

# Salvage Therapy for a Neurologically Devastated Child: Whose Decision Is It?

Jane M. Orient, M.D.

## Case Report

At a family gathering, a 22-month-old child fell into the swimming pool. When his absence was noted a few minutes later, his father, an ophthalmologist, pulled him from the pool and initiated resuscitation. The child was admitted to intensive care at the county hospital that receives all drowning victims in the area.

The child was comatose, and his parents were told that he would die. Had his parents not remained at his bedside constantly, this prediction might have been fulfilled, as the ventilator malfunctioned each night and staff did not respond promptly to the alarms, according to the child's father. The attending physician initially declined to implement any of the father's suggestions, such as steroids, mannitol, neuroprotective agents, or hyperbaric oxygenation, declaring them useless, although mannitol was eventually administered on the advice of an outside expert. Nurses told the parents that the doctors did not want them to have "false hope." Any positive developments, such as appropriate eye blinks in response to questions, were called a "seizure." The parents perceived that the staff was attempting to extinguish all hope. Withdrawal of life support was advised, even demanded.

The parents learned that hyperbaric oxygenation has been used successfully in near drowning<sup>1</sup> as well as anoxic encephalopathies from other causes.<sup>2</sup> The hospital did not have a hyperbaric chamber, but a nearby clinic specializing in the use of this "off-label" treatment in neurologically injured children offered to provide one. The Director of the Pediatric Intensive Care Unit (ICU) adamantly refused, citing payment issues, a safety risk to the hospital, or a drain on the hospital's electrical system (the chamber requires only a 9-volt power supply to operate the intercom). Later, concerns about the lack of proof of efficacy and potential adverse effects to the patient were added. The Director warned that the child would not be accepted directly back into the ICU if he were taken to the clinic for treatment (Weiss J, personal communication, 2003).

Therefore, the parents took their case to the news media. The local press and television stations issued daily reports on the father's quest for treatment to save his son.<sup>3,4</sup> Persuasion having failed, the father petitioned the Broward County Circuit Court, which ordered the hospital to install the chamber, pending approval by the fire marshal, and to permit the child to receive treatment.<sup>5,6</sup>

Ten days after the accident, the chamber was finally ready. One last obstacle was that the ventilator suitable for use in the chamber was not FDA approved for pediatric use. The pediatric intensivists balked. The father insisted on going into the chamber with his son and an Ambu bag. When the treatment was completed an hour later, the child was lying in his father's arms, breathing on his own. In the father's opinion, the ventilator might not have been necessary had the child not been continuously sedated. He had been breathing spontaneously since admission.

In the parents' view, the child's neurological status improved noticeably after 40 treatments, and his SPECT (single photon emission computerized tomography) scan also improved. They opted to continue hyperbaric treatments at home. More than one year later, the child is alert, responds appropriately to visual and verbal stimuli, smiles, and continues to improve slowly.

## Ethicists Criticize Decision to Treat

The physicians' confident prognosis having been proved wrong, criticism of their resistance to treatment might be expected, posing the obvious question of whether the outcome might have been far better had treatment been initiated immediately. Instead, the decision in this case to "impose an unproven therapy on an acutely compromised child" has been denounced by John J. Paris, S.J., Ph.D., Professor of Bioethics at Boston College; Michael D. Schreiber, M.D., of the Department of Pediatrics at the University of Chicago Children's Hospital; and Frank E. Reardon, J.D.<sup>7</sup>

Paris et al. were apparently offended by the "for profit" nature of the treating clinic, alluding to it repeatedly, and also concerned about physician parents having too much input into decisions about their own offspring.

The major explicit issues that they raise are these: (1) the basis for decisions; (2) who has the authority to decide; (3) the scientific justification for an intervention; and (4) the cost to the community.

The basis for treatment, they state, is the "best interests of the child," with the primary commitment to "do no harm." While it is difficult to argue with these precepts, except to observe that all efforts to do good may involve some chance of harm, the main question is who decides what they mean, and what constitutes an "undue" risk of harm. The answer of Paris, et al., is: *not* the parents and *not* the private physician:

There is now a strong consensus in the medical, legal and ethical literature in the US that it is the best interests of the child—not the desires of parents or determination of the physician—which must prevail in the care of children. That standard, unlike *substituted judgment*, does not rest on autonomy or self-determination....<sup>7</sup>

Children, after all, are "now seen not merely as the property of parents, but as patients in their own right."<sup>7</sup> And parents may experience "guilt and anxiety" that are "so overwhelming as to cloud what otherwise would be a carefully reasoned parental judgment." If a child is critically ill, his desperate parents may be willing to try almost anything.<sup>7</sup>

The physician of the parents' choice, in this case the director of the hyperbaric clinic, is also apparently disqualified. He may be unduly susceptible to the parents' influence, especially if the parents may pay him for his services.

