stored triglycerides and the release of free fatty acids (FFA) into the plasma. (7,10,13). This further results in the increased secretion of hepatic FFA and hepatic triglycerides in the blood stream. (14,15) The above factors thus contribute to the development of Dyslipidemia which is a well established risk factor for the development of CAD.

Kershbaum et al (16) reported that chain cigarette smoking increases plasma FFA levels 3-fold over the baseline value. This points toward the increased risk involved with smoking more number of cigarettes per day, thereby outlining the heavier risk involved with heavy smokers as compared to moderate smokers.

Worldwide individuals at a very young age are regularly falling prey to this lethal habit of smoking, thus affecting the age of incidence of CHD and IHD. The number of years that an individual actively smokes is also increasing because of this early habit of smoking in these youngsters.

Tamsin Lisa et al in their 1985 study (17) had shown that smoking is a risk factor for cardiovascular disease and may contribute to the occurrence of AMI at a younger age.

A study done by Doll Richard et al in 1976(18) has also shown a twofold increase of death rate among young smokers as compared to non smokers.

Singler et al in 1955(19) had examined the records of 1520 cases of coronary heart disease and found that the higher the degree of smoking the earlier was the onset of the clinical manifestations of cardiac disease.

Similar to the above study our study too revealed that when Age of onset of AMI was compared it was found that the Heavy smokers had a highly significant ($p < 0.001$) earlier onset of AMI as compared to those of the Moderate Smokers.

The effects of Cigarette smoking like transient increase in adhesiveness of platelets, acceleration of heart rate and making the myocardium more vulnerable to ventricular fibrillation along with

acute rise in the catecholamines and fatty acids are often provoked 20 or more times a day with each inhaled cigarette in heavy smokers. Due to this repetitive insult to the coronary tissues, eventually, myocardial infarction or sudden death is precipitated earlier in Heavy smokers with a already compromised coronary circulation. (20)

CONCLUSION AND SUMMARY

The present study thus brings to light the adverse effects that heavy smokers have in comparison to their moderate counterparts. Total cholesterol was found to be significantly higher in heavy smokers than the moderate smokers thus contributing to greater risk factors. Similarly age of onset of myocardial disease was seen to be significantly earlier amongst the heavy smokers. Both the above findings thus highlight the redundant effects that heavy smoking can have on the general population.

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