Rapid Recovery Hyperbarics

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Hyperbaric Oxygenation - New strategy for attacking brain tumors

The concept of increasing atmospheric pressure to heal ailments dates to the 1600s.

Now, University of Cincinnati researchers and doctors at University Hospital are studying the use of ***hyperbaric chambers for treating brain tumor patients suffering potentially fatal side effects from brain radiation therapy.***

"These patients don't have a whole lot of options," says Dr. Laurie Gesell, director of the Division of Hyperbaric Medicine in the UC's Department of Emergency Medicine, who's leading the study.

"They have a devastating disease, they have a brain tumor, which has significant morbidity associated with it," she said. "They then get treated aggressively to try to treat that horrific disease.

"They end up with a complication that can have just as much significant morbidity or mortality as the disease itself."

Gesell is working with University Hospital's new Brain Radionecrosis Center, the only facility in the country participating in the two-year, $450,000 study. It's funded by the National Cancer Institute, through the National Institutes of Health.

Gesell explains the problem this way.

When patients are diagnosed with brain tumors, typical treatment includes radiation therapy, chemotherapy or surgery. That often leads to a usually treatable brain radiation injury. ***Soft-tissue injury to the brain begins with swelling*** that sometimes disappears without treatment. So when it's first diagnosed, doctors might just watch it, Gesell says.

If patients start showing clinical symptoms they're put on steroids. "If the steroids don't control the progressive injury pattern, the dose of the steroids will increase and increase and increase," Gesell says. "But there are complications and side effects from the steroids, which can be just as devastating for individuals' health," she said. "If the steroids don't work in controlling this disease, the only thing really left out there as a standard of care is to go in and surgically cut out that portion of the brain.

"But lots of brain tumors are in areas where you can't do surgery because they're too far down or in areas where it's too risky to do surgery."

Furthermore, the incidence seems to be increasing because of the aggressiveness with which doctors are trying to treat brain tumors, she says.

Although more study needs to be done to determine how many people develop side effects from brain radiation therapy, about 200,000 people a year in the United States are diagnosed with either primary or secondary brain tumors, says Gesell.

"Physicians have become more aggressive in treating these brain tumors in order to get better outcomes for their patients," Gesell says.

"That also means that the incidence of problems and complications from the radiation has also increased."

Knowing that *hyperbaric oxygen treatment is the standard of care for conditions such as carbon monoxide poisoning, hard-to-heal wounds, crush injuries, decompression sickness and a host of other conditions, doctors at University began using hyperbaric treatments on the patients with the conciliation* -- known as brain radionecrosis -- about six years ago.

The treatment involves placing the patient in a pressure chamber and having the patient breathe pure oxygen at a pressure similar to being under 33 to 66 feet of seawater, Gesell says. Each treatment lasts 1½ hours. Treatments are repeated every day for one to three months.

Preliminary results are promising, Gesell says. In many patients damaged tissues have been healed completely.

In about ***86 percent of cases, doctors were able to stabilize or decrease the steroids dosage. In some cases, patients even were able to stop taking steroids.***

MRIs showed that the disease had stabilized or improved in 78 percent of patients, Gesell says. Armed with the results, doctors applied for the funding for the current study.

Doctors believe the ***pure oxygen at increased pressure causes new blood vessels to grow in injured tissue***, but no one is sure exactly how, says Gesell.

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Gesell and her team of researchers at UC and the Neuroscience Institute set up the Brain Radionecrosis Center to study not only how well hyperbaric oxygen therapy works, but also the mechanism that enables it to work.

Her collaborators in the research are Christopher Lindsell of the Institute for Health Policy and Health Services Research at UC; Dr. Ronald Warnick, a neurosurgeon with the Mayfield Clinic and the Neuroscience Institute and professor of neurosurgery at UC; and Dr. John Breneman, a neuroradiologist with institute and professor of radiation oncology and neurosurgery at UC.

The initial study, known as a pilot trial, will involve only 30 patients, but researchers have already been receiving calls from all over the nation, Gesell says.

If the treatment proves to be as effective as preliminary findings indicate, the team expects to expand its study into a multi-center trial involving a large number of patients.

That ultimately could lead to the establishment of hyperbaric oxygen therapy as the main treatment for patients with brain radionecrosis.

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