Mean platelet volume may not be reduced in patients with acute bronchiolitis

Dear Editor,

We read the research study conducted by Ergül et al. (1) related with "Reduction in mean platelet volume (MPV) in children with acute bronchiolitis," which was published in your journal, with great interest. We would like to explain some issues that we found to be contradictory.

In the Introduction part of the article, an argument was proposed suggesting that changes in MPV occured before changes in the platelet number. According to current sources, there is an inverse relation between the platelet number and MPV, which provides maintenance of a stable platelet mass in the circulation, and this relation is an inverse relation that is also observed in other living creatures and is considered an example of evolutionary transmission (2). Actually, the sources indicated by the authors in relation with the argument they proposed do not include such an assessment. In addition, the results obtained in the study show that the MPV values were significantly lower and the platelet number values were significantly higher in the mild, moderate, and severe bronchiolitis groups compared with the control group. This is contradictory to the argument proposed by the authors.

This study was conducted in a substantially large group and contained a total of 514 individuals aged below two years, comprising 313 pediatric patients and 201 healthy children. However, the retrospective nature of the study leads to a significant problem because the MPV results could not be standardized. The excessive difference shown in the results when different complete blood count devices were used for platelet volume measurements and the significant variance in MPV values in relation with time with anticoagulation using EDTA (ethylendiamintetraacetic acid) are the most important technical problems accompanying MPV measurement (3). It is important that all complete blood counts were performed using a single device (Mindray - BC 6800), but the inability to standardize measurement times was a significant disadvantage. Jackson and Carter (4) reported that MVP increased gradually as a derivative of time when EDTA was used as anticoagulant in complete blood count. These increments in mean platalet volume occur up to 30% in the first five minutes of contact with EDTA and with an additional 10-15% in the following two hours. Lance et al. (5) found that the time period between obtaining a blood sample and its measurement was very important in the measurement of MPV, and the most appropriate time for measurement was 120 minutes after obtaining blood sample in tests in which EDTA were used. It was not possible to standardize the measurement time of complete blood count and consequently the MPV measurements because this comprehensive study had a retrospective design, and this is a significant element that threatens the reliability of the data.

In conclusion, MPV measurements include significant standardization problems in retrospective studies. It seems important to conduct studies that investigate the role of mean platalet volume value in different diseases in large groups with a prospective design and with standardization of MPV measurements.

References

1. Ergül AB, Torun YA, Uytun S, Aslaner H, Kısaaslan AP, Şerbetçi MC. Akut bronşiolitli çocuklarda ortalama trombosit hacminde azalma. Turk Pediatri Ars 2016; 51: 40-5.
2. Kuter DJ. Megakaryocyte biology and the production of platelets. 2016 UpToDate. Available from: URL: http://www.uptodate.com/contents/megakaryocyte-biology-and-the-production-of-platelets
3. George TI. Automated hematology instrumentation. 2016 UpToDate. Available from: URL: http://www.uptodate.com/contents/automated-hematology-instrumentation
4. Jackson SR, Carter JM. Platelet volume: laboratory measurement and clinical application. Blood Rev 1993; 7: 104-13. [CrossRef]
5. Lancé MD, van Oerle R, Henskens YM, Marcus MA. Do we need time adjusted mean platelet volume measurements? Lab Hematol 2010; 16: 28-31. [CrossRef]

Address for Correspondence: Cengiz Beyan   E-mail: cengizbeyan@hotmail.com

Beyan and Beyan. Acute bronchiolitis and mean platelet volume

Turk Pediatri Ars 2016; 51: 231-2

Cengiz Beyan[1], Esin Beyan[2]

[1]**Division of Hematology, Gülhane Military Medical Academy, Ankara, Turkey**
[2]**Clinic of Internal Medicine, Keçiören Training and Research Hospital, Ankara, Turkey**

Dear Editor,

Platelets play an active role in inflammation. A change in platalet volume is observed during inflammation. Therefore, mean platelet volume (MPV) has been considered a marker of platelet efficiency. Mean platelet volume is included in the complete blood count test and does not require additional cost. Thus, studies proposing that MPV can be used as a marker of inflammation in inflammatory diseases have been conducted (1).