The court apparently is not a satisfactory decision maker either. The judge may have been swayed by the arguments of the parents and the media coverage.

While Paris et al. do not explicitly state who *is* qualified to determine the best interest of the child, by process of elimination it must be, in this case, the physicians working under contract with the tax-funded institution designated by the government to receive all drowning victims.

And what criteria should a disinterested decision maker use in evaluating an “unproven” or “unconventional” therapy if it carries some risk of harm? Paris et al. quote Francis Moore, Chief of Surgery at Harvard Medical School: “There must be a rationale on which the desperately ill patient may be offered not merely pain, suffering, and cost, but also a true hope of prolonged survival [without devastating sequelae].”<sup>8</sup>

A mere rationale—say that a brain damaged by oxygen starvation might recover when treated with extra oxygen and that an occasional dramatic result has been observed—is not sufficient, however. There must be adequate studies documented in the peer-reviewed literature. Otherwise, the treatment is “investigational.” Yet there may be insurmountable barriers to publication of studies if the reviewers disagree with the conclusions or find them to be a threat to their financial self-interest. For example, it took several years to get an article by the child’s father published on the cannulation of retinal blood vessels in central retinal vein occlusion because of reviewers’ inconsistencies and animosity (Weiss J, personal communication, 2003).

Informed consent alone is not enough for embarking on an investigational procedure, state Paris et al., citing Moore’s requirements for a “well worked-out theoretical basis,” “careful laboratory studies on animals,” and “extensive field experience” by the researcher, and adding that even the protection of an Institutional Review Board (IRB) may not be enough—especially when the physician, like the director of the “for profit” clinic, is a “double agent” who has a financial interest in the utilization of the treatment.

In this case, the treating physicians purportedly “could find no evidence in the literature of the proposed treatment’s efficacy in ameliorating the patient’s condition,” and thus, because “the treatment itself had the potential to destroy whatever hope there was for the patient’s recovery,” there was “no ethical justification for the treatment’s use” even as a “desperate last measure.”<sup>7</sup> Not mentioned by these ethicists is the fact that the treating physicians refused to read relevant articles brought in by the child’s father (Weiss J, personal communication, 2003).

Paris et al. do concede that “[o]nce ... the child’s condition deteriorates to the point that no further neurological deterioration short of brain death could occur, it becomes a matter of indifference to the patient’s ‘best interest’ whether or not unconventional interventions are utilized.” In this event, the physician’s role is to help parents “cope with the tragedy.” Treatment might be considered a “socially acceptable accommodation to the parents’ need to assure themselves ‘everything possible’ was done for their child” but if and only if the treatment does not “violate the child’s dignity” or “impose excessive costs on the community.”<sup>7</sup>

These authors conclude that parental authority is “not absolute” and that treating physicians have the obligation to act in what they assert to be the best interests of the child.<sup>7</sup> Clearly, these authors think that the hospital and its staff physicians acted properly in obstructing treatment by every possible means, and that the parents’ actions could set a precedent dangerous to the community. Thus, they wrote a scathing commentary on this case.

## Society Versus the Individual

Although Paris et al. leave both the underlying assumptions and the implications to be inferred by the reader, this case places in sharp relief the two currently competing views of medical ethics: the tradition of Hippocrates, in which the individual patient comes first, and the communitarian ethic. The authors cite the “do no harm” phrase from the Oath of Hippocrates. Nonetheless, in their view, the good of the individual patient is clearly subservient to that of the community, and the judgment of the private physician to the collective determinations of standard-setting authorities and state employees or contractors.

The case at issue illustrates the consequences of the communitarian ethic: callous indifference to the concerns of parents and the fate of individual patients and denial of desired and possibly lifesaving treatments.

The facts of the case are interpreted expediently. On the one hand, the treating physicians asserted that death or “brain death” was certain and that life support should be discontinued. On the other, Paris et al. warned that the treatment could destroy any chance of recovery. Rather than acknowledging that prognostications proved to be wrong, they simply assert—falsely—that the child was discharged without neurologic improvement.

