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Original Article

Can red cell distribution width and mean platelet volume serve as a marker for chronic prostatitis?

Akif Nuri Dogan[1], Basri Cakiroglu[2], Aydin Ismet Hazar[3], Ramazan Gozukucuk[4], Bekir Sami Uyanik[5]

[1]Department of Internal Medicine, Istanbul Aydin University, Beşyol Mh., Inönü Cad. No. 38, Sefa Köy, Istanbul 34295, Turkey; Departments of [2]Urology, [4]Infectious Disease and Clinical Microbiology, [5]Clinical Biochemistry, Hisar Intercontinental Hospital, Saray Mahallesi Site Yolu Caddesi No. 7, Umraniye, Istanbul 34768, Turkey; [3]Department of Urology, Gaziosmanpasa Taksim Training and Research Hospital, Karayolları Mahallesi, Osmanbey Caddesi, No. 120, Gaziosmanpasa, Istanbul, Turkey

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Abstract: Chronic prostatitis is a widespread urological disease, however, underlying pathophysiology is poorly understood and it is usually characterized with recurrences. Platelets take in charge in hemostasis, tissue repairment and inflammation. Mean platelet volume (MPV), is considered as a marker of platelet activation. Red cell distribution width (RDW) refers the size variations of erythrocytes. Recent studies pointed that similar to MPV and RDW were also associated with inflammatory conditions. The aim of present study is to find out the possible association between MPV and RDW with chronic prostatitis. We retrospectively analysed the laboratory data of patients with chronic prostatitis between 2009 and 2012. A total of 338 patients with chronic prostatitis and 110 healthy controls enrolled to the study. Laboratory data of chronic prostatitis patients and healthy controls obtained from the computerized databases of the hospitals and platelet count (PLT), mean platelet volume (MPV) values, red blood cell (RBC), hemoglobin (Hb), hematocrite (Htc) and red cell distribution width (RDW) of the participants recorded. There was no statistically significant difference between groups in terms of mean age, Htc, Hb, RBC and PLT count. However, patients with chronic prostatitis had significantly increased MPV (P=0.000) and RDW (P=0.000) compared to controls. Increased MPV and RDW should help the diagnosis of chronic prostatitis but, more studies with larger study population are needed to confirm our results.

Keywords: Mean platelet volume, chronic prostatitis, platelet activation, red cell distribution width

Introduction

Chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS) is a common urological diagnosis in men under the age of 50 years. There is no one unanimous etiological mechanism or specific curative therapy for CP/CPPS [1]. Many chronic prostatitis patients are usually have symptoms of the disease for a long time and many patients are left without optimal treatment. Often the diagnosis is based on physical examination and history. There are no specific laboratory tests or characteristic findings for chronic prostatitis. It is often characterized by chronic pelvic pain with urinary symptoms and impairment of quality of life (QOL) [2].

Chronic inflammation patterns often appears in the prostate gland of patients with or without prostate disease. The parameter used for the variation of circulating red cells is called Red Cell Distribution Width (RDW). RDW value which is a component of the complete blood count (CBC) shows the heterogenecity of red cell volume. It is inexpensive, widely available and easily repeatable for measuring the red blood cell (RBC) volume variability. Recent reports of the high RDW in cardiovascular and metabolic disorders and colon cancer. RDW and the relationship between severity of liver disease have been reported in the last two studies [3-8].

Red cell distribution with (RDW) is a widely used laboratory parameter for the quantification of the extent of erythrocyte anisocytosis, which reflects the variability of the size of the circulating erythrocytes [9]. The cells which are responsible for hemostasis and tissue repair are called

Table 1. General characteristics and laboratory data of the patients and controls

	Prostatitis Group (N=388)	Control Group (N=110)	*p* Value
Age (years)	40.6±9.6	40.3±11.0	0.820
PLT (mm^3)	235.9±50.1	238.9±40.1	0.602
MPV (fL)	8.8±1.3	8.2±0.9	0.000
RBC (/mm^3)	5.2±0.6	5.1±0.4	0.070
RDW (fL)	13.9±1.2	13.2±1.1	0.000
Hb (g/dL)	15.0 ±1.2	15.1 ±1.1	0.543
Htc (%)	43.7 ±3.8	43.6 ±3.0	0.788