The anticoagulants found in complete blood count tubes may lead to deformations in platelets. An increase in MPV is observed in platelets exposed to the EDTA found in complete blood count tubes (2). Lance et al. (3) reported that the most appropriate time for measurement of MPV in complete blood count measurements using EDTA was the first 120 minutes after obtaining blood samples. In our clinic, complete blood count is performed in the first two hours after obtaining blood sample. It can be stated that EDTA-related change in MPV was similar in the patient and control groups, though our study was conducted retrospectively.

Measurement of mean platalet volume may also show variance depending on the technology used by the complete blood count device. In studies in which different models of measurement devices are used, measurement differences up to 40% have been reported between different devices (4). Device-related measurement difference did not develop in our study because a single type of device was used.

In the literature, there are different studies proposing that MPV is increased or decreased with inflammatory action (1). In our study, MPV was found lower and the platelet count was found higher in children with bronchiolitis compared with the control group. In the literature, an inverse relation has been found between MPV and the platelet count similar to our study (5). An increase in platelet diameter occurs in the acute stage of inflammation. Large platelets are more reactive and produce more cytokine and thromboxane A2, because they have a more intense granule content (6). It has been proposed that megakaryopoesis is affected with excessive production of proinflammatory cytokines and acute phase reactants and platelets with a small volume are released from the bone marrow in the advanced stages of inflammation (7). This reverse relation between the platelet vcount and MPV, which is frequently observed, reflects the tendency to ensure hemostasis by keeping the platelet mass constant in the circulation (8).

In conclusion, MPV appears to be a useful and inexpensive measurement for specifying inflammation. However, measurement of MPV is affected by the anticoagulant found in the tube in which the blood sample is placed, the time period between obtaining blood sample and measurement, and the measurement method of the device. Therefore, prospective studies are more reliable. However, reliable results can also be achieved in studies in which it is known that a single type of anticoagulant was used in the blood sample tubes, a single type of device was used for measurement, and the blood samples were studied in the first 120 minutes after obtaining blood samples.

References

1. Ergül AB, Torun YA, Uytun S, Aslaner H, Kısaaslan AP, Şerbetçi MC. Reduction in mean platelet volume in children with acute bronchiolitis. Turk Pediatri Ars 2016; 51: 40-5. [CrossRef]
2. Beyan C, Beyan E. Editöre Mektup: Ortalama trombosit hacmi mortalite öngörüsünde kullanılmamalıdır. Abant Med J 2014; 3: 242-7.
3. Lancé MD, Sloep M, Henskens YM, Marcus MA. Mean platelet volume as a diagnostic marker for cardiovascular disease: drawbacks of preanalytical conditions and measuring techniques. Clin Appl Thromb Hemost 2012; 18: 561-8. [CrossRef]
4. George TI. Automated hematology instrumentation. UpTo-Date; updated 2012 Jul 24. Available from: http://www.uptodate.com/contents/automatedhematology-instrumentation
5. Koçer D, Sarıgüzel FM, Güler E, Karakükcü Ç, Sütbeyaz ST, Gödekmerdan A. MPV değerinin ankilozan spondilitli hastalarda inflamasyon belirteci olarak değerlendirilmesi. Türk Klinik Biyokimya Derg 2014; 12: 73-7.
6. Kaser A, Brandacher G, Steurer W, et al. Interleukin-6 stimulates thrombopoiesis through thrombopoietin: role in inflammatory thrombocytosis. Blood 2001; 98: 2720-55. [CrossRef]
7. Bath PM, Butterworth RJ. Platelet size: measurement, physiology and vascular disease. Blood Coagul Fibrinolysis 1996; 7: 157-61. [CrossRef]
8. Thompson CB. From precursor to product: how do megakaryocytes produce platelets? Prog Clin Biol Res 1986; 215: 361-71

Ayşe Betül Ergül[1], Yasemin Altuner Torun[2], Salih Uytun[1], Hümeyra Aslaner[1], Ayşenur Paç Kısaaslan[3], Mahmut Can Şerbetçi[1]

[1]**Clinic of Pediatrics, Kayseri Training and Research Hospital, Kayseri, Turkey**
[2]**Division of Pediatric Hematology, Clinic of Pediatrics, Kayseri Training and Research Hospital, Kayseri, Turkey**
[3]**Division of Pediatric Romatology, Erciyes University School of Medicine, Kayseri, Turkey**