最新国外高压氧医学动态

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序　言

十余年来我国高压氧医学事业获得了迅猛的发展。据今年五月在郑州市召开的中国第六次高压氧医学学术交流大会的初步统计，全国已有各种类型的高压氧舱设备达450余台，分布在廿八个省、市、自治区各地，数量之多据世界首位。十年来，随着我国政治、经济体制的改革开放，与国外高压氧医学界的学术交流日益增多，我国高压氧医学在国际上的地位亦日趋增高。在1987年第九届国际高压氧医学会议上决定，1990年在荷兰阿姆斯特丹市召开的第十届高压氧医学会议上，中国高压氧医学专业院员会主任委员李温仁教授将担任大会执行付主席；还决定1993年第十一届国际高压氧医学会议将在中国召开。这必将促进我国高压氧医学事业的进一步发展。

本书《最新国外高压氧医学动态》介绍了1987—1988年国外高压氧医学在基础医学研究、临床应用等方面的论文摘要50篇。目的是使我国的高压氧医学专业人员开拓视野，开阔思路，了解与掌握国外在高压氧医学领域内的最新动态和发展趋势，以达到他人之长为我所用的目的。编排上采用中英文对照的方式，希望能帮助大家提高英文的阅读、书写水平。本书由上海二军大长海医学高压氧科刘青乐·蔡　溱翻译；由南京军区总医院高压氧科张绪中负责校审和编印出版。由于水平有限，时间匆促，难免有错误或不妥之处，敬请广大高压氧医学专业人员批评指正。

张绪中

一九八九年七月于南京

在Sechrist2500—B型单人高压仓内的换气

G.W.Raleigh

为治疗发生在仓内、由吸氧引起的疾病，用Sechrist 2500-B型单人高压仓换气，将氧换为空气，是迅速减少氧吸入的一种方法，也主张在用吸入空气阻断氧疗、推迟中枢性氧中毒发生时使用。Sechrist 仓可充入氧气和压缩空气，并配有呼吸空气的面罩。仓内压力用集中光谱测定法（mass spectrometry）监控。在2.8ATA（60fsw）和1.9ATA（30fsw）下，用5分钟时间分别行空气换气和面罩呼吸空气观察。结果，2.8ATA下用5分钟仓内换气后，仓内氧为41%，此时需21分钟才能使仓内氧恢复到100%；而相同压力下，用面罩呼吸空气5分钟，仓内含氧为88%，这时只需8分钟就能使仓内氧恢复到100%。后者不但可供给含氧21%的空气减少吸氧，而且能很快地让病人吸纯氧。两者比较，在病人配合下，通过面罩给空气比用空气仓内换气更有效。

关键词： 高压氧　单人高压仓　氧中毒

J Hyper Med 1988；3（1）：11—14

Air Breaks in the Sechrist Model 2500-B Monoplace Hyperbaric Chamber

G.W.Raleigh

Changing the gas source from oxygen to air on the Sechrist model 2500-B monoplace hyperbaric chamber has been suggested as amethod of rapidly reducing the inspired Po_2 for the treatment of an oxygen-indueed seizure occurring within the chamber. It has also been advocated for use in providing an air break to clelay the onset of CNS oxygen toxicity. A Sechrist chamber was plumbed to both oxygen and compressed air sources, and a mask for air breathing was installed. Chamber atmosphere was monitored by mass spectrometry. At 2.8 ATA (60 fsw) and 1.9 ATA (30 fsw), 5-min air breaks were provided by changing the gas source and by mask At 2.8 ATA, a 5-min gas source change to air decreased chamber atmosphere to 41% O_2 and required 21 min to return to 100% oxygen. A 5-min air break by mask at 2.8 ATA delivered an F_{IO_2} of 0.21 to the patient and decreased the chamber atmosphere to 88% O_2, but required only 8 min to return to 100% oxygen. For alert, cooperative patients, air breaks given

via mask are more effective than changing the gas source because it guarantees a 0.21 F_{IO_2} during the break, yet provides a more rapid return to 100% oxygen breathing.

hyperbaric oxygen monoplace chambers, oxygen toxicity

J Hyper Med 1988; 3(1):11—14.

