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Qatar Foundation's Office of Industry Development and Knowledge Transfer (IDKT)

مؤسسة قطر
Qatar Foundation

Hyperbaric Oxygen Hood Improves Point-of-Care Treatment for Patients with global & regional Hypoxia

Addressing the Shortcomings of HBO Therapy

Hyperbaric oxygen (HBO) therapy dramatically increases oxygen in the blood and tissues while stimulating antioxidant defenses, making it a promising treatment for COVID-19 and other serious respiratory illnesses, especially since it can prevent the need for mechanical ventilation. However, moving infectious patients from ICUs to an HBO chamber increases clinician exposure risk. HBO therapy is also costly and limits patient access, underscoring the need for a better point-of-care option.

Furthermore, besides treating global hypoxia, HBO can also combat regional hypoxia at the point-of-care.

By increasing the tissue Oxygen

levels, HBO can potentially reduce the size of infarct with Coronary, Cerebral or peripheral arterial occlusion, e.g., during heart attack, stroke and peripheral embolism.

For the same reason, it can be of great benefit in

APPLICATIONS

The key application of the PHBO hood is in-hospital intensive care units for COVID-19 patients. It can decrease the need for mechanical ventilation and ventilators, or provide an additional step in respiratory supportive therapy between NIV and mechanical ventilation. This hood also opens up HBO therapy for patients with:

- Air or gas embolism
- Anemia from severe blood loss
- Carbon monoxide poisoning
- Fire burns
- Skin grafts
- Soft tissue or bone marrow infections

patients suffering from major blood loss due to trauma or surgery.

A Smart, Portable HBO Therapy Solution

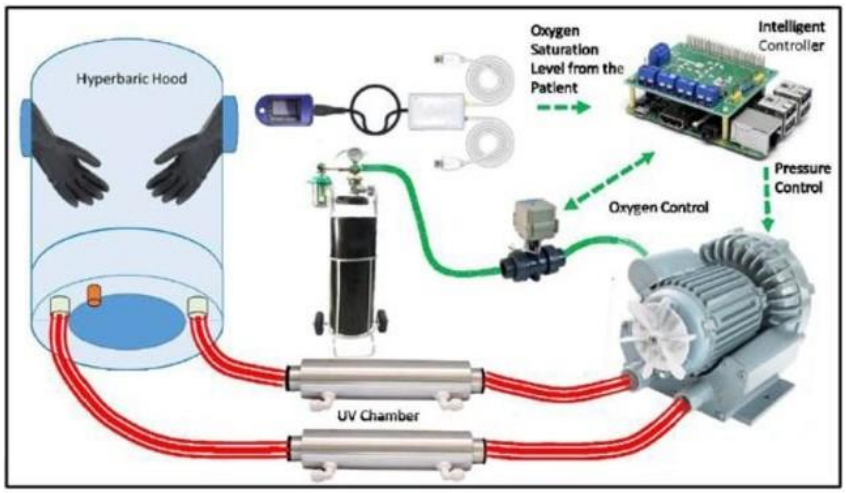
The Portable Hyperbaric Oxygen (PHBO) hood is a safer, ergonomic and cost-effective way to deliver HBO therapy to COVID-19 patients as well to patients suffering from generalized (e.g., due to cardio-respiratory dysfunction, severe blood loss) and regional hypoxia (e.g., evolving MI, stroke and peripheral ischaemia)

The invention includes an interlocking, air-tight head and neck hood, two gloved portals for easier patient interaction, means for communicating with the patient, interposed Virucidal UV tract and a fingertip sensor. The system automatically measures respiratory rate, pressures, flow, SPO2 and capnography. This data is processed via deep learning algorithms to develop an intelligent model for the best operating conditions for each patient.

Solution Advantages

The PHBO hood offers clear logistical advantages for seriously ill COVID-19 patients while enhancing the safety of clinical staff charged with their care, and the portability of this device could dramatically expand the use of hyperbaric oxygen to many more patients with regional or global ischaemia/hypoxia.

- **Safe:** Delivers HBO therapy at patient point of care, making it a safer option for both patients and caregivers in COVID-19 ICU settings
- **Affordable:** Offers a more economical option to deliver HBO therapy ~~for COVID-19 patients,~~ compared with exposing the entire body to oxygen in a large multi-unit chamber
- **Convenient:** Enables easy patient access and ensures ongoing caregiver interaction by design, including the ability to quickly decompress the system to treat the patient in an emergency
- **Improved Outcomes:** May decrease the need for mechanical ventilation and ventilators in certain patient groups. May decrease the size of infarct in evolving MI and stroke.
- **Intelligent:** Includes a smart interface that helps to ensure personalized care by providing continuous data about patient respiratory status through a controller that leverages deep learning algorithms fine-tuned to the patient's health status



A schematic illustration of a portable hyperbaric oxygen (PHBO) hood.