Although any therapy can have side effects, especially in incompetent hands, Paris et al. ignore the remarkable safety record of hyperbaric oxygenation at pressures around 1.5 atmospheres absolute (ATA), demonstrated in millions of treatments worldwide. The clinic involved in the instant case undeniably has the “extensive field experience” demanded by Moore. About 50 treatments are administered there daily, including many to children with serious brain damage. This situation is far removed from the one discussed by Moore,<sup>8</sup> which involved four children subjected to cadaveric transplants of stomach, pancreas, small intestine, liver, and (in two cases) colon, with disastrous results.

In derogatory asides about the “for profit”—that is to say taxpaying, voluntarily funded—clinic, Paris et al. evidently assume that the motives of the state-funded hospital and its contracted physicians are pure. Yet the hospital also receives money—enormous amounts of it, taken by force from taxpayers—and buys advertising on billboards along the highway in South Florida as well as television spots. Unlike the hyperbaric clinic, the county hospital cannot enhance its bottom line by satisfying its patients but only by reducing expenditures. If near-drowning victims fulfill their doctors’ prophecies and die on schedule, within four days, the hospital is financially better off. While the hyperbaric treatment was paid for out of pocket by the patient’s father, and the chamber was loaned without charge by the for-profit clinic, the hospital did bear the cost of the patient’s prolonged stay.

Besides occupying a hospital bed, the patient also failed to contribute a heart, liver, lungs, pancreas, and kidneys to some other deserving child—and a hungry transplant center. Paris et al. did not mention this loss to society, and the parents of this child were not asked to donate, perhaps because it was apparent that they would refuse. However, the implications of aggressive neurologic resuscitation for organ transplant programs are obvious even though rarely discussed. Such efforts may infrequently restore a child to a normal level of function but may well preserve life. A cold but unbiased calculus of costs would have to include both the cost

of caring for a neurologically impaired patient and the cost of maintaining a transplant recipient; the first is more likely to be considered insupportable. The ethical issue is whether children are simply interchangeable, and one child's chance at life may rightfully be forfeited in order to improve another's, of presumably higher "quality."

### **"Proof" of Efficacy—and Consequences**

A key criterion for allowing access to desired treatments is proof of efficacy. However, a double standard is immediately observable in the discussion by Paris et al.: one must have *published* proof of efficacy for "unconventional" treatments. If a treatment is already accepted, then one need not look for equivalent proof.

And once satisfactory proof has been obtained, there is another consequence. If a treatment has been declared to be the "standard of care" by a medical board, case law, or some other mechanism, failure to provide it may be considered medical malpractice. Moreover, if the patient is a child—perhaps with a brain tumor—painful, toxic, minimally beneficial treatment may be forced upon him over strenuous parental objection if a statistical threshold has been crossed in clinical trials.

As "proven" treatments may be required, and "unproven" treatments forbidden, the standard of evidence warrants careful scrutiny.

The gold standard or highest level of evidence is of course the double-blind, randomized, placebo-controlled trial. This is most suitable for drug evaluations in which use of a truly inert placebo is at least theoretically possible, to control for the effects of faith, hope, the greater solicitude afforded to subjects in an experimental trial, investigator bias, and, as recently discussed, regression toward the mean.<sup>9</sup> The first drug to show a statistically significant effect might be mandated for use in subsequent trials, at least for the "controls," so as not to deprive experimental subjects of a chance for beneficial treatment.

Placebo controls are more problematic for procedures such as surgery or hyperbaric oxygenation.

Sham operations have been done, notably to disprove the efficacy of ligation of the internal mammary arteries in treating coronary artery disease. This famous trial had the interesting result that a subject who only had two skin incisions experienced benefits far beyond subjective relief. He more than doubled his pain-free exercise tolerance, and with a normal stress electrocardiogram instead of dramatic T-wave inversions.<sup>10</sup>

In a Canadian study to evaluate the efficacy of hyperbaric oxygenation in cerebral palsy, children who breathed air at 1.3 ATA did as well as those breathing 100 percent oxygen at 1.75 ATA. Both groups showed substantial gains in objectively measurable gross motor function, speech, attention, memory, and functional skills,<sup>11</sup> exceeding those previously achieved with any form of conventional therapy. These improvements were attributed to a placebo effect, although previous research in cerebral palsy had never shown a placebo or participation effect.<sup>12</sup>

Trials like these do not disprove efficacy; they simply show that the "experimental" group did not do significantly better than the "control" group. If both groups do better than expected on objective measures, one must ask whether the "placebo" was truly inert.