氢氧基抑制对常压肺氧中毒的作用

BOYCE NW, Campbell D, Holdsworth SR

研究氢氧基对常压肺氧中毒实验模型的抑制作用。给予金属离子螯合物去铁敏（其抑制氢氧基生成）或氢氧基清除剂二甲基硫脲（DMTU）以试图去阻滞氢氧基介导的组织损伤。对Sprague Dawly 鼠的肺损伤程度通过检测肺组织学、支气管肺泡灌洗液，用[^{135}I]白蛋白肺渗透参数对肺毛细管渗透性的评价和肺重与体重的比率来评定。对照组动物在渗透参数0.183±0.005，肺重与体重之比为4.50±0.10（平均值±平均标准误SEM）。过氧化暴露增加时，肺炎症进行性增加并伴有肺泡膜增厚和肺膨胀不全；肺渗透参数进行性增加（24小时时为0.434±0.088，48小时时为0.954±0.165，60小时时为1.55±0.214），肺重与体重之比（24小时为5.28±0.11，48小时为6.54±0.23，60小时为8.91±0.51）也进行性增加。氧暴露24小时后用去铁敏治疗，对肺损伤有显著的保护作用（如，与24小时氧暴露对照组比较，肺渗透指标为0.250±0.018，肺重与体重之比4.68±0.14，两者P＜0.025），但在氧过多暴露后48和60小时时用，不能减轻肺损伤。相反，在肺组织学和肺毛细管渗透参数方面，DMTU治疗可在任何时间显著减轻过氧化损伤（如，与氧暴露对照组比较，肺渗透指数24小时时为0.193±0.024，48小时时为0.284±0.060，60小时为0.316±0.091，所有的P值均小于0.01）。这些数字表明，在活体中氢氧基清除剂（DMTU）在预防氢氧基介导的组织损伤中，比氢氧基生成抑制剂（去铁敏）更有效，进一步提示常压下氧中毒中，由体内或浸润细胞群体产生的氢氧基在间接的肺损伤中起主要的作用。

关键词： 肺 氧中毒 氧过多

Clin Invest Med 1987；10（4）：316—320

Modulation of Normobaric Pulmonary Oxygen Toxicity by Hydroxyl Radical Inhbition

BOYCE NW, Campbell D, Holdsworth SR.

Effects of hydroxyl-radical inhibition on an experimental model of normobaric pulmonary oxygen toxicity have been studied. The metalion chelator, desferrioxamine (which inhibits hydroxyl-radical generation) or the hydroxyl-radical scavenger, dimethylthiourea (DMTU), was administered in an attempt to block hydroxyl-radical-mediated tissue injury. Lung injury was monitored in Sprague-Dawley and by rats by examining lung histology and broncho-alveolar lavage and by assessing pulmonary capillary permeability using the [^{125}I] albumin lung permeability index and the lung weight: body weight ratio. Control animals had lung permeability indices 0.183 $\pm$0.005 and lung weight: body weight ratio of 4.50$\pm$ 0.10 (all as mean$\pm$SEM). With increased duration of exposure to hyperoxia there was a progressive increase in pulmonary inflammation, with thickening of alveolar membranes and atelectasis and a progressive increase in lung permeability indices

(0.434±0.088 at 24h; 0.954±0.165 at 48h; and 1.55 ±0.214 at 60h); and lung weight:body weight ratio (5.28±0.11 at 24 hr;6.54±0.23 at 48 h; and 8.91 ±0.51 at 60 h). Treatment with desferrioxamine provided significant protection from lung injury after 24h of hyperoxia (e.g., lung permeability indices 0.250±0.018; lung weight:body weight ratio 4.68± 0.14, both $P<0.025$; cf. 24-h hyperoxia controls) but no reduction in pulmonary injury was observed after 48 and 60h of hyperoxia exposure. In contrast, DMTU therapy produced significant attenuation of hyperoxic injury at all time points studied, in terms of both lung histology and pulmonary capillary permeability (e.g., lung permeability index 0.193± 0.024 at 24h; 0.284±0.060 at 48h; and 0.316±0.091 at 60 h, all $P<0.01$; cf. hyperoxic controls). These data indicate that a seavenger of hydroxyl-radical (DMTU) was more efficient *in vivo* at preventing hydroxyl-radical-mediated tissue injury than an inhibitor of hydroxyl-radical generation (desferrioxamine). Further, they suggest that hydroxyl-radical production by intrinsic or infiltrating cell populations plays a pivotal role in mediating pulmonary injury in normobaric oxygen toxicity.

