

By Marc Iskowitz

A UNIQUE APPROACH TO TREATING CERTAIN INFECTIONS, complicated wounds and strokes may offer an alternative therapy for patients with autism, according to the results of an investigational procedure conducted at the Sunstate Preventive Medicine Institute in Winter Park, FL.

Hyperbaric oxygen therapy (HBOT), a method of delivering high levels of oxygen to the blood for therapeutic purposes, caused an improvement in the mood of a child diagnosed with autism, although it had no effect on his speech (Hyperbaric Oxygen Report, Vol. 1, No. 1) This case report was not published in a scholarly journal, but the treatment is significant because of its possible implications for the treatment of others who are diagnosed with autism.

The experimental procedure, possibly the first attempt to study the effect of HBOT on a child with autism, was conducted in 1994 by James M. Parsons, MD, medical director at Sunstate. The patient was almost 3 at the time of the case study, yet he demonstrated the developmental level of a 1-year-old and exhibited aphasia and withdrawal. Dr. Parsons conducted the study to determine whether there was a physical reason for this behavior.

After 10 treatments with HBOT, the young boy showed improvements in mood and began to look at others and smile more. Dr. Parsons also noticed a sense of humor and increased social contact with others. In light of these subjective changes, he reconsidered the diagnosis of childhood autism, believing instead that the boy may have had an intrauterine stroke or a stroke at birth, possibly due to birth trauma.

Based on these findings, Dr. Parsons advised clinicians dealing with children who are diagnosed as having autism

According to a case study, hyperbaric oxygen therapy warrants a closer look for treating children diagnosed with autism



On the first day of therapy, the young patient lies in the hyperbaric chamber with his grandfather. (photo/courtesy Sunstate Preventive Medicine Institute)

to consider HBOT for their patients.

With HBOT patients breathe high levels of oxygen while inside a compression chamber, which allows for administration of 100 percent oxygen at pressures two to three times greater than normal, sea-level pressure.

The increased pressure causes the oxygen to dissolve in the blood quickly and effectively.

"Oxygen is such an effective healer," Dr. Parsons said. "Patients don't heal without it. If you raise the oxygen to 10 times what it would ordinarily be in the plasma, you've created extraordinary conditions for healing" in susceptible individuals.

HBOT is an adjunctive therapy that can be used in various fields of medicine, including orthopedics, various types of surgery, infectious disease, radiation oncology and emergency medicine. It can help promote the healing process for a variety of conditions. The use of HBOT for managing brain



**A** technician readies a clinical acrylic, monoplace hyperbaric chamber, like the one used in the study, for an HBOT session. (photos courtesy Westchester County Medical Center and Environmental Tectonics Corp Westchester County Medical Center does not advocate the use of HBOT for the treatment of autism)

damage following stroke has been reported in the medical literature. However, before Dr. Parsons' experiment this therapy was untested in people diagnosed with autism.

In all the studies that had been performed on the boy he treated, there was no firm diagnosis to explain his arrested development, although the aphasia provided clinical evidence of a stroke. One explanation for his autistic behavior was a CVA, possibly occurring during birth, Dr. Parsons theorized. "Improvement on the child's part after receiving I 113 (IT would tend to offer proof that he had experienced a stroke

The little boy was an exceptional case, Dr. Parsons pointed out, because of his condition and response to treatment. The boy's grandfather, Francis Coy, MD, a retired anesthesiologist, brought the boy to the

attention of Dr. Parsons.

Accompanied by Dr. Coy, the young patient was placed in a monoplace hyperbaric chamber once a day for five days a week. Each HBOT session lasted an hour.

The little boy adapted well to the chamber and did not object to the treatment, although Dr. Parsons was concerned as to whether he would adjust to the changes in atmospheric pressure.

Before receiving HBOT, the boy would not talk, avoided all eye contact with others, and was disinterested in his environment. He was neither alert nor drowsy.

Dr. Parsons defined improvement as eye contact with others, interest in other people, and development of smiling behavior and a normal sense of humor for a child of that age.

The young patient improved in his mood level within the first 10 treatments, Dr. Parsons reported.

Dr. Parsons reported.

Clinicians later diagnosed the boy as mute with normal hearing. Despite his young patient's lack of speech improvement, Dr. Parsons sees a correlation between his gains and those seen in patients who have had a stroke.

"We proved that he was definitely not autistic, because a child with autism would not acknowledge the presence of anybody else and wouldn't look at or talk to anybody," the physician reported. By contrast, the little boy he treated now smiles and is outgoing.

This improvement may serve as proof that the patient had a stroke at birth, Dr. Parsons speculated. If so, HBOT could have been responsible for the change in his mood.

Increased oxygenation in various parts of the brain may offer a possible explanation for this improvement, noted Sheldon F. (Gottlieb, PhD, professor in the Department of Biological Sciences at the University of Alabama in Mobile and research director of the Baromedical Research Institute in New Orleans, LA.

