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RESEARCH ARTICLE

INVESTIGATION OF POSSİBLE RELATİONSHIP BETWEEN MEAN PLATELET VOLUME AND MYOCARDIAL INFARCTION

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ABSTRACT

Objective: High MPV values are seemed to be associated with thromboembolic events. Our aim is to determine a possible relationship between MPV values and myocardial infarction.
Design, Setting, Subjects: Retrospectively, diagnosed myocardial infarction patients were found in data files in Uzunköprü State Hospital in 2015-2016. An age-sex matched control group was picked out. MPV, troponine, CK-MB, platelet, blood glucose levels were noted.
Results: For totally 136 myocardial infarction diagnosed patients, 93(%68,4) were male, 43(%31,6) were female. Mean MPV of patients were 9,19(±0,94) fl. A possible correlation was found between blood glucose and MPV levels ($p<0,01$). For control group 37(%67,2) of 55 subjects were male and 18(%32,7) were female. Mean MPV were 8,29(±0,62). We found statistically important difference in MPV means between this groups($p<0,01$).
Conclusion: MPV values are associated with myocardial infarction and blood glucose levels. MPV values can be used for severity and prognosis of myocardial infarction but it needs more studies to describe this relevance.

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INTRODUCTION

Body homeostasis tries to stop bleeding via four components of hemostasis; adhesion, aggregation, coagulation and fibrinolysis (Hoffman, 1988). Platelets are the major cellular component of this hemostasis (Nemerson, 1988). Platelets secrete vasoactive molecules such as thromboxane A2 and fibrinogen in order to make a hemostatic plug for aggregation step (MacFarlane, 1964). Activity of platelets depends on the size and number of granules contains this vasoactive molecules. Large platelets have more granules so we can say mean platelet volume (MPV) is one of the marker of platelet activity (Hoffman *et al*., 1996). Moreover in the atherosclerotic changes, platelets have an important role making thrombus formation (Ross, 1999). In the literature relationship between MPV and atherosclerosis associated events such as ischemic cerebrovascular stroke and renal artery stenosis are reported (Smith *et al*., 1999; Bath *et al*., 1994). In addition an increase in MPV are reported in patients with diabetes mellitus and smoking which are best known as major cardiovascular risk factors. We aimed to investigate and show whether MPV is associated with myocardial infarction(MI).

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MATERIAL AND METHODS

For this aim firstly we investigated patients who came to emergency service of Uzunköprü State hospital suffering from chest pain and diagnosed myocardial infarction in 2015-2016 retrospectively. We found 136 cases and noted their age, sex, MPV, troponine, CK-MB, platelet, blood glucose levels in their files. After that we made a control group comprised 55 age and sex matched healthy subjects with no history of coronary artery disease and normal electrocardiogram. We performed and noted MPV levels of control subjects.

Statistical analysis

All statistical analysis were performed by SPSS PC Ver. 21(IBM© SPSS Inc. USA). Mean and standart deviations of data were calculated. A value of $p<0,05$ was considered to be statistically significant. For correlation of parameters Pearson correlation and Spearman correlation analysis was performed for parametric values. Also Mann Whitney-U test and independent samples t test was performed for non parametric values.

RESULTS

For totally 136 myocardial infarction diagnosed patients, 93(%68,4) were male, 43(%31,6) were female.

Table 1. Correlation between parameters of patients

		Troponine	CK-MB	Blood Glucose
MPV	Pearson correlation(r)	-0,62	0,87	0,235
	Sig. (two tailed) (p)	0,473	0,319	0,006

Table 2. Statistics of groups' MPV

		N	Mean	Std deviation	Std error mean
MPV	Patient group	136	9,19	0,94	0,081
	Control group	55	8,29	0,62	0,084

Table 3. Independent sample test results for the groups' MPV

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
MPV	Equal variances assumed	5,608	,019	6,491	189	,000	,89961	,13860	,62622	1,17301
	Equal variances not assumed			7,681	149,057	,000	,89961	,11713	,66817	1,13106

