ORIGINAL RESEARCH

MEAN PLATELET VOLUME AND RED CELL DISTRIBUTION WIDTH IN HEPATOSTEATOSIS

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ABSTRACT

Introduction: Non-alcoholic fatty liver disease (NAFLD) effects about 30% of the population in developed regions of the and is considered hepatic manifestation of metabolic syndrome. Studies in literature found association between hepatosteatosis and mean platelet volume (MPV), an indicator of platelet function. Furthermore, authors suggest thatred cell distribution width (RDW) should be an inflammatory marker in certain conditions.
Objective: We aimed in this study to compare RDW and MPV values of the patients with hepatosteatosis to normal population.

Methods: Fifty-three patients with NAFLD admitted to our clinic and 52 healthy controls enrolled to this retrospective study. White blood cell count (WBC), hemoglobin (Hb), mean corpuscular volume (MCV), red cell distribution width (RDW), platelet count (PLT) and mean platelet volume (MPV) values of the obtained and assessed.

Results: We found that, RDW and MPV values were significantly elevated in patients with hepatosteatosis compared to control subjects.

Conclusion: We think that beside MPV, RDW should also be an indicator of hepatosteatosis. More prospective studies with larger cohort are needed to confirm our results.

Keywords: red cell distribution width, mean platelet volume, hepatosteatosis, inflammation

INTRODUCTİON

Non-alcoholic fatty liver disease (NAFLD) effects about 30% of the population in developed regions of the world [1]. It's rate is increasing worldwide. NAFLD is considered hepatic manifestation of metabolic syndrome [2]. Therefore, it is not surprising that it is associated with insulin resistance, hyperlipidemia, hypertension and abdominal obesity. Simple steatosis, steatohepatitis and liver cirrhosis are included in the clinical spectrum of NAFLD [3].

Platelets are anucler cells produced by megakaryocytes in bone marrow. Mean platelet volume (MPV) refers the size of platelets and greater values are associated with platelet activation [4, 5]. However, platelet activation may be associated with microvesicle formation in smaller platelets [6]. A strong association between MPV and metabolic risk factors, included, diabetes mellitus, obesity, metabolic syndrome has been described in literature [7-11].

Red cell distribution width (RDW) refers the size variation of erythrocytes. Some authors suggest that RDW should be an inflammatory marker in certain conditions [12, 13]. Furthermore, there are various studies in literature pointed an association between RDW and cardiovascular diseases, stroke and celiac disease [14-16].

Some of the studies in literature found no association between MPV and hepatosteatosis [6] while others found strong association [17]. However, literature is lack of data about the possible association of RDW and hepatosteatosis. We aimed in this study to compare RDW and MPV values of the patients with hepatosteatosis to normal population.

MATERIALS AND METHODS

Fifty-three patients with NAFLD admitted to our clinic and 52 healthy controls enrolled to this retrospective study. Healthy controls were selected from individuals that have no abnormalities in check-up examinations. None of the subjects in study and control groups had a history of use of medications. Serological markers for known hepatitis viruses were negative for all patients with hepatosteatosis. They do not have an history of alcohol consumption. Degree of hepatosteatosis evaluated by ultrasound scan. Laboratory data of patients with NAFLD obtained at the time of diagnosis. White blood cell count (WBC), hemoglobin (Hb), mean corpuscular volume (MCV), red cell distribution width

(RDW), platelet count (PLT) and mean platelet volume (MPV) values of the participants obtained from computerized medical database of the hospital.

Venous blood samples obtained into sterile standard tubes containing constant amount of anticoagulant. Laboratory tests have been held within several minutes after blood samples obtained. The complete blood count analyses were performed in automatic analyser of LH 780 model of Beckman Coulter device (Beckman Coulter In.; Bre CA).

