

E-NEWS

EDITORIAL NOTE – September 2018

The E-News is the monthly newsletter of CUHMA used to share news and information. We invite relevant content, including announcements, upcoming conferences, new publication abstracts, job postings, and relevant images of related professional scenes. All past issues are available at <https://cuhma.ca>.

Neal W. Pollock
Université Laval

NEWS/ANNOUNCEMENTS

CUHMA BoD - Call for Nominations

The call for nominations for the CUHMA board of directors will go out by September 04 by email to members. The nomination period will close on October 01. Electronic polling will open on October 15 and close on November 02 at 2200 ET. Candidates can have campaign material included in the October E-News if the content is received by the editor by September 25. Allowable content includes: a head and shoulders photo, a 300-word biosketch, and a 300-word statement for candidacy. Candidates have the option of using the statement to respond to the following question: “What are the two most important initiatives that you want to champion as a CUHMA board member?”

UHMS Board Appointment of Ron Linden

Ron Linden, MD, a CUHMA (and founding CC-UHMS) member, was recently elected to serve a two-year term as Vice President on the board of directors of the Undersea and Hyperbaric Medicine Society (UHMS).

Cold Water Diving Symposium - Online Learning

A two-day symposium on the health and safety of cold water diving was held at the Institute Maritime in Rimouski, QC in March 2018. Our goal was to expand communications and develop educational material for the diving and diving oversight communities. A total of 36 mini-talks on a variety of topics, in a mixture of French and English, are now available at no cost for educational purposes. They can be accessed at:

https://www.youtube.com/playlist?list=PLHJt-7L92RI5f2zAfoaeLmqN1x_YNNxbJ

UPCOMING EVENTS

AAUS Diving for Science Symposium 2018

The 2018 American Academy of Underwater Sciences Diving for Science Symposium will be held October 09-13 in Tahoe City, CA. University of California (UC) Berkeley and UC Davis will serve as hosts. This meeting is relevant to diving scientists, students, diving safety officers, and anyone with an interest in diving science. For more information, visit: www.aaus.org/annual_symposium.

CUHMA Annual Scientific Meeting 2018

The 2018 CUHMA ASM will be held November 02-04, in Quebec City, hosted by Université Laval and Hôtel-Dieu de Lévis. One day of pre-conference events will be followed by two days of scientific talks. Pre-conference events include:

- CHT exam offered by the National Board of Diving and Hyperbaric Medical Technology (NBDHMT)
- Hyperbaric emergency team simulation (HETS) course to be held at the hyperbaric chamber at Hôtel-Dieu de Lévis
- Board of Directors meeting

A welcome reception will be held on Friday evening, and the awards banquet on Saturday evening. **Register soon: the earlybird rate ends September 14.** Visit our website for details: <https://cuhma.ca>.

EUROTEK 2018

EUROTEK is Europe’s premiere advanced and technical diving conference. The meeting will be held December 01-02, 2018, in Birmingham, England. Lectures and exhibitors will cover the range of current and emerging equipment, concepts, and issues. For more information, visit: <http://eurotek.uk.com>.

OZTek 2019

OZTek 2019 will bring together an impressive roster of speakers and exhibitors from around the world. It will be held March 16-17 at the International Convention Centre in Sydney, Australia. For further information, see: www.diveoztek.com.

RECENT PUBLICATIONS

Ahmadzai N, Kilty S, Wolfe D, Bonaparte J, Schramm D, Fitzpatrick E, Lin V, Cheng W, Skidmore B, Moher D, Hutton B. A protocol for a network meta-analysis of interventions to treat patients with sudden sensorineural hearing loss. *Syst Rev.* 2018;7(1):74.

