ejpmr, 2017,4(3), 257-259.

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

SIGNIFICANCE OF HYPERLIPIDEMIA IN BLOOD DONATION

S. Nishat Fatima Rizvi PhD Scholar[1], *Dr. Tulika Chandra[1], Dr. Abbas Ali Mahdi[2] and Devisha Agarwal, MBBBS Scholar[1]

[1]Department of Transfusion Medicine and Blood Bank, King Georg's Medical University, Lucknow, Uttar Pradesh, India.

[2]Department of Biochemistry, King Georg's Medical University, Lucknow, Uttar Pradesh, India.

Corresponding Author: Dr. Tulika Chandra

Department of Transfusion Medicine and Blood Bank, King Georg's Medical University, Lucknow, Uttar Pradesh, India.

Article Received on 29/12/2016 **Article Revised on 19/01/2017** **Article Accepted on 09/02/2017**

ABSTRACT: Hyperlipidemia refers to elevated cholesterol and or elevated triglyceride. Cigarette smoking is considered to be a major risk factor for ischemic heart disease (IHD), hypertension and hyperlipidemia. The aim of the present study was to assess the correlation between Hyperlipidemia with specific history of the blood donors. A total of 120 blood samples of blood donors were collected. Out of them 50 samples were found to be hyperlipidemic which were included as cases, while rest was taken as controls. Lipid Profile was assessed by fully automated analyzer (TRIGL:triglycerides),(LDL-C:LDL –Cholesterol plus 2nd generation),CHOL 2:Cholesterol Gen 2),HDL C 3: HDL-Cholesterol plus 3rdgeneration)-(Cobas C311-Roche Diagnostic).The smoking habit showed a significant between smoking index and hyperlipidemia. Smoking group was higher than that of control group. Results were tabulated as out of 50 hyperlipidemic, 25(50%) were heavy smokers (25.8 cigarettes per day), 15(30%) were light smokers (7.7 cigarettes per day) and 5(10%) were non-smokers. Chi square X^2=7.00; P=0.031 Smoking is important risk factors of hyperlipidemia; there was synergistic action between smokings in the development of hyperlipidemia. Therefore, this confounding factor should be included in the donor deferral criteria which lead to further deciding the exclusion criteria for donor selection. This partly explains the pattern of smoking in progression of hyperlipidemia. It will help in making the patients safe as well as the donor deferral criteria more stringent to improve the quality of blood supply and will enable blood bankers to supply safe blood and improve the guidelines for blood safety.

KEYWORDS: Smokers, Hyperlipidemia, Blood donors, Lipid profile.

INTRODUCTION: Hyperlipidemia refers to elevated cholesterol, elevated TG or both. The problem can be due to hereditary factors, but more commonly it is an acquired condition. Hyperlipidemia is a strong risk factor for CVD is well established.[1] Cigarette smoking is accepted as a major risk factor for ischemic heart disease (IHD) as well as hypertension and hyperlipidemia.[2] Certain components of cigarette smoke, such as nicotine and carbon monoxide, have been reported to be responsible for the development of IHD by increasing plasma catecholamine levels and producing hypoxia.[3] On the other hand, cigarette smoking alters plasma lipoprotein levels.[4, 6] and increases the susceptibility of low density lipoprotein (LDL) to oxidation.[7] However, the exact mechanism responsible for the harmful effect of smoking on IHD is not fully understood.[8] Health care providers are concerned about hyperlipidemia because of the well established association between lipid concentrations and risk of CVD, the leading cause of death worldwide.[9] smoking contributes to 443,000 smoking related deaths in the United States and nearly 20% of all coronary heart disease deaths can be attributed to smoking.[10,11] Mechanisms by which smoking increases CVD risk appear to be multifactorial and is not completely understood, in part because of these associations have been derived from observational studies.[12-15] Screening random donor platelets for hyperlipidemia and correlating the condition with other donor criteria such as smoking will lead to further deciding the exclusion criteria for donor selection and make blood transfusions more safe.