Could local anesthesia plus skin incisions and the subjective effect of undergoing an operation somehow affect the pathophysiology of coronary artery disease? Because of the lack of a plausible rationale and the availability of advanced interventions such as coronary artery bypass, no further investigation is likely. In the hyperbaric experiment, the control group was clearly not receiving a placebo, but was testing a lower dose of oxygen and a smaller pressure effect. Breathing air at 1.3 ATA effectively increases plasma oxygen tension by around 50 percent.<sup>13</sup> *The Lancet* declined to use the term placebo for this experiment (Marois P, personal communication, 2003). A nontreatment arm had been suggested in the original experimental design, but ultimately was not permitted.

Unfortunately, the negative interpretation of this experiment, despite clear benefits to children in both standard-dose and low-dose treatment groups, has been used to deny this treatment to children with cerebral palsy (Marois P, personal communication, 2003). If a follow-on study is done, it will come about only because of parental activism. Like Paris et al., others are likely to cite this experiment to argue against treatment for children with other causes of anoxic encephalopathy such as near drowning.

What sort of study might be proposed to win authoritative acceptance of hyperbaric oxygenation for children who are comatose from near drowning? Does it make sense to try to mock the subjective experience of pressurization in a comatose patient, as by pressurizing with air of reduced oxygen content? Is it ethical to place a seriously ill patient into a confined area, be it a magnetic resonance imager or a pressure chamber, in which resuscitative measures might be difficult or delayed, if there is no prospect of benefit?

A more reasonable method might be randomizing on an intention-to-treat basis and comparing the outcome of treated versus nontreated patients.

From a practical standpoint, there is an abundance of potential subjects. In 2000, drowning was the leading cause of death in children between the ages of 1 and 4 years in Florida. About 5,000 children aged 14 years and under are hospitalized each year in the United States for near drowning; 15 percent die in the hospital and as many as 20 percent suffer severe, permanent neurologic disability.<sup>6</sup>

Why then has an acceptable study not been done? The treatment method has been known for decades. Facilities are technologically uncomplicated and relatively inexpensive.

One problem that immediately comes to mind is that of informed consent—perhaps insufficient in the view of Paris et al. but clearly necessary. What parent would give consent to *nontreatment* if told that the choices are (1) almost certain death or severe neurologic damage in a child who does not immediately regain consciousness, or (2) an unproved but highly reasonable treatment that consists of saturating the brain with oxygen?

And what physician bound by the Oath of Hippocrates, believing in the mere possibility of benefit and perhaps having witnessed it at least once, would deliberately withhold it from an otherwise doomed child?

For this type of research, a true double agent is required: someone with the skills and credentials of a physician who is working for the interests of "society" and placing those interests above those of his patient. The requirements of research and of clinical medicine are often irreconcilable. Paris et al. recognize the conflicting responsibilities of clinicians and researchers.<sup>7</sup>

Moreover, the interests of the real-world enterprise purportedly acting on behalf of the abstract entity called “society” may be in fundamental conflict with those of patients.

Enterprises with a possible interest in disproving the worth of neurologic resuscitation include insurers, which might have to foot the bill for the treatment; government, which might have to provide welfare to more disabled survivors; transplant centers, which might have fewer organs to harvest; and physicians, who might have to change their way of thinking. There are also legal implications for those who actively obstructed treatments later shown to be beneficial. Malpractice lawyers might review the world literature and manage to locate evidence that the treating physicians in the instant case could not find—because they didn’t look for it. Case studies and treatment series presented at meetings—and plain common sense—might not impress academicians such as Moore and Paris et al., but might well prove persuasive to juries.

Barriers to progress are a consequence of shifting responsibility to third-party payers, and of a legal system that severely punishes past oversights and errors and thus creates a powerful incentive for covering them up.

The drive for “evidence-based medicine” is also linked to the communitarian system and ethic, for it makes science a collective enterprise controlled by an elite. It overrides the Hippocratic injunction to prescribe for the good of the individual patient—as determined by the patients themselves and those who love them—according to the ability and judgment of the individual physician.

Has art become irrelevant, and science so complex that it is beyond the ken of the mere physician? Is science impossible without a multimillion-dollar infrastructure and blinded, disinterested functionaries? Is the randomized controlled trial (RCT) the sine qua non and infallible oracle of science?

