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

E-NEWS

EDITOR'S NOTE – May 2020

The E-News is the monthly newsletter of CUHMA, our primary outlet to share news and information. We invite relevant content, including news/announcements, upcoming events, new publication abstracts, job postings, professional perspectives, incident reports, and images of relevant professional scenes. Please feel free to share the publication with interested colleagues. Past issues are available at https://cuhma.ca.

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NEWS/ANNOUNCEMENTS

CUHMA COVID-19 UPDATE - 24 April 2020

There have been recent news articles suggesting hyperbaric oxygen may be useful for the treatment of COVID-19, caused by the coronavirus (SARS-CoV-2). There are several university-based hospitals conducting research ethics board-approved studies on the use of hyperbaric oxygen for COVID-19 under strict infection control with access to intensive care units. However, at this time there is no current scientific evidence that hyperbaric oxygen has beneficial effects on COVID patients.

Beware of any hyperbaric clinics promoting COVID-19 treatments or offering to 'boost' immunity to prevent infections with COVID-19. It is possible that some of these centres are not staffed with qualified healthcare personnel trained and equipped to provide safe hyperbaric treatment, and they may not employ strict infection controls required for best practice to reduce the risk for spread of disease, including COVID-19.

In addition, be extremely cautious of individuals or facilities promoting hyperbaric treatments for any condition not recognized by Health Canada, particularly those who provide hyperbaric oxygen in very low pressure portable hyperbaric chambers which are designed to treat altitude-related problems. Health Canada information regarding the safe use of hyperbaric oxygen is available at the following: https://www.canada.ca/en/health-canada/services/healthy-living/your-health/medical-information/hyperbaric-oxygen-therapy.html

COVID-19: DIVING MEDICINE STATEMENTS

Many diving medicine organizations have issues statements regarding COVID-19. Many are accessible for review:
Canadian Undersea and Hyperbaric Medical Association: https://cuhma.ca/learn/hyperbaric-medicine-during-covid-19-pandemic
European Underwater and Baromedical Society: http://www.eubs.org/?p=1074
Undersea and Hyperbaric Medical Society: https://www.uhms.org/covid-19-information.html

CUHMA Annual Scientific Meeting 2020 Cancelled

Many diving and hyperbaric medicine conferences scheduled for 2020 have being cancelled in response to the COVID-19 pandemic. The decision to cancel the CUHMA annual scientific meeting follows similar decisions by the South Pacific Underwater Medicine Society and the International Congress on Hyperbaric Medicine.

UPCOMING EVENTS

UMC Introductory Diving Medicine Course

Undersea Medicine Canada is offering a CSA Z275.2-15 Level 1 'Introductory Course in Diving Medicine - Fitness to Dive' September 28-October 02 in Quebec City, QC. Upon successful completion of the course, physicians will qualify as CSA Z275.2-15 Level 1 Diving Medical Examiners and can have their names listed with the Diver Certification Board of Canada (DCBC) to conduct commercial diver medicals in Canada. This 40-h course has been accredited for 35 MAINPRO+ CME credits by the College of Family Physicians of Canada. Contact Dr. Debbie Pestell (drdeb1@ns.sympatico.ca; 902-225-8214) or visit: https://underseamedicine.ca for more information.

UHN Introductory Hyperbaric Medicine Course

The University Health Network, Toronto General Hospital, course runs November 24-28. The program is suitable for physicians and other health professionals looking to become CHT certified or obtain Level 1 certification. It is accredited by the Undersea and Hyperbaric Medical Society for 40 CME credits, and by the National Board of Diving and Hyperbaric Medical Technology for 40 CME credits. For more information and registration: https://www.uhn.ca/Surgery/Treatments_Procedures/Hyperbaric_Medicine_Unit#tab4

RECENT PUBLICATIONS

Geier MR, Geier DA. Respiratory conditions in coronavirus disease 2019 (COVID-19): important considerations regarding novel treatment strategies to reduce mortality. Med Hypotheses. 2020 Apr 22;140:109760.

