



Editorial

Two-Phase Immune Responses of COVID-19 and Therapeutic Approaches

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The novel coronavirus disease 2019 spread rapidly worldwide and disease was announced a pandemic by the WHO. Standard therapeutic strategy against COVID-19 is lacking. Regarding to the two-phase pathogenesis of the COVID-19 (immune defense-based protective and postinfectious inflammation-driven damaging phases, different therapeutic regimens including antiviral agents (e.g., lopinavir/ritonavir, remdesivir, ribavirin, oseltamivir, and sofosbuvir, etc.), some antibiotics and immunomodulatory (chloroquine/hydroxychloroquine) and anti-inflammatory agents (corticosteroids) have been considered in hospitals for COVID-19 patients, but balancing their benefits and potential risk is of great importance [1-7].

Immune-boosting strategies (e.g., anti-sera or pegylated IFN α) and antiviral therapy may be of great importance in the initial phase or non-severe stages, while immunosuppressive or immunomodulatory approaches can be used for halting tissue damage and managing the symptoms in the inflammatory phase. There are conflicting results in prescribing corticosteroids or immunomodulation for COVID-19 patients due to paradoxical negative effects (risk of death, secondary bacterial infections and longer hospitalization) [8-9]. Activation of coagulation pathways is also associated with increased proinflammatory cytokines, resulting in multiorgan injury. Severe COVID-19 had disseminated intravascular coagulation, leading to the risk of venous thromboembolism [10], where naproxen (for antiplatelet and anti-inflammatory and *anti-coagulative* effects) and low molecular weight heparin (LMWH; anti-inflammatory properties) may be considered for patients. It has been suggested that LMWH is contemplated because of concerns because of the presence of thrombi in the pulmonary circulation for those in patients with raised d-dimer.

However, effective therapeutic approach requires balancing harmful and beneficial effects of regimens, to be prescribed by precision. Also, two-phase pathophysiology and immune responses of COVID-19 should not be underemphasized for treatment of patients.

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