

Ortalama Trombosit Hacmi/Lenfosit Sayısı Oranı İrritabl Barsak Sendromu ve Subtipleri ile İlişkili midir?

Does Mean Platelet Volume to Lymphocyte Ratio Associates with Irritable Bowel Syndrome and its subtypes?

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ÖZ

GİRİŞ ve AMAÇ: Hemogram parametreleri birçok çalışmada inflamatuvar belirteç olarak kullanılmaktadır. Bu çalışmamızdaki amacımız İBS ve sağlıklı kontrollerdeki ortalama trombosit hacmi/lenfosit oranının (MPVLR) karşılaştırılmasıdır.

YÖNTEM ve GEREÇLER: İç hastalıkları polikliniğimize başvuran İBS'li hastalar çalışmamıza alındı. İBS'li hastalar diyare predominant İBS (IBS-D) ve konstipasyon predominant İBS (IBS-C) olarak iki ana gruba ayrıldı. Sağlıklı kişilerden de kontrol grubu oluşturuldu. Çalışmamızda grupların genel özellikleri ve MPVLR seviyeleri karşılaştırıldı.

BULGULAR: IBS-C, IBS-D ve kontrol gruplardaki MPVLR sırasıyla; 0.005 (0.001), 0.004 (0.001) ve 0.003 (0.001), ($p<0.001$) idi. Post Hoc testi ile IBS-C ve IBS-D gruplarındaki MPVLR oranları benzer olup ($p=0.44$), MPVLR kontrol grupta ise IBS-C ($p<0.001$) ve IBS-D ($p<0.001$) gruplarından anlamlı olarak düşük saptandı..

TARTIŞMA ve SONUÇ: MPVLR, İBS hastalarında inflamatuvar marker olarak kullanılabileceği bu çalışmamızdaki ana sonucumuzdur. Ancak İBS grupları arasında anlamlı fark saptanmamıştır. Sonuçta İBS-C ve İBS-D arasında MPVLR benzer olmakla birlikte İBS hastalarının sağlıklılarından ayırımında kullanılabilir.

Anahtar Kelimeler: irritabl barsak sendromu, ortalama trombosit hacmi/lenfosit oranı, inflamasyon

ABSTRACT

INTRODUCTION: Hemogram parameters are considered as inflammatory markers in various diseases. The objective of this study was to assess mean platelet volume to lymphocyte ratio (MPVLR) of subjects with IBS and to compare to those in healthy population.

METHODS: Patients with IBS whose admissions to our outpatient internal medicine clinic were enrolled to the study. Patients with IBS were divided into two groups according to the predominant symptom, either IBS diarrhea predominant (IBS-D) or IBS constipation predominant (IBS-C). Healthy volunteers were enrolled as control group. General characteristics and MPVLR levels of the groups compared.

RESULTS: The MPVLR of IBS-C, IBS-D and control groups were 0.005 (0.001), 0.004 (0.001) and 0.003 (0.001), respectively ($p<0.001$). Post Hoc test revealed that MPVLR of IBS-C and IBS-D groups were similar ($p=0.44$) and MPVLR of control groups was significantly lower than that of the IBS-C ($p<0.001$) and IBS-D ($p<0.001$) groups.

DISCUSSION and CONCLUSION: The main outcome of present study was that MPVLR could be used as a marker of IBS. However, it is not useful in differentiating IBS constipation predominance from IBS diarrhea predominance. In conclusion, despite increased MPVLR could not differentiate IBS constipation predominance from the IBS diarrhea predominance, it could be useful in establishing the diagnosis of IBS.

Keywords: irritable bowel syndrome, mean platelet volume to lymphocyte ratio, inflammation

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INTRODUCTION

Irritable bowel syndrome (IBS) is being considered as a functional gastrointestinal disease for decades. Clinical symptoms of the patients with IBS are affected by their psychological condition. IBS is diagnosed on the basis of recurrent abdominal pain associated with defecation or in association with stool frequency or form alteration in accordance to the Rome IV criteria (1). Either constipation or diarrhea or both predominates the clinical spectrum of IBS along with abdominal discomfort and bloating. Despite it is generally accepted that IBS is a functional disease, recent evidence suggest that inflammation could play important role in the pathogenesis of the IBS (2).