BACKGROUND: Hearing loss is one of the leading causes of disability worldwide, with greater than 20% of Canadian adults having measurable hearing loss in at least one ear. Patients with hearing loss experience impaired quality of life, and emotional and financial consequences that affect themselves and their families. Sudden sensorineural hearing loss (SSNHL) is a common but difficult to treat form of hearing loss that has a sudden onset of ≤ 72 h associated with various etiologies, with the majority of cases being idiopathic. Some patients may partially or completely recover hearing ability, but for 32 to 65% of patients whose hearing does not recover, feelings of social isolation elevate the risk of anxiety and depression. Hearing loss is also associated with poorer functional status, including difficulty with sound localization and hearing in noise. There exists a wide range of therapeutic options; however, treatment of idiopathic SSNHL is controversial because some patients recover spontaneously. The planned systematic review and network meta-analysis (NMA) will assess the relative effects of competing treatments for management of idiopathic SSNHL in adults. **METHODS:** Electronic search strategies were developed by an experienced medical information specialist in consultation with the review team. We will search MEDLINE, Embase, and the Cochrane Library with no date or language restrictions. Key clinical trial registries will also be searched for in-progress and completed trials. Two reviewers will independently screen the literature using pre-specified eligibility criteria, and assess the quality of included studies using the Cochrane Risk of Bias tool.

Disagreements will be resolved through consensus or third party adjudication. Bayesian NMAs will be pursued to compare interventions in terms of their effects on hearing (including audiometric thresholds and speech recognition scores), extent of hearing recovery, quality of life, and incidence of harms (including vestibular dysfunction, incidence of infections, and withdrawals due to adverse events). **DISCUSSION:** This systematic review and NMA will offer new and informative evaluations of current therapies for SSNHL. The results will inform clinicians as to the relative benefits of the currently available interventions for managing this difficult condition, provide optimal clinical treatment strategies, establish evidence gaps, and identify promising treatments for evaluation in future trials. **SYSTEMATIC REVIEW REGISTRATION:** PROSPERO registration number: CRD 42017073756

Chi TH, Chiang MC, Chen RF, Yuan CH. Does the addition of hyperbaric oxygen therapy to conventional treatment modalities influence the outcome of soldiers with idiopathic sudden sensorineural hearing loss? *JR Army Med Corps.* 2018;164(2):69-71.

BACKGROUND: Idiopathic sudden sensorineural hearing loss (ISSNHL) is defined as a 30-decibel (dB) loss in hearing over three contiguous frequencies within 3 days. The cause remains unknown, and there is currently no consensus in the literature as to how it is best treated. Conventional treatment in our unit comprises steroids, pentoxifylline and dextran, with the potential addition of hyperbaric oxygen therapy (HBOT). **METHODS:** A prospective randomised trial was performed on all soldiers diagnosed with ISSNHL in our institution from 1 January 2007 to 31 December 2016. Participants were randomly allocated to one of two groups. Group A was treated with conventional treatment plus HBOT. Group B was treated with conventional treatment only. Data collection included age, gender, clinical symptoms, pure-tone audiometry results and treatment outcome. **RESULTS:** 60 participants were enrolled (53 male, 7 female) with ages ranging from 18 to 65 years (mean age of 30.3). No significant differences were observed in the baseline characteristics between the two groups, including gender, age, site, associated symptoms, duration of symptoms and severity of hearing loss. Hearing recovery using Siegel's criteria on days 8 and 13 showed no significant differences between treatment groups. However, the hearing recovery on day 180 was significantly better in those who received the conventional treatment plus HBOT ($P < 0.05$). Additionally, no significant side effects were observed in either group. **CONCLUSIONS:** HBOT plus existing conventional treatment was associated with a better outcome than conventional treatment alone. We would recommend the addition of HBOT is recommended as a first-line treatment modality for all soldiers presenting with ISSNHL.

