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Effect of Cigarette Smoking on Fibrinogen.

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ABSTRACT

Background: Cigarette smoking is one of the significant health hazards, and it contributes significantly to cardiovascular morbidity and mortality. Aim: To study the levels of serum fibrinogen among the smokers and to compare the concentration of fibrinogen in smokers. **Methods:** 150 cases admitted detailed clinical examination and history regarding smoking, alcohol, diabetes, hypertension, coronary heart disease, renal disease, any infection, surgery, and trauma are enquired. Serum fibrinogen was measured in all these 150 patients who are included in the study and the values interpreted. **Results:** The mean serum fibrinogen value in non-smokers is 318 mg%. The mean serum fibrinogen value in smokers is 489 mg. The smoker who has smoked less than 10 years have serum fibrinogen levels between 450 to 475 mg%. The persons who smoked >10 years have serum fibrinogen levels between 500 to 525 mg% with a statistical significance of 0.0001. **Conclusion:** Smoking potentially increases with smoking cessations. Increased fibrinogen level in the smokers is dose-dependent, that is directly associated with smoking duration and frequency.

Keywords: Fibrinogen, smoking, cardiovascular disease.

INTRODUCTION

Smoking produces a state of chronic inflammation which is mainly due to increased levels of free radicals. Free radicals produce oxidative stress this damages mainly the cardiovascular system, blood vessels and the central nervous system are also affected. Antioxidants do the cell damage and damage recycling process. In smokers, the antioxidants levels are reduced which causes improper cell repair and damage.[1] Smoking causes narrowing of airways which also affects pulmonary function test.[2] Cigarette also contains carcinogens. This predisposes them to many cancers. Smoking is also associated with low levels of high-density lipoprotein. This increases the risk of atherosclerosis.[3] Smoking is a mediator of inflammation. Therefore it increases the levels of acute phase reactants. One among them is fibrinogen. Fibrinogen is synthesized by the liver. Apart from its major role in the coagulation cascade, it is also produced in various inflammatory conditions as an acute phase reactant. Smoking is the main cause for chronic inflammation it increases the levels of serum fibrinogen. Increased fibrinogen keeps the blood in the hyper coagulated state.[4] Since hypercoagulation causes arterial and venous thrombosis increased fibrinogen is associated with major Cerebro and cardiovascular events.[5]

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Aim

To study the levels of serum fibrinogen among the smokers and to compare the level of fibrinogen in smokers based on their duration, amount and type of smoking.

MATERIALS AND METHODS

This study was conducted in our medical college hospital. Patients recruited from medicals wards and IMCU. A total of about 160 patients were selected and 10 of them were excluded as per exclusion criteria used. The remaining 150 patients were included in the study. Among them 100 patients are smokers and 50 are non-smokers informed consent was obtained from all patients. Serum fibrinogen value was estimated in all 150 patients admitted in our hospital.

Inclusion Criteria

1. Patients and relatives of outpatients and inpatients in Tirunelveli medical college.
2. Healthy individuals between 20 to 60 years of age.

Exclusion Criteria

Patients with history of diabetes mellitus, hypertension, hyperlipidemia, vascular disorder,

liver, kidney dysfunction, thyroid dysfunction, taking aspirin or lipid lowering drugs, Obese individuals, surgery in 3 months, patients having space occupying lesions, Subdural hematoma.

For all the 150 cases admitted detailed clinical examination and history regarding smoking, alcohol, diabetes, hypertension, coronary heart disease, renal disease, any infection, surgery, and trauma are enquired. Blood sugar, ECG and routine investigation was done. Serum fibrinogen was measured in all these 150 patients who are included in the study and the values interpreted.

