Original Article/Orjinal Makale

MEAN PLATELET VOLUME CHANGES IN SECOND AND THIRD TRIMESTER OF GESTATION

İLK VE İKİNCİ TRİMESTERDE ORTALAMA PLATELET HACMİNDEKİ DEĞİŞİKLİKLER

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Abstract

Our purpose in this study is to assess MPV levels in the second and third trimester whose increase is known to be a risk factor in thromboembolic events. This is a retrospective study of 119 pregnant women who followed up at Bursa Sevket Yılmaz Education and Research Hospital. Sixty- two second trimester, fifty-seven third trimester pregnant women were included in the study and MPV levels were determined retrospectively. The mean values of MPV were 7.27±1,69 and 7.34±1,71 in the second and third trimester pregnant women, respectively. MPV levels in the third trimester was significantly higher (p=0.020) than MPV levels in the second trimester. In the third trimester, significantly higher MPV levels were observed in our study. As complete blood count (CBC) is a cheap, rapid, easily accesible test, increased MPV levels must be taken into consideration for the potential risk of thromboembolic events and preeclampsia. Further research studies are required to understand the role of MPV in pregnancy.

Key Words: Mean platelet volume, pregnancy.

Özet

Bu çalışmada tromboembolik olaylarda risk faktörü olduğu bilinen MPV (ortalama trombosit hacmi)'nin gebeliğin ikinci ve üçüncü trimesterlerinde seviyelerini değerlendirmek amaçlandı. Çalışma retrospektif olarak planlandı ve Bursa Şevket Yılmaz Hastanesi Polikliniğine başvuran 119 gebe (62 gebe 2. Trimester, 57 gebe 3. Trimester) çalışmaya dahil edildi. Hastalara 2. ve 3. trimesterde rutin bakılan tam kan sayımı analizleri değerlendirilerek MPV seviyeleri belirlendi. Çalışmamızda 3. Trimester MPV değerleri anlamlı oranda yüksek bulundu. Artmış MPV seviyelerinde gebelikte oluşabilecek tromboembolik olay ve preeklampsi riski göz önünde bulundurulmalıdır.

Anahtar Kelimeler: Ortalama trombosit hacmi (MPV), gebelik

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Introduction

Normal pregnancy is characterized by an increase in platelet aggregation and a decrease in the number of circulating platelets with gestation (1). Increased consumption of platelets in the uteroplacental circulation has been suggested to be the explanation of the reduction in the number of circulating platelets. Platelet lifespan declines and the MPV increases minimally during pregnancy (2). In pregnancies, as a sign of platelet function, MPV is more important than platelet number (3). Mean platelet volume (MPV), an accurate measure of platelet size, is considered a marker and determinant of platelet function. Larger platelets with higher MPV levels are hemostatically more reactive and raise higher amounts of the prothrombotic factor thromboxane A 2, increasing the tendency to thrombosis (4, 5).

In the recent years, it has been presented that MPV increase indicates the increase of serious inflammatory activity, such as myocardial infarction, metabolic syndrome (6) and it can result in an increased risk of preeclampsia, thrombosis and cerebrovascular, cardiovascular diseases (7-10). The hypothesis is that higher MPV in the third trimester might be associated with cardiovascular and thromboembolic complications in pregnancy.

Material and methods

Between July 1, 2013 and February 30, 2014, 119 pregnant women (Sixty- two second trimester, fifty-seven third trimester pregnant women) admitted to Bursa Sevket Yılmaz Education and Research Hospital were included in the study. The patients who suffer from preeclampsia, hypertension, diabetes mellitus, immune thrombosithopenic purpurae, anemia, thrombocytosis, thrombocytopenia, polycythemia were excluded from the study. Patients who had taken non-steroid anti-inflammatories, aspirin, oral anti-coagulants that may affect platelet count and functions or the coagulation system and patients who smoked were excluded from the study. MPV values between the second and third trimester were evaluated by using simple blood cell count that was checked during routine analysis in the second and third trimesters. For automatic blood count EDTA tubes (15% K3 EDTA 0.054 ml/4.5 ml blood) were used. Samples taken from the antecubital vein were processed within 30 minutes. Full blood measurements were done on an automatic blood count machine (LH 750, Beckman Coulter, England). Normal MPV values were accepted as 7.4-12 fL (femtolitre, µm3) in the laboratories.

Statistical analysis: The data was analyzed using the Statistical Package for Social Sciences (SPSS) software version 20. The results were expressed in terms of mean ± standard deviation (SD). A two-tailed p value <0.05 was regarded as statistically significant for all comparisons. T-test was used to compare the different groups.

Results

The patients included in the study were divided into two groups according to the trimester. Group 1 (n:62) consisted of 2nd Trimester healty pregnant women and Group 2 (n: 57) consisted of 3rd Trimester healthy pregnant women. Distribution of demographic data of patients according to trimester was shown in Table 1. The median age of women in the study was 29 for group 1 and 29 in the group 2. The median gravida was 3 and 3, respectively. There was significant difference between them for trimester ($p<0.001$). The mean values of MPV in the Group 1 and Group 2 was 7,27±1,69 and 7,34±1,71, respectively ($p=0.02$).

	2nd Trimester n=62	**3rd Trimester n=57**	**P value**
Age	29,00 (21-38)	29,00 (19-40)	0.101
Gravida	3,00 (2-5)	3,00 (2-10)	0.484
Parite	1,50 (1-3)	1,00 (1-7)	0.407
Gestational week	18,50 (15-26)	35,00 (26-39)	<0.001

Table 1. Distribution of demographic data of patients according to trimester

$P \leq 0.05$ was taken as significant. Values are given as median.

Discussion

MPV increase is a risk factor for cardiovascular complications, intracranial complications, low-grade inflammator disorders prone to arterial and venous thromboses (7-10). Maconi et al. (11) have found in PLT and MPV between healty and nonhealty pregnant women can be helpful in the differential diagnosis and in the management of complicated pregnancies. Jaremo et al. (12) have declared that pre-eclamptic cases involve lower platelet numbers and higher MPV values. Boriboonhirunsarn et al.(13) have suggested that high values in MPV are useful in differentiating severe preeclamptic cases from normal pregnancy. But Temel et al.(14) have not seen differences in terms of MPV values between severe pre-eclamptic cases and normal pregnancies. Ahmet et al. (2) suggested that pregnant women with high MPV in the second and third trimesters are at risk of preeclampsia. Gioia et al.(15) reported that MPV >10fL may be associated with adverse neonatal outcomes in women affected by abnormal uterine artery doppler findings. Increased MPV levels are seen in cases of diabetes, polycystic ovarian disease, missed abortus (16-18).

In our study, significantly higher MPV levels were observed in the third trimester. It is known that, higher MPV levels can increase the risk of thromboembolic event, cardiovascular complications, intracranial complications, systemic, surgical complications, preeclampsia and MPV levels might be

used as an independent, prognostic marker in high risk of pregnant women.

The limitation of our study is its retrospective design. We agree that it would better to document the relationship between these results and the perinatal outcome.

As complete blood count (CBC) is a cheap, rapid, easily accesible test, increased MPV levels must be taken into consideration for the potential risk of thromboembolic events and preeclampsia. Further research studies are required to understand the role of MPV in pregnancy.

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