CUHMA ACMHS
Canadian Undersea and Hyperbaric Medical Association
Association Canadienne de Médecine Hyperbare et Subaquatique

Addendum to the CUHMA Guidelines for Hyperbaric Medicine: COVID-19 pandemic (and other highly contagious high fatality respiratory tract infectious agents)

Background and recommendations

The World Health Organization declared COVID-19 to be a pandemic. It is likely that there will be patients, staff and visitors at hyperbaric treatment facilities that are infected with the virus. These individuals may be asymptomatic for a period of time or may have mild or severe symptoms. The hyperbaric facility provides care to many patients that have multiple co-morbidities, are elderly and with impaired immune systems (due to medications or medical conditions). These patients are at increased risk of infection and serious health effects from the COVID-19 virus. Hyperbaric facilities may be constrained in terms of space and are not commonly designed with the management of highly contagious patients in mind, potentially increase the risk of spread of highly contagious infections such as COVID-19. This makes it imperative that hyperbaric facilities adopt policies on infection control including for highly contagious viruses, have supplies and equipment to protect staff and ensure training, practice and simulation to promote proficiency. It is important that hyperbaric staff are familiar with all infectious precautions being implemented by the hospital or health authorities AND take additional precautions specific to the hyperbaric unit.

Screening

Patients and staff may present to the hyperbaric unit that have been exposed or potentially exposed to the virus and without hyperbaric staff being aware. Therefore, suitable screening of all persons and other precautions need to be adopted. Screening should preferably take place prior to any individual entering the hyperbaric facility. Suitable screening questionnaires may administered by telephone, online, email, text messaging or other electronic means rather than in person whenever possible. Temperature measurements of individuals entering the facility should be considered to ensure they are afebrile. An example public notice for the entrance to the hyperbaric unit is provided at the conclusion of this document.

Given the potential consequences of patient exposure within a hyperbaric chamber and its associated delivery systems, hyperbaric units need to be especially vigilant. Hyperbaric units should also adopt a zero-tolerance policy of not permitting any visitors, family or non-essential staff within the unit.

Elective assessments should be deferred if screening raises concerns about the possibility of COVID-19 infection or exposure, and testing and retesting for COVID-19 using oral/nasal swabs should follow any requirements and guidelines established in the applicable jurisdiction. Urgent assessments of possibly exposed patients should occur via remote, electronic means whenever possible, and any initial assessments should occur outside of the hyperbaric unit using full protective measures to avoid contamination.

In the event that concern arises about the potential for any individual inside the hyperbaric facility being a potential source of infection with COVID-19, hyperbaric staff should immediately implement infectious precautions including donning appropriate respiratory protection masks, such as N95 masks for which staff have been FIT tested. The hyperbaric facility or health authority should have policies and procedures in place to determine further steps and requirements. Masks of any type may offer some degree of protection from spread of infection and may be considered for patients, staff and visitors in the hyperbaric facility. In the event that local health authorities suspend elective healthcare appointments due to COVID-19 infection concerns, the hyperbaric facility should likewise suspend elective treatments.

Cleaning

Hyperbaric staff must be aware of potential challenges for disinfection within the facility. The COVID-19 virus may remain infectious for extended periods of time (hours – days) on surfaces. Careful attention to the task is necessary, personal protective equipment must be utilized when COVID-19 is present in the community and the cleaning equipment be disinfected after use. Both monoplace and multiplace chambers are constrained spaces to which both patients and staff are exposed. Additionally, monoplace chambers have limited access for cleaning and this requires the use of long-handled cleaning devices. The cleaning may therefore not be completely effective or may miss some areas, without proper care.

The routine and thorough cleaning of hyperbaric chambers is required to ensure reliable disinfection for COVID-19. The Centre for Disease Control (CDC) and the Environmental Protection Agency (EPA) has provided a list of chemical agents that are approved for disinfection of COVID-19 and other infectious agents. Many of commercially available chemical compounds used for cleaning hyperbaric chambers (including the acrylics) are not on the EPA list for COVID-19 at this time (March 2020) but would be expected to be effective. The suitability, safety and effectiveness of disinfection chemicals for hyperbaric chambers must be carefully considered by each hyperbaric facility, in consultation with local infection control experts. Each hyperbaric unit must adopt and implement policies that require effective cleaning after each and every patient treatment. Procedures must provide for a sufficient time for contact between chamber surfaces and the cleaning agent to ensure effective disinfection. Such disinfection is required even when the hyperbaric facility adopts comprehensive screening of all persons entering the hyperbaric facility.