RESULTS

Persons in smoking criteria falls maximally in the age group between 30 to 39 years. The mean age of smokers is 37. The mean age of non-smoker is 36. The maximal number of persons in both smoking and non-smoking criteria falls between 30 to 39 years of age. P value by chi-square method is 0.501, and the symmetrical measure value is 0.078. This proves that simply classifying the people according to the age group is of no significance. The total number of smokers in my study is 100. The total number of non-smoker in my study is 50. Smokers contribute 66.7% of my study. Non-smokers contribute 33.3% of my study. The total numbers of beedi smokers in my study are 60. The total number if cigarette smoker is 40. Cigarette smoker contributes to 40% of the total 150 persons. Beedi smokers contribute to 26.7% of total 150 persons. The maximal number of persons who smoke in my study smokes an average of 3 to 4 packs per day. The mean is 3.26 with a standard deviation of 1.440. The majority of smokers in my study smoke around 10 to 19 years. The mean value is 12.17 with a standard deviation of 6.17. The maximal number of smoker 54% in my study smoke are having pack-years of <40 years. Only 1% of the smokers are having a pack year of >120. All non-smokers have serum fibrinogen value <450 mg%. Whereas the majority of the smokers have a serum level of fibrinogen between 475 to 500 mg%. The mean serum fibrinogen value in non-smokers is 318 mg%. The mean serum fibrinogen value in smokers is 489mg. P value is <0.01. The symmetrical measure is 0.706 which proves that the level of serum fibrinogen is smokers are significant and a positive correlation between smoking and the levels of fibrinogen. Among the smoker who has smoked less than 10 years have serum fibrinogen levels between 450 to 475 mg%. The process who smoked >10 years has serum fibrinogen levels between 500 to 525 mg % with a statistical significance of p 0.000 which proves that a strong correlation exists between serum fibrinogen levels and the duration of smoking. Among the smoker with pack years, less than 40 years have serum fibrinogen levels between 450 to 500mg %. Smoker with pack years between 40 to 80 years has serum fibrinogen levels between 500 to 525mg %. Smoker with pack years more than 80 years have serum fibrinogen levels more than 525 mg%. Among the smoker who have serum fibrinogen levels between 450 to 475 mg% most of them are cigarette smokers. Among the smoker who have serum fibrinogen levels between 475 to >525 mg% most of them are beedi smokers. This result has a statistical significance of p-value 0.000 which proves that the result is significant.

Table 1: Cross tabulation of Smoking with Fibrinogen.

Fibrinogen group	Non smoker	Smoker	Total
<450	50	0	50
450-475	0	28	28
475-500	0	38	38
500-525	0	24	24
>525	0	10	10

Table 2: Cross tabulation of Duration of Smoking with Fibrinogen.

Fibrinogen	Duration of Smoking			Total
	<10	10 to 19	>20	
450-475	27	1	0	28
475-500	11	24	3	38
500-525	1	18	5	24
>525	0	6	4	10

DISCUSSION

This study is mainly done because the habit of smoking is very common in our culture. Almost every men living in my place has a habit of smoking. They are also more prone for the adverse effects of smoking. Along with smoking they are also more prone for developing other habits like alcoholism and drug abuse. One of the main adverse effect of smoking is myocardial infarction. The main substance present in smoking responsible for producing the adverse effect of smoking is nicotine. The main way by which smoking produces damage is by inflammation. One of the main substance that is produced during inflammation is fibrinogen. It is mainly responsible for the adverse effects of smoking like myocardial infarction, stroke and other thrombotic episodes. Therefore this study is carried out to find out levels of serum fibrinogen in the smokers and to compare the levels of fibrinogen according to the type, duration and amount of smoking. The results of the study are interrupted here below. Cigarette smoking is one of the major leading causes of death and essential public health problem in world over (Kume et al., 2009; Islam et al., 2007).[6] In this study we utilized a quantitative approach for the determination of fibrinogen level. We observed a significant increase in the mean of the fibrinogen level among smokers, when compared with the control group and the smoking cessation group. Increased fibrinogen levels among smokers may promote a hypercoagulable state, and may in part explain the association of smoking with high

risk for cardiovascular diseases, hypertension, stroke and clotting disorder. The effects of smoking on fibrinogen synthesis may be a part of a generalized inflammatory reaction, as smoking is strongly related to other measures of inflammation (Pearson et al., 2003; Danesh et al., 2004).[7,8] Our finding confirms that smoking potentially increases fibrinogen level. Fibrinogen level was significantly decreased among smoking cessation group, when compared with smokers group, indicating that the effect of smoking on fibrinogen level is reversible with smoking cessation. Kirsty et al. concluded that abstention from smoking for a period of only 2 weeks induces a significant decrease in the rate of fibrinogen synthesis by the liver, with a concomitant reduction in the plasma fibrinogen concentration (Kirsty et al., 2001).[9] Increased fibrinogen levels were significantly associated with the number of cigarettes smoked per day, and the duration of smoking, indicating that the association of the smoking with the increased level of fibrinogen is a dose-dependent.

CONCLUSION

Serum level of fibrinogen in smokers is significantly higher than in non-smokers. Higher level of smoking is associated with lower value of APTT. Higher level of smoking is associated with higher levels of CRP. Smokers who smoke more cigarette or beedis per day have higher level of serum fibrinogen. Smokers having higher pack years have higher levels of fibrinogen. Beedi smokers have higher levels of serum fibrinogen.

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