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Research Article

Mean Platelet volume to platelet and red cell distribution width to platelet ratios in Irritable Bowel Syndrome

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ABSTRACT

Aim: Irritable Bowel syndrome (IBS) is a common gastrointestinal disease worldwide with a broad spectrum of symptoms. In present retrospective study, we aimed to compare mean platelet volume to platelet ratio (MPR) and red cell distribution width to platelet ratio (RPR) values of IBS patients to those of healthy subjects.

Methods: Patients whom followed up in internal medicine clinic of our institution between 2014 January to 2018 January were enrolled to the study. IBS subjects divided into constipation dominant or diarrhea dominant IBS groups. Healthy individuals visited our outpatient clinics for a check-up were enrolled as control group.

Results: Median MPR of the constipation IBS, diarrhea IS and control groups were 0,034 (0,02-0,06), 0,034 (0,02-0,06), and 0,028 (0,01-0,05), respectively. The difference between groups was statistically significant (p=0.004).

Conclusion: We think that elevated MPR in a patient with typical symptoms of IBS could be helpful in the diagnosis of the disease. Therefore, we suggest automatic calculation of MPR in hemogram assays.

Keywords: Irritable bowel syndrome; mean platelet volume to platelet ratio; inflammation; red cell distribution width to platelet ratio.

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Introduction

Irritable Bowel syndrome (IBS) is a common gastrointestinal disease worldwide with a broad spectrum of symptoms [1]. Despite it is a common disorder, only a few rate of the victims seek medical attention. Symptoms of the disease is usually mild, however, could be as serious as that deteriorating quality of life.

Recent studies focused on the role of inflammation in the course of IBS [2,3]. Indeed, IBS was related with inflammatory markers in various studies [4,5]. Novel

inflammatory markers, derived from hemogram, platelet volume to platelet ratio (MPR) and red cell distribution width to platelet ratio (RPR) have been proposed to be associated with inflammatory conditions [6-10].

In present retrospective study, we aimed to compare MPR and RPR values of IBS patients to those of healthy subjects.

Methods

Patients whom followed up in internal medicine clinic of our institution between 2014 January to 2018 January were enrolled to the study. IBS subjects divided into constipation dominant or diarrhea dominant IBS groups. Subjects with active inflammatory or infectious diseases, malignancy, or pregnancy were excluded. Participants whom on treatment with medicines that may affect platelet functions (i.e. aspirin) were not enrolled to the study. Healthy individuals visited our outpatient clinics for a check-up were enrolled as control group.

Age, gender, subtype of IBS (either constipation dominant or diarrhea dominant), and laboratory parameters, such as white blood cell count (WBC), hemoglobin (Hb), hematocrit (Htc), mean corpuscular volume (MCV), red cell distribution width (RDW), platelet count (plt), mean platelet volume (MPV), were obtained from database and patient files of the institution. The MPR value calculated by dividing of MPV by plt. Similarly, RPR was calculated by division of RDW by plt.

Data were analyzed with SPSS software, SPSS 15.0 for Windows, IBM, Co, Chicago, IL, USA). Distribution of the study parameters were analyzed with Kolmogov-Smirnov test. Variables with homogenous distribution were compared with One Way ANOVA test and expressed as mean ± standard deviation. Variables with non-homogenous distribution were compared with Kruskall-Wallis test and expressed as median (min-max). Categorical variables were compared with X^2 test. Statistical significance was set on a p value lower than 0.05.

Results

Study population was of 145 subjects; 53 in constipation IBS, 29 in diarrhea IBS and 63 in control groups. Mean age of the constipation IBS, diarrhea IBS and control groups were 40 ± 16 years, 44 ± 12 years and 39 ± 10 years, respectively. Mean age of the study groups was not statistically different among study groups (p=0.25).

There were 14 (26%) men and 39 (74%) women in constipation IBS group, 14 (48%) men and 15 (52%) women in diarrhea IBS group, and 23 (37%) men and 40 (63%) women in control group. Gender of the subjects in constipation IBS, diarrhea IBS and control groups was not statistically different (p=0.13).

There were no significant difference between study groups in terms of Hb (p=0.49), Htc (p=0.25), WBC (p=0.55), MCV (p=0.07) and plt (p=0.67).

Median MPR of the constipation IBS, diarrhea IS and control groups were 0,034 (0,02-0,06), 0,034 (0,02-0,06), and 0,028 (0,01-0,05), respectively. The difference between groups was statistically significant (p=0.004). However, there was no significant difference in RPR values of the study groups, constipation IBS, diarrhea IBS and controls (p=0.20).

Discussion

Important results of present study showed that patients with IBS have higher MPR values

compared to healthy controls. Effect of the IBS in MPR was independent from the type of IBS (constipation or diarrhea pre-dominant). On the other hand, RPR was not associated with either constipation or diarrhea dominant IBS.

Several studies in literature suggested the relation between MPR and inflammatory conditions. Authors used an index containing MPV and platelet count in a study in cancer patients and found that platelet count and MPV index, as a simple and inexpensive test, was more effective prognostic factor than and is considered a more effective prognostic factor than other prognostic indices in patients with oral squamous cell carcinoma [11]. Not only squamous cell carcinoma but also other types of cancers were associated with MPR, too. Cho et al studied MPR in patients with hepatocellular carcinoma and found that increased MPR was associated with higher hepatocellular carcinoma risk [12]. Their results were suggested by Iida et al in a more recent study, which proposed MPR as an independent risk factor for liver cirrhosis [13]. Both cancer and cirrhosis are conditions associated with inflammatory burden. Therefore, elevated MPR in IBS patients can be explained via inflammation hypothesis.

Possible mechanism of increased MPR in IBS could be explained by that inflammatory situations may induce platelet production in bone marrow and cause releasing of larger platelets. Since platelets produced by megakaryocytes become enlarged, number of platelets produced from a megakaryocyte might be decreased. Thus, elevated MPV and decreased platelet count make higher MPR.

The RPR has been introduced as a novel marker of inflammation. It has been supposed as an independent predictor of mortality in patients with severe burn [14]. However, there are conflicting results about RPR in literature. RPR of patients with premature ovarian insufficiency was not statistically different from the RPR of healthy control subjects in a study by Ilhan et al. [15]. Similarly, we could not found an association between IBS types and RPR in present study. Therefore, we think that more studies are needed to observe whether RPR and inflammatory conditions were associated.

There are two limitations in our report; retrospective design and small study cohort. These limitations make the results of present report difficult to interpret in current medical knowledge. However, to the best of our knowledge, this is the first study in literature that reported association between IBS and MPR.

In conclusion, we think that elevated MPR in a patient with typical symptoms of IBS could be helpful in the diagnosis of the disease. Therefore, we suggest automatic calculation of MPR in hemogram assays.

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