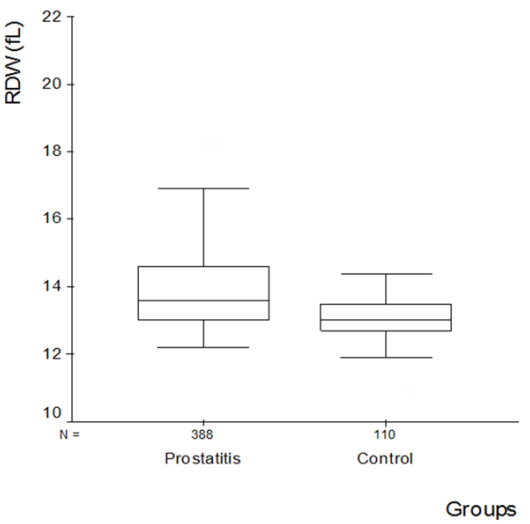

Figure 1. Box plots of RDW in prostatitis and control groups.

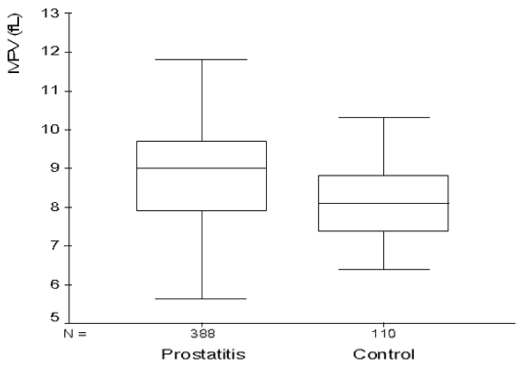

Figure 2. Box plots of MPV in prostatitis and control groups.

the platelets [10]. These activated blood cells are also have an important role in inflammation.The marker that shows the platelet activation and the production rate of the platelets is called the mean platelet volume (MPV) [11]. MPV is associated with a lot of inflammatory processes like subclinical inflammation (in coronary ischemia, preecplamsia and stroke) or overt inflammation (in rheumatoid arthritis and inflammatory bowel disease) [12-16].

There is no ideal diagnostic test for chronic prostatitis, so we conducted this study to further examine the possible association between chronic prostatitis and the MPV and RDW blood levels.

Recently, studies have examined the MPV and RDW as a marker of inflammation, and they suggest that these values are significantly higher in chronic inflammatory diseases. Therefore MPV and RDW in patients with chronic prostatitis were investigated in the present study to show a possible association with chronic prostatitis.

Materials and methods

Between 2009 and 2012 patients were retrospectively reviewed with chronic prostatitis, chronic prostatitis is diagnosed only when these patients were included in the study, additional pathology of screened patients were excluded from the study. A total of 498 subjects were enrolled, 388 patients were included in these individuals, as a control group from the same age group between this year checkup clinic to come to any pathology were included 110 healthy male subjects. The ages of patients, complete blood count parameters were evaluated.

The patients with chronic prostatitis generally complained of pain in the perineal, suprapubic, and penile regions that spread to the testicles, groin, and waist, pain during and after ejaculation, urgency, strained and intermittent micturition. To confirm the diagnosis of chronic prostatitis, the hemogram, urinalysis, urine and semen cultures, Meares-Stamey four-glass test, prostate-specific antigen, and urinary ultrasound were performed. Patients with thyroid disorders, malignancies, autoimmune conditions, and chronic respiratory disorders (chronic obstructive pulmonary disease or asthma) were excluded from the study. Patients known to have platelet disorders or on medications that affect platelet function were also excluded. Patients with iron deficiency anemia were not included to the study because RDW

increases in this condition. The Sysmex XT-1800i uses the electric resistance detecting method (impedance technology) with hydro dynamic focusing to measure RBC, platelet (PLT), mean platelet volume (MPV), and Hematocrit (HCT). Mean platelet volume (MPV) may be reported with a CBC. It is a calculation of the average size of platelets. Red cell distribution width (RDW), which may be included in a CBC, is a calculation of the variation in the size of RBCs.

Statistical analysis

All analyses were performed using SPSS 11.5 (Statistical Package for Social Sciences, Chicago, USA. Independent sample T test was used to examine the significance of differences between in data of patients with chronic prostatitis and controls.

