Brain Disorders/Neurological

Hyperbaric oxygen treatment decreases post-ischemic neurotrophin-3 mRNA down-regulation in the rat hippocampus.

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The therapeutic effect of hyperbaric oxygen (HBO) on ischemic injury was investigated using in situ hybridization to detect the mRNA expression of neurotrophin-3 (NT-3), which is thought to play a crucial role in protecting against neuronal death induced by brain ischemia. The rats under investigation were subjected to 10 min transient forebrain ischemia, and subsequently exposed to HBO (100% oxygen, 2.5 atm absolute) for 2 h. Levels of NT-3 mRNA in the CA1, CA2 and CA3 regions, and the dentate gyrus of the hippocampus were measured after various reperfusion periods. Neuronal death in the hippocampal CA1 region was also measured by Nissl staining, seven days post ischemia.

The results demonstrated that HBO treatment significantly reduced the ischemia-induced down-regulation of the NT-3 mRNA level at 4 h post ischemia, and significantly increased cell survival 7 days after reperfusion. The findings suggest that an HBO treatment maintaining the NT-3 mRNA level in the hippocampus can be beneficial to the ischemic brain within a certain time frame.

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