World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

Platelet Volume Indices: Emerging Markers of Diabetic Thrombocytopathy

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Abstract : Diabetes mellitus (DM) is metabolic disorder prevalent in pandemic proportions, incurring significant morbidity and mortality due to associated vascular angiopathies. Platelet related thrombogenesis plays key role in pathogenesis of these complications. Most patients with type II DM suffer from preventable vascular complications and early diagnosis can help manage these successfully. These complications are attributed to platelet activation which can be recognised by the increase in Platelet Volume Indices(PVI) viz. Mean Platelet Volume(MPV) and Platelet Distribution Width(PDW). This study was undertaken with the aim of finding a relationship between PVI and vascular complications of Diabetes mellitus, their importance as a causal factor in these complications and use as markers for early detection of impending vascular complications in patients with poor glycaemic status. This is a cross-sectional study conducted for 2 years with total 930 subjects. The subjects were segregated in 03 groups on basis of glycosylated haemoglobin (HbA1C) as: - (a) Diabetic, (b) Non-Diabetic and (c) Subjects with Impaired fasting glucose(IFG) with 300 individuals in IFG and non-diabetic group & 330 individuals in diabetic group. The diabetic group was further divided into two groups: - (a) Diabetic subjects with diabetes related vascular complications (b) Diabetic subjects without diabetes related vascular complications. Samples for HbA1C and platelet indices were collected using Ethylene diamine tetracetic acid(EDTA) as anticoagulant and processed on SYSMEX-XS-800i autoanalyser. The study revealed stepwise increase in PVI from non-diabetics to IFG to diabetics. MPV and PDW of diabetics, IFG and non diabetics were 17.60 ± 2.04, 11.76 ± 0.73, 9.93 ± 0.64 and 19.17 ± 1.48, 15.49 ± 0.67, 10.59 ± 0.67 respectively with a significant p value 0.00 and a significant positive correlation (MPV-HbA1c r = 0.951; PDW-HbA1c r = 0.875). However, significant negative correlation was found between glycaemic levels and total platelet count (PC- HbA1c r =-0.164). MPV & PDW of subjects with and without diabetes related complications were (15.14 ± 1.04) fl & (17.51±0.39) fl and (18.96 ± 0.83) fl & (20.09 ± 0.98) fl respectively with a significant p value 0.00.The current study demonstrates raised platelet indices & reduced platelet counts in association with rising glycaemic levels and diabetes related vascular complications across various study groups & showed that platelet morphology is altered with increasing glycaemic levels. These changes can be known by measurements of PVI which are important, simple, cost effective, effortless tool & indicators of impending vascular complications in patients with deranged glycaemic control. PVI should be researched and explored further as surrogate markers to develop a clinical tool for early recognition of vascular changes related to diabetes and thereby help prevent them. They can prove to be more useful in developing countries with limited resources. This study is multi-parameter, comprehensive with adequately powered study design and represents pioneering effort in India on account of the fact that both Platelet indices (MPV & PDW) along with platelet count have been evaluated together for the first time in Diabetics, non diabetics, patients with IFG and also in the diabetic patients with and without diabetes related vascular complications.

Keywords : diabetes, HbA1C, IFG, MPV, PDW, PVI
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020