Health Policy and Technology 10 (2021) 29–30

Contents lists available at ScienceDirect

Health Policy and Technology

journal homepage: www.elsevier.com/locate/hlpt

Letter to the Editor

Performing hyperbaric oxygen therapy for central retinal artery occlusion under COVID-19: From myringotomy to rapid viral test

Dear Editor,

Being a pandemic with >24 million cases worldwide and over half a million deaths, the novel coronavirus disease 2019 (COVID-19) not only scared patients from attending clinics [1], but also ophthalmologists from caring duty. However, urgent ophthalmic diseases still warrant timely treatment to prevent blindness; central retinal artery occlusion (CRAO), [8] also known as ocular ischemic stroke, is one of them. CRAO causes retinal ischemia, and the retina is viable only for ~2 h; beyond which irreversible retinal cells damage would result in blindness [2]. Aimed to reperfuse the ischemic retina from intact choroidal circulation, timely emergency hyperbaric oxygen therapy (HBOT) adds as the last resort in treating CRAO [3], when prior standard SARS-CoV-2 test would take few hours beyond the golden timeframe. In addition, the delivery of HBOT requires lots of staff-patient interaction inside a closed chamber for hours, which is particularly risky for COVID-19 transmission [4]. Here, we present our new practice on minimizing COVID-19 transmission during HBOT.

HBOT is delivered inside a closed mono-place or multi-place chamber; each session lasts for ~1.5 h for standard CRAO treatment protocol. For a multi-place chamber, commonly employed among public hospital service settings, a few to a dozen of patients could enter the HBOT chamber simultaneously to receive treatment. Nursing staff often needs to enter, or even stay inside, the chamber to care for the patients; mainly assisting pressure equalization across the Eustachian tube, to prevent middle ear barotrauma [5]. Occasionally, instructing patients on Otovent usage inside the chamber is crucial to get rid of barotrauma. In case ear pain persists under the treatment pressure with exhaustion to all non-invasive maneuvers, patients would require emergency myringotomy or even tympanostomy tube placement (grommet) [6], to safely continue on HBOT. As the only public ophthalmic service unit equipped with HBOT chamber in the city serving 7 million populations, we received territory-wide CRAO referrals for emergency HBOT. Before the COVID-19 pandemic, 59.1% CRAO patients failed to equalize pressure across the middle ear upon usage of our multi-place HBOT chamber (model Haux-Starmed-Quadro 3300-2300). A total of 45.5% CRAO patients required emergency myringotomy to continue HBOT, whereas 13.6% were manageable with Otovent assistance.

During the early COVID-19 pandemic times, rapid testing for SARS-CoV-2 was not locally available; nursing staff's entrance to the HBOT multi-place chamber was strategically minimized to fight against COVID-19 transmission. Patients were offered prophylactic needle myringotomy before commencement of emergency HBOT, therefore nurses were no longer required to enter the HBOT chamber for coaching. This move not only served as disease prevention measures and personal protective equipment (e.g. N95) savings, but also improved CRAO patients' pressure gradient comfort upon HBOT, which improved compliance to their consecutive daily hospital visits under COVID-19 for continuation of treatment. Standard myringotomy runs a risk of ~1% [7], and needle myringotomy is less dangerous with higher tendency to spontaneous closure. Although a cost-benefit analysis was not possible (variable CRAO and COVID-19's local prevalence), the benefit on protecting the medical and nursing staff from COVID-19 infection outweighs the risk, especially during this serious COVID-19 pandemic. To the best of our knowledge, HBOT offered some favorable outcomes on treating respiratory failure COVID-19 cases, and a registered randomized controlled clinical trial is ongoing (NCT04358926). Therefore, keeping the professional HBOT medical team healthy and functional is of paramount importance.

Since the local outbreak of COVID-19 [1], four CRAO cases received emergency HBOT with the above mentioned logistics. None experienced complications, nor ear pain with HBOT after prophylactic needle myringotomy. All successfully completed the 5-day course of HBOT, and none of our team members was infected with COVID-19. Since HBOT is effective in treating a wide range of diseases across different specialties, our experience on HBOT logistics may help other practitioners with running their service during the COVID-19 pandemic.

In conclusion, multi-place HBOT chamber is risky for SARS-CoV-2 transmission when treating potential COVID-19 cases. Our practice of prophylactic needle myringotomy before emergency HBOT could minimize patient coaching's manpower and staff entrance to the closed chamber. Required in 45.5% of CRAO cases at baseline, prophylactic myringotomy running ~1% risk on patients could protect our HBOT team from COVID-19. Eliminating this occupational hazard of workplace SARS-CoV-2 infection is essential to support our medical staff in the fight against any future waves of the COVID-19 pandemic.

Patient consent: All gave permission to be included in the manuscript

References

[1] Au SCL. A surge in eye clinic nonattendance under 2019 novel coronavirus outbreak. Indian J Ophthalmol 2020;68(5):948.
[2] Hadanny A, Maliar A, Fishlev G Bechor Y, Bergan J, Friedman M, et al. Reversibility of retinal ischemia due to central retinal artery occlusion by hyperbaric oxygen. Clin Ophthalmol 2016;11:115–25.
[3] Au SCL, Ko STC. An old lady with acute headache and sudden blindness.. Hong Kong J Emerg Med 2020 In preparation. doi:10.1177/1024907920913665.
[4] Lo JJ, Wang SC, Lee HY, et al. Proactive COVID-19 infection prevention measures in a hyperbaric oxygen therapy center. Medicina (Kaunas) 2020;56(6):E261.
[5] Hexdall E, Brave R, Kraft K, Siewers J. Diving deep into hyperbaric oxygen therapy. Nursing (Brux) 2016;46(10):28–36.

https://doi.org/10.1016/j.hlpt.2020.10.009

[6] Lima MA, Farage L, Cury MC, Júnior Bahamad F. Update on middle ear barotrauma after hyperbaric oxygen therapy-insights on pathophysiology. Int Arch Otorhinolaryngol 2014;18(2):204–9.
[7] Barati B, Hashemi SM, Goljanian Tabrizi A. Otological findings ten years after myringotomy with tympanostomy tube insertion. Iran J Otorhinolaryngol 2012;24(69):181–6.
[8] Au SCL. Acute blindness by central retinal artery occlusion. Vis J Emerg Med 2020;21:100807 In preparation. doi:10.1016/j.visj.2020.100807.

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