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D-DIMER IN IDENTIFYING PROGRESSION OF DIABETES MELLITUS

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ABSTRACT

Diabetes has acquired an epidemic character. The death in diabetic patients is due to thrombotic event due to cardiovascular cause, which is sometimes related to hypercoaguability. D – dimer is a direct marker for fibrinolytic and coagulation activity. Using D - dimer with other biomarkers like blood glucose, serum lipids and cardiac enzymes can predict the risk of progression of diabetes.

KEYWORDS: D-dimer, Diabetes, Coagulation.

INTRODUCTION

Diabetes has acquired a epidemic character due to large increase in number of individual affected, over recent decades. Diabetes related mortality is because of thrombotic events especially cardiovascular. In general patients with diabetes presents symptoms of hypercoauguability and hypofibrinolysis.[1] D-dimer is a direct marker of fibrinolytic activity. It is a clinical screening marker of preceding coagulation activity.[2]

It is known that D-dimer is associated with an increased risk of arterial thrombotic events, irrespective of baseline vascular disease, even after adjusting for confounders such as age, smoking and diabetes. Given the high risk of cardiovascular death in patients with PAD and the uncertainty regarding the individual risk profile, there is a need for simple markers that can help identify patients at risk. D-dimer is such a simple test. High – risk patients could thus be monitored and treated more intensely. Our objective was therefore to assess the utility of D-dimer as a marker of morbidity and death.[3] D-dimer levels that became increasingly higher than control as the disease progressed from pre-diabetes to cardiovascular complications was observed. A statistically significant difference was observed between control versus diabetes. Using d-dimer in conjunction with other biomarkers to identify stages of disease progression to macrovascular complications.[4]

MATERIAL AND METHOD

The study was done over a period of one year (June 2016 to May 2017). Fifty four previously or newly diagnosed diabetic patients were taken in the study. Their blood sugar levels were correlated with the d-dimer levels at that same time.

D-dimer was done using NYCOCARD test. This test is based upon an immunometric flow-through principle.

The cut-off value for the sample was 0.3mg/L.

Normal subjects are expected to have a d- dimer concentration below 0.3mg/L. The sample material is citrated platelet-free plasma.

Data Analysis

Our study included 54 patients.

The random blood sugar value was divided into three categories.150 to 300 mg/dl, 301 to 400 mg/dl and more than 400mg/dl which was given as ↑,↑↑,↑↑↑ respectively.

30 patients had value between 150 to 300 mg/dl, 18 patients had value between 301 to 400 mg/dl, and 6 patients and value more than 400mg/dl.

For cardiac enzymes only positive and negative value was given. Out of 54 patients, 8 patients showed positive value.

In serum lipids mainly triglycerides and LDL cholesterol was considered.

Here value < 150 mg/dl, borderline high 150-199 mg/dl and high 200-499mg/dl, was given as ↑,↑↑,↑↑↑.

Out of 54 patients 5 patients had value between 200-499mg/dl, 11 patients had value of 150-199 mg/dl and 12 patients had value of < 150 mg/dl.

52 of 54 patients had d dimer value of > 0.3 mg/L.

In our study, we included patients having raised blood sugar. Amongst them 52 patients had raised d-dimer levels. Those having more deranged d-dimer had more raised blood sugar and more deranged lipids.

8 patients had positive cardiac enzymes.in these patients most i.e., 7 patients had d-dimer value of above 5mg/l.Only one patient had value of 3.74mg/l, even though he was positive for cardiac enzymes.

DISCUSSION

Changes in D - dimer levels indicate diabetes disease progression to macrovascular complications. D-dimer levels that became increasingly higher than control as the disease progressed from pre-diabetes to cardiovascular complications. Using D - dimer in conjunction with other biomarkers to identify stages of disease progression, commencing from pre-diabetes and continuing to development of asymptomatic and clinical cardiovascular disease in diabetes mellitus.[5,9] When we compared plasma D-dimer levels between diabetes without complications and diabetes with positive cardiac enzymes i.e., with coronary artery disease, plasma D - dimer levels were found to be significantly higher in patients with positive cardiac enzymes.

Ezekiel U.Nwose et al concluded that using D-dimer in conjunction with other biomarkers identify stages of disease progression.[4]

Dhara Kanani et al has suggested that in patients with diabetes, presenting with coronary artery diseases without dyslipidemias, the D-dimer can serve as a novel marker for prediction of the coronary artery diseases. A higher level of D-dimer in diabetic nephropathy patients suggest that increased thrombogenic state may be related to increased susceptibility of vascular diseases in these patients.[5]

In the present study, the patients having increased random blood sugar also had increased D -dimer values. The value of D-dimer is even more in patients having deranged blood sugar values.

The patients having positive cardiac enzymes had even more increased D – dimer values in the mean range of 7.21 mg/L.

Plasma D-dimer test is now routine and can be measured easily. So we can use complimentary test in early identification of complications.

In the present study the D -dimer values are raised in patients having deranged blood sugar, dyslipidemias and cardiac enzymes.

D-dimer if employed as an additional test may improve the risk assessment for early coronary artery disease in DM patients. In our study there is higher concentration of D - dimer in coronary artery diseases. It indicates increased pro-coagulant activity. D-dimer, hence, can be used as an additional, novel biomarker of diabetic complications.

Previous studies have not observed consistent significant correlations of D-dimer with diabetes mellitus (type 2) and systolic blood pressure. However, it is known that diabetes and hypertension can contribute to cardiovascular mortality.[10] High plasma d-dimer levels and the increased risk of arterial thrombotic event can possibly be found in the fact that d-dimer is part of the so-called inflammation-coagulation – axis.[3] D-dimer is simply a marker of the extent of the disease and therefore related to the event.

According to the study done by E U Nwose et al; there is an identifiable, steady, unidirectional increase in D-dimer levels in the progression of diabetes mellitus. Positive D-dimer level is salient in pre-diabetes conditions. Using D-dimer determination to complement cholesterol profile could improve risk assessment for early CVD identification and intervention during pre-clinical diabetes.

On the basis of knowledge of coagulation/fibrinolysis imbalance in DM, the observation of plasma D-dimer in complicated DM patients, we can use at least complimantary role of D-dimer in early identification of complications.

CONCLUSION

Elevated levels of D-dimer are associated with increased risk of arterial thrombotic events. D-dimer is a simple tool to identify patients at increased risk. Elevated D-dimer seems to be a better predictor for the short term rather than long-term risk of thrombotic events.

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