Fernandez FA, Martin-Martin R, García-Camacha I, Juarez D, Fidel P, González-Ravé JM. Medium term effects of physical conditioning on breath-hold diving performance. *Respir Physiol Neurobiol.* 2018 Aug 3. pii: S1569-9048(18)30139-3. doi: 10.1016/j.resp.2018.07.013. [Epub ahead of print]

The current study aimed to analyze the effects of physical conditioning inclusion on apnea performance after a 22-week structured apnea training program. Twenty-nine male breath-hold divers participated and were allocated into: (1) cross-training in apnea and physical activity (CT; $n = 10$); (2) apnea training only (AT; $n = 10$); and control group (CG; $n = 9$). Measures were static apnea (STA), dynamic with fins (DYN) and dynamic no fins (DNF) performance, body composition, hemoglobin, vital capacity (VC), maximal aerobic capacity ($VO_{2\max}$), resting metabolic rate, oxygen saturation, and pulse during

a static apnea in dry conditions at baseline and after the intervention. Total performance, referred as POINTS (constructed from the variables STA, DNF and DYN) was used as a global performance variable on apnea indoor diving. + 30, +26 vs. + 4 average POINTS of difference after-before training for CT, AT and CG respectively were found. After a discriminant analysis, CT appears to be the most appropriate for DNF performance. The post-hoc analysis determined that the CT was the only group in which the difference of means was significant before and after training for the VC ($p < 0.01$) and $VO_{2\max}$ ($p < 0.05$) variables. Inclusion of physical activity in apnea training increased VC and $VO_{2\max}$ in breath hold divers; divers who followed a mixed training, physical training and hypoxic training, achieved increased DNF performance.

Kiboub FZ, Møllerløkken A, Hjelde A, Flatberg A, Loennechen Ø, Eftedal I. Blood gene expression and vascular function biomarkers in professional saturation diving. *Front Physiol.* 2018 Jul 16;9:937. doi: 10.3389/fphys.2018.00937. eCollection 2018.

Saturation diving is an established way to conduct subsea operations with human intervention. While working, the divers must acclimatize to the hyperbaric environments. In this study, genome-wide gene expression and selected plasma biomarkers for vascular function were investigated. We also examined whether antioxidant vitamin supplements affected the outcome. The study included 20 male professional divers, 13 of whom took vitamin C and E supplements in doses of 1,000 and 30 mg daily during saturation periods that lasted 7-14 days. The dives were done in a heliox atmosphere with 40 kPa oxygen partial pressure (PO_2) to a depth of 100-115 m of sea-water (msw), from which the divers performed in-water work excursions to a maximum depth of 125 msw with 60 kPa PO_2 . Venous blood was collected immediately before and after saturation. Following gene expression profiling, post-saturation gene activity changes were analyzed. Protein biomarkers for inflammation, endothelial function, and fibrinolysis: IL-6, CRP, ICAM-1, fibrinogen, and PAI-1, were measured in plasma. Post-saturation gene expression changes indicated acclimatization to elevated PO_2 by extensive downregulation of factors involved in oxygen transport, including heme, hemoglobin, and erythrocytes. Primary endogenous antioxidants; superoxide dismutase 1, catalase, and glutathione synthetase, were upregulated, and there was increased expression of genes involved in immune activity and inflammatory signaling pathways. The antioxidant vitamin supplements had no effect on post-saturation gene expression profiles or vascular function biomarkers, implying that the divers preserved their homeostasis through endogenous antioxidant defenses.

Lafère P, Germonpré P, Guerrero F, Marroni A, Balestra C. Decreased incidence of pulmonary barotrauma after discontinuation of emergency free ascent training. *Aerosp Med Hum Perform.* 2018;89(9): 816-21.

INTRODUCTION: Because a significant association between training to perform emergency free ascent (EFA) and the occurrence of pulmonary barotrauma (PBT) was demonstrated in 2006, the Belgian Underwater Federation (BUF) decided to discontinue this procedure. An evaluation was needed 10 yr after the implementation of this change. **METHODS:** All medical records with a diagnosis of PBT that occurred in Belgium from November 2006 to September 2016 were prospectively collected. Data on the proportion of in-water skills training dives were obtained from BUF. **RESULTS:** A total of 5 cases of PBT were identified, significantly down from 34 cases in the previous 10-yr period. Of those cases, four occurred during training dives (two during ascent training). Analysis of the case files furthermore showed that two should have been medically disqualified from diving. Compared with the retrospective cohort (1995-2005), incidences are significantly reduced from 0.83 to 0.078/10,000 training dives and from 3.33 to 0.11/10,000 ascent-training dives; concomitantly, the incidence of PBT in nontraining dives also was reduced (from 0.0042 to 0.0014×10^{-4} /10,000 dives), possibly because less divers undertake the EFA procedure in case of a technical incident and have learned to solve the problem differently. **DISCUSSION:** Discontinuation of emergency free ascent training was associated with a reduction in the incidence of PBT in the 10-yr follow-up period. We observed a significant decrease of PBT during training dives, confirming the hypothesis that EFA training in its previous form did not contribute significantly to diving safety.

