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Extracorporeal cytokine hemadsorption in severe COVID-19 respiratory failure

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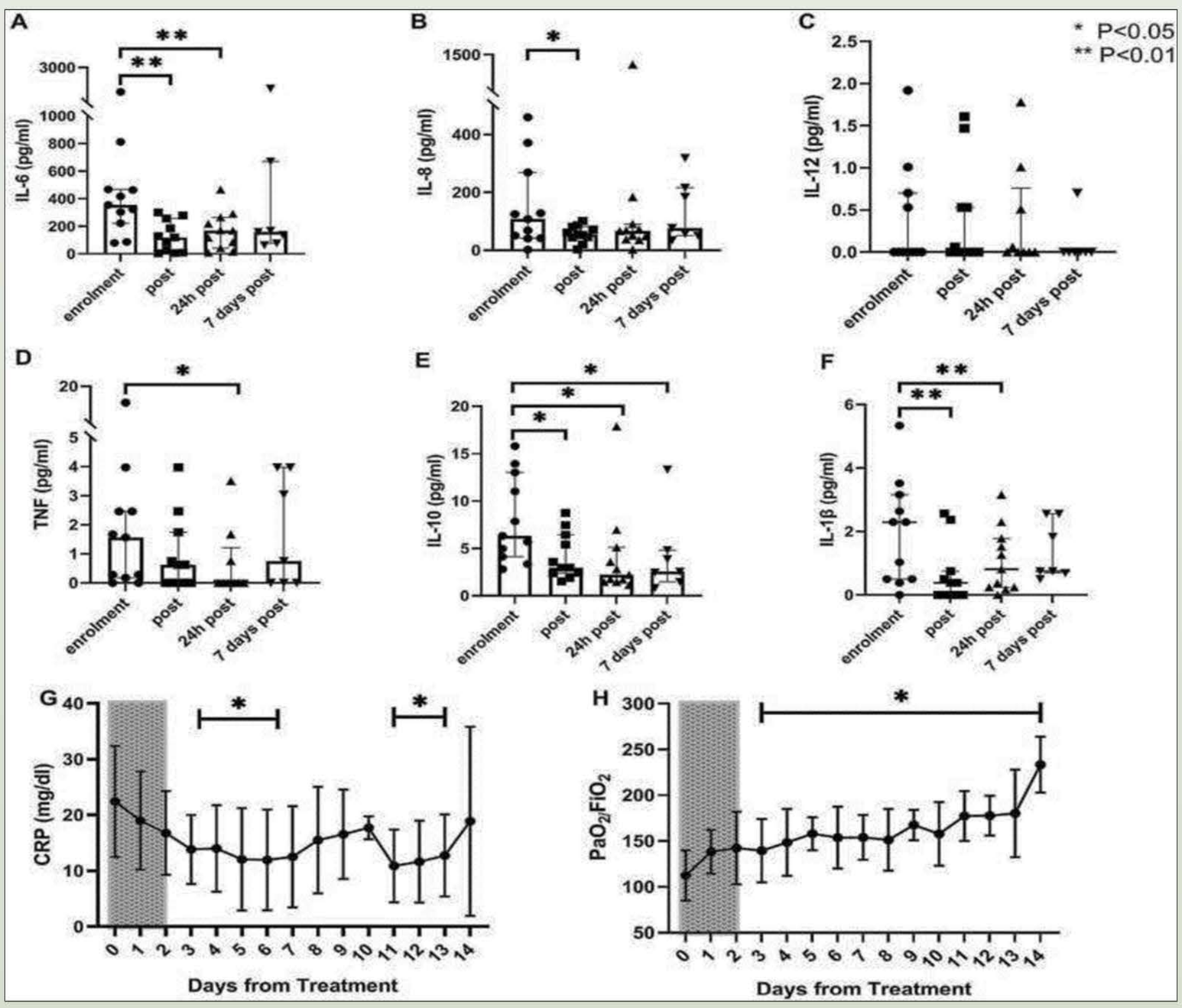
Background: At least 20% of coronavirus disease 2019 (COVID-19) patients develop acute hypoxemic respiratory failure requiring admission to intensive care unit in 5–32% of the cases. Hyper-inflammatory activation characterized by immune cell infiltration and elevated levels of cytokines was reported as the main mechanism leading to critical illness and severe acute respiratory distress syndrome (ARDS).
CytoSorb® is currently used for all the conditions where elevated levels of cytokines are present. Along with the beneficial effect on systemic inflammation, CytoSorb® can be easily integrated with all extracorporeal circulation systems.

Case Presentation: Here, we present the laboratory and clinical outcomes of 11 patients with microbiological confirmed SARS-CoV-2 infection. These patients were treated with CytoSorb® to remove the excess of cytokine. All patients were male, overweight and only 3 (27%) were over 70 years old. Median age was 62 years and median body mass index was 28. Best supportive care was provided according to hospital guidelines of that moment and included antibiotic therapy, antiretroviral therapy and protective ventilation.

Results: Cytokines levels were evaluated before and after treatment. A significant reduction of IL-6, IL-8, IL-10 and IL-1β was observed.
A significant drop of C-reactive protein (CRP) median levels was observed starting from 48 hours after treatment start levels. The decrease in the inflammatory status was associated with a progressive improvement in the respiratory function, with a significant increase in P/F from the first day after the end of the therapy. A similar trend was observed for procalcitonin.



Conclusion: CytoSorb therapy proved to be safe in COVID-19 patients. A clinical improvement was observed in most of the treated patients despite the severity of the disease. In this study CytoSorb was used empirically for 24–48 hours based on previous experience in septic shock. The persistence of significant levels of IL-6 and CRP after CytoSorb® treatment may suggest that a prolonged treatment can improve the efficacy in controlling COVID-19 hyperinflammatory status.