MATERIAL AND METHODS: This cross-sectional study was done on 120 blood samples of blood donors. The samples were collected from June 2015 to December 2015. Subjects was taken from the department of Transfusion Medicine, King George's Medical University Lucknow. Written informed consent of each participant was taken and study protocol was approved by the institutional ethics committee. Subjects with age between 18 and 65 years were enrolled for the study. The inclusion criteria for the subject selection were: haemoglobin level >12.5gm/dl and weight 45 kg or more, Pulse Rate: 60 to 100 per minute and regular, Blood Pressure: Systolic 100 to 180 mm of mercury; Diastolic 50 to 100 mm of hg.[19] Exclusion criteria were:

donors with previous transfusion within 6 month or previous donation within 3 month. Donor with known cardiac problem, endocrinal disorder, thyroid disorder, diabetes (on insulin therapy), hypertension, subjects undergoing medication like NSAIDs, steroids, anticancer drugs, were also excluded the study. A questionnaire was used to record general inform ation and the history of smoking. Out of 120 blood samples ncollected, 50 samples were found to be hyperlipidemic which were included as cases, while rest was taken as controls. After 350 ml of blood donation, 5 ml blood was collected in plain vial, serum was separated after centrifugation and different parameters of lipid was assessed by fully automated analyzer (TRIGL:triglycerides),(LDL-C:LDL –Cholesterol plus 2nd generation),CHOL 2:Cholesterol Gen 2),HDL C 3: HDL-Cholesterol plus 3rdgeneration)- (Cobas C311-Roche Diagnostic). Statistical analysis was done by SPSS software version 16.

RESULTS: The smoking habit showed a significant between smoking index and hyperlipidemia. Smoking group was higher than that of control group. Results were tabulated as out of 50 hyperlipidemic, 25(50%) were heavy smokers (25.8 cigarettes per day), 15(30%) were light smokers (7.7 cigarettes per day) and 5(10%) were non-smokers. Chi square X^2=7.00; P=0.031 (p-value < 0.05).

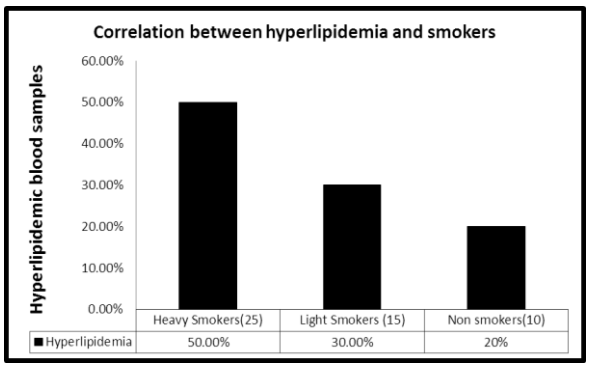

Fig: Correlation between hyperlipidemia and smokers

DISCUSSION: In our study we have discussed about the smoking habit of blood donors and compared it with hyperlipidemia and found a positive correlation between smokers and hyperlipidemia, as smoking is important risk factors of hyperlipidemia; there was synergistic action between smoking's in the development of hyperlipidemia while some study showed that among current smokers, increased smoking burden is associated with small increases in total cholesterol, LDL-C, and triglycerides. Increased recent smoke exposure is associated with small decreases in HDL-C and HDL particles.[13] While some showed that Cigarette smoking is generally accepted as the most preventable cause of death in the United States today. Individuals who smoke experience a wide range of physiologic side effects that increase the risk of cardiovascular disease (CVD), including insulin resistance, elevated catecholamine levels which contribute to an elevated heart rate and blood pressure, and hypercholesterolemia. What is more, this link is strengthened in smokers as cigarette smoking is known to increase total cholesterol (TC), triglycerides (TG) and low-density lipoprotein (LDL), while acting to decrease the cardio-protective high-density lipoprotein (HDL). Alterations in the enzymes that control lipid transport may be a key underlying mechanism contributing to these health destroying effects.[15]

Cigarette smoking is reported to be associated with an average 70% increase in the risk of death from coronary artery disease. In calculating this figure the surgeon general took into account all age groups. The excess risk of coronary artery disease associated with smoking is, however, relatively higher among younger than older adults. To date sufficient data on prospective risk to allow the calculation of meaningful risk estimates are available only for serum cholesterol: a 1% increase in serum cholesterol concentration is associated with at least a 2% increase in the risk of coronary artery disease. The 30% mean increase in serum cholesterol concentrations identified among all current smokers in the study would therefore be associated with an estimated 6 0% higher absolute risk of coronary artery disease with a range of 3 6-9 0% higher absolute risk for light to heavy cigarette smoking. According to the present estimates, at least 9% of the total excess relative risk of coronary heart disease in current smokers could be accounted for by increased serum cholesterol concentrations. A further proportion of this excess risk is likely to be accounted for by changes in the other lipid and lipoprotein variables, but this cannot be quantified until their association with the risk of coronary artery disease is better defined prospectively.[16]

Some findings indicate that cigarette smoking is associated with substantially lower levels of HDL cholesterol. Further, this association appears to be dose-dependent and is consistent with other research, indicating a possible causal relationship between cigarette smoking and lower HDL cholesterol.[17] Some study revealed that tobacco smoking is associated with a decrease in the proportion of small, dense LDL particles. Regardless of these surprising results, we do not recommend smoking, given that it is a major cause of cardiovascular disease.[18]

CONCLUSION: Smoking is important risk factors of hyperlipidemia; there was synergistic action between smokings in the development of hyperlipidemia. Therefore, this confounding factor should be included in the donor deferral criteria which lead to further deciding the exclusion criteria for donor selection. This partly explains the pattern of smoking in progression of hyperlipidemia. It will help in making the patients safe as well as the donor deferral criteria more stringent to improve the quality of blood supply and will enable

blood bankers to supply safe blood and improve the guidelines for blood safety.

