Hyperbaric Oxygenation and the Eye

Retinitis Pigmentosa

(Investigative Ophthalmology 38; 5713 Abstract #3296, 1997).

Researchers in Italy are reporting a breakthrough treatment for retinitis pigmentosa with the use of hyperbaric oxygen therapy. Daily hyperbaric oxygen at 2.2 atmospheres of pressure was employed among 24 RP patients for two years. The electroretinogram readings of RP patients undergoing hyperbaric oxygen treatment improved from 4.86 at the beginning of the study to 14.4 at the end of the study. RP patients who did not undergo oxygen therapy experienced diminished electroretinograms, beginning with an average of 4.92 decreasing to 2.97. Hyperbaric oxygen therapy may rescue retinal photoreceptors. This report provides encouraging news to RP patients since there is no proven treatment for RP save for vitamin A therapy which only slows down progressive loss of vision as measured by an electroretinogram and does not improve the ERG.

K.K. Jain, author of The Textbook of Hyperbaric Medicine, indicates the retina has the highest rate of oxygen consumption of any organ in the body. That hyperbaric oxygen treatment is helpful in cases of RP is an anomaly because it has been shown to cause severe constriction (narrowing) of retinal blood vessels. The hallmark of RP is poor retinal circulation. The constriction of the retinal blood vessels however is offset by the greatly increased oxygen carrying capacity of the blood during treatment (oxygen saturation increases by 23 percent).

Contrast Sensitivity

(Undersea & Hyperbaric Medicine 21; 387-90, 1994)

Hyperbaric oxygen treatment improves contrast sensitivity (ability to see shades of gray) when administered to healthy volunteers. Even though patients with non retinal eye disorders have experienced constriction of retinal blood vessels following hyperbaric oxygen treatment, when there is a lack of oxygen supply to the retina narrowing of retinal blood vessels does not occur.

Other Reports


The medical literature reveals that hyperbaric oxygen treatment has been tried on cases of retinitis pigmentosa as early as 1965. A 1987 report in the Journal of French Ophthalmology indicates hyperbaric oxygen treatment improved the visual acuity of a patient with retinitis pigmentosa and macular edema.
Radiation neuritis, optic nerve


Hyperbaric oxygen treatment has been used as a rescue remedy for optic nerve damage caused by radiation treatment for brain tumors.

Hyperbaric oxygen improved vision among individuals who experienced a sudden loss of vision due to diminished blood supply to the optic nerve. Oxygen therapy must be administered early following onset of the event before shrinkage of the optic nerve occurs. (Arh Hig Rada Tokaikol 45; 19-24, 1994)

Decreased Vision due to multiple sclerosis

(New England Journal Medicine 308; 181-86, 1983)

Multiple sclerosis patients undergoing 20 hyperbaric oxygen treatments experienced temporary improvement of their symptoms including visual symptoms.

Recently 100 percent oxygen delivered at 2 times atmospheric pressure did not produce a significant improvement in visual acuity or peripheral vision among patients suffering from a condition known as non arterial anterior ischemic optic neuropathy. (American Journal Ophthalmology 122; 535-41, 1996)

Glaucoma

Among glaucoma patients, hyperbaric oxygen has been shown to expand peripheral vision, an effect which lasted for 3 months. (Acta Ophthalmologica 71; 315-19, 1993)

The fluid pressure in the eye of humans and animals decreases as atmospheric pressure is raised in a hyperbaric chamber. (Investigative Ophthalmology 19; 43-48, 1980)

K.K. Jain, author of Textbook of Hyperbaric Medicine, reports that hyperbaric oxygen has been used to successfully treat cases of glaucoma. Twenty or more 90 minute treatments at 2 atmospheres of pressure expanded the visual field among all glaucoma subjects tested. There was no change in eye fluid pressure.
Retinal artery and vein occlusion

Hyperbaric oxygen treatment combined with a blood vessel widening drug (vasodilator) has been shown to improve visual function among individuals experiencing retinal artery occlusion. (European Journal Ophthalmology 3; 89-94, 1993)

Hyperbaric oxygen treatment has been successfully used to improve vision among patients with retinal swelling (macular edema) and retinal vein occlusion. (Survey of Ophthalmology 39; 347-66, 1995)

Hyperbaric oxygen treatment has been administered successfully to patients with central retinal swelling (macular edema) resulting from retinal vein occlusion. Among 12 patients who were treated, 10 experienced visual improvement, with median visual acuity improving from 20/100 to 20/25. The hyperbaric oxygen treatment is believed to constrict retinal capillaries and thus decrease leakage of fluid that causes edema. (Ophthalmologica 210; 168-170, 1996)