Association of preeclampsia with maternal mean platelet volume

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Objective

The purpose of this study was to compare maternal mean platelet volume (MMPV) in severe and mild preeclamptic pregnancies prior to the delivery with those of healthy pregnant controls.

Methods

Our study population was initially divided into two groups as ""mild"" and ""severe"". Healthy pregnants women were used as controls. In the preeclampsia group, patients were divided into three subrooups according to their gestational week at the time of delivery: Early preterm (<34th gestational week), late preterm (between 34th and 37th) and term birth (>37th gestational week). All control groups were healthy singleton pregnancies. 237 preeclamptic women were included, 86 of them were mild and 151 of them were considered as severe preeclampsia. There was no patient with mild preeclampsia before 34th gestational week, 4 patients with mild preeclampsia was present between 34th and 37th gestational weeks. After 37th gestational weeks, 82 mild preeclamptic patients were included. 87 pregnant women were complicated with severe preeclampsia before 34th gestational weeks. 48 pregnancies associated with severe preeclampsia between 34th and 37th gestational weeks. After 37th gestational weeks, 16 severe preeclamptic pregnancies were seen. The control group included 290 healthy singleton pregnancies. Control group included early preterm (n=69), late preterm (n=63) and term (n=158) subgroups.

Results

The demographic characteristics such as maternal age, maternal body mass index, gravida, parity, abortion rate and gestational delivery week were not significant between the severe and control groups (p>0. 05). However, neonatal mean birth weight of severe preeclamptic groups was statistically lower than that of the control (1295, 2±474, 8 vs 1680, 9±628, 1; p<0. 05). MMPV in severe preeclamptic women at the early preterm group was significantly higher than that of the control groups (9. 38±1. 27 vs 8. 56±1. 16; p<0. 05). Also, there was statistically significant difference regarding the mean hematocrit, hemoglobine (mg/dl), platelet count and serum creatinine levels of preeclamptic women when compared to the control group (35. 30±3. 73 vs 33. 18±4. 44, p<0. 05; 1. 56±1. 42 vs 11. 08±1. 54, p<0. 05; 0. 56±0, 09 vs 0. 52±0, 08, p<0. 05 respectively). Serum mean Alanine Aminotransferase and Aspartate Aminotransferase of both groups were not significant (p>0. 05). In late preterm period, the mean birth weight of severe preeclamptic women were significantly lower than that of the control (1942±416 vs 2523±476, p<0. 05). There was no statistically significant difference between two groups for their mean age (years), body mass index (kg/m2), gravida, parity, abortion, gestational delivery week (p>0. 05). MMPV, hemotocrit and serum creatinine levels of the control group were significantly lower than those of preeclamptic group respectively (8. 51±1. 53 vs 9. 41±1. 12, p<0. 05; 33. 71±4. 57 vs 34. 77±3. 47, p<0. 05; 0. 51±0. 09 vs 0. 58±0. 11, p<0. 05). In our mild preeclamptic group, patient number was insufficient to compare as it is only 4, thus we could not report the results of them. For the term group, mild, severe and control group were included. Mean maternal age, gravida, parity and abortion rate of all groups were not significantly different when compared among the three groups (p>0. 05). BMI of the severe preeclamptic group was not statistically different when compared with mild and control groups (p>0. 05), however mild group was significantly higher than that of the control group (32. 31±4. 34 vs 29. 69±5, 01, p<0. 05). Mean gestational age at delivery in mild preeclamptic women was not significantly different when compared with severe and control groups (p>0. 05). There was statistically significant difference between severe and normal groups for their gestational birth weeks, which was higher in the control group than in the severe group (39. 26 ± 1. 23 vs 28. 38±1. 20, p<0. 05). Mean birth weight of severe group was significantly less than that of mild and control groups (2333±581 vs 3191±560 and 3076 ± 433, p<0. 05). The laboratory values of all groups showed no statistically significant difference when compared with each others (p>0. 05).

Conclusion

MMPV may be a considerable associated marker in the diagnosis of severe preeclampsia when its onset occurs before the 37th gestational week. However, MMPV may not show remarkable evidence in diagnosing mild and severe preeclampsia at term pregnancies.

