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How Beneficial is Hyperbaric Oxygen Therapy For Near-Drowning Brain Injuries?

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News of a toddler who experienced a remarkable recovery after a near drowning that left her without a heartbeat for two hours is sweeping the internet and instilling new hope for other near drowning victims.

The toddler, Eden Carson, slipped past a baby gate and fell into the family's backyard swimming pool. Eden was in the water for five to 15 minutes before her mother found her. Eden's mother performed CPR immediately and paramedics soon took over. Eden's heart had stopped

and her blood pressure was zero. CPR continued for 100 minutes before Eden's heart started beating on its own. Once her condition was stabilized, Eden was flown to Arkansas Children's Hospital, where she spent five weeks.

Eden suffered a brain injury from the near-drowning incident. According to a [case study](#) published in the journal Medical Gas Research, Eden's brain function was largely restored after treatment with hyperbaric oxygen therapy. Hyperbaric oxygen therapy introduces a greater than normal amount of oxygen to patients within a special chamber. Dr. Paul G. Harch, clinical professor and director of hyperbaric medicine at LSU Health New Orleans School of Medicine, stated that the focus of the therapy is to stimulate growth of tissue, inhibit inflammation, and stop cell death. A doctor controls both the pressure and the level of oxygen, explained Harch, who treated Eden and is the lead author of the case study. Harch is also a co-owner of Harch Hyperbarics Inc., a consulting company.

Early on, doctors told Eden's family she would never talk, walk, or eat on her own again. Three weeks after Eden was released from the hospital, her parents found information about hyperbaric oxygen therapy on Harch's website. Eden could not be moved yet and no hyperbaric oxygen chambers were available locally, so Harch treated the girl remotely with a "bridging therapy." Using a normal oxygen tank with tubes to the nose, Harch put the child on two liters per minute for 45 minutes a day. The first treatment occurred 55 days after Eden fell into the pool.

When Eden's mother sent a videotape of Eden's response to the therapy to Dr. Harch, he saw a positive change and continued the treatment for three weeks. As soon as it was possible, Eden's parents took her to New Orleans for treatments in a hyperbaric chamber, using the same amount of oxygen but with added pressure. Eden's mother reports that after months of oxygen treatments, Eden experienced a remarkable recovery from her brain injury. Eden regained her cognitive abilities and speech, most of her fine motor skills and walks with assistance.

Dr. Harch called Eden's brain injury "profound." The case study reports that the 23-month-old experienced cardiac arrest after a cold water drowning. Magnetic resonance imaging (MRI) showed deep gray matter injury immediately after the injury and cerebral atrophy with gray and white matter loss thereafter. The child reportedly had no speech, gait, or responsiveness to commands following hospital discharge on day 48 after the incident.

Approximately one month after Eden's 40th oxygen session — 162 days post-drowning — an MRI scan was compared with one taken in the hospital showed only mild residual injury to the brain, near-normalization of ventricles and reversal of atrophy. Drowning-induced cortical gray matter and white matter loss was restored.

The [Centers for Disease Control and Prevention](#) reports that for every child who dies from drowning, five children receive emergency department care for nonfatal submersion injuries. More than 50% of those victims treated in emergency departments require hospitalization or transfer for further care. Nonfatal drowning injuries can cause severe brain injuries that may result in long-term disabilities such as memory problems, learning disabilities, and permanent loss of basic functioning.

Prevention of near drowning incidents should be the focus of efforts to avoid brain injuries. But the question on everyone's mind is whether Eden's remarkable recovery can be reproduced.

A recent [review](#) examines the efficacy of hyperbaric oxygen therapy for traumatic brain injury. The review concludes that for moderate-to-severe TBI at the acute phase of treatment, because of the complexity and severity of brain injury, hyperbaric oxygen therapy may be of value and could benefit these patients as a "relatively safe adjunctive therapy."

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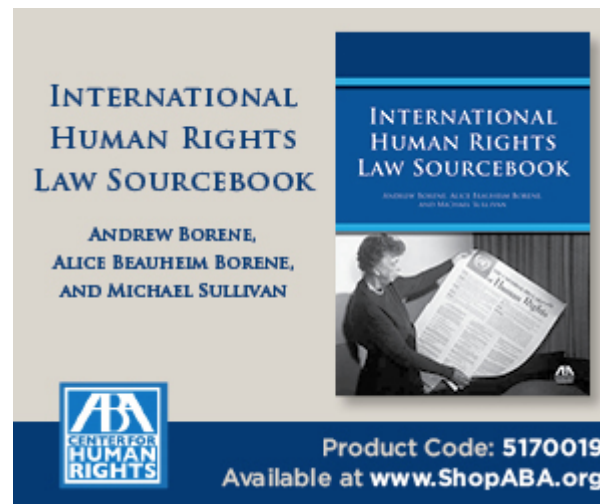
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