

Blood inflammatory markers and cytokines in patients with COVID-19 and bacterial coinfections

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Abstract

Background: Bacterial coinfection in patients with SARS-CoV-2 infection is an important risk factor for death. This study investigated and analyzed whether there were differences in levels of serum inflammatory markers in patients with SARS-CoV-2 and bacterial coinfection compared with those without bacterial infection. **Methods:** A total of 121 inpatients with SARS-CoV-2 infection admitted to Qingdao Central Hospital from December 7, 2022, to February 7, 2023, were included. Patients were divided into a bacteria-positive group (61 cases) and a bacteria-negative group (60 cases) according to whether they had bacterial infections. PCT, CRP, and 12 cytokines were compared between groups, and the composition of bacterial species in the positive group was statistically analyzed. **Results:** The serum levels of CRP ($Z = 3.95$, $P < 0.001$), PCT ($Z = 3.20$, $P = 0.001$), IL-1 β ($t = 2.90$, $P = 0.008$), IL-2 ($t = 3.83$, $P = 0.001$), IL-12p70 ($t = 3.28$, $P = 0.004$), IL-17 ($t = 2.22$, $P = 0.039$) and TNF- α ($t = 3.02$, $P = 0.007$) between the two groups were significantly different. IL-17 increased more significantly than other markers, while IL-6, IL-8, IL-10, interferon- α , interferon- γ , IL-4 and IL-5 were not statistically significant ($P > 0.05$). Among the 61 bacteria-positive patients, 27 patients were positive for one species, mainly *Staphylococcus aureus*, *Haemophilus influenzae*, and *Acinetobacter baumannii*. Eleven patients were two species positive, and *Acinetobacter baumannii* combined with *Pseudomonas aeruginosa* was common. **Conclusions:** Serum PCT and CRP levels in SARS-CoV-2-infected patients with bacterial coinfection are higher than those in patients without bacterial infection. Cytokines such as IL-1 β , IL-2, IL-12 p70, IL-17, and TNF- α may be involved in the progression of COVID-19 combined with bacterial infection. They can be used as potential markers to evaluate the disease condition and prognosis.

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