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The acute and long-term ischemic penumbra – duration and clinical significance

J. M. Uszler¹, R. A. Neubauer² and F. Gerstenbrand³

¹*Molecular and Medical Pharmacology, Santa Monica-UCLA;*

²*Ocean Hyperbaric Neurologic Center, Lauderdale-by-the-Sea, FL, USA; and* ³*Neurologic Medicine, Vienna, Austria*

In 1981 the ischemic penumbra was first postulated and recently verified by weighted MRI imaging. Viability of this marginal neuronal area, likened to hibernating myocardium, was thought to be 6–8 h. It was suggested that acute intervention was crucial to limit the devastating effects of the ischemic cascade or be henceforth ineffective. HBO has been shown to reduce cerebral edema and alter intraextra cellular changes causing this cascade. A study of AIE treated within 4 h demonstrated remarkable recovery. Existence of the 'acute' ischemic penumbra is documented with clinical significance. We have observed via sequential SPECT scanning/HBO that in brain insult there may remain recoverable cells years following the acute event. The injured brain may be likened to a bomb explosion, with an epicenter of irreversible damage, surrounded by injured, viable recoverable cells. A case was published in *Lancet* 14 years post ictus with recoverability and clinical improvement. Clinical experience treating cases at 2+ years post has verified this. Many cases treated years post-insult with HBO/SPECT imaging have shown significant amounts of recoverable brain and 'reawakening' of dormant neurons. We suggest that there are areas of recoverable neurons, which when treated with HBO and reinstatement of therapy may significantly lessen ultimate disability.

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Rehabilitation by artificial oxyhelium gas mixtures on their periodical feeding and warming up

N. B. Pavlov, A. T. Logunov and N. B. Pavlov

Russian Federation State Scientific Centre, Institute of Biomedical Problems RAS, Moscow, Russia

Attempts to use the unique physical properties of helium for medical purposes have been made since 1934. This

development faced a number of difficulties, which mainly are connected with cooling properties of helium, in consequence of its high heat conductivity. It is proposed to use oxyhelium gas mixtures for breathing, heated up to the temperatures considerably exceeding the normal range. The leading experiments which show an increase of diffusing lung capacity during and after carrying out of procedures is shown. In clinical research an improvement of external breathing parameters was shown and an acceleration of clinical remission in patients with obstructive lung disease, which were treated with thermal oxyhelium inhalations. Pre-production models of devices for carrying out thermal oxyhelium therapies are developed. Ways of introduction of the given method in medical practice are discussed.

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Hyperbaric oxygen therapy (HBO₂) in the treatment of acute hypoxic encephalopathies

E. C. Sanchez, G. Schmitz, M. Nochetto, A. Medina,

A. Suarez, D. Gomez and R. Uribe

Hospital Angeles Del Pedregal, Mexico D.F., Mexico

Background Acute hypoxic encephalopathies are frequent, important and devastating lesions. The acute treatment may improve the outcome of patients. Hyperbaric oxygenation has been proposed to help salvage tissue when used early.

Purpose To determine the value of HBO₂ in the treatment of acute hypoxic encephalopathies.

Materials and methods A Medline search, using as keywords hyperbaric oxygen/oxygenation and brain/head/neurological encephalopathies, was conducted to review the clinical literature regarding this subject.

Results A total of 1674 articles were retrieved. An evidence-based medicine approach (AHA) was used to analyse these articles.

Conclusions Hyperbaric oxygenation appears to be beneficial in the acute treatment of hypoxic encephalopathies. Even with the vast favorable results published, adequate scientific articles based on evidence need to be produced to prove its real value in the treatment of acute hypoxic encephalopathies.

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