

UHMS Position Statement: Hyperbaric Oxygen (HBO₂) for COVID-19 Patients

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Introduction

There have been numerous recent inquiries regarding use of hyperbaric oxygen (HBO₂) for patients with COVID-19. Questions have been raised pertinent to two possible mechanisms for HBO₂ in this clinical context:

- support of oxygenation
- attenuation of pulmonary inflammation

Based on a review of the current literature, discussion with hyperbaric researchers working on this topic, and senior UHMS members, the following conclusions and recommendations are provided.

CONCLUSIONS AND RECOMMENDATIONS

- At this time there is insufficient evidence for the UHMS to endorse the routine use of HBO₂ for COVID-19 patients outside the context of an IRB-approved clinical trial.
- The UHMS encourages appropriately powered, well-designed prospective clinical trials consistent with good clinical practice to determine whether the use of HBO₂ is associated with clinically significant benefit in COVID-19 patients.
- Due to the potential for rapid clinical deterioration the treatment of COVID-19 patients with HBO₂ should be confined to hospital-based programs comfortable with the management of critically ill patients, and as part of an IRB-approved clinical trial.
- The UHMS is unaware of any evidence that the use of HBO₂ in this population is associated with patient harm or worsening clinical status. It is unknown what effects HBO₂ will have on the infected lung. Further prospective research is needed to determine whether the use of HBO₂ is associated with clinically significant pulmonary oxygen toxicity in this patient population.

- Hyperbaric medicine departments treating patients during this pandemic must maintain strict infection control measures. Please refer to the UHMS Guidelines for Infection Control. https://www.uhms.org/images/MiscDocs/UHMS_Guidelines_-_COVID-19_V4.pdf

BACKGROUND

The current COVID-19 pandemic has stretched medical systems and created considerable anxiety among health care workers and the general population. The search for novel treatments in an effort to reduce mortality and morbidity associated with COVID-19 is intense. The clinical findings of severe hypoxia and overwhelming inflammation have prompted questions around the use of HBO₂.

A recent case-series of five patients in China¹ has prompted multiple discussions related to the possible utility of HBO₂ for COVID-19 patients. The mechanisms through which HBO₂ may be beneficial are outlined below and include support of oxygenation and attenuation of pulmonary inflammation.

Support of Oxygenation

Patients with COVID-19-associated lung injury can develop severe hypoxemia, requiring increasing fractions of inspired oxygen. HBO₂ is likely to raise arterial PO₂ for the relatively brief period in which it can be realistically administered. However, arterial and tissue PO₂ rapidly decrease to baseline at the end of hyperbaric exposure. It is hypothesized that COVID-19 patients have an accumulated oxygen debt, and that HBO₂ offers a reprieve from this debt and possibly initiates recovery. There is also a concern about exacerbating pulmonary oxygen toxicity, especially in patients receiving high oxygen concentrations for prolonged periods before and after HBO₂. Pulmonary oxygen toxicity was not reported in the case series in China¹. It is unknown what effects (beneficial or adverse) HBO₂ will have on the COVID-19-affected lung.

Attenuation of Pulmonary Inflammation

HBO₂ has demonstrated anti-inflammatory effects in other organs, but this has not been tested for COVID-19-associated lung injury. We are not aware of data supporting antiviral effects of HBO₂.

¹ Ruiyong Chen, Xiaoling Zhong, Yanchao Tang, Yi Liang, Bujun Li, Xiaolan Tao, Changbo Liao.

The outcomes of hyperbaric oxygen therapy to severe and critically ill patients with COVID-19 pneumonia. Correspondence to: Dr. Xiaoling Zhong, HBOT Department of General Hospital of the Yangtze River Shipping, Wuhan China.

The Importance of IRB-Approved Prospective Research

At the time of publication there are at least six clinical trials nearing IRB approval or are already recruiting patients (refer to *clinicaltrials.gov* and the UHMS COVID-19 link for further details). Properly designed and conducted prospective trials will provide a sound foundation for future research and may result in a refinement of clinical practice. We must be cautious about implementing unsubstantiated treatment approaches.

There are multiple unanswered questions related to patient selection, timing of treatment initiation, hospital resource management, clinical efficacy, treatment protocols, treatment duration, and the logistical and safety issues associated with infection control. The many unknowns surrounding the use of HBO₂ for COVID-19 patients underlie the UHMS's position that there is insufficient evidence to endorse the use of routine adjunctive HBO₂ for COVID-19 patients outside the context of an IRB-approved clinical trial.

Research on COVID-19 Patients with HBO₂:

There are several clinical trials related to the use of HBO₂ for COVID-19 patients. Please refer to the links below for further details and updates on study status.

- <https://clinicaltrials.gov/ct2/results?term=hyperbaric+and+COVID&Search=Search>
- <https://www.uhms.org> (this URL will be updated when we have a list of studies posted under the COVID-19 link).