

## Varikosel ile ortalama platelet hacmi arasındaki bağlantı hala açık değil

*The relationship between varicocele and mean platelet volume levels is still not clear*

Sezgin Okçelik<sup>1</sup>, Mevlüt Gök<sup>2</sup>, İrfan Şener<sup>3</sup>, Ferhat Ateş<sup>4</sup>, Hasan Soydan<sup>4</sup>, Ömer Yılmaz<sup>4</sup>, Temuçin Şenkul<sup>4</sup>

<sup>1</sup> Van Eğitim ve Araştırma Hastanesi, Üroloji Kliniği, Van

<sup>2</sup> Beytepe Murat Erdi Eker Devlet Hastanesi, İç Hastalıkları Kliniği, Ankara

<sup>3</sup> Beytepe Murat Erdi Eker Devlet Hastanesi, Biyokimya Kliniği, Ankara

<sup>4</sup> Haydarpaşa Sultan Abdülhamid Eğitim ve Araştırma Hastanesi, Üroloji Kliniği, İstanbul

### Özet

**Giriş:** Bu çalışmada varikosel ile ortalama platelet hacmi arasındaki ilişkiyi araştırmayı amaçladık.

**Gereç ve Yöntem:** Üroloji polikliniğine kontrol amacıyla başvuran hastalar çalışmaya dahil edildi. Bütün hastaların fizik muayeneleri aynı üroloji uzmanı tarafından yapıldı. Periferik venöz kan örnekleri aç karnına saat 8:30 ile 12:00 arasında alındı. Tam Kan analizi kan alındıktan 2 saat içinde Mindray BC 5500 Auto Hematology Analyzer (Mind-ray Bio-Medical Electronics Co., Ltd., Shenzhen, China) cihazı ile yapıldı. Hastalar iki gruba ayrıldı. Grup 1: Grade III varikosel grubu; Grup 2: Kontrol grubu. Hastaların yaşları, RBC, Hb, MCV, WBC, PLT, MPV değerleri kaydedildi. İstatistiksel analiz SPSS for windows ver. 16.0 (SPSS Inc., Chicago, IL, USA) kullanılarak yapıldı. İstatistiksel anlamlılık  $p < 0.05$  olarak kabul edildi.

**Bulgular:** Ekim 2014 ile Mart 2015 tarihleri arasında 309 hasta çalışmaya dahil edildi. Ortalama yaş  $22.94 \pm 1.71$ , ortalama RBC  $5.29 \pm 0.43$ , ortalama Hb  $16.21 \pm 1.03$ , ortalama MCV  $91.01 \pm 5.96$ , ortalama WBC  $6.97 \pm 1.76$ , ortalama PLT  $248.01 \pm 56.76$ , ortalama MPV  $10.89 \pm 6.40$  idi. 144 hastada grade III varikosel ve 165 hastada normal fizik muayene bulguları mevcuttu. Her iki grubun yaşları benzerdi. RBC, Hb, MCV, WBC değerleri her iki grup arasında farklı değildi. Platelet değerleri varikosel grubunda anlamlı şekilde düşüktü. MPV değerleri varikosel grubunda yüksekti, fakat bu istatistiksel olarak anlamlı değildi.

**Sonuç:** Ortalama platelet hacmi varikosel grubunda yüksek olmasına rağmen istatistiksel olarak anlamlı değildi. Buna bağlı olarak ortalama platelet hacmi varikoselin patofizyolojisi ile ilgili olmayabilir.

**Anahatar Kelimeler:** Ortalama platelet hacmi; varikosel; MPV

### Abstract

**Objective:** To assess the relationship between mean platelet volume levels and varicocele.

**Materials and Methods:** Patients, who admitted to urology outpatient clinic for check-up, enrolled in the study. All physical examinations were made by a single urologist. Peripheral venous blood samples were collected to tube including ethylenediaminetetraacetic acid (EDTA-K2) anticoagulant between 8:30 AM and 12 AM after an overnight fasting. All complete blood count (CBC) analysis done within 2 hours after venipuncture using Mindray BC 5500 Auto Hematology Analyzer (Mind-ray Bio-Medical Electronics Co., Ltd., Shenzhen, China). Patients were divided into two groups. Group 1: Grade III varicocele group; Group 2: Control group. We recorded the patient's age, red blood cell (RBC), hemoglobin (Hb), mean corpuscular volume (MCV), white blood cell (WBC), platelet (PLT), mean platelet volume (MPV) values. Statistical analyses were performed using the SPSS for windows ver. 16.0 (SPSS Inc., Chicago, IL, USA). Statistical significance was set at  $p < 0.05$ .

