The diagnostic utility of mean platelet volume and red cell distribution width in active Crohn's disease and intestinal tuberculosis

To the Editor

We read with interest the recent article entitled "The utility of platelet, mean platelet volume, and red cell distribution width in the diagnosis of active Crohn's disease and intestinal tuberculosis" by Huang et al.[1] The authors investigated whether mean platelet volume (MPV) and red cell distribution width (RDW) have diagnostic utilities in active Crohn's disease (CD) and intestinal tuberculosis (ITB). Their findings demonstrated increased platelets (PLTs) and RDW, as well as decreased MPV in active CD and ITB. Also RDW, possessing the advantage of being inexpensive and readily available, has favorable utility to predict active CD and ITB. We would like to thank Huang et al[1] for their contribution.

The MPV indicates the average size of PLTs, and is also an emerging marker of inflammation.[2,3] Furthermore, elevated MPVs were related to tuberculosis, sepsis, congestive heart failure autoimmune disorders, acute pulmonary emboli, thrombocytopenia, hepatitis B and C. Lower MPVs have been described in patients with CD, ulcerative colitis, anemia, chronic renal failure.[3] There are only a few studies that demonstrate the relationship between MPV, RDW, and CD, and ITB.[1] The RDW, which is used in the differential diagnosis of anemia, measures the size variability of the red blood cell.[4] Aging, malnutrition, iron, or vitamin B12 deficiency, bone marrow depression, chronic inflammation, inflammatory bowel diseases, and any medication may affect RDW levels.[5]

Medication may alter MPV and RDW levels in patients with CD and ITB, so it would have been better if the patients were described with more detailed explanation in terms of mesalazine, antibiotic, steroid, antituberculosis agents use and/or other medication. In addition, it would also be more relevant, if the authors mentioned the elapsed time between taking the blood samples and measuring MPV, and RDW, since MPV, and RDW values may be affected by a time delay.[3,6]

In the literature, it has been shown that cardiovascular diseases such as heart failure, myocardial infarction, strokes, and pulmonary hypertension, renal, hepatic, infectious diseases, aging, malnutrition, bone marrow depression, iron, and/or vitamin B12 deficiency, and chronic inflammatory diseases may affect RDW levels.[4-6] Thus, it would have been more effective if the authors had mentioned these RDW affecting factors.

We are of the opinion that the findings of Huang et al[1] will lead to further research concerning the relationship between RDW, MPV, and active CD, and ITB. However, it should be kept in mind that MPV or RDW itself, alone without other parameters, may not have the favorable utility to predict active CD and ITB. In conclusion, we believe that RDW and/or MPV should be evaluated with other independent variables as mentioned above.

Alpaslan Tanoglu
Department of Gastroenterology
Ergenekon Karagoz
Department of Infectious Diseases and Clinical Microbiology
Gulhane Military Medical Academy (GATA)
Haydarpasa Training Hospital
Istanbul, Turkey

Reply from the Author

We are grateful for the attention and the correspondence regarding our paper by Drs. Tanoglu and Karagoz. We value their comments and suggestions very much, and are pleased to provide the following response.

Firstly, as said in the correspondence, the impact of medication on the level of MPV and RDW in patients should not be neglected. Thus, we emphasized in the paper that all patients and controls had never received any medications such as aspirin, oral contraceptives, nonsteroidal anti-inflammatory drugs, or oral anticoagulants, which can cause PLTs or coagulation, and fibrinolytic abnormalities during the last 8 weeks before blood sampling.[1] Secondly, according to the rules in the Department of Clinical Laboratories in Zhongnan Hospital, Wuhan, China blood samples in our research were analyzed as soon as available and should be disposed within 5 hours. We believe that the elapsed time between obtaining and measuring samples is appropriate, and met the requirements for detecting MPV or RDW.[7-9] Thirdly, we are thankful for the comments regarding adding factors related to RDW. Notably, we highlighted the exclusive criteria of patients with other severe systemic or infectious diseases to avoid the influence of other diseases on the parameters measured.[1]

Table 1 - Comparison of PLT, MPV, RDW, CRP, and ESR performance as markers in active Crohn's disease (CD) and intestinal tuberculosis (ITB).