Data was assessed by using SPSS programme. (SPSS 15.0; SPSS Inc., Chicago, IL, USA). Results expressed as mean ± SD. Variables are conducted with independent samples t test and Mann- Whitney U test. A p value of < 0.05 is considered as statistically significant. The study was approved by the local ethics committee of Abant Izzet Baysal University School of Medicine.

RESULTS

There were 26 women and 27 men in hepatosteatosis group, while 21 women and 31 men in control subjects. Table I shows general characteristics and laboratory data of the study and control groups. Mean ages of the study and control group were 47 and 43.1 years, respectively (p=0.08). Moreover, WBC (p=0.34), Hb (p=0.59), MCV (p=0.99) and platelet (p=0.26) levels were not statistically different between groups. However, RDW (p=0.018) and MPV (p<0.001) values were significantly elevated in patients with hepatosteatosis compared to controls.

Table 1: General characteristics and laboratory data of the patients

	Study group	Control Group	P value
Mean age (years)	47±12	40.1±10	0.081
Gender			
Men	27	31	0.37
Women	26	21	
WBC	7±1.7	7.3±2.1	0.34
Hb (g/dl)	14.5±1.5	14.4±1.7	0.59
MCV (fL)	86±3	86±6	0.99
RDW	16.1±0.6	15.8±0.6	**0.018**
PLT	267±107	248±53	0.26
MPV	9.8±1.7	8.1±0.8	**<0.001**

DISCUSSION

We showed that besides MPV, increased RDW was associated with hepatosteatosis in patients with hepatosteatosis. This is the first study in literature presenting both elevation in RDW and MPV in this population.

Hepatosteatosis, together with obesity and type 2 diabetes mellitus, furthermore, proinflamatory and prothrombotic state are components of metabolic syndrome [18-20].

Inflammatory pathways are activated by ectopic fat accumulation in liver [21-23]. Inflammation activated by fat accumulation is associated with insulin resistance, hepatosteatosis and failure of pancreas beta cells. Because hepatosteatosis and thus, metabolic syndrome are inflammatory processes, an increase in MPV may reflect the inflammatory burden of these diseases.

Activated platelets are greater than normal platelets in size which cause an elevation in MPV. Therefore MPV is an indicator of platelet activation which is believed to be associated with subclinic/clinic inflammatory processes [5].

Studies in literature have been reported that hepatosteatosis was associated with an elevation in MPV [17, 24, 25]. We showed in present study that not only MPV but also RDW were increased in hepatosteatosis compared to healthy subjects. To our knowledge, this is the first study reporting RDW elevation beside MPV in these patients.

RDW has been studied in inflamamtory diseases recently. It has been found to be associated with disease activity in inflammatory bowel syndrome, another inflammatory disease [26]. Some other reports showed that patients with inflammatory bowel disease have increased RDW compared to health controls [12, 27]. Li et al reported that anti TNF antibodies, potent supressors of inflammation, caused complete resolution in hepatic steatosis in a mice model [28]. This report is an evident that hepatosteatosis may be an inflammatory process such as inflammatory bowel disease. Because hepatosteatosis is associated with a subclinic inflammation, our results are not surprising indicating increased RDW in patients with hepatosteatosis compared to healthy controls.

In recent studies, authors found that patients with systemic lupus erythematosus have increased RDW compared to healthy subjects [29, 30]. One of these studies is Vaya et al's study, which proved SLE patients have elevated RDW compared to controls. However, although mean Hb levels of SLE and control groups in that study were in normal range, SLE group had significantly reduced Hb levels compared to controls. Iron deficiency, a common cause of anemia may cause an elevation in RDW. On the other hand, Hb levels were not different between study and control groups in our report. We excluded patients with anemia and iron deficiency in present study. Therefore our results are important indicating increased RDW in patients with hepatosteatosis compared to controls even both groups had similar Hb levels.

In conclusion, we think that beside MPV, RDW should also be an indicator of hepatosteatosis. More prospective studies with larger cohort are needed to confirm our results.

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