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

# E-NEWS

## EDITORIAL NOTE – November 2019

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

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## NEWS/ANNOUNCEMENTS

### BSAC Diving Conference Presentations Online

The 2019 British Sub-Aqua Club (BSAC) diving conference was held October 26, 2019 in Birmingham, England. The event included a variety of main stage and breakout sessions. The former addressed ocean exploration and conservation, BSAC operations, underwater archaeology, recent diving incidents, and diver health and safety. More than 850 persons registered for the event. To increase the outreach value of the conference, the main stage presentations were recorded and are now available to the wider community at no cost (https://www.bsac.com/news-and-blog/bsac19conf/). The next BSAC diving conference will be held in 2021.

## UPCOMING EVENTS

### UHN Introductory Hyperbaric Medicine Course

The University Health Network, Toronto General Hospital, is offering this course November 26-30, 2019. The program will provide participants the basic competencies to practice in hyperbaric medicine. Content will include indications and contraindications for hyperbaric treatments and guidelines on treatment table usage. There will be hands-on practice of clinical skills, chamber management, and clinical emergencies during hyperbaric treatments, as well as theory and historical background. For more information, visit: https://www.uhn.ca/Surgery/PatientsFamilies/Clinics_Tests/Hyperbaric_Medicine_Unit/Pages/Continuing_Education.aspx

### Hyperbaric Technician Training Course 2020

Simon Fraser University is offering a hyperbaric technician course February 02-07 in Burnaby, BC. It will cover skills and knowledge to maintain a hyperbaric facility including: operating principles of the main control equipment; air filtration systems; hyperbaric electric systems; and maintenance and inspection of acrylic windows. Hands-on components include: valve & regulator service, Swagelok fittings and tube bending; HP Bauer compressor servicing; oxygen cleaning; and HP cylinder inspection. Visit: https://www.sfu.ca/science/faculty-support/facilities-services/empu/courses/hyperbaric-technician.html.

### Hyperbaric Safety Director Course 2020

Simon Fraser University, in Burnaby, BC, is offering this 3-day program in collaboration with International ATMO February 07-09. It will provide necessary tools and resources to fulfill the responsibilities of the Hyperbaric Safety Director (as defined by CSA Z275.1). Both classroom instruction and practical exercises are provided. Visit: https://www.sfu.ca/science/faculty-support/facilities-services/empu/courses/hyperbaric_safety_director.html.

### Hyperbaric Medical Emergency Simulation 2020

Simon Fraser University, in Burnaby, BC, is offering this HMES course on February 10. It is an interactive team simulation program aimed at improving team dynamics to optimize patient outcomes in a crisis. It is intended for both physicians and non-physicians. Participants will gain hands-on experience with simulated monoplace and multiplace emergencies. The program is approved for 6.75 h of AMA PRA Category 1 credits. For more information, visit: https://www.sfu.ca/science/faculty-support/facilities-services/empu/courses/hyperbaric-medical-emergency-simulation.html.

### International Congress on Hyperbaric Medicine

The 20th ICHM will be held November 11-15, 2020 at the Rio Othon Palace Hotel, in Copacabana, Rio de Janeiro, Brazil. The conference is held every three years, and is unusual in not being linked to any single institution. The scientific program will include oral and poster research presentations and invited lectures by renowned national and international speakers. CUHMA members are being offered 10% off the registration price. Visit www.ichm2020.rio.br.

## RECENT PUBLICATIONS

**Arora S, Tantia P. Physiology of oxygen transport and its determinants in intensive care unit. Indian J Crit Care Med. 2019;23(Suppl 3):S172-7.**

Transport of oxygen is one of the most important functions of blood. How oxygen moves from the air, where its partial pressure is about 150 mm Hg to mitochondria, where it drops down to a single digit is an evolutionary marvel. In this article, we discuss the physiology of oxygen transport from the alveoli to the tissue, the alveolar gas equation and the oxyhemoglobin dissociation curve. In the applied physiology section, we discuss the impact of high altitude, hyperbaric conditions, carbon monoxide poisoning on the transport of oxygen. Some common pitfalls in the interpretation of pulse oximetry and arterial blood gas are also discussed. Finally, we talk about the methods of increasing oxygen delivery, the compensation for hypoxia and some indications of venous oxygen saturation measurement.