A novel virus named 2019 novel coronavirus (2019-nCoV/SARS-CoV-2) causes symptoms that are classified as coronavirus disease (COVID-19). Respiratory conditions are extensively described among more serious cases of COVID-19, and the onset of acute respiratory distress syndrome (ARDS) is one of the hallmark features of critical COVID-19 cases. ARDS can be directly life-threatening because it is associated with low blood oxygenation levels and can result in organ failure. There are no generally recognized effective treatments for COVID-19, but treatments are urgently needed. Anti-viral medications and vaccines are in the early developmental stages and may take many months or even years to fully develop. At present, management of COVID-19 with respiratory and ventilator support are standard therapeutic treatments, but unfortunately such treatments are associated with high mortality rates. Therefore, it is imperative to consider novel new therapeutic interventions to treat/ameliorate respiratory conditions associated with COVID-19. Alternate treatment strategies utilizing clinically available treatments such as hyperbaric oxygen therapy (HBOT), packed red blood cell (pRBC) transfusions, or erthropoiesis-stimulating agent (ESA) therapy were hypothesized to increase oxygenation of tissues by alternative means than standard respiratory and ventilator treatments. It was also revealed that alternative treatments currently being considered for COVID-19 such as chloroquine and hydroxychloroquine by increasing hemoglobin production and increasing hemoglobin availability for oxygen binding and acetazolamine (for the treatment of altitude sickness) by causing hyperventilation with associated increasing levels of oxygen and decreasing levels of carbon dioxide in the blood may significantly ameliorate COVID-19 respiratory symptoms. In conclusion, is recommend, given HBOT, pRBC, and ESA therapies are currently available and routinely utilized in the treatment of other conditions, that such therapies be tried among COVID-19 patients with serious respiratory conditions and that future controlled-clinical trials explore the potential usefulness of such treatments among COVID-19 patients with respiratory conditions.

Janisch T, Stollenwerk A, Siekmann UP, Kopp R. Treatment of children with hyperbaric oxygenation (HBOT): an Europe-wide survey. Minerva Pediatr. 2020 Apr 9[Online ahead of print]

Background: Hyperbaric oxygenation therapy (HBOT) is used as emergency treatment for decompression sickness, gas embolism, carbon monoxide intoxication, necrotizing fasciitis. There is low evidence and little clinical knowledge about treating children with HBOT. Methods: We sent an internet-based questionnaire to HBO centers in Europe to gain information about their experience with children and HBOT. Results: Out of all HBO-centers who participated in the questionnaire 90% treat children analogue to adults with regard to indication and HBOT protocol. Most treated children had life- threatening indications or the risk of organ loss. The reported rate of side effects was: 6.8% anxiety, 2.4% barotrauma, 0.9% seizure, 0.2% retinopathy and no case of pulmonary barotrauma or oxygen toxicity. Conclusions: HBO therapy for children is present in European HBO centers. The rate of severe side effects is as low to the rates in adults; apart from this, oxygen-related seizures and anxiety are more frequent. A special focus seems necessary on the psychological management of the children, because anxiety is common depending on the age of the children. Especially for smaller children an adequate psychological support seems essential. Prospective observational or controlled studies in children seem necessary to create relevant clinical evidence for HBOT and to observe the rate of side-effects.

Kim M, Suh DH, Lee KH, Eom KY, Lee JY, Lee YY, Hansen HF, Mirza MR, Kim JW. Major clinical research advances in gynecologic cancer in 2019. J Gynecol Oncol. 2020;31(3):e48.

In 2019, 12 topics were selected as the major research advances in gynecologic oncology. Herein, we first opted to introduce the significant clinical activity of pembrolizumab in women with advanced cervical cancer based on the results of the phase 2 KEYNOTE-158 trial. Thereafter, we reviewed 5 topics, including systemic lymphadenectomy in the advanced stage with no gross residual tumor, secondary cytoreductive surgery in recurrent ovarian cancer according to the results of Gynecologic Oncology Group-213 trial, dose-dense weekly paclitaxel scheduling as first-line chemotherapy, the utility of intraperitoneal therapy in the advanced stage, and an update on poly(ADP-ribose) polymerase (PARP) inhibitors for the treatment of ovarian cancer. Additionally, we conducted a thorough review of emerging data from several clinical trials on PARP inhibitors according to drug, target population, and combined usage. For uterine corpus cancer, we reviewed adjuvant therapy for high-risk disease and chemotherapy in advanced/recurrent disease. For the field of radiation oncology, we discussed the utility of neoadjuvant chemotherapy added to chemoradiotherapy and the treatment of radiation-induced cystitis using hyperbaric oxygen. Finally, we discussed the use of individualized therapy with humanized monoclonal antibodies (trastuzumab emtansine and sacituzumab govitecan-hziy) and combination therapy (fulvestrant plus alpesilib,

fulvestrant plus anastrozole, and ribociclib plus endocrine therapy) for women with advanced breast cancer.

