

Original Article

Study of plasma fibrinogen levels with Hypertension, Dyslipidemia, BMI, and Glycemic status in type 2 Diabetes Mellitus

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Introduction : A prospective study of correlation of plasma fibrinogen with Blood Pressure, BMI, and lipid profile and glycemic status in type 2 Diabetes Mellitus (DM).

Method : The study included 100 cases of type 2 diabetes mellitus that attended the outpatient and admitted as in patient at Jawaharlal Nehru Medical College and Associated Group of Hospitals, Ajmer. A detailed history and physical examination was done ie, measurement of blood pressure and anthropometric measurements as height, weight and body mass index. Laboratory Investigation like plasma fibrinogen, serum lipid profile, blood sugar and HbA1c was done.

Result : Detailed Statistical analysis was done and the data that emerged from the study was represented in the form of statistical table and geographical plates.

Conclusion : The study shows increase in plasma fibrinogen level with age and more in hypertensive than normotensive. There was also positive correlation with BMI and HbA1c lead to increase in plasma fibrinogen. There is also positive correlation with serum cholesterol and triglyceride level and negative correlation with serum HDL.

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Key words : Diabetes, Hypertension, Dyslipidimia, Fibrinogen.

During past decade the potential role of haemostatic factors particularly fibrinogen in various disorders and their complication has gained considerable interest. The plasma fibrinogen predicts cardiovascular events in both general population and diabetics and non diabetics with clinical vascular disease.

Elevation of fibrinogen level and impaired fibrinolysis are more common in diabetic than non diabetics. Increase plasma fibrinogen concentration with those of other acute phase reactants in the emerging view of sub clinical inflammation as a characteristic of and possibly a risk factor for type 2 diabetes mellitus.

Fibrinogen is an acute phase reactant synthesized in the liver and comprise of 2 to 3% of plasma protein. Fibrinogen is associated with various pathophysio-

Editor's Comment :

- Hypertensive, Diabetic, Obese & dyslipidemic Patients have increased plasma fibrinogen levels it can be used as a marker of metabolic syndrome.

logical processes. It is involved in coagulation, blood rheology, platelet aggregation, and endothelial dysfunction. Fibrinogen is a component of atherosclerotic lesion at every stage of evolution even at the earliest.

A relationship between fibrinogen and cardiovascular disease was first described in 1950s when plasma fibrinogen was slightly elevated in patient with IHD.

In the present study an attempt is made to correlate the level of fibrinogen with blood pressure, BMI, smoking, history of hypertension and lipid profile and glycemic status of the patient

AIMS AND OBJECTIVE

1. To know the fibrinogen levels in patients of type 2 diabetes mellitus
2. To correlate plasma fibrinogen levels in patients of type 2 diabetes mellitus with blood pressure body mass index, lipid profile and glycemic status.

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MATERIAL AND METHOD

A prospective study of Correlation of Plasma Fibrinogen with Blood Pressure, BMI, Lipid Profile and Glycemic Status in type 2 diabetes mellitus in JLN Hospital, Ajmer over a period of 15 month from June 2013 to August 2014. The study included outpatient and inpatient at Jawaharlal Nehru Medical College and associated Hospital. Patients informed consent taken. Detail history and physical examination done along with anthropometric measurement. Laboratory data included blood sugar HbA_{1c} lipid profile, and plasma fibrinogen level. Other additional investigation was done wherever they needed. Plasma fibrinogen level was done by thrombin clotting method by fibroquant kit.

Z test, CHI square test and Pearson correlation coefficient have been used to find the significant of study parameter statics software PRIMER an SPSS version 20 were used for the analysis of data and Microsoft word and excel have been used to generate graph and tables.