**Boet S, Cheng-Boivin O, Martin L, Hurskainen T, Etherington N. Evidence for simulation-based education in hyperbaric medicine: a systematic review. Diving Hyperb Med. 2019;49(3):209-15.**

INTRODUCTION: Evidence from many areas of healthcare suggests that skills learned during simulation transfer to clinical settings; however, this has not yet been investigated in hyperbaric medicine. This systematic review aimed to identify, summarize, and assess the impact of simulation-based education in hyperbaric medicine. METHODS: Eligible studies investigated the effect of simulation-based education for learning in hyperbaric medicine, used any design, and were published in English in a peer-reviewed journal. Learning outcomes across all Kirkpatrick levels were included. MEDLINE, Embase, and the Cochrane Central Register of Controlled Trials were searched. Pairs of independent reviewers assessed references for study eligibility. RESULTS: We found no article assessing the impact of simulation-based education in hyperbaric medicine published in English. Only one potentially relevant paper published in German was found. CONCLUSIONS: More research is needed to determine how the hyperbaric medicine community and their patients may benefit from simulation-based education to optimize both practice and patient care.

**Elia A, Barlow MJ, Deighton K, Wilson OJ, O'Hara JP. Erythropoietic responses to a series of repeated maximal dynamic and static apnoeas in elite and non-breath-hold divers. Eur J Appl Physiol. 2019 Sep 28. doi: 10.1007/s00421-019-04235-1. [Epub ahead of print]**

PURPOSE: Serum erythropoietin (EPO) concentration is increased following static apnoea-induced hypoxia. However, the acute erythropoietic responses to a series of dynamic apnoeas in non-divers (ND) or elite breath-hold divers (EBHD) are unknown. METHODS: Participants were stratified into EBHD (n = 8), ND (n = 10) and control (n = 8) groups. On two separate occasions, EBHD and ND performed a series of five maximal dynamic apnoeas (DYN) or two sets of five maximal static apnoeas (STA). Control performed a static eupnoeic (STE) protocol to control against any effects of water immersion and diurnal variation on EPO. Peripheral oxygen saturation (SpO2) levels were monitored up to 30 s post each maximal effort. Blood samples were collected at 30, 90, and 180 min after each protocol for EPO, haemoglobin and haematocrit concentrations. RESULTS: No between group differences were observed at baseline ($p>0.05$). For EBHD and ND, mean end-apnoea $S_pO_2$ was lower in DYN (EBHD, 62±10%, $p=0.024$; ND, 85±6%; $p=0.020$) than STA (EBHD, 76±7%; ND, 96±1%) and control (98±1%) protocols. EBHD attained lower end-apnoeic $S_pO_2$ during DYN and STA than ND ($p<0.001$). Serum EPO increased from baseline following the DYN protocol in EBHD only (EBHD, $p<0.001$; ND, $p=0.622$). EBHD EPO increased from baseline (6.85±0.9mlU/mL) by 60% at 30 min (10.82±2.5mlU/mL, $p=0.017$) and 63% at 180 min (10.87±2.1mlU/mL, $p=0.024$). Serum EPO did not change after the STA (EBHD, $p=0.534$; ND, $p=0.850$) and STE ($p=0.056$) protocols. There was a significant negative correlation ($r = -0.49$, $p=0.003$) between end-apnoeic $S_pO_2$ and peak post-apnoeic serum EPO concentrations. CONCLUSIONS: The novel findings demonstrate that circulating EPO is only increased after DYN in EBHD. This may relate to the greater hypoxemia achieved by EBHD during the DYN.