Latimer CR, Lux CN, Roberts S, Drum MG, Braswell C, Sula MJM. Effects of hyperbaric oxygen therapy on uncomplicated incisional and open wound healing in dogs. *Vet Surg.* 2018 Jul 26. doi: 10.1111/vsu.12931. [Epub ahead of print]

OBJECTIVE: To determine the safety of a hyperbaric oxygen therapy (HBOT) protocol and its influence on the healing of uncomplicated open and incisional wounds in dogs. **STUDY DESIGN:** Prospective, controlled experimental study. **ANIMALS:** Adult dogs ($n=10$). **METHODS:** Two 2×2 -cm open wounds and two 3-cm-long full-thickness dermal incisions were created on the dorsum of each dog. Dogs in the hyperbaric oxygen treatment group (HBO) received HBOT once daily (1.7 atmospheres absolute [ATA], 30 min on day 1; 2.0 ATA, 40 min on days 2-7) for 7 consecutive days, and dogs in the control group (CON) received standardized wound care. Dogs were monitored during HBOT for adverse side effects. Total wound area, percentage epithelialization,

and percentage contraction were compared for the open wounds. Subjective wound scores were compared for the open and incisional wounds. Biopsies of both wound types were taken and used to determine histopathology scores. Bacterial cultures were completed on open wounds. RESULTS: No difference was detected between HBO and CON uncomplicated open and incisional wounds at any time for contraction, epithelialization, subjective wound scores, histopathology scores, or bacterial loads. All HBO dogs tolerated hyperbaric oxygen treatments with no adverse effects. CONCLUSION: The HBOT protocol tested here was safe but did not enhance the healing of uncomplicated acute wounds and incisions of dogs. CLINICAL SIGNIFICANCE: These results do not provide evidence to support the use of HBOT to manage uncomplicated wounds in dogs.

Park S, Park KM. Hyperbaric oxygen-generating hydrogels. *Biomaterials*. 2018 Aug 15;182:234-244. doi: 10.1016/j.biomaterials.2018.08.032. [Epub ahead of print]

Oxygen plays a critical role as a substrate for metabolism and as a signaling molecule regulating cellular activities. In particular, hyperbaric oxygen has been demonstrated to facilitate wound healing processes, including cell proliferative activity, tissue growth, and vascular recruitment, via transient oxidative stress in surrounding tissues. In this study, we report hyperbaric oxygen-generating (HOG) hydrogels comprising thiolated gelatin (GtnSH) that can form hydrogel networks in situ via a calcium peroxide-mediated oxidative cross-linking reaction with oxygen generation. We demonstrate that the HOG hydrogels rapidly generate molecular oxygen up to hyperoxic levels and maintain hyperoxic levels for up to 12 days in vitro and 4 h in vivo. The HOG hydrogel enhances cell proliferative activities of human dermal fibroblasts and endothelial cells, which are closely related to wound healing and angiogenesis. Moreover, the HOG hydrogel promotes wound healing with enhanced tissue infiltration and vascular recruitment in vivo. The HOG hydrogels is a new type of oxygen-generating biomaterials that have great potential as advanced hydrogel materials for tissue regenerative medicine applications, including the treatment of wound and vascular disorders.

Sahin MO, Sen V, Eser E, Koc E, Gumus U, Karakuzu C, Ucer O. The effect of hyperbaric oxygen therapy on erectile functions: a prospective clinical study. *Urol Int*. 2018;101(2):1-6.