**Results:** Three hundred and nine patients enrolled in the study between September 2014 and March 2015. Mean age was  $22.94 \pm 1.71$ , mean RBC was  $5.29 \pm 0.43$ , mean Hb was  $16.21 \pm 1.03$ , mean MCV was  $91.01 \pm 5.96$ , mean WBC was  $6.97 \pm 1.76$ , mean PLT was  $248.01 \pm 56.76$ , mean MPV was  $10.89 \pm 6.40$ . 144 patients had grade III varicocele and 165 patients had normal physical examination. Age of two groups were similar. There was not any significant difference for RBC, Hb, MCV, WBC levels between two groups. Platelet levels were significantly low in varicocele group. MPV levels were high in varicocele group, but it was not statistically significant.

**Conclusions:** Although mean platelet volumes high in varicocele group, it was not statistically significant. According to that mean platelet volume may not be related to the physiopathology of varicocele.

**Keywords:** Mean platelet volume; varicocele; MPV

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### Yazışma / Correspondence

Sezgin Okçelik, Üroloji Uzmanı

Van Eğitim ve Araştırma Hastanesi,

Üroloji Kliniği, Van

Tel: +90 507 198 2156

E-mail: drsezginokcelik@hotmail.com

## Introduction

Varicocele is defined as an abnormal venous dilatation and tortuosity of the pampiniform plexus<sup>1</sup>. It is an important situation, because it's the most common correctable cause of infertility in men<sup>2</sup>. Physical examination is the gold standart method for diagnosis<sup>3</sup>. Three grades are determined according to Dubin system<sup>3</sup>. Third grade is defined as varicose veins are observed in the scrotum without any maneuver or manipulation<sup>3</sup>. Although several theories have been developed to explain the causes of varicocele, there has been no theory gain acceptance yet.

Mean platelet volume(MPV) is associated with platelet volume and function<sup>4</sup>. Some researchers studying the pathophysiology of varicocele reported that MPV's rising in varicocele patients and decline in the value after varicocelectomy<sup>5,6</sup>. Also there are studies about increased MPV is related to peripheral vascular diseases<sup>7</sup>. While MPV is a parameter that is provided from the automatic Hematology Analyzer, there must be some rules to study this parameter. Especially time to study is very important for standartation<sup>8</sup>.

In this study we determined the relationship between the third grade varicocele and MPV levels as standart within two hours.

## Material and Methods

Patients, who admitted to urology outpatient clinic for check-up, enrolled in the study between September 2014 and March 2015. All physical examinations were made by a single urologist. Peripheral venous blood samples were collected to tube including ethylenediamine-tetraacetic acid (EDTA-K2) anticoagulant between 8:30 AM and 12 AM after an overnight fasting. All complete blood count (CBC) analysis done within 2 hours after venipuncture using Mindray BC 5500 Auto Hematology Analyzer( (Mind-ray Bio-Medical Electronics Co., Ltd., Shenzhen, China). Medical records of the patients were retrospectively analyzed. Patients were divided into two groups. Group 1: Grade III varicocele group; Group 2: Control group. Patients with undescended testis, hypotrophic testis, atrophic testis, chronic illness, obesity, history of coronary artery disease, hypertension, hyperlipidemia, peripheral vascular disease, diabetes mellitus, splenectomy, thrombotic thrombocytopenic purpura, idiopathic thrombocytopenic purpura, myeloprolifera-