**Hagan JC 3rd, Maturo JV, Kirby JP. Rapidly developing large bilateral cataracts in a 58-year-old woman after only 46 hyperbaric oxygen treatments. Mo Med. 2019;116(5):396-9.**

We are reporting a 52-year-old female that developed documented vision impairing, large, bilateral nuclear and cortical cataracts during therapy after 46 treatments of a planned 60 treatment course of $HBO_2$ for a non-healing post-radiation leg wound. A review of the available literature makes this one of the earliest cases of cataract formation.

**Nik Hisamuddin NAR, Wan Mohd Zahiruddin WN, Mohd Yazid B, Rahmah S. Use of hyperbaric oxygen therapy (HBOT) in chronic diabetic wound - a randomised trial. Med J Malaysia. 2019;74(5):418-24.**

INTRODUCTION: The purpose of this study was to investigate the effect of hyperbaric oxygen therapy (HBOT) towards diabetic foot ulcer (DFU) patients in addition to the standard wound care management. METHODS: Fifty-eight diabetic patients with ulcers at Wagner Grade 2 and above involved in this study after presented at two study centres of tertiary teaching hospitals. The assigned patients received conventional

wound care with additional HBOT given at 2.4 ATA for 90 minutes. Patients in the control group who received conventional wound care only were treated and observed for 30 days. The progress of wound healing was observed and measured at day 0, 10, 20 and 30 of study. The data collected were analysed using SPSS software (ver. 22) to study the association of HBOT towards healing of the diabetic foot ulcers. RESULTS: Repeated Measures ANOVA analysis with Greenhouse-Geisser correction indicated that the means of wound size over time points (Day 0, 10, 20 and 30) among patients under HBOT group were statistically significantly different [$F(1,61)=30.86$, $p<0.001$)] compared to conventional therapy group. Multiple logistic regression analysis showed that HBOT group has nearly 44 times higher odds to achieve at least 30% wound size reduction within the study period (95%CI: 7.18, 268.97, $p<0.001$). CONCLUSION: The results obtained in this study indicated that as an adjunctive therapy to conventional wound care, HBOT affected the rate of healing in diabetic foot ulcers significantly in terms of wound size reduction when compared to administering the conventional wound care alone

**Oya M, Tadano Y, Takihata Y, Ikomi F, Tokunaga T. Utility of hyperbaric oxygen therapy for acute acoustic trauma: 20 years' experience at the Japan Maritime Self-Defense Force Undersea Medical Center. Int Arch Otorhinolaryngol. 2019;23(4):e408-14.**

Introduction: Acute acoustic trauma, which is a kind of sensorineural hearing loss, is caused by acoustic overstimulation. Hyperbaric oxygen therapy (HBOT) is reported to be effective against acute acoustic trauma. Objective: We aimed to evaluate the efficacy of HBOT against acoustic hearing loss based on our 20 years of experience with such cases. Methods: Patients who were treated with HBOT for acute acoustic trauma between April 1997 and August 2017 were evaluated in this study. Thirty-five patients with a mean age of 25.7±9.2 (range: 16-48) years were included. Thirty-nine out of 70 ears (35 patients) were damaged. We investigated the initial level of hearing loss; the extent to which hearing recovered; subjective symptoms, such as tinnitus and aural fullness; and the treatment administered. Results: The planned HBOT was completed in 37 of 39 ears. Twenty-six of the 37 ears (70.2%) displayed improved hearing, and 31 of the 37 ears (83.9%) exhibited symptom improvement. Twenty-three (76.7%) and 26 (86.7%) of the 30 ears treated with steroids demonstrated improvements in hearing and subjective symptoms, respectively. Conclusion: A combination of HBOT and steroids should be considered as a treatment for acute acoustic trauma in cases involving symptoms such as tinnitus and aural fullness.

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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