The only indispensable requirements for science are observation, measurement, and telling the truth. The blinded experiment—never necessary in physics—helps to compensate for bias, mendacity, the effects of suggestibility, and inadequate measurement of all potentially relevant variables. Yet the RCT has defects also. Moreover, the RCT is often impossible and perhaps more often simply unavailable because of disinterest or active opposition by those who control research funding. Thus, while physicians should certainly study and use the results of such trials when possible, denying treatment unless or until high-quality evidence becomes available will inevitably result in patients being deprived of treatment that could help them.

## Conclusions

In the case presented here, a court had to intervene to permit a child to receive “unconventional” or “off-label” life-saving therapy demanded and paid for by his own family, over the objections of physicians employed by a for-profit corporation contracted with a governmental entity. Some ethicists would justify the attempt to obstruct aggressive resuscitation, in this instance using oxygen under pressure, on the basis that it is still “unproven” and might be “too costly to society.”

In microcosm, this case illustrates the ongoing war against patient self-determination and the autonomy of private physicians. The drive toward central control over clinical decisions is cloaked

in concerns about scientific evidence and the societally defined best interest of the child.

The communitarian best interest here was apparently to let the baby (or at least half the babies) die—either in an experiment or for want of an approved experiment.

The physician who provided the hyperbaric treatment, and the physician-father who insisted upon it, represent the traditional medical ethic: when science has no clear answer and a unique and precious life is in the balance, the physician must act according to the best of his own knowledge and judgment.

Official decision makers who dictate clinical practice are in a position to do far more harm than any individual physician. And it is far more difficult to hold them accountable for saying “no” than to punish physicians who take risks and say “we’ll try.”

The case also shows the need for a free market to protect patients against physicians who may arrogantly insist upon or refuse therapy, proclaiming as in this case that “I’m in charge and you’re not,” while protected by their governmental sponsors.

**Jane M. Orient, M.D., F.A.C.P.**, is an internist in Tucson, AZ, and Clinical Lecturer in Internal Medicine at the University of Arizona College of Medicine. E-mail: jorient@mindspring.com.

## REFERENCES

- 1 Neubauer RA, Gottlieb SF, Miale A Jr. Identification of hypometabolic areas in the brain using brain imaging and hyperbaric oxygen. *Clin Nucl Med* 1992;17:477-481.
- 2 Harch PG, Neubauer RA. Hyperbaric oxygen therapy in global cerebral ischemia/anoxia and coma. In: Jain KK, ed. *Textbook of Hyperbaric Medicine*, 3<sup>rd</sup> ed. Seattle, Wash.: Hogrefe & Huber; 1999:319-349.
- 3 McVicar N. Parents pursue therapy to save son. *South Florida Sun-Sentinel* (Broward Metro ed.), June 5, 2002, p. 1.
- 4 LaMendola B. Hospital treatment of toddler at issue. *South Florida Sun-Sentinel* (Broward Metro ed.), June 27, 2002, p. 9B.
- 5 Herrera JDP. Judge allows pure oxygen for toddler; fall in pool left boy near death. *South Florida Sun-Sentinel* (Broward Metro ed.), June 4, 2002, p. 1B.
- 6 Locklear K. Jeffrey Weiss, et al., vs. North Broward Hospital District. *Hyperbaric Medicine Today* 2003;2(1):16.
- 7 Paris JJ, Schreiber MD, Reardon FE. Hyperbaric oxygen therapy for a neurologically devastated child: whose decision is it? *J Perinatol* 2003;23:250-253.
- 8 Moore FD. The desperate case: CARE (costs, applicability, research, ethics). *JAMA* 1989;261:1483-1484.
- 9 Morton V, Torgerson DJ. Effect of regression to the mean on decision making in health care. *BMJ USA* 2003;3:393-395.
- 10 Cobb LA, Thomas GI, Dillard DH, et al. An evaluation of internal mammary artery ligation by a double-blind technique. *N Engl J Med* 1959;260:1115-1118.
- 11 Collet JP, Vanasse M, Marois P, et al. Hyperbaric oxygen for children with cerebral palsy: a randomised multicentre trial. *Lancet* 2001;357:582-586.
- 12 Marois P. HBOT and neurological conditions. Proceedings of the 3<sup>rd</sup> International Symposium for Cerebral Palsy and the Brain-Injured Child, Fort Lauderdale, Fla.; 2003.
- 13 James PB. Correspondence: Hyperbaric oxygenation for cerebral palsy. *Lancet* 2001;357:2052-2053.