

## Assessment of mean platelet volume and platelets histogram among Sudanese pregnant women with gestational diabetes mellitus

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### ABSTRACT

**Background** The GDM consequences lead to increased prenatal and maternal morbidity and mortality, in addition to long-term complications, its accurate identification and treatment are of utmost important .As MPV could be used for predicting the possibility of impending type2 diabetes, so this study aimed to compare the platelet count and other platelet parameters in Sudanese women with GDM and non diabetic pregnant women as control group.

**Material and methods** This was descriptive cross sectional study conducted in Omdurman maternity hospital in Khartoum state .One hundred Sudanese pregnant women with gestational diabetes mellitus and 40 non diabetic pregnant women were enrolled into the study. For all candidates GTT, platelet count, mean platelet volume, and platelet distribution width were analyzed.

**Results** Women with gestational diabetes had higher mean values for MPV 10.5 fl and PDW 13.7 ,compared to control group 9.3 fl and 11.6 respectively ( $p=0.00$ ), which reflecting greater platelet activation in GDM. Furthermore mean platelet volume positively correlates with blood glucose level ( $p=0.00$ ).

**Conclusions** Our results indicate that MPV play an important predictive role in gestational diabetes mellitus, which were agreed with reported literature, in addition to, its increase could demonstrate an independent risk factor for current and future type 2 diabetes mellitus complications.

**Key words:** Type 2 diabetes mellitus risk, gestational diabetes, mean platelet volume

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## INTRODUCTION

Gestational diabetes mellitus is defined as any degree of glucose intolerance with onset or first recognition during pregnancy. Early diagnosis of this complication and appropriate treatment aimed at tight control over maternal glucose levels may positively influence the prenatal outcome [1, 2]. The GDM consequences lead to increased prenatal and maternal morbidity and mortality, in addition to long-term complications, its accurate identification and treatment are of utmost important [3].

Platelets play an important role in the integrity of normal homeostasis, and mean platelet volume (MPV) is the indicator for its function. MPV is an important, simple, effortless and cost-effective measure that should be used for predicting the possibility of impending type2 diabetes. Patients with larger platelets can easily be identified during routine hematological examination and could possibly benefit from preventive treatment [4].

So the aim of this study was to compare the platelet count and other platelet parameters in Sudanese women with GDM and non diabetic pregnant women as control group and further more to investigate whether the obtained parameters have a predictive significance in GDM to develop type2 diabetes mellitus.

## MATERIALS AND METHODS

This was descriptive cross sectional study, carried out in Omdurman maternity Hospital in Khartoum state (Sudan), the study was conducted between January to June 2012 .Hundred pregnant women, their age ranged from 25-38 years with GDM diagnosed according to American Diabetes Association criteria in addition to 40 apparently healthy non diabetic pregnant women with matched age were enrolled in this study informed

consent have been taken from each participant before blood collection. A total of 75-g OGL (Oral Glucose) was administered at 24–34 gestational weeks to all participants. A fasting blood glucose level measured from collected venous blood sample which was been obtained from all participants at the same time during GTT. 2mls of venous blood sample were collected from the antecubital vein into tube containing tri potassium (EDTA) and analyzed within 2-6 hours from venipuncture to minimize changes in platelets size. All samples were analyzed on Sysmex-KX-21N automated blood cell analyzer to perform Total Platelets count, MPV, and PDW (Platelets Distribution Width), and stained blood film will be prepared from each sample.

Statistical analysis was performed using SPSS software version 16.0, by which calculated Frequencies, independent- Sample T test, Correlations and One-Way ANOVA were performed. All reported P values were considered significant at a level of  $P < 0.05$ .

## RESULTS

A total of 140 pregnant women fulfilling the selection criteria were selected and allocated to two groups. Those included 40 women with normal OGL (after 1hr), and 100 women with GDM, the mean of MPV and other platelet parameters with biochemical results were shown in Table (1). Women with gestational diabetes had higher mean values for MPV 10.5 fl and PDW 13.7, compared to control group 9.3 fl and 11.6 respectively ( $p = 0.00$ ), which reflecting greater platelet activation in GDM. Furthermore mean platelet volume positively correlates with blood glucose level ( $p = 0.00$ ). In spite of the difference in the mean of platelets count between the GDM and non diabetic women group  $209.8 \times 10^3$  and  $226.2 \times 10^3$  respectively, there was no statistical difference observed ( $p = 0.08$ ). Furthermore There was a relationship between MPV and blood glucose FBG ( $p = 0.00$ ) ( $r = 0.69$ ), 1hr ( $p = 0.00$ ) ( $r = 0.79$ ) and 2hrs ( $p = 0.00$ ) ( $r = 0.61$ ).

**Table (1): Descriptive statistics and Chi square test for analyzed data among non diabetic and GDM group**

Laboratory parameters	Controls no (40)				GDM no (100)				P value
	Mean	SD	Max.	Min.	Mean	SD	Max.	Min.	
Platelet( n)	226.2	42.1	350.0	153	209.8	45.3	335	119	0.08
MPV (fl)	9.3	0.3	10.0	8.4	10.5	0.6	12	9.3	0.00
PDW	11.6	0.8	13.7	9.9	13.7	1.9	18.8	9.2	0.00
FBG mg/dl	79	6.7	90	60	112	11.6	136	89	0.56 <sup>*</sup> 0.00 <sup>**</sup> 0.00 <sup>***</sup>
1hrBG (mg/dl)	132	8.1	160	119	180	6.2	200	166	0.57 <sup>*</sup> .00 <sup>**</sup> .00 <sup>***</sup>
2hrBG (mg/dl)	133	6.5	147	110	143	9.2	159	120	0.96 <sup>*</sup> 0.00 <sup>**</sup> 0.00 <sup>***</sup>
*Platelet ** MPV ***PDW									

## DISCUSSION

GDM is a significant but frequently neglected problem for the future health of the mother. Women with history of GDM have an 18–50% risk of developing type 2 DM within 5 years following pregnancy.[5,6] Although this risk for future type 2 diabetes mellitus is well established for women with GDM, there have been previous studies of this issue in women with GDM, In the present study we found that there was no statistically significant difference observed in the platelet count between the two groups, while in MPV and PDW values of the gestational diabetes group were higher than healthy pregnancy group .Our results agreed with Aydin *etal*, Bozkurt *etal*, BK, May *etal* and Erick *et al* ,whom their study demonstrated that GDM cases

had a higher MPV values with significant difference ( $p < 0.05$ ) and lower platelet count on average [7.8.9.10]. Another study done by Saigo *et al* a group of 22 patients with diabetes mellitus, MPV values were found to be higher initially, but with the decrease of blood glucose, a significant decrease in MPV values was also observed [11].

## CONCLUSION

The present study indicate that MPV play an important predictive role in gestational diabetes mellitus, which were agreed with reported literature, in addition to, its increase could demonstrate an independent risk factor for current and future type 2 diabetes mellitus complications, so the MPV value can contribute to improvement of follow up and management GDM and It may aid in decreasing the complications of glucose intolerance through early realization of future type 2DM risk.

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