

Platelet Indices and Blood Groups in Early Recurrent Miscarriage: A Study in Pregnant Women

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Abstract

Background: Recurrent miscarriage estimated prevalence with 1% to 3% of pregnancies and the probable causes of recurrent miscarriage are multiple, ranging from genetic, environmental, infectious, metabolic, and endocrine to anatomic causes. However, there is no study in the literature to date about the platelet indices in recurrent miscarriage.

Methods: This observational, retrospective study was investigated a total of 51 recurrent miscarriage patient and 64 healthy controls.

Results: MPV values were none significantly higher in controls than ERM (8.2 vs 8.1, P 0.75). Also there were no significant differences between the groups related to WBC, PDW, platecrit, platelet and glucose levels. There was no significant correlation between the number of miscarriage and MPV, PDW and platecrit (P 0.25, 0.3 and 0.7, respectively).

Conclusions: In conclusion, this is the first study which compares the platelet indices in the recurrent pregnancy loss. Platelet indices such as MPV, PDW and platecrit didn't risk factor for recurrent miscarriage in pregnant women. There is no significant difference for ABO blood group in recurrent miscarriage and control.

Keywords: Miscarriage; MPV; PDW; Blood group

Introduction

Recurrent miscarriage is defined as two consecutive miscar-

riages without a previous birth or three miscarriages, whether or not interspersed with a term delivery of a healthy child. Pregnancy loss is very common and precise prevalence of early recurrent miscarriage (ERM) is dependent on its definition, but it has estimated prevalence with 1% to 3% of pregnancies [1]. Furthermore, etiology of ERM has most causes. Boue et al and Hassold et al accepted that at least 50% of clinical abortions result from chromosomal abnormalities [2, 3]. Age and success of previous pregnancies are two independent risk factors that affect the miscarriage [4]. The probable causes of recurrent miscarriage are multiple, ranging from genetic, environmental, infectious, metabolic and endocrine to anatomic causes. The best defined causes are parental chromosomal abnormalities, metabolic abnormalities, and anatomic abnormalities [1]. Blood group incompatibility can affect reproduction. Couples with incompatibility blood groups' experiences spontaneous miscarriage or stillbirth more frequently [5, 6]. However, there is not enough study about the ABO blood group in ERM patients and also no study published to date platelet parameters such as MPV, PDW and platecrit levels in recurrent miscarriage.

Method

Study population

This observational, retrospective study was conducted in the Sakarya University School of Medicine, Department of Gynecology and Obstetrics clinic. A total of 51 recurrent miscarriage patient and 64 healthy controls between March 2010 and November 2011 were enrolled. The Institutional Review Board of the Sakarya University Faculty of Medicine approved the study. The local ethics committee has also approved the study. Inclusion criteria's were; (1) two consecutive miscarriages without a previous birth or three miscarriages whether or not interspersed with a term delivery of a healthy child, (2) pregnant women with gestational age before 13 weeks. Exclusion criteria were as follows (1) having a chronic disease such as diabetes, uncontrolled hypertension, hypothyroidism, hyperthyroidism, renal failure or heart disease, (2) abnormal pelvic ultrasound and known anatomic

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Table 1. Comparison of the General Characteristics of Patients With ERM and Controls

	ERM (n = 51) SD/IR	Control (n = 64) SD/IR	P Value
Age, years	32.1 ± 3.5	29.4 ± 4.0	0.3
WBC × 10 ⁹ per L	10.5 ± 3	11.0 ± 2.0	0.45
Hemoglobin, g/dL	11.8 ± (1.5)	11.6 ± 1.0	0.5
Platelet count, × 10 ⁹ per L	250 ± 70	267 ± 60	0.8
MPV	8.1 ± 1.1	8.2 ± 1.5	0.75
PDW	17.8 ± 1.0	18 ± 1.2	0.7
Platecrit	0.2 ± 0.05		0.9
Glucose, mg/dL	85 ± 10	89 ± 15	0.6

ERM: Early recurrent miscarriage; WBC: White blood cell; MPV: Mean platelet volume; PDW: Platelet distribution width.

defects, uterine abnormality, (3) luteal phase deficiency, (4) having thrombophilias and or antiphospholipid syndrome, (5) smoking, previous thrombosis/embolism history.