Table 1. Demographic characteristics of two groups for early preterm birth

<34 gestational weeks	Severe (n=87)	Normal (n=69)	p values
Maternal age	28.39±6.07	28.43±6.40	.965
BMI	29.66±4.61	29,34±3,96	.643
Gravida	2.32±1.50	2.39±1.45	.772
Parity	0.84±0.96	0.88±0.97	.774
Abortion	0.40±0.69	0.52±0.88	.345
Birth gestational week	31.01±2.65	31.28±3.02	.563
Birth weight	1295.17±474.74	1680.94±628.14	.000

Table 2. Laboratory values of both groups for early preterm birth

<34 gestational weeks	Severe (n= 87)	Normal (n= 69)	p values
Hemoglobine	11.56±1,42	11.08±1.54	.034
Hematocrite	35.30±3.73	33.18±4.44	.001
Platelet	237.28±81.34	270.00±83.87	.015
AST	22.3±12.18	21.14±7.02	.280
ALT	22.01±11.33	19.19±8.54	.088
Creatinine	0.56±0.09	0.52±0.08	.012
Mean platelet volume	9.38±1.27	8.56±1.16	.000

Table 3. Demographic characteristics of two groups for late preterm birth

34-37 gestational weeks	Severe (n=48)	Normal (n=63)	p values
Maternal age	27.92±6.00	28.00±6.44	.895
BMI	30.46±4.84	29.70±4.94	.248
Gravida	2.21±1.20	2.43±1.43	.616
Parity	0.88±0.95	0.95±1.12	.885
Abortion	0.29±0.61	0.48±0.73	.343
Birth gestational week	35.06±0.84	35.16±0.85	.279
Birth weight	1942.92±416.97	2523.02±476.47	.000

Table 4. Laboratory values of both groups for late preterm birth

34-37 gestational weeks	Severe (n= 48)	Normal (n= 63)	p values
Hemoglobin	11.45±1.39	11.17±1.55	.060
Hematocrit	34.77±3.47	33.71±4.57	.027
Platelet	232.33±80.12	268.73±92.65	.098
AST	47.77±153.56	21.06±7.11	.379
ALT	38.90±68.15	19.78±8.41	.086
Creatinin	0.58±0.11	0.51±0.09	.000
Mean platelet volume	9.42±1.12	8.51±1.53	.001

Table 5. Demographic characteristics of two groups for term birth

>37 gestational weeks	Severe (n=16)	Mild (n=82)	Normal (n=158)	p values
Maternal age	28.50±5.69	26.70±5.53	25.66±5.15	.071
BMI	30.41±5.12	33.31±4.34	29.70±5.01	.000
Gravida	2.31±1.25	1.89±2.27	2.01±1.42	.504
Parity	1.06±2.24	0.59±0.80	0.68±0.95	.171
Abortion	0.25±0.57	0.23±0.78	0.29±0.65	.839
Birth gestational week	38.38±1.20	38.87±1.33	39.26±1.24	.006
Birth weight	2333.13±581.93	3191.33±560.09	3076.77±433.39	.000

Table 6. Laboratory values of both groups for term birth.

>37 gestational weeks	Severe (n=16)	Mild (n=82)	Normal (n=158)	p values
Hemoglobine	10.86±1.50	11.33±1.43	11.49±1.30	.184
Hematocrite	33.23±3.99	34.41±3.77	36.62±18.72	.438
Platelet	223.94±81.38	221.01±74.42	229.01±78.94	.746
AST	41.94±44.45	30.73±54.67	32.39±56.79	.761
ALT	39.38±39.17	31.00±53.07	26.83±31.99	.425
Creatinine	0.56±0.06	0.60±0.13	0.71±1.39	.704
Mean platelet volume	9.71±1.37	9.40±1.19	9.41±1.01	.561

>37 gestational weeks	Severe (n=16)	Mild (n=82)	Normal (n=158)	p values
Maternal age	28.50±5.69	26.70±5.53	25.66±5.15	.071
BMI	30.41±5.12	33.31±4.34	29.70±5.01	.000
Gravida	2.31±1.25	1.89±2.27	2.01±1.42	.504
Parity	1.06±2.24	0.59±0.80	0.68±0.95	.171
Abortion	0.25±0.57	0.23±0.78	0.29±0.65	.839
Birth gestational week	38.38±1.20	38.87±1.33	39.26±1.24	.006
Birth weight	2333.13±581.93	3191.33±560.09	3076.77±433.39	.000