Dr. Gottlieb co-authored a study with Richard A. Neubauer, MD, and Robert F.

Kagan, MD, that shows chronic neurological deficits may benefit from HBOT ("Enhancing 'Idling' Neurons," *The Lancet*, No. 335). Evidence suggests that patients who have had a stroke have only a small area of dead brain tissue. The rest of the dysfunctional tissue is stunned by a lack of oxygen. These peri-infarctional zones may remain viable for a long time, and the return of neuronal function may be clinically significant.

Single photon emission computerized tomography (SPECT) showed peri-infarctional zones lasting up to 14 years in a 60-year-old patient with a right-middle cerebral artery infarction. After HBOT he experienced improvements in speech, motor control and other areas.

Another study reported that idling neurons are metabolically lethargic and electrically nonfunctional but remain viable in the ischemic penumbra because of critical low-tissue oxygen availability ("The State of Penumbra in the Ischemic Brain: Viable and Lethal Threshold in the Cerebral Ischemia," *Stroke*, Vol. 12). Idling neurons may be metabolically stimulated to regain electrical function by correcting oxygen deficiencies.

Those patients receiving HBOT following stroke customarily undergo physical and occupational therapy to help retrain the neurons as they regain function.

The implications of the work of HBOT in stroke are that all stroke impairment is not permanent brain damage but may be reversible to some extent.

Children with apparent autism actually may have idling brain cells that can be revitalized through HBOT, Dr. Parsons said. "There's a lot of misdiagnosis of childhood autism that is really minimal brain damage which occurs at birth through the equivalence of stroke."

An alternative to Dr. Parsons' hypothesis is that the child he treated may have been born with abnormal microcirculation, thereby leaving parts of the brain relatively hypoxic, Dr. Gottlieb speculated. "The HBOT then may have helped overcome the localized hypoxia at least temporarily to help bring about improvement in neuronal function."

Dr. Parsons recommended that children thought to be autistic undergo HBOT.

Dr. Gottlieb suggested these children obtain a complete neurological assessment to determine if there is any indication of brain injury, including stroke, before HBOT is considered.

The little boy in the study had been seen by a pediatric neurologist, obstetrician **and** pediatrician, none of whom noted any indication of brain injury before HBOT was considered.

Such evidence would have provided a reason for trying hyperbaric therapy, but "HBOT is the type of treatment clinicians have received benefits with, when there's nothing in the literature to suggest benefit," Dr. Parsons told *ADVANCE*. "Something had to be done to rock this child's boat. As it happened, the HBOT rocked his boat."

Determining the exact conditions surrounding *the* child's birth is critical, he said. "Often that information will point toward brain damage, especially mild brain damage."

Researchers also have linked severe oxygen shortage to the brain or trauma to the head during labor and delivery to cerebral palsy, according to the National Institute of Neurological Disorders and Stroke.

Dr. Parsons hopes the results of his case study will motivate professionals in large medical centers with departments of hyperbaric medicine to conduct controlled studies with large patient groups in order to substantiate his hypotheses.

No one has followed up on his work to date, he said, noting the tremendous cost involved may discourage such efforts.

Researchers should use SPECT scanning before and after single exposure to HBOT to provide an objective basis for diagnosing, treating and assessing the effectiveness of the treatment when dealing with brain injury, advised 1726: Gottlieb.

Comparisons of the scans would reveal an increase in the uptake of radioactive tracer.

Such evidence might point to potentially recoverable brain tissue, he said.

"One can work to recover that brain tissue," Dr. Gottlieb noted. "Through the integration of HBOT, physical and 'occupational therapy, as well as clinical psychological assessments and further SPECT scanning, one can ascertain whether further recovery can be made or whether we have reached an endpoint of therapy."

Before and after therapy, SPECT scans help provide a semi-quantitative means of making assessments about the effectiveness of HBOT, he explained.

"Without specific evaluations of what is taking place in the hyperbaric chamber with relation to blood flow and metabolism, one has no assurance of what is happening," he said. "SPECT techniques are available, and they should be used."

Dr. Gottlieb advocated the evaluation of HBOT for treating children diagnosed with autism providing there is evidence of brain injury. All treatment should be done ethically and scientifically.

A lack of objective analysis may raise false hopes about the potential of HBOT for treating individuals diagnosed with autism, he noted. "Some patients respond to HBOT, but some may not. The only way to differentiate between them is by a physical technique, and SPECT scanning helps to provide this information."

#### For More Information

Sheldon F. Gottlieb, PhD, Department of Biological Sciences, LSCB 124, University of South Alabama, Mobile, AL 36688; (334) 460-7527.

James M. Parsons, MD, Sunstate Preventive Medicine Institute, 2699 Lee Rd., Ste. 303, Winter Park, FL 32789; (407) 628-3399

---

Marc Iskowitz is assistant editor of *ADVANCE*.