INTRODUCTION: We aimed to evaluate the effects of hyperbaric oxygen therapy (HBOT) on erectile function in patients who had no cavernosal or urethral injury by using International Index of Erectile Function (IIEF) questionnaire. METHODS: The male patients who were treated by HBOT for several diseases between July 2017 and September 2017 were examined. All patients filled the

IIEF questionnaire form before the first day and after the last day of HBOT and a questionnaire including demographic characteristics and medical history. The effects of demographic characteristics and risk factors on erectile function were evaluated, and the IIEF domain scores of patients in first day and last day of HBOT were compared. RESULTS: Totally, 50 patients were included in the study between July 2017 and September 2017 and the mean age was 59.38 ± 13.77 . The mean post-HBOT IIEF-EF score of patients was significantly higher than the mean pre-HBOT IIEF-EF score of patients (15.74 ± 10.52 vs. 19.50 ± 10.91 ; $p < 0.001$). The mean post-HBOT IIEF scores of other domains including intercourse satisfaction, orgasmic function, sexual desire, and overall satisfaction were also significantly higher than pre-HBOT scores. CONCLUSIONS: HBOT may be a good alternative treatment or adjunctive treatment for erectile dysfunction

Smith R, Ormerod JOM, Sabharwal N, Kipps C. Swimming-induced pulmonary edema: current perspectives. *Open Access J Sports Med*. 2018;9:131-7.

With the growing popularity of water-based sports, cases of swimming-induced pulmonary edema (SIPE) are becoming increasingly recognized. SIPE, a potentially life-threatening condition, is an acute cause of breathlessness in athletes. It has been described frequently in scuba divers, swimmers, and triathletes and is characterized by symptoms and signs of pulmonary edema following water immersion. It is important to recognize that athletes' symptoms can present with a spectrum of severity from mild breathlessness to severe dyspnea, hemoptysis, and hypoxia. In most cases, there is rapid resolution of symptoms within 48 hours of exiting the water. Recent advances in the understanding of the pathophysiology of SIPE, particularly regarding exaggerated pulmonary vascular pressures, have begun to explain this elusive condition more clearly and to distinguish its predisposing factors. It is essential that event organizers and athletes are aware of SIPE. Prompt recognition is required not only to prevent drowning, but also to implement appropriate medical management and subsequent advice regarding return to swimming and the risk of recurrence. This manuscript provides a current perspective on SIPE regarding the incidence rate, the current understanding of the pathophysiology, clinical presentation, medical management, recurrence rates, and advice on return to sport.

Sugawara, Tomoto T, Lin HF, Chen CH, Tanaka H. Aortic reservoir function of Japanese female pearl divers. *J Appl Physiol* (1985). 2018 Aug 2. doi: 10.1152/jappphysiol.00466.2018. [Epub ahead of print]

Female pearl divers in Japan, called "Ama," engage in repeated breath-hold free-diving maneuvers for collecting pearls, seaweeds, and shellfish in the cold sea. We previously reported that they have lower systemic arterial

stiffness than age-matched sedentary peers. As a follow-up study, we evaluated their segmental arterial stiffness and aortic reservoir function. A total of 120 non-medicated women living in the same fishing villages (mean age: 65±11 y), including 88 ama and age-matched 32 sedentary peers, were studied. Pulse wave velocity from the heart to the brachial artery (hbPWV; partly reflecting proximal aortic stiffness) and between the brachial artery and the ankle (baPWV; reflecting stiffness of abdominal aorta and leg arteries) were measured. Aortic hemodynamic variables were estimated from applanation-tonometrically-carotid arterial pressure waveforms via general transfer function. Carotid artery impedance was calculated from blood flow velocity and blood pressure of contralateral common carotid arteries. baPWV was not different between the groups (P=0.117) whereas hbPWV was significantly lower in pearl divers than sedentary peers (P=0.004). Additionally, ama had significantly lower aortic reservoir pressure integral (P=0.029) and carotid artery impedance modulus in frequency ranges from 0.78 to 4.0 Hz (P=0.011~0.019) than in sedentary peers. Collectively, these findings indicate that lifelong female pearl divers have superior reservoir function in central elastic arteries (eg, the proximal aorta and carotid artery) in comparison with age-matched sedentary women living in the same fishing village.