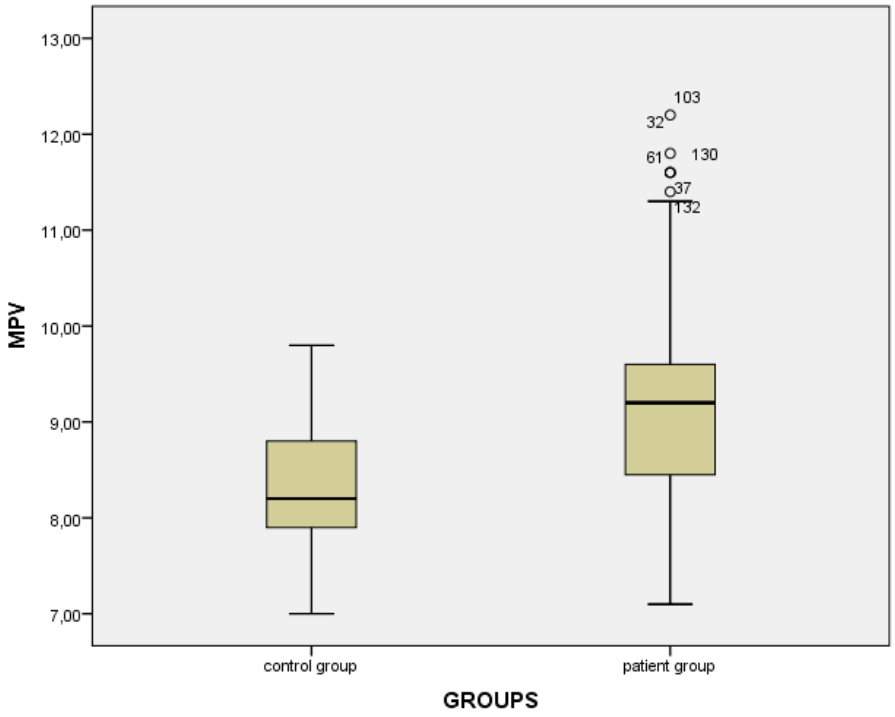

Figure 1. Independent sample test results for the groups' MPV

Mean age of patients were 63,6(±13,8). Mean MPV of patients were 9,19(±0,94)fl. We performed pearson correlation between MPV and other parameters; troponine, CK-MB and blood glucose levels. We didn't find any relationship between MPV and troponine, CK-MB levels. On the other hand correlation was found between blood glucose and MPV levels($p<0,01$). Power of correlation was weak(r:0,235). The results are showed in the table 1. For control group 37(%67,2) of 55 subjects were male and 18(%32,7) were female. Mean age were 62,54(±7,8). Mean MPV were 8,29(±0,62). Mean MPV in Patient group was higher than MPV in control group. We performed independent sample t test for MPV between patient and control groups. We found statistically important difference in MPV means between this groups($p<0,01$). The results are showed in the table 2,3 and figure1.

DISCUSSION

We found higher MPV values in patients with MI than control subjects. On contrast we didn't show any correlation between MPV levels and myocardial infarction markers; troponine and CK-MB levels. It means MPV levels cannot be used as a marker for MI. But higher MPV levels can be accepted as a risk factor for MI. Khandekar *et al* showed a significant difference in MPV mean 10,43fl in MI patients and 9,2fl in healthy control group (Khandekar *et al*., 20006). Kılıçlı-Çamur *et al* found MPV mean 11,7fl in MI group and 10,89fl in control group (Kiliçli-Çamur *et al*., 2005). There were more reported studies with similar study design; Endler *et al*. (2002), Şenaran *et al*. (2001), Mathur *et al*. (2001) and Trowbridge *et al*. (1987). As in our research all studies refer that MPV is an

independent risk factor for coronary atherosclerosis as a consequence. Former studies reported that EDTA usage for anticoagulation cause an increase in MPV. However rise in MPV is %3,4 after 1-2 hours (Bath, 1993; Dastjerdi *et al*., 2006; Bartels *et al*., 19978). Because of our study design for patient group was retrospectively, we didn't know exact time between sample collections and analyzes. But we assumed the time was less than 60 minutes because they were performed in emergency service. For control group we obeyed two hours rule when analyzing the blood samples. In a previous study MPV levels were found associated with subcutaneous abdominal fat, hepatosteatozis, fasting blood glucose levels and HOMA IR levels (Muscari, 2008). Association of MPV and Diabetes mellitus and fasting blood glucose showed in former studies (Coban, 2006; Sharpe, 1993; Zuberi, 2008). Also we found an association between MPV levels and blood glucose levels. We couldn't perform possible correlation between diabetes or fasting blood glucose levels and MPV due to lack of history. In conclusion, MPV values are associated with myocardial infarction and blood glucose levels. MPV values can be used for severity and prognosis of myocardial infarction but it needs more studies to describe this relevance.

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