lungs, oxygen toxicity, hyperoxia

Clin Invest Med 1987; 10(4):316-320

氧中毒与血清中氢氧基(·OH)的相互关系

NAKAYAMA T, Miyake S, Takano N, et al

本项研究的目的是对氧中毒的特性作一评价。50%氧或纯氧下暴露兔，每12小时取一次血，直到暴露后156小时或死亡为止。被测参数为血清中的(·OH)产生、谷胱甘肽过氧化酶(GPX)、脂质过氧化酶(MDA)和红细胞中的超氧化物歧化酶(SOD)。通过电子旋转共振法(electron spin reaonance)测定，发现因氧暴露的变化(·OH)产生也发生相当大的变化。在纯氧暴露组，GPX增加较50%氧暴露组多。这一结果提示过氧化氢增加。血清MDA仅在纯氧暴露组中增加，但红细胞中的SOD无显著变化。(·OH)变化的真正机理尚不清楚，但(·OH)可能是预示氧中毒的指标之一。

关键词： 氧中毒　前基反应　预告

Jpn J Hyperbaric Med 1987; 22(1):71—76

Relation Between Oxygen Toxcity and Hydroxyl Radicad in Plasma

NAKAYAMA T. Miyake s, Takano N, et al.

The purpose of this study is to evaluate the characteristics of oxygen toxicity. Rabbits were exposed to 50 or 100% oxygen and blood samples were obtained every 12 h until 156 h or death. Examined parameters were hydroxyl radical (·OH) production, GSH peroxidase (GPX), lipoperoxidase (MDA) in plasma, and superoxide dismutase (SOD) in RBC. (·OH) production varied considerably by oxygen exposures which was measured by electron spin resonance method. GPX increased more in the group that was exposed to 100% oxygen than those exposed to 50% oxygen. This result suggested an increase of hydrogen peroxide. Plasma MDA increased only in those exposed to 100% oxygen, but SOD in RBC did not change significantly. The real mechanism of (·OH) change was not clear; however, (·OH) could be one of the indexes to predict oxygen toxicity. (English abstract)

oxygen toxicity, preradical reactions, prediction

Jpn J Hyperbaric Med 1987;22(1):71-76

高压氧治疗脓皮病性坏疽（1例）

Cardwell RJ, Taha AM, Vonu P, Thomford NR

作者报道了一位患Crohn s病6年且已引起皮肤损伤的病人。损伤可能是脓皮病性坏疽引起的。在数次住院期间，接受了各种药物治疗，疼痛只是暂时的缓解，并出现暂时的愈合体症。在她最后一次住院治疗时加用高压氧治疗。结果，高压氧和辅助治疗对溃疡的皮肤损伤效果很好。

关键词： 高压氧　Crohn's病　皮肤损伤
脓皮病性坏死

J Hyper Med 1988；3（2）:73—78

Hyperbaric Oxygen Therapy in Pyoderma Gangrenosum:

A Case Report

R. J. Cardwell, A. M. Taha, P. Vonu, and N. R. Thomford

The authors report a patient with a 6-yr history of Crohn's disease who developed skin lesions, possibly the onset of pyoderma gangrenosum. During a number of hospital admissions she was treated with various combinations of drug therapy; relief of pain and signs of healing were only temporary. During her last admission, hyperbaric oxygen (HBO) therapy was added to the treatment regimen, and the ulcerated skin lesions responded well to the HBO and ancillary therapies.

hyperbaric oxygen, Crohn's disease, skin lesions, pyoderma gangrenosum

J Hyper Med 1988; 3(2):73—78

活鼠脑中的HO_2产生与氧压的关系

YUSA T.