RESULT

- In the present study 63 were male patient and 37 were female patients. In these 25 were of 40-49 age group, 39 were age group of 50-59, 22 were of 60-69, 12 were of 70-79, and 2 patient were of >80.
- In the present study there was age related increase in plasma fibrinogen level among type 2 diabetes mellitus patient. The patient in the age group of 40-49 years showed (6.17± 1.27g/l) plasma fibrinogen level. The patient in the age group of >80 years had (7.10± 0.14g/l).
- In this study female patient shows comparatively higher level than male patient. Female patient shows (6.47±1.72 versus 5.80±1.57) from male.
- Mean level of plasma fibrinogen with family history of hypertension and diabetes compared to those without family history (7.45±1.10 versus 5.12±1.98g/l). Out of 100 patient 26 patient had family history of diabetes or hypertension or both.
- Among 63 male patient 33 were smoker and 30 were non smoker the smoker had (6.90±1.01g/l) fibrinogen level compared to (4.32±1.15g/l) level in non smokers.
- From total 100 patient 62 had hypertension and hypertensive patient had (6.26±1.67g/l) level compared to patient without hypertension (5.75±1.40g/l).
- In this study BMI of patient ranges from 17.58 to 38.26kg/m² and fibrinogen level ranges from (5.65±0.65 to 7.00±1.15g/l). BMI more than 30kg/m² had higher fibrinogen level (7.00±1.15) compared to those with less body mass index.
- From total 100 patient maximum number patient had serum level of cholesterol of 150-199 and mean plasma fibrinogen level in range of (5.76±1.43)g/l and the patient had serum cholesterol level of 250-299 with mean plasma fibrinogen level of (7.41±1.82)g/l.
- The patient who had serum triglyceride level between 100-149 had plasma fibrinogen level about 3.19±0.15g/l and those with serum triglyceride level more than 400 mg/dl had (9.80±0.85g/l) plasma fibrinogen level.
- In this present study patient with HDL level 30-34mg/dl with mean plasma fibrinogen level (6.63±1.72g/l) and patient had HDL level 45-49 had mean plasma fibrinogen level of (4.39±1.10g/l).
- In this present study total 37 patient had LDL cholesterol level 50-99 had mean plasma fibrinogen level of (5.73±1.47g/l) with 54 patients having mean plasma fibrinogen level of (6.10±1.55g/l).
- In comparison of plasma fibrinogen level with glycosylated haemoglobin level 13 patient having HbA_{1c} level 6.0-6.9 have mean plasma fibrinogen level of (3.55±0.34g/l), 29 patient had HbA_{1c} level 7.0-7.9 had plasma fibrinogen level of (4.96±0.52g/l), 48 patient having HbA_{1c} level 8.0-8.9 had mean plasma fibrinogen (7.08±0.59g/l) 8 patient having HbA_{1c} level 9.0-9.9 had mean plasma fibrinogen level of (8.43±0.16g/l), and 2 patient having HbA_{1c} level of >10 had mean plasma fibrinogen level of (8.43±0.16g/l).

DISCUSSION

Fibrinogen which was earlier found to be raised in inflammatory condition but now it has emerged as one of the cardio vascular risk factor. So it has gained much more importance today. Patient with high fibrinogen level are more prone to develop myocardial infarction, stroke and peripheral vascular disease.

- In this present study age group of the patient range from 40-85 years and maximum no. patient were seen in age group of 50-59 sex distribution show male predominance. The result shows age related increase level of plasma fibrinogen from (6.17±1.27 to 7.10±0.14g/l) this is possibly due to age related decrease in fibrinogen degradation.
- Female are having more level of plasma fibrinogen level compared to men (6.47±1.72 versus 5.80±1.57g/l). May be due to the structural difference in fibrinogen which resist the lysis of fibrinogen lead to increase level and addition of two allele possibly lysine which causes functional difference in fibrinogen level which causes reduce incidence of IHD, STROKE and PVD.

3. There is higher mean plasma fibrinogen level in patient with family history of hypertension and diabetes compared to those without family history (7.45 ± 1.10 versus 5.12 ± 1.98 g/l) these incidence of heritability suggest genetic component may be a contributor.
4. In this study patient of diabetes with duration of diabetes ranging from the less than one year to twenty five year patient with longer duration having decrease level of fibrinogen possibly due to use of insulin lead decrease in fibrinogen survival.
5. There is higher level of fibrinogen in smoker than non-smoker. Smoker had (6.90 ± 1.01 versus 4.32 ± 1.15 g/l) possibly smoking lead chronic stimulation of monocyte which secrete the IL-6 which increase the synthesis of fibrinogen level.
6. In our study, higher plasma fibrinogen levels were noted in type-2 diabetic patients with hypertension compared to normotensives. Out of 100 patients, 62 patients had hypertension. The difference in plasma fibrinogen levels among hypertensive and normotensive patients was statistically insignificant (6.26 ± 1.67 versus 5.75 ± 1.40 ; $p > 0.05$).
7. Glycosylated haemoglobin showed a linear correlation with plasma fibrinogen level in this study. Mean plasma fibrinogen value increased as HbA1C value increased.
8. The body mass index (BMI) was correlated in each patient and was correlated with plasma fibrinogen levels and found that there was positive correlation between BMI and plasma fibrinogen level. All the patients with BMI more than 30 Kg/m², had significantly higher plasma fibrinogen levels, compared to others.
9. In the present study, serum lipids were measured in each patients such as serum cholesterol, triglyceride, HDL and LDL and their correlation with plasma fibrinogen level was ascertained. The positive correlation was found between cholesterol level, LDL level and triglyceride levels and negative correlation between HDL level and plasma fibrinogen

level. Possible explanation for increase level of fibrinogen level in this metabolic syndrome condition is that these conditions are associated with low grade inflammatory response which releases the cytokines like interleukin 6, tumor necrosis factor-alpha which lead to increase fibrinogen level which can be reversed by increase in physical activity.

CONCLUSION

The study shows increase in plasma fibrinogen level with age and more in hypertensive than normotensive. There was also positive correlation with BMI and HbA1c. Increase in BMI and HbA1c lead to increase in plasma fibrinogen. There is also positive correlation with serum cholesterol and triglyceride level and negative correlation with serum HDL.

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Conflict of Interest : None

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