International Journal of Multidisciplinary Research and Development
Online ISSN: 2349-4182, Print ISSN: 2349-5979 Impact Factor: RJIF 5.72
Received: 10-01-2020 Accepted: 06-02-2020 Published: 07-03-2020
www.allsubjectjournal.com
Volume 7 Issue 3; 2020 Page No. 45-47

A cross sectional study on Plasma Fibrinogen levels, BMI and Lipid profile in patients with Type 2 Diabetes Mellitus and Hypertension

Dr. Prajwal Kumar US[1], Dr. C Ramachandra Bhat[2], Dr. Monika MP[3]
[1, 3] Post Graduates, Department of General Medicine, K V G Medical College and Hospital, Sullia, RGUHS, Karnataka, India
[2] Prof and Head, Department of General Medicine, KVG Medical College and Hospital, Sullia, Karnataka, India

Abstract
Background: In the evaluation of patients with diabetes and hypertension, the presence of markers for cardiovascular risk has become important. The study was done to evaluate the levels of plasma fibrinogen in patients with diabetes and hypertension and also correlate the fibrinogen levels in these patients with BMI and lipid profile.
Materials and Methods: A total of 50 patients with Type 2 diabetes mellitus and hypertension selected by systematic random sampling were considered as cases and these patients were matched by age and sex with 50 controls after obtaining informed consent and institutional ethical clearance.
Results: 32 (64%) males and 18 (36%) females were studied among the cases and controls. The mean plasma fibrinogen levels in cases was 468.42 ± 43.72 which was significantly higher than controls. Similarly the mean BMI, LDL levels and Total cholesterol levels were also higher in cases when compared to controls. Correlation existed between plasma fibrinogen and total cholesterol.
Conclusion: Plasma fibrinogen levels, BMI, LDL cholesterol and total cholesterol levels where higher in cases than controls. Correlation was positive between plasma fibrinogen and total cholesterol.

Keywords: plasma fibrinogen, diabetes with hypertension, lipid profile, BMI

Introduction
People in low income and developing countries have started to adopt a lifestyle associated with high calorie intake and low energy expenditure which has probably increased the prevalence of obesity and Type 2 diabetes mellitus. It is predicted that the number of cases with Type 2 Diabetes Mellitus will rise from 415 million to 642 million by 2040 [1]. Even more common is Hypertension, which has an estimated 1.39 billion cases worldwide [2]. Both these conditions freqeuently coexist in an individual, and this coexistence is not just a coincidence, as the aspects of pathophysiology are shared by both these conditions, particularly those related to obesity and insulin resistance.
Hypertension is an important risk factor for diabetes associated microvascular complication, because hypertension is itself characterised by vascular dysfunction and injury. Thus vascular damage and endothelial dysfunction is amplified when diabetes and hypertension coexist. Thus, diabetes is associated with an increased risk of CVD, which is exaggerated with coexistent hypertension [3].
The excess cardiovascular morbidity and mortality in diabetes has not been completely explained by mere presence of hypertension, cigaratte smoking and hypercholesterolemia. Increased attention is paid to deranged hemostatic mechanisms and particularly, the fibrinogen in diabetics [4, 5]. But fibrinogen itself is thought to be determined by various factors like age, sex, smoking, BMI, hypertension, alcoholism, glycemic control, lipid profile and urine albumin excretion rate.
The present study was thus undertaken to estimate the levels of fibrinogen in patients with Type 2 diabetes mellitus with hypertension and study its relationship with BMI and Lipid profile.

Materials and Methods
The source of data were patients attending a tertiary care teaching hospital of Dakshina Kannada district, Karnataka from January 2019 to January 2020. A total of 50 patients with Type 2 Diabetes Mellitus and Hypertension were selected by a systematic random sampling method. Similar number of controls were selected after matching for age and sex. Diagnosis of diabetes mellitus was as per the ADA criteria [6] and Diagnosis of systemic hypertension was done according to Joint National Committee 7th report[7]. BMI was recorded as per WHO recommendations [8]. Serum lipid profile was estimated by standard enzymatic technique and plasma fibrinogen level by Clauss method.

Statistical Analysis
The data was entered in Microsoft Office Excel 2007 and SPSS version 21 was used for analysis. T test was used to find if there was a significant difference between two means and Pearson correlation was used to assess the correlation between fibrinogen and BMI, Lipid profile.