The novel inflammation markers derived from routine hemogram tests are attracted great interest from researchers worldwide. One of these inflammatory markers is mean platelet volume (MPV), which refers the size of circulating platelets. Platelets are tend to have greater size when they are activated by inflammation or other stimuli (3). Association between MPV and inflammatory conditions have been demonstrated in various research in literature (4-13). In a recent study it has been reported that, MPV of subjects with vitamin D deficiency, another condition that associated with low grade inflammation, have greater MPV values compared to subjects with normal serum vitamin D levels (14). Increased MPV has been also shown in stable coronary artery disease patients who have inadequate coronary collateral development (15). Moreover, MPV has been studied in IBS in literature and authors reported elevated MPV in patients with IBS compared to healthy subjects (16). In contrast, low MPV values have been reported in other inflammatory conditions (17).

The MPV to lymphocyte ratio (MPVLR), a combination has been studied in diabetic nephropathy, a chronic complication of diabetes mellitus, and elevated MPVLR values were reported in subjects with diabetic nephropathy compared to those diabetics without nephropathy (18).

In present study, we aimed to study MPVLR levels of subjects with IBS and to compare to those in healthy population.

METHODS

In present retrospective analysis, patients with IBS whose admissions to our outpatient internal medicine clinic were between February 2018 and October 2019 enrolled to the study, after institutional board approved the research protocol. Patients with active infection, inflammatory disease, diabetes mellitus, hypertension, chronic kidney disease, chronic liver disease, and cancer were excluded from the study. Pregnant women were also excluded. Patients with IBS were divided into two groups according to the predominant symptom, either IBS diarrhea predominant (IBS-D) or IBS constipation predominant (IBS-C). The control group was consisted of healthy subjects whom visited our clinic for a routine check-up.

Age, gender, leukocyte count (WBC), hemoglobin (Hb), hematocrit (Htc), platelet count (PLT), lymphocyte count (Lym) and MPV levels of the participants obtained from institutional database. MPVLR was calculated simply division of MPV by Lym. These parameters were compared between 3 study groups.

Statistics held with SPSS software (SPSS 16.0 IBM Co. Chicago, IL, USA). Shapiro-Wilk test used for whether study parameters have normal distribution in study groups. Comparison of variables with and without normal distribution were conducted with One Way ANOVA and with Kruskal-Wallis tests, respectively. While variables with normal distribution were expressed as mean \pm standard deviation, variables without normal distribution were expressed as median (interquartile range). Post hoc tests of variables with and without normal distribution were conducted with either Tukey test or Games-Howell test, respectively. Categorical variables were compared with chi-square test and expressed as percentage. A p value lower than 0.05 was considered statistically significant.

RESULTS

One hundred and thirty six subjects enrolled to the study; 50 patients in IBS-C, 30 in IBS-D and 56 in control groups.

IBS-C group was consisted of 13 (26%) men and 37 (74%) women, IBS-D group was consisted of 14 (47%) men and 16 (53%) women, and control group was consisted of 21 (37.5%) men and 35 (62.5%) women. Gender was not statistically different

between study groups ($p=0.16$).

Median ages of IBS-C, IBS-D and control groups were 42 (29), 40 (18) and 38 (12) years, respectively. Median ages of study groups were not statistically different ($p=0.31$).

Mean WBC ($p=0.21$), Htc ($p=0.1$), PLT ($p=0.25$) and median Hb ($p=0.17$) levels of IBS-C, IBS-D and control groups were similar.

The MPVLR of IBS-C, IBS-D and control groups were 0.005 (0.001), 0.004 (0.001) and 0.003 (0.001), respectively ($p<0.001$). Post Hoc test revealed that MPVLR of IBS-C and IBS-D groups were similar ($p=0.44$) and MPVLR of control groups was significantly lower than that of the IBS-C ($p<0.001$) and IBS-D ($p<0.001$) groups. Data of all three groups were summarized in table 1.

Table 1. Data of the study population					
	IBS-C group	IBS-D group	Control Group	P	
Gender	Women (n,%)	37 (74%)	16 (53%)	35 (62,5%)	0.1 6
	Men (n,%)	13 (26%)	14 (47%)	21 (37,5%)	
Median (IQR)					
Age (years)	42 (29)	40 (18)	38 (12)	0.31	
Hb (g/dL)	13,9 (1,95)	14,35 (1,38)	14,10 (1,40)	0.17	
MPVLR (%)	0.005 (0.001)	0.004 (0.001)	0.003 (0.001)	<0.001	
Mean \pm SD					
Htc (%)	41 \pm 3	43 \pm 3	42 \pm 3	0.1	
WBC (k/mm ³)	7146 \pm 2049	7065 \pm 2535	7763 \pm 1916	0.21	
PLT (k/mm ³)	249750 \pm 66432	269667 \pm 54588	266357 \pm 56190	0.25	

DISCUSSION

The main outcome of present study was that MPVLR could be used as a marker of IBS. However, it is not useful in differentiating IBS constipation predominance from IBS diarrhea predominance.

