Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Hemoperfusion during veno-venous ECMO in severe COVID-19 with IL-6 elevation

Dear Editor,

We read with great interest the paper by Smieszek and colleagues aimed to study the distribution of IL-6 at baseline in hospitalized COVID-19 patients and the role of genetic variants associated with attenuated IL-6 response [1]. The Authors reported worse outcome in patients with elevation of IL-6 (>150 pg/ml) and in carriers of specific allelic variants of IL6/IL6R, thus hypothesizing that these might be a biomarker of earlier intervention with anti-IL-6 drugs.

Among the potential treatments for patients with severe COVID-19, the use of hemoperfusion to remove inflammatory cytokines is increasingly widespread [2].

We report the case of a 41 years old male patient suffering from COVID-19 undergone to veno-venous-Extracorporeal Membrane Oxigenation (vv-ECMO) because of severe acute respiratory failure. Subsequently he developed a rapid increase of IL-6, septic shock with need of vasopressors and Acute Kidney Injury (AKI). Renal replacement therapy (RRT) with Omni device (B. Braun, Germany) combined with hemoperfusion treatment was started. A total of 3 cycles of hemoperfusion with HA-380 cartridges (Jafron Biomedical, China) lasted 12 h each for 3 consecutive days. Applied setup of RRT permitted a slightly negative daily fluid balance. After 72 h, IL-6 value dropped down from a maximum of 4995 pg/mL to 1917 pg/mL. Norepinephrine dosage was reduced from 0.15 to 0.04 mcg/Kg/min, but rapidly raised to 0.14 mcg/Kg/min. At the end of the third treatment, chest X-ray imaging was markedly improved [Fig. 1]; AKI ameliorated too and spontaneuos diuresis was restored. After 30 days the patient was succesfully weaned from vv-ECMO and mechanical ventilation.

Pathogenesis of severe COVID-19 includes virus-activated “cytokine release syndrome (CRS)” and studies have suggested a prognostic value of IL-6 [3]. The use of hemoperfusion in these subset of patients might be especially relevant when considering that ECMO support increases the production of

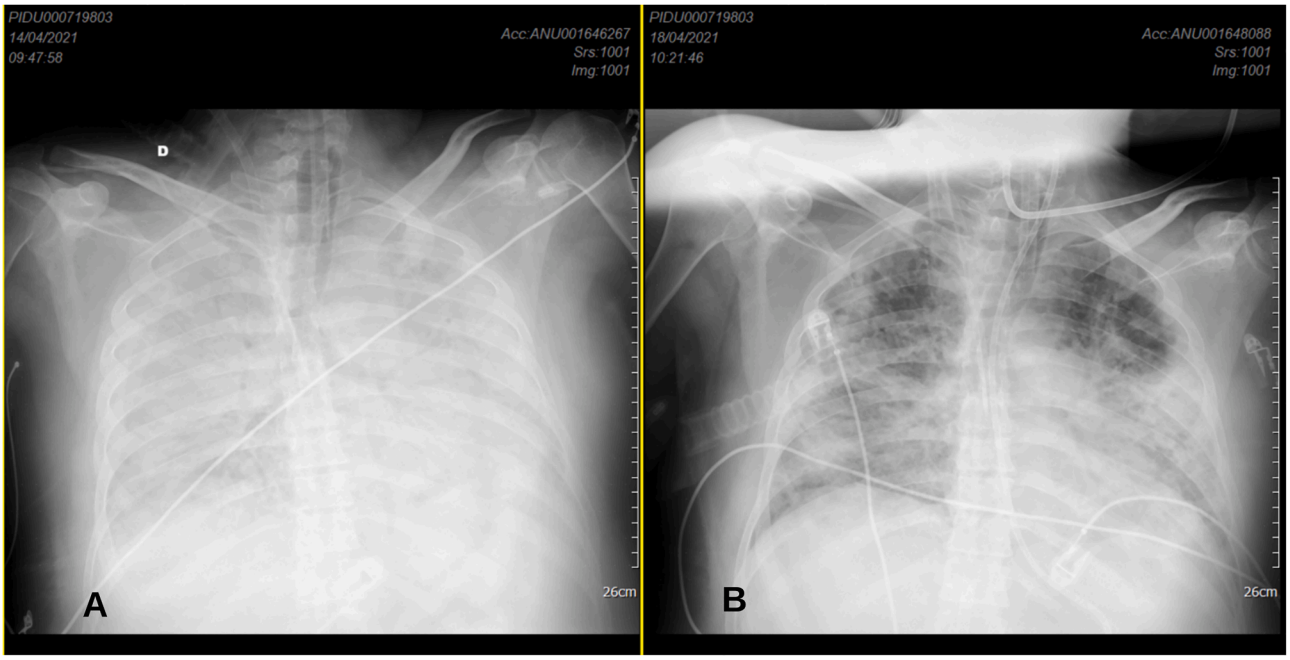

Fig. 1. Chest X-ray before (A) and after (B) 3 cycles of treatment with HA-380 cartridge. The figure shows extensive bilateral infiltrations of both lungs in (A) and a marked improving aeration, mainly in the upper quadrants, in (B).

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pro-inflammatory cytokines, thus exerting a potential additional detrimental effect [2]. Furthermore, in critically ill patients, CRS is triggered by different causes and the immunomodulating effect of hemoadsorption cartridges can influence the course of the inflammatory response [2]. The HA-380 filter consists of a neutral, macroporous adsorption resin, with a high surface area (60.000 m^2) that significantly reduces the levels of alveolar and circulating cytokines such as IL-6 and can balance the disregulation of inflammatory factors [4,5]. Although the presence of specific genetic variants was not investigated in this patient, the use of hemoperfusion reduced IL-6 levels and improved chest X-ray imaging and AKI, although the hemodynamic effect was recorded only during the treatment. The possibility to identify specific subsets of patients that could beneficiate from targeted and tailored anti-IL-6 therapies is very promising.

If Authors' results are confirmed by further studies, do they consider hemoperfusion techniques to be a valid immunomodulating adjuvant strategy to support the therapy with anti-IL-6 monoclonal antibodies in this subset of patients?

However, hemoperfusion could lead to anti-IL-6 drugs adsorption. Do they consider that a combination strategy might effect more positively if applied in the right sequence, i.e to administrate the anti-IL-6 drugs after hemoadsorption therapy?

Authors' contributions

All Authors contributed equally to this work.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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