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To assess mean platelet volume in type II diabetes mellitus patients

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Abstract

Background: Diabetes mellitus (DM) is a widespread disease. The present study was conducted to assess mean platelet volume in type II diabetes mellitus patients.

Materials & Methods: The present study was conducted on 116 type II diabetes mellitus patients of both gender. Mean Platelet volume (MPV) estimation was done in the laboratory by five part fully automatic hematology analyzer by Horiba ABX pentra 80.

Results: Out of 116 patients, males were 76 and females were 40. The mean platelet volume in diabetic patients was 8.52 fL and healthy patients was 7.69 fL. The difference was significant ($P < 0.05$).

Conclusion: Authors found increase platelet volume in diabetic patients as compared to healthy.

Keywords: Diabetes, Platelet, Glucose

Introduction

Diabetes mellitus (DM) is a widespread disease, currently the most common endocrine disorder around the world. DM comprises a group of common metabolic disorder that share the common phenotype of hyperglycemia^[1].

The onset of T2DM is often silent and insidious. Pathogenic processes causing T2DM range from autoimmune destruction of the B cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action^[2]. DM is characterized by asymptomatic phase between actual onset of hyperglycemia and clinical diagnosis which has been estimated to last at least 4-7 years. The asymptomatic phase of hyperglycemia accounts for the relatively high prevalence of complications at initial presentation. Diabetes is known to cause microangiopathy and affects small caliber vessels leading to end organ damage like DR. DR is a very common, potentially preventable, long term, microvascular complication of diabetes mellitus and a leading cause of visual disability and blindness^[3].

The mean platelet volume (MPV) is a marker of platelet activation. Although there are other methods of assessing platelet function, but they are more expensive or time-consuming. The determination of platelet size by quantification of the MPV, using automated hemograms, is simple and inexpensive. Increase in MPV has been recognized in patients with the metabolic syndrome, stroke and DM. Moreover, studies have shown that increased MPV is one of the risk factors for myocardial infarction, cerebral ischemia and transient ischemic attacks^[4]. The present study was conducted to assess mean platelet volume in type II diabetes mellitus patients.

Materials and Methods

The present study was conducted in department of Internal Medicine. It comprised of 116 type II diabetes mellitus patients of both gender. Equal number of healthy subjects was taken. The study was approved from institutional ethical committee. All patients were informed regarding the study and written consent was taken.

Data such as name, age, gender etc. was recorded. Routine baseline investigations hemoglobin (Hb), total leucocyte count (TLC), differential leucocyte count (DLC), peripheral blood smear PBF fasting blood glucose (FBS), lipid profile, blood urea, serum creatinine serum electrolytes were done. Mean Platelet volume (MPV) estimation was done in the laboratory by five part fully automatic hematology analyzer by Horiba ABX pentra 80. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

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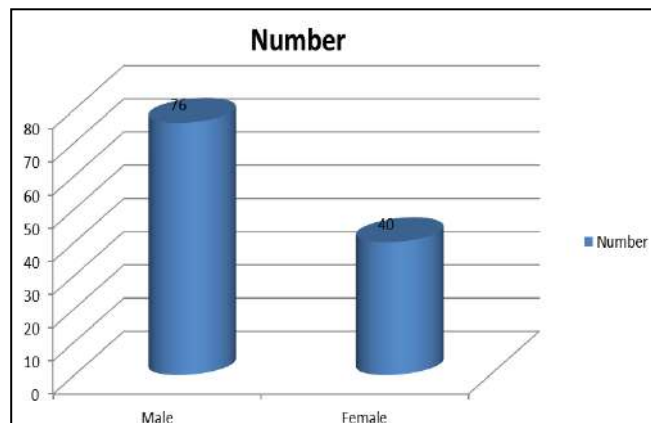
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Results

Table I: Distribution of patients

| Gender | Males | Females |
|--------|-------|---------|
| Number | 76 | 40 |

Table I, graph I shows that out of 116 patients, males were 76 and females were 40.

