PLATELETS: THE LINK BETWEEN IMMUNITY, INFLAMMATION AND MICROVASCULAR DYSFUNCTION

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Platelets play a central role in the coagulation and integrity of the vascular system, but numerous studies clearly show that these blood cells are powerful immune modulators and effectors. They contribute to the diversity of immune processes, beyond their functions as mediators of hemostasis and thrombosis. Platelets have been shown to have: 1) anti-infectious functions, such as antimicrobial protection and antiviral effects - directly recognize, sequester and kill pathogens, activate and direct leukocytes to sites of infection and inflammation, and modulate leukocyte behavior by increasing their ability to phagocytose and kill pathogens; 2) increase innate effector cellular functions and cause unique effector functions, such as the production of neutrophilic extracellular traps (NETs); 3) enhance the presentation of antigens by APCs; 4) enhancing adaptive T- and B-cell immune responses; 5) participation in cellular immunity. This multifaceted response to infection and inflammation is due in part to the vast array of viral receptors, soluble mediators, and molecules on the cell surface of platelets. Thus, they have developed as one of the key regulators of immunity and inflammation.

The main pathophysiological response to inflammation is microvascular dysfunction, which involves the activation of vascular endothelial cells and circulating leukocytes and platelets. Endothelial cells and leukocytes have been recognized as major "players" in microvascular changes caused by inflammation, but recently the focus has been on the modulating role of platelets, which act as both effector and target cells in inflamed microvessels. Evidence is presented that demonstrates the ability for so-called "cross-talk" between platelets and other cells (vascular endothelial cells, leukocytes), which contribute to the inflammatory response, tissue injury and organ dysfunction.

In hospitalized patients with COVID-19, platelet-to-lymphocyte (PLR) ratios, increased platelet counts, and their dynamic changes during treatment have been shown to be related to severity, duration of hospitalization, and disease prognosis. The PLR of patients determines the degree of so-called "cytokine storm", which may provide a new monitoring indicator in patients with COVID-19.