Results

Table 1: General characteristics of the study population

Characteristics	Cases	Controls	T Value	P Value	95 % CI
Number of Patients	50	50	-	-	-
No. of Males	32	32	-	-	-
No. of Females	18	18	-	-	-
Mean BMI (Kg/m^2)	25.66 ± 1.44	24.62 ± 1.24	3.8698	0.0002*	0.5067 to 1.5733
Mean Fibrinogen (mg/dl)	468.42 ± 43.72	421.32 ± 65.91	4.2109	< 0.0001*	24.9031 to 69.2969
Mean HDL (mg/dl)	46.86 ± 6.54	50.12 ± 6.88	2.4284	0.0170*	-5.9240 to -0.5960
Mean LDL(mg/dl)	159.14 ± 19.40	127.58 ± 31.89	5.9785	< 0.0001*	21.0842 to 42.0358
Mean Total Cholesterol (mg/dl)	220.68 ± 36.86	180.06 ± 32.39	5.8535	< 0.0001*	26.8490 to 54.3910

Table 2: Relationship of fibrinogen levels with BMI and lipid profile in patients with type 2 diabetes and hypertension

Pearson's Correlation	R Value	P value
Fibrinogen Vs BMI	0.142933	0.32217
Fibrinogen Vs Total Cholesterol	0.28972	0.0412
Fibrinogen Vs HDL	-0.00514	0.97196
Fibrinogen Vs LDL	0.079429	0.5836

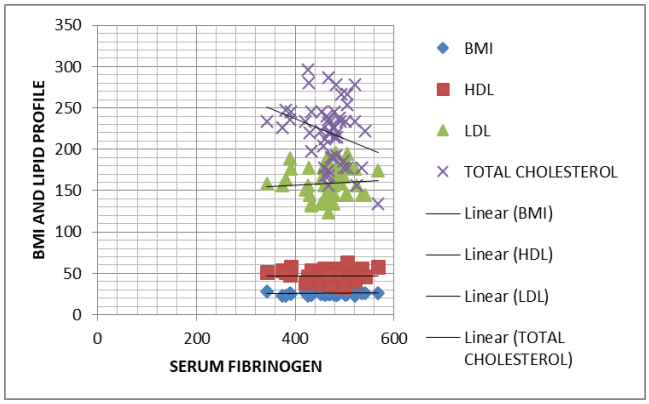

Fig 1: Correlation of Serum Fibrinogen with BMI and Lipid profile

A total of 50 patients with Type 2 diabetes mellitus and hypertension selected by systematic random sampling were studied. These patients were matched by age and sex with 50 controls. 32(64%) males and 18(36%) females were studied among the cases and controls.

The mean BMI in the study group was slightly higher when compared to the control group and this difference was statistically significant with p value less than 0.05. The mean Fibrinogen levels, LDL levels and Total cholesterol levels were also higher in the patients with diabetes and hypertension when compared to the controls. This difference was also statistically significant with p value less than 0.05.

The mean HDL levels were higher in the control group when compared to those with diabetes and hypertension. This difference was also statistically significant with p value less than 0.05.

Pearson correlation statistic was done to assess the relationship of serum fibrinogen levels in diabetics with hypertension with BMI and Lipid profile. There was a positive relationship of serum fibrinogen levels with BMI and LDL levels. Negative relationship of serum fibrinogen levels were found with Total cholesterol and HDL. However statistically significant correlation existed only between serum fibrinogen and total cholesterol.

Discussion

The present study was done to evaluate the fibrinogen levels in patients with diabetes and hypertension and also to study its relationship with BMI and lipid profile. There are various studies which show an increased fibrinogen level in patients with diabetes [9, 10, 11]. Even in the present study, the fibrinogen levels were found to be higher in patients with diabetes and hypertension when compared to the controls. This difference was also found to be statistically significant. This suggests that there exists a procoagulant state in patients with diabetes and hypertension when compared to controls which predisposes them to a cardiovascular risk.

For many years, hemostatic factor, especially serum fibrinogen levels have been implicated in the etiology of atherosclerosis and myocardial infarction. The exact mechanism of how increased fibrinogen level increases the cardiovascular risk is not fully understood. But fibrinogen is thought to play a role in the development of atherosclerosis starting from the stage of plaque formation till the formation of occlusive thrombus [12].

The various reasons for increased fibrinogen levels could be a procoagulant state in the diabetics because of an increased in number of coagulation factors scuh as plasminogen activator inhibor 1, Von-Willebrand factor, Fibrinogen, Factor VII and thrombin antithrombin complexes. Plasma levels of Lipoprotein A is also elevated in patients with diabetes. Lip A has a major role in vascular complications by decreasing fibrinolysis and thus increasing plasma fibrinogen levels [13].

A positive correlation existed between serum fibrinogen levels and BMI. But this was not statistically significant. This finding was similar to that obtained by Ying Zhao et al [14]. But there are also studies which show a relationship between BMI and fibrinogen levels as seen in Bembde AS [12], Jain A et al [11], DR Kaflee et al [15] and Harsoor S et al [16].