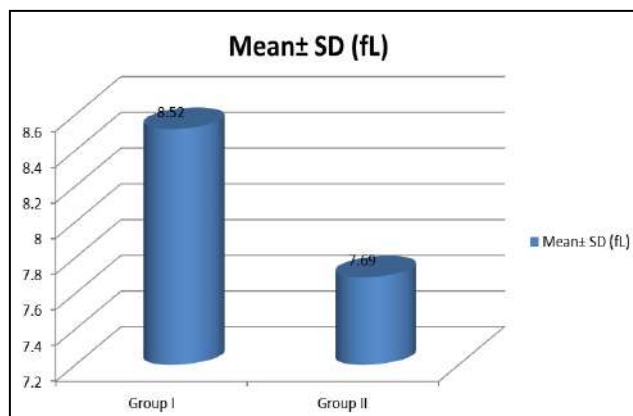


Graph I: Distribution of patients

Table II: Mean platelet volume in patients

| Groups | Mean± SD (fL) | P value |
|----------|---------------|---------|
| Group I | 8.52± 0.30 | 0.04 |
| Group II | 7.69± 0.24 | |

Table II, graph II shows that mean platelet volume in diabetic patients was 8.52 fL and healthy patients was 7.69 fL. The difference was significant ($P < 0.05$).



Graph II: Mean platelet volume in patients

Discussion

Platelets express procoagulant proteins such as P-selectin and glycoprotein IIIa on their surfaces. Large platelets contain denser granules that are metabolically and enzymatically more active than smaller ones thus having higher thrombotic potential^[5]. This might be the basis of the link between increased MPV and increased thrombotic potential. A relationship between the presence of vascular complications in DM and MPV has been suggested by several studies^[6]. Mean platelet volume (MPV), an easily and inexpensive parameter derived from routine blood counts, is usually used to evaluate platelet morphology and can be used as an indicator of platelet activity. Elevated MPV has been demonstrated to be related to cardiovascular diseases and its risk factors such as T2DM, hypertension,

and nonalcoholic fatty liver disease (NAFLD)^[7]. The present study was conducted to assess mean platelet volume in type II diabetes mellitus patients.

In present study, out of 116 patients, males were 76 and females were 40. Zubair *et al.*^[8] conducted a study to determine the MPV in diabetics compared to nondiabetics, to see if there is a difference in MPV between diabetics with and without vascular complications, and to determine the correlation of MPV with fasting blood glucose, glycosylated hemoglobin (HbA1c), body-mass index, and duration of diabetes in the diabetic patients. Platelet counts and MPV were measured in 300 Type 2 diabetic patients and 300 nondiabetic subjects using an automated blood cell counter. The blood glucose levels and HbA1c levels were also measured. The mean platelet counts and MPV were higher in diabetics compared to the nondiabetic subjects [$277.46 \pm 81 \times 10^9/l$ vs. $269.79 \pm 78 \times 10^9/l$ ($P = 0.256$)], 8.29 ± 0.74 fl versus 7.47 ± 0.73 fl ($P = 0.001$), respectively. MPV showed a strong positive correlation with fasting blood glucose, postprandial glucose and HbA1C levels ($P = 0.001$). We found that mean platelet volume in diabetic patients was 8.52 fL and healthy patients was 7.69 fL. Muhammad *et al.*^[9] investigated mean platelet volume levels in healthy participants and type 2 diabetic patients with and without microalbuminuria. After their mean platelet volume values were compared, correlation of mean platelet volume with sex, duration of diabetes, microalbuminuria, fasting blood glucose, hemoglobin A1c, creatinine clearance, and body mass index was examined. Mean platelet volume levels were higher in all diabetic patients than those in controls. Mean platelet volume levels were highest in diabetics with microalbuminuria. The mean platelet volume levels had a positive correlation with microalbuminuria. Mean platelet volume values of diabetic patients were higher than those of nondiabetics, the highest levels being in diabetics with microalbuminuria.

Mean platelet volume (MPV) is a marker of platelet function and activation that can easily be evaluated by hematological analysis. It has been demonstrated that large platelets are either metabolically or enzymatically more active, and they release more adhesion molecules such as thromboxane A2 and β -thromboglobulin. This shows that changes in MPV reflect the state of thrombogenesis. Although there is accumulating evidence that MPV is associated with increased cardiovascular morbidity, the severity of atherosclerotic vascular changes was not found to be associated with MPV values^[10]. As stroke was considered, different results were determined as far as the associations of MPV levels with the presence and severity of stroke, infarct extent, and functional recovery were concerned.

Conclusion

Authors found increase platelet volume in diabetic patients as compared to healthy.

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