Thistlethwaite KR, Finlayson KJ, Cooper PD, Brown B, Bennett MH, Kay G, O'Reilly MT, Edwards HE. The effectiveness of hyperbaric oxygen therapy for healing chronic venous leg ulcers: a randomised, double blind, placebo-controlled trial. Wound Repair Regen. 2018 Aug 21. doi: 10.1111/wrr.12657. [Epub ahead of print]

Over 30% of venous leg ulcers do not heal despite evidence-based treatment. This study aimed to determine the effectiveness of hyperbaric oxygen therapy (HBOT) as an adjunct treatment for non-healing venous leg ulcers. A randomised, double-blind, parallel group, placebo-controlled trial was undertaken in three hyperbaric medicine units. Adults with a venous leg ulcer, transcutaneous oxygen measurement indicative of a hypoxic wound responsive to oxygen challenge, and without contraindications for HBOT; were eligible. Of 84 eligible patients, 10 refused and 74 enrolled. 43 participants achieved over 50% ulcer percent area reduction (PAR) after four weeks of evidence-based care and were thus excluded from the intervention phase. Thirty-one participants were randomised to either 30 HBOT treatments (100% oxygen at 2.4 atmospheres absolute (ATA) for 80 min), or 30 "placebo" treatments, receiving a validated 'sham' air protocol, initially pressurised to 1.2 ATA, then cycled between 1.05-1.2 ATA for eight minutes before settling at 1.05ATA. The primary outcome was numbers in each group completely healed. Secondary outcomes were ulcer PAR, pain and quality of life, 12 weeks after commencing interventions.

The participants' mean age was 70 years (SD 12.9) and median ulcer duration at enrolment was 62 weeks (range 4-3120). At 12 weeks, there was no significant difference between groups in the numbers completely healed. The HBOT intervention group had a mean of 95 (SD 6.53) ulcer PAR, compared to 54 (SD 67.8) mean PAR for the placebo group (t = -2.24, p=0.042, mean difference -40.8, SE 18.2) at 12 weeks. HBOT may improve refractory healing in venous leg ulcers, however patient selection is important. In this study, HBOT as an adjunct treatment for non-healing patients returned indolent ulcers to a healing trajectory.

Walker JM, Mulatya C, Hebert D, Wilson SH, Lindblad AS, Weaver LK Sleep assessment in a randomized trial of hyperbaric oxygen in US service members with post concussive mild traumatic brain injury compared to normal controls. Sleep Med. 2018;51:66-79..

STUDY OBJECTIVE: In this exploratory, double-blind, longitudinal sham-controlled trial of hyperbaric oxygen (HBO₂) for military personnel with post concussive mild traumatic brain injury (mTBI), self-reports and objective measures of sleep-wake disturbances were assessed and compared to normals. **METHODS:** Self-reports consisting of Pittsburg Sleep Quality Index (PSQI), sleep diary, screening for obstructive sleep apnea (OSA) risk, restless legs syndrome (RLS), cataplexy, and objective actigraphic measures of sleep-wake were obtained on 71 military personnel with mTBI [baseline, 13 weeks and six months post-randomization (post-intervention)], of which 35 met post-traumatic stress disorder (PTSD) criteria, and 75 healthy volunteers (baseline). Baseline between-group and follow-up changes from baseline overall and within subgroups were evaluated. Mild TBI was defined as consisting of head injury associated loss of consciousness (<24 h), post-traumatic amnesia, and neurological deficits. **RESULTS:** Sleep quality by self-reports was markedly degraded in the mTBI group at baseline compared to a normative cohort; insomnia 87.3 versus 2.8%, OSA risk 70% versus 1.3%, RLS 32.4% versus 2.7%. (all p-values <0.001), but actigraphy measures did not differentiate between groups. HBO₂ compared to sham treatment improved self-reports of PSQI sleep measures, reports (five out of eight at 13-weeks and two out of eight at six-months). However, other sleep-wake measures were not different. **CONCLUSIONS:** Perceived sleep quality was markedly disrupted in mTBI military personnel and sleep-wake disturbances were prevalent compared to a normative cohort. HBO₂ relative to sham improved some measures of sleep quality on the PSQI, but other measures of sleep were not significantly different.