All breathing equipment including head tents, oxygen masks or BIBS masks must be thoroughly disinfected after each use even if assigned and labeled for individual patients. Disinfection is also required for gurneys, stretchers, wheelchairs and patient seating after each use. It is recommended that each hyperbaric facility make a list of items that are commonly touched by hands, such as faucets or door handles, and implement a schedule of frequent disinfection. Patient personal clothing and other items are also a potential source of infection. Bins for storage of these items during hyperbaric oxygen treatment are best labeled and kept for each individual patient but in any case, must also be disinfected after each use.

Patient Selection

As with all conditions, the risk-benefit analysis for hyperbaric oxygen treatment must be considered not only for patients, but also for staff and others in the hyperbaric facility when assessing patients with high risk contagious conditions. Assessment must also evaluate the appropriateness of routine practices that create the potential for dispersing infectious agents (for

example nebulized bronchodilators). Alternative practices to decrease the risk of disbursement must be considered (for example, metered dose inhalers).

Elective Treatment

COVID-19, and other contagions are known to seriously impair respiratory function and may greatly increase the risk of hyperbaric induced barotrauma, thus limiting the utility of hyperbaric oxygen. Any use of hyperbaric medicine for approved elective medical conditions should be deferred until sufficient recovery of respiratory function and gas exchange has occurred and the patient is no longer infectious. Asymptomatic patients may also be infectious and this risk may not be readily apparent. For this reason, routine and repeated screening is necessary when there is any potential for COVID-19 infection to occur. Consideration should be given to testing each patient for the virus to confirm negativity, during which interval of time the patient remains personally isolated from risk, including isolation from family members.

Emergent Treatment

In those facilities with the expertise and capacity to treat emergent conditions, it is recommended that emergency treatments in patients with known or suspected COVID-19 infection should not be undertaken except in extraordinary circumstances and with very extensive expert preparation that must include specialists in infection control. As above, anticipation for possible impaired respiratory function and risk of barotrauma should be anticipated and included in the risk-benefit analysis.

Investigational Treatment

At present there is no acceptable evidence for a therapeutic benefit of hyperbaric oxygen to either combat the viral respiratory effects or for supportive care of patients with COVID-19. The investigational or research use of hyperbaric oxygen for support and treatment of patients with COVID-19 must only be undertaken when approved by a publicly administered research ethics board. Such research requires comprehensive advanced procedures and equipment to safeguard patients, staff and the study investigators. Unsupported and false claims of efficacy of hyperbaric oxygen treatment for COVID-19 patients is unethical, hazardous for patients and staff and should be addressed by appropriate regulatory and health care authorities.

Special Considerations

The use of high flow oxygen (or air for air breaks) for head tents during hyperbaric treatment may result in some degree of leak of exhaled gases into the confined space of the hyperbaric chamber. Whenever patients or staff are exhaling directly into the chamber this may result in contamination of the chamber interior with infectious particles to which others will be exposed. The use of BIBS breathing masks with unidirectional inspiratory and expiratory valves would be expected to reduce the risk of cross-contamination.

During multiplace chamber treatments consideration should be given to staff breathing from disinfected BIBS masks and piping throughout the exposure. The use of N95 masks inside hyperbaric chambers has not been evaluated in detail but could be considered.

Monoplace chambers pose additional challenges in the potential for exposure to contaminated droplets when opening the door of the hyperbaric chamber after a treatment, and appropriate PPE should be employed.

The risks of connection to a common exhaust system is likely minimal due to unidirectional valves but may not be eliminated entirely. The hyperbaric facility should consult with engineering and infection control experts to ensure exhaust gases from the facility do not pose an infection hazard to others.

During the pandemic many patients may be using alcohol-based hand sanitizer. This must be washed off immediately prior to hyperbaric treatment due to the risks with oxygen and to chamber acrylics. Frequent hand-washing is essential for staff and patients.

Although this addendum is intended to provide guidance specific to the COVID-19 virus the principles could potentially be applied to other serious contagious respiratory pathogens. Pandemic planning is fluid and should be updated routinely as new information becomes available.

Notice: COVID-19 Pandemic Infection Precautions

CURRENTLY NO VISITORS ARE ALLOWED IN THE HYERBARIC UNIT.
ESSENTIAL STAFF ONLY.

Additionally, do not enter the hyperbaric facility if you have any of the following symptoms that may occur with infections due to the COVID-19 virus:

- Fever
- Cough
- Muscle aches and tiredness
- Shortness of breath or difficulty breathing
- Sore throat
- Pneumonia in both lungs
- Less commonly, headache and diarrhea may occur

Furthermore, if you have travelled within the previous 2 weeks to other countries or regions inside or outside Canada where infections with COVID-19 have been reported you should not enter the hyperbaric facility without first informing hyperbaric staff by telephone. This is also necessary if you have had close contact with a person that has tested positive for COVID-19 or is in isolation due to possible exposure.

To contact hyperbaric chamber staff please call:_____

You may also arrange testing or ask whether testing is needed by calling: ***