Variable	Optimal cut-off value	Sensitivity (%)	Specificity (%)	Youden index	Diagnostic accuracy (%)
CD versus control group					
CRP (mg/L)	4.73	70.6	90.9	0.615	75.55
ESR (mm/h)	8.50	85.3	86.4	0.717	85.6
PLT (x10^9/L)	247.50	70.6	90.9	0.615	75.55
RDW (%)	14.45	60.3	86.4	0.467	66.7
MPV (fL)	9.25	75.0	72.7	0.477	74.4
RDW+PLT	-	86.8	81.8	0.686	85.6
RDW+MPV	-	91.2	68.2	0.594	85.6
PLT+MPV	-	85.3	72.7	0.580	82.2
RDW+PLT+MPV	-	94.1	68.2	0.623	87.8
ITB versus control group					
CRP (mg/L)	6.25	74.3	90.9	0.652	80.7
ESR (mm/h)	9.50	80.0	90.9	0.709	84.2
PLT (x10^9/L)	217.00	68.5	77.3	0.458	71.9
RDW (%)	14.45	74.3	86.4	0.606	78.95
MPV (fL)	9.01	60.0	77.3	0.373	66.7
RDW+PLT	-	85.7	68.2	0.539	78.95
RDW+MPV	-	85.7	72.7	0.584	80.7
PLT+MPV	-	88.6	68.2	0.568	80.7
RDW+PLT+MPV	-	94.3	63.6	0.579	82.5

PLT - platelet, MPV - mean platelet volume, RDW - red cell distribution width, CRP - C-reactive protein, ESR - erythrocyte sedimentation rate

Lastly, we agree with the comments that neither MPV nor RDW should be analyzed alone without other indices, and we have shown a parallel test in our manuscript (**Table 1**). It was noticed that RDW combined with PLT in active CD as well as RDW combined with PLT and MPV in ITB displayed a favorable Youden index and diagnostic accuracy, which were not higher than C-reactive protein or erythrocyte sedimentation rate. The content above was not shown in the published article due to limitations in number of tables and words required.

In conclusion, the results of our study highlight certain beneficial diagnostic values of RDW in diagnosing active CD and ITB, and do not mean that RDW alone owns favorable diagnostic utility without assistance of other markers. We thank the authors again for the correspondence and hope our response answers the points raised.

Sha Huang, Rui Zhou, Bing Xia
Department of Gastroenterology
Zhongnan Hospital of Wuhan University School of Medicine
Hubei Clinical Center & Key Laboratory
of Intestinal & Colorectal Diseases
Fengming Yi
Department of Oncology
Second Affiliated Hospital of Nanchang University
Nanchang, China

References

1. Huang S, Yi FM, Zhou R, Chen M, Lei Y, Zhao JZ, et al. The utility of platelet, mean platelet volume, and red cell distribution width in the diagnosis of active Crohn's disease and intestinal tuberculosis. ***Saudi Med J*** 2013; 34: 1161-1166.
2. Gasparyan AY, Ayvazyan L, Mikhailidis DP, Kitas GD. Mean platelet volume: a link between thrombosis and inflammation? ***Curr Pharm Des*** 2011; 17: 47-58.

3. Karagöz E, Tanoglu A. Mean platelet volume: an emerging diagnostic factor of recurrent aphthous stomatitis and behcet disease. ***Angiology*** 2014; 65: 326.
4. Lou Y, Wang M, Mao W. Clinical usefulness of measuring red blood cell distribution width in patients with hepatitis B. ***PLoS One*** 2012; 7: e37644.
5. Meynaar IA, Knook AH, Coolen S, Le H, Bos MM, van der Dijs F, et al. Red cell distribution width as predictor for mortality in critically ill patients. ***Neth J Med*** 2013; 71: 488-493.
6. Balta S, Demirkol S, Unlu M, Celik T. Red cell distribution width is a predictor of mortality in patients with major bleeding. ***Rev Port Cardiol*** 2013; 32: 843-844.
7. Karagöz E, Tanoglu A. Mean platelet volume: an emerging diagnostic factor of recurrent aphthous stomatitis and behcet disease. ***Angiology*** 2014; 65: 326.
8. Demirin H, Ozhan H, Ucgun T, Celer A, Bulur S, Cil H, et al. Normal range of mean platelet volume in healthy subjects: Insight from a large epidemiologic study. ***Thromb Res*** 2011; 128: 358-360.
9. Balta S, Demirkol S, Unlu M, Celik T. Red cell distribution width is a predictor of mortality in patients with major bleeding. ***Rev Port Cardiol*** 2013; 32: 843-844.

Related Articles

Al-Mofleh IA, Azzam NA. Crohn's disease. *Increasing trend in Saudi Arabia.* ***Saudi Med J*** 2013; 34: 1105-1113.

Al Asmi MM, Faqeehi HY, Alshahrani DA, Al-Hussaini AA. A case of pediatric gastrointestinal basidiobolomycosis mimicking Crohn's disease. *A review of pediatric literature.* ***Saudi Med J*** 2013; 34: 1068-1072.

Al-Beladi FI, Al-Fawaz MA, Al-Solami EA, Al-Solami RA. Possible central nervous system vasculitis as an early presentation of Crohn's disease. *A challenge in diagnosis and management.* ***Saudi Med J*** 2012; 33: 1025-1027.

El Mouzan MI, Al Mofarreh MA, Assiri AM, Hamid YH, Al Jebreen AM, Azzam NA. Presenting features of childhood-onset inflammatory bowel disease in the central region of Saudi Arabia. ***Saudi Med J*** 2012; 33: 423-428.