Wu X, Chen S, Li S, Zhang J, Luan D, Zhao S, Chu Z, Xu Y. Oxygen therapy in patients with retinal artery occlusion: A meta-analysis. PLoS One. 2018 Aug

29;13(8):e0202154. doi: 10.1371/journal.pone.0202154.
eCollection 2018

BACKGROUND: Oxygen therapy has been widely used for RAO (retinal artery occlusion) patients; however, inconsistent results have been reported. **METHODS:** PubMed, Web of Science, EMBASE, Medline (OvidSP), Cochrane, China National Knowledge Infrastructure (CNKI), and Wanfang Database were examined. The primary endpoint was visual acuity (VA), and RevMan software 5.3 was used to statistically analyze the outcomes. **RESULTS:** Seven randomized controlled trials (RCTs) met the inclusion criteria. Patients who received oxygen therapy exhibited probability of visual improvement about 5.61 times compared with the control group who did not receive oxygen therapy (OR = 5.61; 95% CI, 3.60-8.73; $p < 0.01$). No statistically significant difference was observed between oxygen inhalation methods ($\text{Chi}^2 = 0.18$, $df = 1$, $p = 0.67$), combined therapy ($\text{Chi}^2 = 0.21$, $df = 1$, $p = 0.64$), or RAO type ($\text{Chi}^2 = 0.06$, $df = 1$, $p = 0.81$). Conversely, 100% oxygen ($\text{Chi}^2 = 4.55$, $df = 1$, $p < 0.05$) and hyperbaric oxygen ($\text{Chi}^2 = 4.55$, $df = 1$, $p < 0.05$) significantly improved VA in RAO patients. Better effect was showed in period within 3 months ($\text{Chi}^2 = 5.76$, $df = 1$, $p < 0.05$). The most effective treatment length was over 9 hours ($\text{Chi}^2 = 6.58$, $df = 1$, $p < 0.05$). **CONCLUSION:** Oxygen therapy demonstrated beneficial effects in improving VA in RAO patients, particularly when patients were treated with 100% hyperbaric oxygen and for over 9 hours.

Wu X, Zhu Y, Huang W, Li J, Zhang B, Li Z, Yang X. Hyperbaric oxygen potentiates doxil antitumor efficacy by promoting tumor penetration and sensitizing cancer cells. Adv Sci (Weinh). 2018 Jun 25;5(8):1700859. doi: 10.1002/advs.201700859. eCollection 2018 Aug.

Hypoxia is a fundamental hallmark of solid tumors and helps contribute to chemotherapy resistance. Hyperbaric oxygen (HBO) therapy can overcome tumor hypoxia and promote chemotherapy antitumor efficacy; however, the simultaneous administration of some conventional chemotherapies, including doxorubicin (DOX), with HBO is considered an absolute contraindication. Here, DOX-loaded liposome (Doxil) is coadministered with HBO to assess the safety and efficacy of this combination treatment. By overcoming tumor hypoxia, HBO not only improves Doxil tumor penetration by decreasing the collagen deposition but also sensitizes tumor cells to Doxil. As a result, the combination treatment synergistically inhibits H22 tumor growth, with a tumor inhibition rate of 91.5%. The combination of HBO with Doxil shows neither extra side effects nor promotion of tumor metastasis. These results collectively reveal that the combination of HBO with Doxil is an effective and safe treatment modality. As both HBO and Doxil are routinely used, their combination could quickly translate to clinical trials for patients with hypoxic solid tumors.

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.

Canadian Undersea and Hyperbaric Medical Association
10 Plumtree Place, Portugal Cove-St. Philips,
Newfoundland and Labrador, A1M 3T1
info@cuhma.ca <https://cuhma.ca>

Editor: Neal W. Pollock, PhD - neal.pollock@kin.ulaval.ca

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