Data are expressed as mean values SD. A value of $P<0.05$ was considered statistically significant.

Results

All of the participants were male. The mean ages of the patients with chronic prostatitis and controls were 40.6±9.6 and 40.3±11.0 years, respectively. There was no significant difference between the groups (P=0.82). The platelet and red blood cell levels of the patients with chronic prostatitis and controls were 235.900±50,100, 5200±600 and 238.900± 40.100 in mm 3, 5.100±3-400 respectively. The difference was statistical significant (P=0.60, 0,07). The chronic prostatitis patients had a significantly (P=0.000) higher MPV than the controls (8.8±1.3 vs. 8.2±0.9 respectively). And the chronic prostatitis patients had a significantly (P=0.000) higher RDW than the controls (13.9±1.2 vs. 13.2±1.1 respectively), but RBC, hemoglobin, hematocrit values did not differ statistically (P=0.07, 0.54, 0.78).

Table 1 and **Figures 1**, **2** summarizes the general characteristics and laboratory data of the study.

Discussion

There is no ideal diagnostic test for chronic prostatitis. In this study we evaluated the relationship between chronic prostatitis with MPV and RDW measurements, obtained from a complete blood count-a cheap and easily accessable blood test. Although the primary function of platelets is hemostasis, studies have demonstrated a link between inflammatory processes and MPV which is a platelet index that demonstrates platelet activation [13, 16]. It has also been recognised as an inflammatory marker in systemic diseases such as myocardial infarction, acute pancreatitis and ulcerative colitis [17].

RDW also shows an increase in inflammation, similar to MPV. There are only a few studies reporting any relationship between chronic prostatitis and hemogram parameters. Two studies have evaluated possible link between chronic prostatitis and MPV [18, 19]. On the other hand, our study is the first to evaluate the link between RDW and chronic prostatitis. Our data has demonstrated that mean platelet volume of the patients with chronic prostatitis is significantly increased compared to age matched controls.

Aktaş et al. [19] compared blood MPV measurements in healthy volunteers to those with chronic prostatitis and similar to our results found that MPV was higher in patients with chronic prostatitis. Our study, however, has a larger population.

As it is known to increase in chronic infections, it is reasonable for an increase in MPV to be seen in patients with chronic prostatitis. Sit et al. [20] evaluated the MPV measurements in preoperative blood count results in patients with hepatic hydatic cyst and found it to be significantly increased when compared to postoperative levels. Similarly, there are several studies reporting an increase in MPV during chronic infections [21-23]. Our study supports these previous findings with MPV found to be higher in patients with chronic prostatitis when compared to healthy adult controls.

RDW is an important biomarker of cardiovascular mortality and morbidity as shown in the recent studies. It is also used to be as an indicator for infections and auto-immune diseases which can be active, acute or chronic inflammatory conditions. Studies have shown RDW to be an important prognostic factor for mortality and morbidity. RDW is used to detect early anemia, the status of the increased oxidative stres, paired iron mobilization and its elevation has

been associated with elevation of other inflammation markers, such as C-reactive protein, Tumor Necrosis Factor-a, Interleukin-6 [17, 25, 26].

It has been reported that RDW is high in patients with heart disease, cerebro-vascular diseases, septicemia, hepatitis, hepatosteatosis, inflammatory bowel disease and patients with chronic lung disease [24-26]. In accordance with these results, we hypothesized that RDW would increase in chronic disesaes and therefore compared RDW between groups. Similar to MPV, RDW was found to be significantly increase in patients with chronic prostatitis when compared to control groups. There was no difference between hemoglobin, hematocrit, RBC and platelet levels between the groups.

Conclusion

Similar to previous reports, we found a positive correlation between chronic prostatitis and increase in MPV. Although our study found a similiar relationship between chronic prostatitis and RDW, this relationship needs to be further evaluated with larger studies.

Disclosure of conflict of interest

None.

Address correspondence to: Dr. Basri Cakiroglu, Department of Urology, Hisar Intercontinental Hospital, Saray Mahallesi Site Yolu Caddesi No. 7 Umraniye, Istanbul 34768, Turkey. Tel: +905335167320; E-mail: drbasri@gmail.com

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