Meng WT, Qing L, Li CZ, Zhang K, Yi HJ, Zhao XP, Xu WG. Ulinastatin: a potential alternative to glucocorticoid in the treatment of severe decompression sickness. Front Physiol. 2020; 11, 273.

Inflammatory reaction is the crux in various clinical critical diseases including decompression sickness (DCS). Ulinastatin (UTI), a potent anti-inflammatory agent, has been used clinically, including as a substitution for steroids. This study aimed to explore the potential effects of UTI upon DCS in a rabbit model. Eighty-eight rabbits were subjected to simulated diving to 6 atmospheres absolute (ATA) for 60 min with 2.5-minute decompression. Three doses of UTI (15/7.5/3.75 × 105 U/kg) or saline were intravenously administered immediately following decompression. Circulating bubbles were monitored for 3 h following decompression and DCS signs were evaluated for 24 h. Blood was sampled 8 times during 72 h after decompression for inflammatory, endothelial, oxidative and routine blood indices. Lung tissues were also sampled for evaluating endothelial function. Another six rabbits were used as Normal controls. In the high dose UTI group the mortality, general morbidity and incidence of severe DCS was decreased from 31.25 to 9.38% (P=0.030), 84.38 to 62.50% (P=0.048) and 46.88 to 21.88% (P=0.035), respectively. The high dose of UTI significantly postponed the occurrence of DCS (P=0.030) and prolonged survival time (P=0.009) compared with the Saline group, and significantly ameliorated inflammation responses, endothelial injuries and oxidative damage. The results strongly suggest the benefit of UTI on DCS, especially for severe cases. Large doses are needed to achieve significant effects. UTI may be a potential ideal pharmacological candidate for the treatment of severe DCS.

Simon JC, Holm JR, Thiel J, Dunmire B, Cunitz BW, Bailey MR. Evidence of microbubbles on kidney stones in humans. Ultrasound Med Biol. 2020; Mar 31[Online ahead of print]

The color Doppler ultrasound twinkling artifact has been found to improve detection of kidney stones with ultrasound; however, it appears on only ~60% of stones. Evidence from ex vivo kidney stones suggests twinkling arises from microbubbles stabilized in crevices on the stone surface. Yet it is unknown whether these bubbles are present on stones in humans. Here, we used a research ultrasound system to quantify twinkling in humans with kidney stones in a hyperbaric chamber. Eight human patients with non-obstructive kidney stones previously observed to twinkle were exposed to a maximum pressure of 4 atmospheres absolute (ATA) while breathing air, except during the 10-min pause at 1.6 ATA and while the pressure decreased to 1 ATA, during which patients breathed oxygen to minimize the risk of decompression sickness. A paired one-way t-test was used to compare the mean twinkle power at each pressure pause with baseline twinkling, with $p<0.05$ considered to indicate significance. Results revealed that exposure to 3 and 4 ATA of pressure significantly reduced twinkle power by averages of 35% and 39%, respectively, in 7 patients ($p=0.04$); data from the eighth patient were excluded because of corruption. This study supports the theory that microbubbles are present on kidney stones in humans.

Yuan JH, Song LM, Liu Y, Li MW, Lin Q, Wang R, Zhang CS, Dong J. The effects of hyperbaric oxygen therapy on pelvic radiation induced gastrointestinal complications (rectal bleeding, diarrhea, and pain): a meta-analysis. Front Oncol. 2020 Apr 9;10:390.