For all participants, clinical risk factors and other demographic data were recorded from hospital records. Complete blood count samples which were drawn into vacutainer tubes containing 0.04 mL of the 7.5% K salt of EDTA were analyzed within 30 minutes after sampling with a commercially available analyzer.

Statistical analyses

All statistical analyses were conducted by using the SPSS 17.0 statistical software program (SPSS, Chicago, IL). Continuous variables were presented as mean ± standard deviation and categorical variables as percentages. Data with

normal distribution were analyzed using unpaired t test. Mann-Whitney U test was used for analyzing non-normally distributed data. Categorical variables were compared with the chi-square test. A cut off value of MPV was calculated with roc curve analysis. Correlations were studied using Pearson's correlation test. P values under the 0.05 were considered as statistically significant.

Results

Clinical and laboratory findings of the patients with ERM and controls were presented in Table 1. There were no statistically significant differences between the groups with regard to age and laboratory parameters. MPV values were none significantly higher in controls than ERM (8.2 vs 8.1,

Table 2. ABO Blood Groups in ERM and Control Group

ABO Blood group	ERM	Control	P (chi square)
0 group	14	16	
A group	25	31	
B group	7	10	
AB group	5	7	
Total	51	64	0.98

ERM: early recurrent miscarriage.

P 0.75). Furthermore, there were no significant differences between the groups related to WBC, PDW, platecrit, thrombocyte and glucose levels. ABO blood groups for ERM and controls were presented in the Table 2. The most common blood group was A (50%) in the ERM group and there was no significant difference to the control group. There were no significant differences between the groups for ABO blood groups (chi square P 0.98). Also there was no significant difference between the groups for rh group (P 0.7). ERM group had 22 patients with two abortions, 19 patients had 3; four patients had 4; six patients had 5 or more abortions. There was no significant correlation between the number of miscarriage and MPV, PDW and platecrit (P 0.25, 0.3 and 0.7, respectively).

Discussion

In this study, we found that ABO blood groups and platelet parameters such as MPV, PDW, Platecrits, did not an etiopathologic risk factor for early recurrent miscarriage in our population.

The causes of recurrent miscarriage are multiple and best defined causes are parental chromosomal abnormalities, metabolic abnormalities, and anatomic abnormalities [1] but there are lots of unknown causes. Platelet dysfunction can be one of these causes. Mean platelet volume (MPV) is a machine-calculated measurement of platelet size from the blood that is usually reported in the blood tests as part of the CBC. Furthermore, it has been shown that MPV is the most accurate measure of the size of platelets in stable conditions and inversely associated with platelet count. In comparison to smaller platelets, larger platelets contain more granules and produce greater amounts of prothrombotic factors, such as thromboxane A₂ and serotonin, also they aggregate rapidly under a stimulus and express a greater number of adhesion molecules, such as P-selectin and glycoprotein IIb/IIIa [7-12]. In obstetric population, increased MPV have been described as precursors to the onset of preeclampsia, diabetes mellitus and intrauterine growth restriction [13, 14]. To date, there is no study about MPV values in ERM. Kosus et al didn't find any significant differences between the MPV and missed abortion [15]. Furthermore, we did not find too in our study population.

Platelet distribution width (PDW) is novel platelet indices and accepted as a platelet activation marker [16]. Platelet activation causes morphologic changes of platelets by pseudopodia formation. Increased PDW have been shown in the vaso-occlusive in sickle cell disease, ischemic heart disease [17, 18]. Also PDW had not been studied in pregnant population before. Platelet activation should be a risk factor for ERM, but we didn't find significant differences between the ERM group and control (17.8 vs 18, P 0.7).

ABO Bloods group incompatibility is a risk factor in re-

current abortion. Ghasemi et al found that type 1 ABO blood incompatibility, defined as when wife and husband have two different blood groups, is a risk factor for pregnancy loss [19]. In addition, were coupled with incompatibility blood groups' experiences spontaneous miscarriage or stillbirth more frequently [6, 20]. In our study, we could not compare the blood groups in couples but according to control group any of the ABO blood groups didn't take a risk to recurrent miscarriage in our pregnant population.

There are some study limitations such as this study designed as a retrospective study, also we have limited number of study population and we couldn't compare the parents and fetus ABO blood group.

In conclusion, this is the first study which compares the platelet indices in the recurrent pregnancy loss. Platelet indices such as MPV, PDW and platecrit didn't risk factor for ERM in pregnant women. There was no significant difference for ABO blood group in ERM and control.

Declaration

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