Competing interests

The authors have declared that no competing interests exist.

ACKNOWLEDGEMENT

This research study received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. We would like to acknowledge the efforts of the personnel of Department of Transfusion Medicine who have helped us in carrying out our work.

REFERENCES

1. Hyperlipidemia as a Risk Factor for Cardiovascular Disease. Robert H. Nelson, MD. Prim Care. 2013; 40(1): 195–211.
2. Kannel WB:Update on the role of cigarette smoking in coronary artery disease. Am Heart J, 1981; 101(3): 319328.
3. Yokode M, Kita T, Arai H, Kawai C, Narumiya S, Fujiwara M:Cholesteryl ester accumulation in macrophages incubated with low density lipoprotein pretreated with cigarette smoke extract. Proc Natl Acad Sci, 1998; 85: 23442348.
4. McGill HC:Potential mechanisms for the augmentation of atherosclerosis and atherosclerotic disease by cigarette smoking. Prev Med, 1979; 8: 390403.
5. Topping DL:Effects of tobacco smoke and its constituents on lipid and carbohydrate metabolism. In:Clemens MJ, Ashwell M, eds. Biochemistry of cellular regulation. Boca Raton, Florida, CRC Press, 1980; Vol2, pp. 165183.
6. Craig WY, Palomaki GE, Haddow JE:Cigarette smoking and serum lipid and lipoprotein concentrations:an analysis of published data. Br Med J, 1989; 298: 784788.
7. Scheffler E, Wiest E, Woehrle J, Otto I, Schulz I, Huber L: Smoking influences the atherogenic potential of lowdensity lipoprotein. Clin Invest, 1992; 70: 263268.
8. Moriguchi EH, Fusegawa Y, Tamachi H, Goto Y: Effects of smoking on HDL subfractions in myocardial infarction patients:effects on lecithin: cholesterol acyltransferase and hepatic lipase. Clin Chim Acta, 1990; 195: 139144.
9. Murphy SL, Xu JQ, KD K. Deaths: Preliminary data for 2010. National vital statistics reports, Table B. Hyattsville, MD: National Center for Health Statistics; 2012.
10. Center for Disease Control and Prevention. Smoking-Attributable Mortality, Years of Potential Life Lost and Productivity Losses - United States. 2002–2004 [accessed 2009 Apr 8]. Morbidity and Mortality Weekly Report. 2008; 57: 1226–28.
11. American Heart Association. Heart Disease and Stroke Statistics--2009 Update. Dallas, TX: American Heart Association; 2009.
12. Ambrose JA, Barua RS. The pathophysiology of cigarette smoking and cardiovascular disease: an update. J Am Coll Cardiol. 2004; 43: 1731–37.
13. Gossett LK, Johnson HM, Piper ME, et al. Smoking Intensity and Lipoprotein Abnormalities in Active Smokers. J Clin Lipidol. 2009; 3: 372–78.
14. Benowitz NL. Cigarette smoking and cardiovascular disease: pathophysiology and implications for treatment. Prog Cardiovasc Dis. 2003; 46: 91–111.
15. Campbell SC, Moffatt RJ, Stamford BA. Smoking and smoking cessation - The relationship between cardiovascular disease and lipoprotein metabolism: A review. Atherosclerosis. 2008; 201: 225–35.
16. Craig WY, Palomaki GE, Haddow JE. Cigarette smoking and serum lipid and lipoprotein concentrations: an analysis of published data. BMJ. 1989; 298: 784–88.
17. Criqui MH, Wallace RB, Heiss G, et al. Cigarette smoking and plasma high-density lipoprotein cholesterol. The Lipid Research Clinics Program Prevalence Study. Circulation. 1980; 62: IV70– IV76.
18. Urahama N, Iguchi G, Shimizu M, et al. Smoking and small, dense low-density lipoprotein particles: cross-sectional study. Nicotine Tob Res. 2008; 10: 1391–95.
19. Blood donor selection. Guidelines on assessing donor suitability for blood donation. Annex 3. Geneva: World Health Organization; 2012. [17 August 2012].