Background: Radiotherapy is a routine treatment for pelvic cancer patients. While it had been proven effective, gastrointestinal side effects remain a concern, impairing the quality of life. A few studies focused on the effects of hyperbaric oxygen (HBO) treatment to alleviate radiation-induced gastrointestinal complications. This meta-analysis aimed to critically review and summarize existing literature, assessing the effectiveness of HBO therapy for the treatment of radiation-induced gastrointestinal side effects. Methods: Medical literature search was performed with PubMed, Cochrane Library, and EMBASE up to March 14, 2019. Literatures about HBO treatment upon patients undergoing pelvic cancer (endometrial, cervix, rectum, or prostate cancers) radiotherapy were collected, and the effects of HBO treatment on radiotherapy-induced gastrointestinal complications were evaluated. A random-effects model was used to calculate the pooled effect size. Subgroup analyses were performed to search for sources of heterogeneity. Publication bias was detected with Funnel plots and Egger's test. Results: Three different radiotherapy-related gastrointestinal complications, including rectal bleeding, diarrhea, and pain, were analyzed after screening. It was revealed that the improvement rates were considerable in rectal bleeding (0.81, 95% CI: 0.74-0.89) and diarrhea (0.75, 95% CI: 0.61-0.90) and slightly in pain (0.58, 95% CI: 0.38-0.79). Subgroup analysis revealed factors that significantly influenced the heterogeneity of rectal bleeding, diarrhea, and pain (evaluation criteria, follow-up time, and scoring system, respectively). No significant publication bias was detected. Conclusion: HBO treatment might have the potential to alleviate radiotherapy-related gastrointestinal complications, including rectal bleeding, diarrhea, and pain, but more data are needed for further conclusions. Other symptoms were not further analyzed, as the number of studies was insufficient. More large-scale and prospective studies are needed for better evaluation of HBO's therapeutic values.

Westerweel PE, Rienks R, Sakr A, Taher A. Diving with hypertension and antihypertensive drugs. Diving Hyperb Med. 2020; 50(1): 49-53.

Hypertension is a common condition, which is highly prevalent amongst scuba divers. As a consequence, a substantial proportion of divers are hypertensive and/or on antihypertensive drugs when diving. In this article, we review available literature on the possible risks of diving in the presence of hypertension and antihypertensive drugs. Guidelines are presented for the diving physician for the selection of divers with hypertension suitable for diving, along with advice on antihypertensive treatment best compatible with scuba diving.

Zhang J, Guo Y, Li W, Li G, Chen Y. The efficacy of N-butylphthalide and dexamethasone combined with hyperbaric oxygen on delayed encephalopathy after acute carbon monoxide poisoning. Drug Des Devel Ther. 2020;14:1333-9.

Background: Carbon monoxide (CO) poisoning is a common health problem among people in many countries, primarily because of its severe clinical effects and high toxicological morbidity and mortality. Acute brain injury and delayed encephalopathy after acute carbon monoxide poisoning (DEACMP) are the most common neurological complications. This study was performed to assess the efficacy of N-butylphthalide (NBP) and dexamethasone (DXM) combined with hyperbaric oxygen (HBO) in patients with DEACMP. Patients and methods: A total of 171 patients with DEACMP were recruited and assigned to the combined therapy group (receiving NBP and DXM 5 mg/day plus HBO therapy) or the control group (HBO therapy as monotherapy). Conventional treatments were provided for all patients. The cognition and movement changes in patients were evaluated by the Mini-Mental State Examination (MMSE), the Montreal Cognitive Assessment (MoCA) scale and the Barthel index of activities of daily living (ADL) before and after the treatment at 1 month, 3 months, and 1 year, respectively. Results: At 1 month, 3 months, and 1 year after the treatment, the MMSE, MoCA and ADL scores were all significantly higher in the combined therapy group than those in the control group. There were no significant alterations in blood glucose, blood lipids, or liver and kidney function during the whole treatment session. Some patients experienced loss of appetite, mild headache and minor skin irritations. However, these patients recovered by themselves and needed no additional medications or special treatment. Conclusion: These results indicated that NBP and DXM combined with HBO for the treatment of DEACMP can significantly improve the cognitive and motor functions of patients and is very safe.

CUHMA-ACMHS is the Canadian voice for the advancement of hyperbaric and diving medicine throughout our country and beyond. Our activities include continuous medical education for physicians, nurses, respiratory therapists and anyone involved in the fields of hyperbaric and diving medicine. We are also promoting dissemination of clinical research, publishing position statements, liaising with related professional associations and government agencies. Our main goal is advocating on behalf of our patients. Our vision is to be the reference for the development and delivery of hyperbaric and diving medicine in Canada and beyond. Our mission is to promote excellence in hyperbaric and diving medicine through leadership in education, promotion of best practices and advocacy for our patients. Our values are excellence, leadership, collaboration, communication, and integrity.

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