

Category : **Renal: extracorporeal support**

A265 - PMX hemoperfusion restores COVID-19-induced lymphopenia by removal of NETs-related nuclear proteins

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Introduction:

Previous studies demonstrated neutrophil extracellular traps (NETs) formation augmented during COVID-19 and the levels of circulating NETs-derived molecules correlated to the severity of COVID-19. We hypothesized that removal of circulating NETs-derived molecules from the bloodstream could be an effective strategy to reduce dysregulated inflammation in COVID-19. In this study, we examined whether treatment with direct hemoperfusion with polymyxin B (PMX)-immobilized fiber column (Toray Industries, Japan) can limit the progression of COVID-19.

Methods:

We studied, 30 COVID-19 ARDS patients, who required admission to the ICU and mechanical ventilation from August 2020 to June 2021. Thirteen patients received PMX hemoperfusion within 12 h after ICU admission and blood samples were taken from them before and immediately after hemoperfusion. Plasma levels of NETs-related products including myeloperoxidase-DNA, neutrophil elastase-DNA, and cell free-DNA were measured.

Results:

Plasma levels of NETs-related products collected at ICU admission increased in COVID-19. This result suggests that NETs would be accelerated by COVID-19. When plasma levels of NETs-related products and cytokines were measured before and after PMX, the former significantly decreased after PMX, whereas the latter did not change. Time-course change in lymphocytes count without PMX significantly decreased at 5-7 days when compared with 0-1 days. On the other hand, patients who were treated with PMX lymphocytes counts significantly increased at 5-7 days compared with patients without PMX.

Conclusion:

We demonstrated that PMX membrane can effectively capture various nucleus-derived molecules. Furthermore, scavenging nucleus-derived molecules by treatment with PMX inhibited the progression of lymphopenia. Removing systemic nucleus-derived molecules from circulation by PMX may ameliorate irrelevant inflammatory and thrombotic complications in patients with COVID-19.