Mean platelet volume and lymphocyte count, which two make the MPVLR value, are routine indices studied in hemogram test. MPV refers to as the size of circulating thrombocytes. Increased MPV is a marker of platelet activation and commonly noted in inflammatory conditions (3, 4). Elevated MPV has also been reported in IBS subjects in a study by Aktas et al (16). Lymphocyte count is usually considered to be associated with worse outcome in various studies in literature (19). Utilization of lymphocyte in inflammatory micro-

environment may cause a reduction in circulating lymphocyte count (20). A combination of these two parameters, MPVLR, have increased diagnostic value than either of indices alone. In concordance with literature, increased MPVLR levels were reported in IBS patients compared to healthy controls in present study.

A number of studies also reported high MPVLR levels in various diseases in literature. A study by Kocak et al showed increased MPVLR levels in diabetic subjects with diabetic kidney injury compared to those diabetics without diabetic kidney injury (18). Authors studied MPVLR in patients with coronary heart disease and concluded that MPVLR was significantly higher in patients with poor coronary collateral circulation compared to those with adequate coronary collateral circulation (21). Hudzik et al reported that MPVLR was an independent predictor of mortality in diabetic patients with ST elevated myocardial infarction (22). The severity of osteoarthritis was reported to be related with elevated MPVLR levels (23). In another study in literature reported that elevated MPVLR was associated with no reflow in patients with ST elevation myocardial infarction and considered as a predictor of all-cause mortality in this population (24). The results of our study reported elevated MPVLR in IBS patients are compatible with the knowledge in literature.

Another study in patients with Kawasaki disease concluded lower MPVLR levels in these subjects compared to controls (25). Active platelets with greater dimension could be utilized in inflammatory sites in conditions with great burden of inflammation, such as, Kawasaki disease, may lead to reduction in MPV due to remaining smaller platelets in circulation, which consequently also lead to decreased MPVLR levels.

Retrospective design is a limitation of present study. Another limitation is relatively small study population. However, this is the first report in literature found elevated MPVLR levels in IBS.

In conclusion, despite increased MPVLR could not differentiate IBS constipation predominance from the IBS diarrhea predominance, it could be useful in establishing the diagnosis of IBS.

