Brain Disorders/Neurological

Hyperbaric Oxygenation prevented brain injury induced by hypoxia-ischemia in a neonatal rat model.

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The occurrence of hypoxia-ischemia (HI) during early fetal or neonatal stages of an individual leads to the damaging of immature neurons resulting in behavioral and psychological dysfunctions, such as motor or learning disabilities, cerebral palsy, epilepsy or even death. No effective treatment is currently available and this study is the first to use hyperbaric oxygen (HBO) as a treatment for neonatal HI. Herein, we sought out to determine if HBO is able to offer neuroprotectivity against an HI insult. Seven-day-old rat pups were subjected to unilateral carotid artery ligation followed by 2.5 h of hypoxia (8% O(2) at 37 degrees C). HBO treatment was administered by placing pups in a chamber (3 ATA for 1 h) 1 h after hypoxia exposure. Brain injury was assessed based on ipsilateral hemispheric weight divided by contralateral hemispheric weight, light microscopy, and EM. Sensorimotor functional tests were administered at 5 weeks after hypoxia exposure. After HI, the ipsilateral hemisphere was 52.65 and 57.64% (P<0.001) of the contralateral hemisphere at 2 and 6 weeks, respectively. In HBO treated groups, the ipsilateral hemisphere was 77.77 and 84.19% (P<0.001) at 2 and 6 weeks.

There was much less atrophy and apoptosis in HBO treated animals under light or electron microscopy. Sensorimotor function was also improved by HBO at 5 weeks after hypoxia exposure (Chi-square, P<0.050). The results suggest that HBO is able to attenuate the effects of HI on the neonatal brain by reducing then progression of neuronal injury and increasing sensorimotor function.

[Brain Res 2002 Sep 27;951(1):1]

PMID: 12231450

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