In the present study, HDL cholesterol was lower while LDL cholesterol and total cholesterol was significantly higher in patients with diabetes and hypertension when compared to controls. The results are similar to those obtained by Nancy Ibeh et al [17]. This is in contrast to a study done by Isezue *et al* [18] who studied a cohort of Nigerian subjects with type 2 diabetes, hypertension, and diabetes coexisting with hypertension. It was reported that there was no significant difference in the means of total cholesterol, HDL-cholesterol, LDL-cholesterol, and triglyceride levels among the study groups. The research concluded that concurrent hypertension and type 2 diabetes does not necessarily result in a more severe dyslipidemia than when either of the two

Conditions occurs in isolation. Plasma fibrinogen correlated negatively with HDL. This result was similar to that of Nancy Ibeh et al [17].

The mean BMI, Plasma fibrinogen levels, Total cholesterol and LDL levels were higher in patients with diabetes and hypertension when compared to controls. There existed a correlation between fibrinogen levels and total cholesterol.

Limitation

The study is limited by a small number of study subjects in both the groups.

References

1. Ogurtsova K, da Rocha Fernandes JD, Huang Y, IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. Diabetes Res Clin Pract. 2017; 128:40–50.
2. Mills KT, Bundy JD, Kelly TN. Global disparities of hypertension prevalence and control: a systematic analysis of population-based studies from 90 countries. Circulation. 2016; 134:441–450.
3. Petrie JR, Guzik TJ, Touyz RM. Diabetes, Hypertension and Cardiovascular Disease: Clinical insigts and Vascular mechanisms. Can J Cardiol. 2018 34(5):575-584.
4. Fuller JH, Keen H, Jarrett RJ, Omer T, Meade TW, Charkrabarti R. Haemostatic variables associated with diabetes and its complications. Br Med J. 1979; 2:964–966.
5. Kannel BW, Wilson WF, Belanger AJ, Gagnon Dr. D' Agostino BD. Diabetes, fibrinogen, and risk of cardiovascular disease: the Framingham experience. JAMA. 1987; 258:1183–1186.
6. American Diabetes Association. 2. Classification and diagnosis of diabetes: Standards of Medical Care in Diabetes, 2020. Diabetes Care 2020 43 (Suppl. 1):S14–S31
7. JNC 7. National High Blood Pressure Education Program. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Available at https://www.nhlbi.nih.gov/files/docs/guidelines/jnc7full.pdf. Accessed on 19/12/2019.
8. Nuttall FQ. Body Mass Index. Obesity, BMI and Health: A Critical Review. Nutr Today. 2015; 50(3):117-128.
9. Imperator G, Riccardi G, Iovine G. Plasma Fibrinogen: A new factor of metabolic Syndrome. Diabetes Care. 1994; 21(4):649–54.
10. Metan SB. Evaluation of plasma fibrinogen levels in Type 2 Diabetes Mellitus and its Correlation with HbA1C levels. GJRA. 2017; 6(4):2277-8160.
11. Jain A, Gupta H, Narayan S. Hyperbrinogenemia in patients of diabetes mellitus in Relation to glycemic control and urinary albumin excretion rate. J Assoc Physicians India. 2001; 49:227-30.
12. Bembde A. A Study of Plasma Fibrinogen Level in Type-2 Diabetes Mellitus and its Relation to Glycemic Control Indian J Hematol Blood Transfus. Indian J Hematol Blood Transfus. 2012; 28(2):105-108.
13. Mohan A, Srinivasan V, Deepa R, Mohan V. Lipoprotein (a): role in diabetes and its vascular complications. JAPI. 2001; 49:1100-1105.
14. Zhao Y, Zhang J, Zhang J, Wu J. Diabetes Mellitus Is Associated with Shortened Activated Partial Thromboplastin Time and Increased Fibrinogen Values. Plos ONE. 2011; 6(1):e16470.
15. Kaflee D, Shrestha P. Study of brinogen in patients with diabetes mellitus. Nepal Med .Coll J 2010 12(1): 34-37.
16. Harsoor S, Kinagi A. Correlation of Plasma Fibrinogen with Blood Pressure, BMI, Lipid Prole and Glycemic Status in Type II D M". JEMDS. 2014; 3(68):14615-14627.
17. Ibeh N, Aneke J, Chide OE, Enemuo E, Chukwuemeka U, Ibeh C. Plasma fibrinogen correlates with lipid profile in Nigerian patients with hypertension and diabetes coexisting with hypertension. Afr J Med Health Sci. 2016; 15(1):1-6.
18. Isezuo SA, Badung SL, Omotoso AB. Comparative analysis of lipid profiles among patients with type 2 diabetes mellitus, hypertension and concurrent type 2 diabetes and hypertension: A view of metabolic syndrome. J Natl Med Assoc. 2003; 95:328-34.