**Table 1.** Comparison of Normal and Grade III Varicocele Patients' Hemogram Levels

|     | Normal Patients | Varicocele Patients | P             |
|-----|-----------------|---------------------|---------------|
| Age | 22.77±1.33      | 23.15±2.06          | 0.309**       |
| RBC | 5.31±0.45       | 5.28±0.42           | 0.665**       |
| Hb  | 16.24±0.95      | 16.18±1.12          | 0.604*        |
| MCV | 91.32±5.62      | 90.65±6.33          | 0.458**       |
| WBC | 7.22±1.82       | 6.68±1.66           | 0.052**       |
| PLT | 256.18±56.36    | 238.65±55.95        | <b>0.007*</b> |
| MPV | 10.55±0.94      | 11.28±9.32          | 0.327**       |

\*Independent samples t test \*\*Mann Whitney U test

tive disorders, leukemia, thrombocytopenia and thrombocytosis were excluded from the survey. Only grade III varicocele patients were included in the study to see the difference better. We recorded the patient's age, red blood cell(RBC), hemoglobin(Hb), mean corpuscular volume(MCV), white blood cell(WBC), platelet(PLT), mean platelet volume(MPV) values.

Statistical analyses were performed using the SPSS for windows ver. 16.0 (SPSS Inc., Chicago, IL, USA). Compliance of variables with a normal distribution was analyzed with visual (histogram and probability plots) and analytical methods (the Kolmogorov-Smirnov test). Descriptive analyses were provided as mean and standard deviation. Since the PLT and hemoglobin values showed normal distribution, the independent samples t test was used in the comparison of these parameters, while the Mann-Whitney U test was used for the other parameters that did not comply with the normal distribution. Statistical significance was set at  $p < 0.05$ .

## Results

Three hundred and nine patients enrolled in the study between September 2014 and March 2015. Mean age was 22.94±1.71, mean RBC was 5.29±0.43, mean Hb was 16.21±1.03, mean MCV was 91.01±5.96, mean WBC was 6.97±1.76, mean PLT was 248.01±56.76, mean MPV was 10.89±6.40. One hundred and forty four patients had grade III varicocele and 165 patients had normal physical examination. The results of the patients were shown on the table 1 seperately. Age of two groups were similar. There was not any significant difference for RBC, Hb, MCV, WBC levels between two groups. Platelet levels were significantly low in varicocele group. MPV levels

were high in varicocele group, but it was not statistically significant.

### Discussion

There are studies that show MPV levels are high in varicocele patients<sup>5,6,9,10</sup>. Higher MPV levels are reported in patients with higher grade varicocele and MPV increase is related to severity of varicocele<sup>10</sup>. Coban et al. reported that varicocele correction lead to normalization of preoperatively elevated mean platelet levels<sup>5</sup>. However they did not clearly explain the connection. Also they determined routine MPV levels in CBC analysis.

MPV increase is seen also in some vascular diseases<sup>7</sup>. Although there are several studies show MPV increase in routine automatic blood count device in varicocele patients, it is not true to assess MPV in routine tests. Because timing is important when measuring MPV<sup>8</sup>. The optimal measuring time with K2-EDTA should be 120 minutes after taking blood sample<sup>8</sup>. In routine tests measurement times were not standardised. All previous studies evaluated samples retrospectively. Beyan also criticized the Coban's study for not to be standardised measurement timing<sup>11</sup>. The results might be due to a coincidence or patient selection bias. In our study MPV was high but it was not statistically significant. Our samples were also determined retrospectively, but all CBC analysis done within 2 hours after venipuncture for standartation . Many conditions can be affect PVI such as a history of coronary artery disease, hyperlipidemia, peripheral vascular disease, hypertension, diabetes mellitus, thrombotic thrombocytopenic purpura, idiopathic thrombocytopenic purpura, myeloproliferative disorders, splenectomy, leukemia, thrombocytopenia and thrombocytosis<sup>12,13</sup>. Therefore, we excluded patients with these conditions.

Coban et al. found that relationship with between MPV values and varicocele and they suggested that increase of MPV led to the varicocele formation<sup>6</sup>. On the other hand De Luca et al. suggested that MPV is not associated with platelet reactivity<sup>14</sup>. Beyan et al. did not observe any correlation between MPV and platecrit and they also said platelet aggregation responses with collagen, adenosine diphosphate and epinephrine<sup>15</sup>.

