Mean platelet size: Looking at the chicken or the egg?

According to the WHO, in 2030, more than 23 million people will die annually as a result of cardiovascular disease (CVD). This will make it the leading cause of death worldwide. Although medicine has made huge steps in diagnostics (e.g., bio-markers, MRI, echocardiography) and therapy (e.g., antihypertensive drugs, platelet inhibitors, and cardiologic interventions, such as PCI), treatment of a disease will not be sufficient to reduce the burden of CVD. Early diagnosis and prediction of cardiovascular risk might become a cornerstone in primary prevention. From the legendary Framingham study, we know that smoking, arterial hypertension, physical inactivity, and lifestyle, but also gender and age, are major risk factors. Some of them are modifiable and appropriate as interventional targets. As arterial hypertension is a well-known risk factor, which can be easily diagnosed, its coexistence with other potential risk factors might identify patients who are prone to CVD. Although the pathophysiology is not completely understood, we know that depending on the severity and permanence, uncontrolled arterial hypertension will progress to vascular stiffness, cardiac hypertrophy, renal dysfunction, and other CVDs. Timely diagnosis of arterial hypertension could prevent these complications.

Coagulation disorders and platelet dysfunction might contribute to the progression of atheroma growth and thromboembolic complications. On the other hand, there is suspicion that coronary artery disease might be associated with inflammation. For that reason, early identification of laboratory abnormalities could protect patients from myocardial infarction and embolism.

One of the routinely reported hematologic parameters is mean platelet volume (MPV). Since MPV measurement is completely automatized, scientists discuss its interpretation and correlate platelet size with reactivity. Furthermore, they reported an inverse ratio of platelet size and platelet count. However, underlying diseases contribute to platelet size; smaller platelets have been associated with chronic inflammatory processes (e.g., inflammatory bowel disease, lupus erythematosus, rheumatoid arthritis), whereas larger platelets are found in cardiovascular disease. Furthermore, there are no uniform cutoff values described to distinguish between small, normal, and large platelets. In this context, some technical issues are of interest. Platelet size changes after blood is drawn. Here, the anticoagulant and the time frame play a major role. According to own research, platelet size increases in citrate more and for longer than in EDTA. Moreover, the technique of assessment (electrical impedance, optical, immunological) provokes a difference in size of up to 40%. Still, there is no standardization available (1). In other words, do we look at the chicken or the egg when we try to interpret the MPV?

Another point of attention is that coagulation activity and also platelet activity show diurnal changes. This variability is modified by gender, age, and comorbidities (e.g., diabetes mellitus). The same is found in blood pressure measurements, too, where a diurnal pattern is reported. The latter is recognized by the authors of the article in the current edition of this journal, published by Uçar et al. (2). In their article, entitled "Relationship between mean platelet volume and morning blood pressure surge in newly diagnosed hypertensive patients," they take the diurnal changes in blood pressure as a chance to estimate the cardiovascular risk in a cohort of about 300 patients who were newly diagnosed with arterial hypertension. After arbitrary allocation to a small-size MPV or large-size MPV group, they looked for a variety of blood pressure patterns. Interestingly, the MPV correlated in the statistical analysis with the morning blood pressure increase, which had been described by other authors as a risk factor for CVD. However, inflammatory parameters (hs-CRP) also correlated with the MPV groups, which might be due to ongoing chronic inflammation, reflected by the increased CRP. Again, the question could be: Is the inflammation or the increase in MPV the egg?

In their conclusion, the authors suggest a relationship with larger platelets and morning blood pressure increase, while both parameters are associated with CVD. Although this conclusion is not without substantiation, some remarks seem necessary. As described above, the laboratory parameter MPV is not without doubts regarding its difficulty in quantifying it accurately. Thus, the correlation of MPV and platelet activity might be weaker than suggested by the literature. A single identification of increased morning blood pressure might be a predictor for CVD, but it is not clear if an addition of any biomarker will increase the power of this prediction. Still, this investigation is interesting, because it challenges the current diagnostics and gives hints to improve them. I think a possible next step should then be to standardize MPV measurements and to select a larger cohort of patients whose blood pressure is monitored over a long period of time while assessing MPV regularly. Here, one should search for the development of CVD and correlate this with the markers mentioned. A relationship between the parameters and CVD would render MPV a simple, easily accessible

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predictor. Until that study, we should carefully interpret MPV results. Remember, it is not necessarily the truth: if you have many chickens, you will find a lot of eggs, because not every hen lays an egg every day.

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