本文研究的是氧过多对活鼠脑中 H_2O_2 产生速率的作用。通过测定由氨基三唑一五六（amino—trizole）产生的内源性过氧化氢酶的抑制物来推测活体中H_2O_2的产生。腹腔内注射氨基三唑一五六后30、60、120分钟，呼吸空气（0.2ATA O_2）鼠的脑过氧化氢酶活性分别比对照组降低74.95%、60.91%和40.26%。在氨基三唑一五六注射后30分钟，分别在0.2ATA O_2（常压空气），0.6ATA O_2（3.0ATA空气）、1.0ATA O_2（常压纯氧），3.0ATA O_2 暴露30分钟，每克鼠脑组织过氧化氢酶分别为138.94±5.54，122.75±6.25，120.36±4.55和94.79±3.00单位；注射后60分钟，分别为112.91±3.70，104.36±2.85，95.81±3.25和66.80±4.17。随着氧压的升高，计算的有关脑过氧化氢产生的K值（min^{-1}）呈直线上升。这些发现提示H_2O_2和O_2^-（H_2O_2的前提物）是氧诱导的中枢神经系统损害的重要媒介。

关键词： 脑 氧 氧过多 高压氧 酶

Masui 1986；35（7）：1077—1082

H_2O_2 Genertion in Rat Brain in Vivo Correlates with Oxygen Pressure

YUSA T.

The effect of hyperoxia on the rate of H_2O_2 generation in the rat brain in vivo was studied. H_2O_2 generation in vivo was determined by measuring the inhibition of endogenous catalase by aminotriazole. Brain catalase activity in rats breathing air (0.2ATA O_2) decreased 74.95, 60.91, and 40.26% of the controls at 30, 60, and 120 min after intraperitoneal aminotriazole injection, respectively. Brain catalase activities in unit per gram tissue of rats exposed to 0.2 ATA O_2 (normobaric air), 0.6 ATA O_2 (3.0 ATA air), 1.0 ATA O_2 (normboaric 100% O_2), and 3.0 ATA O_2 for 30 min were 138.94±5.54, 122.75±6.25, 120.36±4.55, and 94.79 ± 3.00 at 30 min postaminotriazole injection; and 112.91±3.70, 104,36±2.85, 95.81± 3.25, and 66.80±4.17 at 60 min postaminotriazole injection, respectively. The calculated relative K (min^{-1}) of H_2O_2 generation by brain increased directly as a function of oxygen pressure. These findings support the concept that H_2O_2 and O_2^-, a precursor of H_2O_2, are important mediators of oxygen-induced CNS injury.

brain, oxygen, hyperoxia, hyperbaric oxygen, enzymes

Masui 1986;35(7):1077-1082

急性氰化物中毒
——用高压氧治疗的病例报告

Davis FM, Ewer T.

一位22岁男性因误服引起急性氰化物中毒，在2个多小时常规处理效果不佳的情况下，行高压氧治疗（2.8ATA）。在第一个20分钟HBO时，病人很快清醒。现在病人已康复。

关键词：临床的　氰化物　人类　高压氧中毒

J Hyper Med 1988；3（2）:103—106

Acute Cyanide Poisoning: Case Report of the Use of Hyperbaric Oxygen

F. M. Davis and T. Ewer

A 22-yr-old male suffered severe acute cyanide poisoning from selfingestion. After a poor response to standard methods of care over about 2 h, he underwent hyperbaric oxygen therapy (HBO) at 2.8 ATA. Full consciousness was regained rapidly during the first 20 min HBO. He made an uneventful recovery.

clinical, cyanide, human, hyperbaric oxygen, poisoning

J Hyper Med 1988; 3(2):103—106

高压氧对鼠Lewis肿瘤生长和肺转移的作用

Nemiroff PM

将Lewis肺癌癌接种于鼠体，研究高压氧对肿瘤生长和肺转移的作用。90只瑞士白鼠以标准方法接种1mm^{3}的肿瘤，并随机分成对照组或高压氧组。鼠接受高压氧（2.5ATA90分钟），每天二次共7天，在特定时间用单盲法评定肿瘤体积、肿瘤重量和肺的转移。结果表明高压氧组和对照组所有的测量参数无显著性差异。目前的研究结果表明高压氧不能促进肿瘤生长或肺转移。

关键词：高压氧　肿瘤生长　鼠　肺转移

J Hyper Med 1988；3（2）:89—95