REFERENCES

1. Mearin F, Lacy BE, Chang L, Chey WD, Lembo AJ, Simren M, et al. Bowel Disorders. *Gastroenterology*. 2016.
2. Camilleri M, Katzka DA. Irritable bowel syndrome: methods, mechanisms, and pathophysiology. *Genetic epidemiology and pharmacogenetics in irritable bowel syndrome*. *American journal of physiology Gastrointest Liver Physiol*. 2012;302(10):G1075-84.
3. Park Y, Schoene N, Harris W. Mean platelet volume as an indicator of platelet activation: methodological issues. *Platelets*. 2002;13(5-6):301-6.
4. Gasparyan AY, Stavropoulos-Kalinoglou A, Toms TE, Douglas KM, Kitas GD. Association of mean platelet volume with hypertension in rheumatoid arthritis. *Inflam Allergy Drug Targets*. 2010;9(1):45-50.
5. Aktas G, Kocak MZ, Duman TT, Erkus E, Atak BM, Sit M, et al. Mean Platelet Volume (MPV) as an inflammatory marker in type 2 diabetes mellitus and obesity. *Bali Med J*. 2018;7(3):650-3.
6. Karagoz I, Aktas G, Yoldas H, Yildiz I, Ogun MN, Bilgi M, et al. Association Between Hemogram Parameters and Survival of Critically Ill Patients. *J Intensive Care Med*. 2019;34(6):511-3.
7. Ha S-I, Choi D-H, Ki Y-J, Yang J-S, Park G, Chung J-W, et al. Stroke prediction using mean platelet volume in patients with atrial fibrillation. *Platelets*. 2011;22(6):408-14.
8. Dagistan Y, Dagistan E, Gezici AR, Halicioglu S, Akar S, Ozkan N, et al. Could red cell distribution width and mean platelet volume be a predictor for lumbar disc hernias? *Idegyogy Sz*. 2016;69(11-12):411-4.
9. Kapsoritakis AN, Koukourakis MI, Sfiridaki A, Potamianos SP, Kosmadaki MG, Koutroubakis IE, et al. Mean platelet volume: a useful marker of inflammatory bowel disease activity. *Am J Gastroenterol*. 2001;96(3):776-81.
10. Cakir L, Aktas G, Enginyurt O, Cakir SA. Mean platelet volume increases in type 2 diabetes mellitus independent of HbA1c level. *Acta Med Mediterranea*. 2014;30(2):425-8.
11. Choi CU, Seo HS, Kim YK, Na JO, Lim HE, Kim JW, et al. Can mean platelet volume predict coronary vasospasm? *Platelets*. 2011;22(3):173-8.
12. Aktas G, Cakiroglu B, Sit M, Uyeturk U, Alcelik A, Savli H, et al. Mean platelet volume: a simple indicator of chronic prostatitis. *Acta Med Mediterranea*. 2013;29:551-4.
13. Sit M, Aktaş G, Yilmaz EE, Hakyemez IN, Alçelik A, Küçükbayrak A. Platelet parameters in hepatic hydatid cysts. *Int J Inflam*. 2013;2013.
14. Erkus E, Aktas G, Atak BM, Kocak MZ, Duman TT, Savli H. Haemogram Parameters in Vitamin D Deficiency. *J Coll Physicians Surg Pak*. 2018;28(10):779-82.
15. Sincer I, Gunes Y, Mansiroglu AK, Cosgun M, Aktas G. Association of mean platelet volume and red blood cell distribution width with coronary collateral development in stable coronary artery disease. *Postepy Kardiol Interwencyjnej*. 2018;14(3):263-9.
16. Aktas G, Alcelik A, Tekce BK, Tekelioglu V, Sit M, Savli H. Red cell distribution width and mean platelet volume in patients with irritable bowel syndrome. *Prz Gastroenterol*. 2014;9(3):160-3.
17. Aktas G, Sit M, Tekce H, Alcelik A, Savli H, Simsek T, et al. Mean platelet volume in nasal polyps. *West Ind Med J*. 2013;62(6):515-8.
18. Kocak MZ, Aktas G, Erkus E, Duman TT, Atak BM, Savli H. Mean Platelet Volume to Lymphocyte Ratio as a Novel Marker for Diabetic Nephropathy. *J Coll Physicians Surg Pak*. 2018;28(11):844-7.
19. Imtiaz F, Shafique K, Mirza SS, Ayoob Z, Vart P, Rao S. Neutrophil lymphocyte ratio as a measure of systemic inflammation in prevalent chronic diseases in Asian population. *Int Arch Med*. 2012;5(1):2.
20. Allavena P, Sica A, Solinas G, Porta C, Mantovani A. The inflammatory micro-environment in tumor progression: the role of tumor-associated macrophages. *Crit Rev Oncol Hematol*. 2008;66(1):1-9.
21. Ornek E, Kurtul A. Relationship of mean platelet volume to lymphocyte ratio and coronary collateral circulation in patients with stable angina pectoris. *Cor Artery Dis*. 2017;28(6):492-7.
22. Hudzik B, Szkodziński J, Lekston A, Gierlotka M, Poloński L, Gąsior M. Mean platelet volume-to-lymphocyte ratio: a novel marker of poor short-and long-term prognosis in patients with diabetes mellitus and acute myocardial infarction. *J Diabetes Complications*. 2016;30(6):1097-102.
23. Tasoglu O, Sahin A, Karatas G, Koyuncu E, Tasoglu I, Tecimel O, et al. Blood mean platelet volume and platelet lymphocyte ratio as new predictors of hip osteoarthritis severity.

- Medicine. 2017;96(6):e6073.
24. Kurtul A, Acikgoz SK. Usefulness of Mean Platelet Volume-to-Lymphocyte Ratio for Predicting Angiographic No-Reflow and Short-Term Prognosis After Primary Percutaneous Coronary Intervention in Patients With ST-Segment Elevation Myocardial Infarction. *Am J Cardiol.* 2017;120(4):534-41.
 25. Bozlu G, Karpuz D, Hallioglu O, Unal S, Kuyucu N. Relationship between mean platelet volume-to-lymphocyte ratio and coronary artery abnormalities in Kawasaki disease. *Cardiol Young.* 2018;28(6):832-6.