

Role of Platelet Volume Indices in Diabetes Related Vascular Angiopathies

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Abstract : Diabetes mellitus (DM) is a group of metabolic disorders characterized by metabolic abnormalities, chronic hyperglycaemia and long term macrovascular & microvascular complications. Vascular complications are due to platelet hyperactivity and dysfunction, increased inflammation, altered coagulation and endothelial dysfunction. Large proportion of patients with Type II DM suffers from preventable vascular angiopathies, and there is need to develop risk factor modifications and interventions to reduce impact of complications. These complications are attributed to platelet activation, recognised by increase in Platelet Volume Indices (PVI) including Mean Platelet Volume (MPV) and Platelet Distribution Width (PDW). The current study is prospective analytical study conducted over 2 years. Out of 1100 individuals, 930 individuals fulfilled inclusion criteria and were segregated into three groups on basis of glycosylated haemoglobin (HbA1C): - (a) Diabetic, (b) Non-Diabetic and (c) Subjects with Impaired fasting glucose (IFG) with 300 individuals in IFG and non-diabetic groups & 330 individuals in diabetic group. Further, diabetic group was divided into two groups on the basis of presence or absence of known diabetes related vascular complications. Samples for HbA1c and PVI were collected using Ethylene diamine tetraacetic acid (EDTA) as anticoagulant and processed on SYSMEX-X-800i autoanalyser. The study revealed gradual increase in PVI from non-diabetics to IFG to diabetics. PVI were markedly increased in diabetic patients. MPV and PDW of diabetics, IFG and non diabetics were (17.60 ± 2.04) fl, (11.76 ± 0.73) fl, (9.93 ± 0.64) fl and (19.17 ± 1.48) fl, (15.49 ± 0.67) fl, (10.59 ± 0.67) fl respectively with a significant p value 0.00 and a significant positive correlation (MPV-HbA1c $r = 0.951$; PDW-HbA1c $r = 0.875$). MPV & PDW of subjects with diabetes related complications were higher as compared to those without them and were (17.51 ± 0.39) fl & (15.14 ± 1.04) fl and (20.09 ± 0.98) fl & (18.96 ± 0.83) fl respectively with a significant p value 0.00. There was a significant positive correlation between PVI and duration of diabetes across the groups (MPV-HbA1c $r = 0.951$; PDW-HbA1c $r = 0.875$). However, a significant negative correlation was found between glycaemic levels and total platelet count (PC- HbA1c $r = -0.164$). This is multi-parameter and comprehensive study with an adequately powered study design. It can be concluded from our study that PVI are extremely useful and important indicators of impending vascular complications in all patients with deranged glycaemic control. Introduction of automated cell counters has facilitated the availability of PVI as routine parameters. PVI is a useful means for identifying larger & active platelets which play important role in development of micro and macro angiopathic complications of diabetes leading to mortality and morbidity. PVI can be used as cost effective markers to predict and prevent impending vascular events in patients with Diabetes mellitus especially in developing countries like India. PVI, if incorporated into protocols for management of diabetes, could revolutionize care and curtail the ever increasing cost of patient management.

Keywords : diabetes, IFG, HbA1C, MPV, PDW, PVI

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