Camoglio et al. reported that there was an age-related increase in MPV values. Also they declared that testicular hypotrophy did not affect MPV levels. On the other hand

they noticed that many factor might affect their results<sup>16</sup>. As shown these factors are not clear. We have already excluded these patients.

There are some limitations of our study. We did not evaluate other markers of platelet activations such as beta-thromboglobulin and platelet factor IV. We did not know the smoking status and androgen levels. However, we tried to standardise the conditions.

### Conclusions

We have tried to standardize the conditions that affects the MPV levels. However, there are still some missings. According to our results, MPV levels may not be related to pathophysiology of varicocele in standart analysis. Further prospective studies, which analysis MPV within 120 minutes as standard without patient selection bias, excluding all conditions that affects MPV levels except varicocele , are needed to clear up these topic.

Conflict of Interest:

There is no conflict of interest.

### References

1. Baazeem A, Belzile E, Ciampi A, et al. Varicocele and male factor infertility treatment: a new meta-analysis and review of the role of varicocele repair. *Eur Urol* 2011;60:796-808.
2. Redmon JB, Carey P, Pryor JL. Varicocele: the most common cause of male factor infertility? *Hum Reprod Update* 2002;8:53-8.
3. Inci K, Gunay LM. The role of varicocele treatment in the management of non-obstructive azoospermia. *Clinics* 2013;68:89-98.
4. Bath PM, Butterworth RJ. Platelet size: Measurement, physiology and vascular disease. *Blood Coagul Fibrinolysis* 1996;7:157-61.
5. Coban S, Keles I, Biyik I et al. Does varicocele correction lead to normalization of preoperatively elevated mean platelet volume levels? *Can Urol Assoc J* 2015;9:E5-9.
6. Coban S, Keles I, Biyik I, et al. Is there any relationship between mean platelet volume and varicocele? *Andrologia* 2014;47:37-41.
7. Vizioli L, Muscari S, Muscari A. The relationship of mean platelet volume with the risk and prognosis of cardiovascular diseases. *Int J Clin Pract* 2009;63:1509-15.
8. Lancé MD, van Oerle R, Henskens YM, et al. Do we need time adjusted mean platelet volume measurements? *Lab Hematol.* 2010;16:28-31.
9. Mahdavi-Zafarghandi R, Shakiba B, Keramati MR, et al. M.

- Platelet volume indices in patients with varicocele.” *Clinical and experimental reproductive medicine* 2014;41: 92-95.
10. Bozkurt Y, Soylemez H, Sancaktutar AA, et al. Relationship between mean platelet volume and varicocele: a preliminary study. *Urology* 2012;79:1048-51.
  11. Beyan C, Beyan E. Mean platelet volume may not be related to the physiopathology of varicocele. *Andrologia* 2015;47:367.
  12. Leader A, Pereg D, Lishner M. Are platelet volume indices of clinical use? A multidisciplinary review. *Ann Med* 2012;44:805–816.
  13. Nena E, Papanas N, Steiropoulos P, et al. Mean Platelet Volume and Platelet Distribution Width in non-diabetic subjects with obstructive sleep apnoea syndrome: new indices of severity? *Platelets* 2012;23:447–454.
  14. De Luca G, Verdoia M, Cassetti E, et al. Novara Atherosclerosis Study (NAS) group Mean platelet volume is not associated with platelet reactivity and the extent of coronary artery disease in diabetic patients. *Blood Coagul Fibrinolysis* 2013; 24:619–624.
  15. Beyan C, Kaptan K, Ifran A. Platelet count, mean platelet volume, platelet distribution width, and plateletcrit do not correlate with optical platelet aggregation responses in healthy volunteers. *J Thromb Thrombolysis* 2006;22:161–164.
  16. Camoglio FS, Peretti M, Bianchi F, et al. Mean platelet volume and varicocele: comparison between adolescents and adults. *Am J Clin Exp Urol* 2015;3:100-106.