Are Platelet Indices of Clinical Use to Monitor Disease Activity and Inflammatory Burden in Axial Spondyloarthritis?

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Platelets act as inflammatory cells by playing a central role in the cross-talk between stromal and immune cells, leading to their activation, which is needed in inflammatory disease progression. Platelets contain many organelles and have two types of granules. The \( \alpha \) granules contain an array of peptide mediators, including the chemokines platelet factor-4, \( \beta \)-thromboglobulin, regulated upon activation, normal T cell expressed and secreted, and macrophage inflammatory protein-1 \( \alpha \), which are involved in leukocyte recruitment and activation. Dense platelet bodies contain adenosine nucleotides, calcium, and serotonin that exert effects in the initial phase of inflammation \([1,2]\). In addition to their capacity to release pre-stored inflammatory mediators, platelets can also produce eicosanoids, such as thromboxane A2, prostaglandin F2a (PGF2a), and PGE2, to regulate inflammatory response and can synthesize peptide mediators, such as interleukin (IL)-1 \( \beta \), on stimulation \([3,4]\).

Many platelet changes have been described in various autoimmune and inflammatory diseases, and these include several morphological alterations (mean platelet volume \([MPV]\), platelet distribution width \([PDW]\), plateletcrit \([PCT]\), and platelet large cell ration \([PLCR]\)), platelet count increase, microparticle release, and granular content over-excretion, which are all linked to platelet activation induced by inflammatory stimuli and are now referred to as platelet indices \([5-9]\). Several studies on the role of changes in platelet indices in rheumatic diseases documented a significant association between MPV levels and disease activity \([10-13]\). Previous studies conducted on patients with rheumatoid arthritis (RA) revealed significant correlations of elevated MPV with increased disease activity and inflammatory markers \([10,11]\). Similar correlations were also found in spondyloarthritis (SpA), including ankylosing spondylitis (AS) and psoriatic arthritis. A study showed significantly higher MPV levels in patients with AS than in healthy controls and a therapeutic-induced decrease in MPV levels \([12]\). Another study also showed increased MPV levels among patients with psoriasis compared with controls, and a positive correlation of MPV levels with disease severity and presence of arthritis \([13]\).

Although many reports showed elevated MPV levels in active inflammatory disease, other authors contradicted the above findings in RA and AS \([14,15]\), showing lower MPV values in patients with higher disease activity and increased MPV levels after treatment. A retrospective study showed lower MPV levels among patients with active familial Mediterranean fever than among those with inactive disease \([16]\). Similar negative correlations between lowered MPV levels and elevated disease activity have been documented in ulcerative colitis and chronic obstructive pulmonary disease \([17,18]\). In this regard, Gasparyan et al. \([19]\) attempted to explain this contradiction by hypothesizing that high-grade inflammatory diseases, such as active RA or attacks of familial Mediterranean fever, result in low MPV levels, whereas low-grade inflammatory diseases have the opposite effect on MPV. Nevertheless, pending further investigation, these findings still seem contradictory, and the nature of MPV as an inflammatory marker seems to remain controversial.
In the recent issue of *The Journal of Rheumatic Diseases*, Kang et al. [20] examined the associations between various platelet indices and disease activity of axial SpA. Their study enrolled 161 patients with axial SpA classified based on the Assessment of Spondyloarthritis International Society criteria and measured inflammatory burdens with magnetic resonance imaging (MRI) of the sacroiliac joints, as well as clinical assessment tools reflecting disease activity and radiographic progression. As a result, the authors found that MPV, PLCR, and PDW levels were negatively associated with ankylosing spondylitis disease activity score (ASDAS), acute phase reactant levels, and inflammatory severity observed on sacroiliac joint MRI. In addition, changes in platelet indices at baseline and after one year also showed significant correlations with changes in ASDAS and acute phase reactant levels. With these observations, the authors concluded that platelet indices reflect disease activity and inflammatory severity of the sacroiliac joints in patients with axial SpA. Although several studies addressed the association of MPV with disease activity of AS [12,15], the study by Kang et al. [20] is the first to adopt radiographic parameters for disease progression of the spine and inflammation severity of the sacroiliac joints by using the modified Stoke AS Spinal Score and the SPondyloArthritis Research Consortium of Canada method. Another notable point of this study is the comprehensive examination of platelet indices, including PDW, PCT, and PLCR, in addition to the well-known MPV, in large numbers of patients with axial SpA.

Besides many valuable aspects, this study has a cross-sectional and observational design and thus has potential limitations to be considered. As aforementioned, controversies still exist regarding the role of platelet indices as validated biomarkers for inflammation. Lack of serial measurements of platelet indices and clinical parameters in this study might lead to failure to document for a causal relationship between platelet indices and inflammatory burdens and an association between platelet indices and radiographic disease progression. However, with enrollment of relatively large numbers of patients and use of the most sophisticated clinical assessment tools, the findings of the study by Kang et al. [20] can provide a valuable evidence for the usefulness of platelet indices as biomarkers for monitoring disease activity of axial SpA.

**CONFLICT OF INTEREST**

No potential conflict of interest relevant to this article was reported.

**REFERENCES**