Hyperbaric oxygen therapy may be effective to improve hypoxemia in patients with severe COVID-2019 pneumonia: two case reports

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Abstract

Objectives: To determine whether hyperbaric oxygen (HBO2) therapy be effective to improve hypoxemia for severe COVID-19 pneumonia patients.

Methods: Two male patients ages 57 and 64 years old were treated. Each met at least one of the following criteria: shortness of breath; respiratory rate (RR) ≥30 breaths/minute; finger pulse oxygen saturation (SpO2) ≤93% at rest; and oxygen index (P/F ratio: PaO2/FiO2 ≤300 mmHg). Each case excluded any combination with pneumothorax, pulmonary bullae or other absolute contraindications to HBO2. Patients were treated with 1.5 atmospheres absolute HBO2 with an oxygen concentration of more than 95% for 60 minutes per treatment, once a day for one week. Patients' self-reported symptoms, daily mean SpO2 (SO2), arterial blood gas analysis, D-dimer, lymphocyte, cholinesterase (che) and chest CT were conducted and measured.

Results: For both patients, dyspnea and shortness of breath were immediately alleviated after the first HBO2 treatment and remarkably relieved after seven days of HBO2 therapy. The RR also decreased daily. Neither patient became critically ill. The decreasing trend of SO2 and P/F ratio was immediately reversed and increased day by day. The lymphocyte count and ratio corresponding to immune function gradually recovered. D-dimer corresponding to peripheral circulation disorders and serum cholinesterase, reflecting liver function had improved. Follow-up chest CT showed that the pulmonary inflammation had clearly subsided.

Conclusion: Our preliminary uncontrolled case reports suggest that HBO2 therapy may promptly improve the progressive hypoxemia of patients with COVID-2019 pneumonia. However, the limited sample size and study design preclude a definitive statement about the potential effectiveness of HBO2 therapy to COVID-2019 pneumonia. It requires evaluation in randomized clinical trials in future.