Effects of Hyperbaric Oxygen Therapy on Children with Spastic Diplegia Cerebral Palsy

Montgomery, D., Ph.D.1, Goldberg, J., Sc., P.T.3, Amar, M., M.D.4, Lacroix, V., M.D.1, Lecomte, J., M.A.1, Lambert, J., Ph.D.5, Vanasse, M., M.D.2, Marois, P., M.D.2,3

Affiliations:
1. McGill University
2. Hopital Sainte-Justine
3. Hopital Marie Enfant
4. Institut Maritime de Rimouski
5. Universite de Montreal

Abstract

Background: Hyperbaric oxygen (HBO2), a treatment in which a patient breathes 100% oxygen at greater than atmospheric pressure (i.e. > 1 atmosphere absolute), is currently approved for 13 indications by the Undersea and Hyperbaric Medical Society (UHMS). To date, only anecdotal reports exist concerning the beneficial effects of HBO2 therapy for individuals with cerebral palsy. The purpose of this pilot study was to determine the effects of hyperbaric oxygen (HBO2) therapy for children with spastic diplegic cerebral palsy.

Methods: Twenty-five subjects (10 girls & 15 boys; mean age = 5.6 ± 1.6 years; range 3.1 – 8.2 years) with a functional diagnosis of spastic diplegia cerebral palsy participated in this study. In order to be considered for participation in the study, all subjects met the following inclusion criteria: 1) functional diagnosis of spastic diplegia; 2) age range: 3 – 8 years; 3) functional plateau in rehabilitation for the last 12 months; 4) ability to understand and respond to verbal instruction; 5) medical clearance for hyperbaric oxygen (HBO) therapy. Children were excluded from the study if any of the following criteria was present in their medical history; previous rhizotomy, recent thoracic surgery, seizures, cancer, chronic asthma, V-P shunts and previous HBO therapy. Subjects were evaluated pre and post HBO2 therapy. Each evaluation consisted of the following: 1) video analysis; 2) Gross Motor Function Measure (GMFM); 3) Jebsen Test for hand function; 4) spasticity level using the modified Ashworth Scale; and 5) parental questionnaire. The protocol for HBO2 therapy was 95% oxygen at 1.75 atmospheres absolute (ATA) for 60 minutes. All subjects underwent 20 HBO2 treatments. The schedule of treatments at McGill University was 1 treatment/day; 5 days/week for 4 weeks. The unit at McGill University is a monoplace hyperbaric chamber (Sigman Plus Monoplace Hyperbaric System, Perry Baromedical, Riviera Beach, FL) which pressurizes with 95% oxygen. Children were accompanied by a parent or guardian in the hyperbaric chamber for each treatment. The schedule of treatments at the Centre Hospitalier Regional de Rimouski is a multi-place (6 person) hyperbaric chamber that pressurizes with air and delivers oxygen to the patient via an oxygen treatment hood. The Wilcoxon matched pairs signed rank test for non-parametric measures was used to compare pre and post treatment data.

Results: Results showed improved gross motor function in 3 of the 5 items in the GMFM test, improved fine motor function in 3 of the 6 hand tests, reduced spasticity in 3 of 4 muscle groups when assessed by a physician specializing in CP, and improvements for 4 of 9 questions posed for parents. HBO therapy appears to be a promising treatment for children with CP.

Reference:


