

# **“Brain Death and Disorders of Consciousness”**

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## **“Brain Death” Is Not Death**

by

Paul A. Byrne, M.D. and Walt F. Weaver, M.D.

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## “BRAIN DEATH” IS NOT DEATH

Paul A. Byrne, M.D.\*. and Walt F. Weaver, M.D.\*

### 1. INTRODUCTION

We draw attention to differences and difficulties in language and in concepts between “brain death” and true death that was published 24 years ago.<sup>1</sup> We also focus on failure to utilize the scientific method, sound reasoning, and available medical technology in the determination of *one* of the two most important states known to man: *death*. The other condition, *life*, is obviously related because of the interdependence of the two conditions. Life and true death cannot and do not exist at the same time in the same person.

### 2. THE COMMITTEE

“Brain death” was not propagated via a medical scientific method. A committee of experts was convened to deal with issues that could affect disposition and/or utilization of these patients. The first words of the “Report of the Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death”<sup>2</sup> are as follows: “Our primary purpose is to define irreversible coma as a new criterion for death.” Was this the hubris of a few academicians or was it simply a surrender to fear of legal chastisement regarding perceived economic and utilitarian needs in 1968, especially the desire to get healthy living vital organs for transplantation?

The primary purpose of the Committee was not to determine *IF* irreversible coma was an appropriate criterion for death but *to see to it* that *IT WAS* established as a “new criterion for death.” With an agenda like that at the outset, the data could be made to fit the already arrived at conclusion. It seems that there was a serious lack of scientific method in this process.

### 3. THE BRAIN

The brain consists not of a single part but of several closely interrelated ones (cortex, cerebellum, midbrain, medulla, etc.). Though composed of superficially similar tissues that are closely linked together both anatomically and physiologically, these parts can continue to have activity independently of one another, even when one or more of them

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\*Paul A. Byrne, MD FAAP, Director of Dept of Pediatrics and Neonatology, St. Charles Mercy Hospital and Clinical Professor of Pediatrics, Medical College of Ohio. Address: 2600 Navarre Ave., Oregon, OH 43616.

Walt F. Weaver, MD FACC, Clinical Associate Professor of Medicine, University of Nebraska School of Medicine, Lincoln, NE. In the past: Member International Society for Heart Transplantation; Chairman Board of Governors, American College of Cardiology and Member Task Force on Clinical Research, American College of Cardiology.

have been destroyed. As one might then expect, the brain as a whole has no physiologically identifiable function or functions that could rightly be called the “life-giving function or functions.” Rather, there exists a large multiplicity of different functions that are characteristic of the different parts. Although the characteristic functions of the brain-parts normally are closely coordinated, the parts have different functions that often cannot be carried out without the other parts. Further, none of these parts is in complete control of the others.

The brain is an organ whose varied functions serve to integrate physiologically (i.e., by biophysical, biochemical, or other neuronal mechanisms) the different parts of the body. Such physiological operations of integration are, in fact, the ordinary conditions for the continuance of the organismic unity of the body. The brain’s ceasing to function does not imply, *a priori*, its destruction but only absence of physiological activity at the time of the evaluation. If the persistence of absence of physiologic activity is accompanied by asystole, hypotension, and other detrimental responses, then this tends quickly, if not instantaneously, to destruction of the brain and disintegration of the body that we call death. However, with immediate institution of life support measures, the brain tissue may end up being only stunned. Often at the time of the initial absence of physiological functioning, this will have caused the patient to be declared “brain dead.” Even if another examiner consults (as required in some situations), an apnea test or variant of it<sup>3</sup> will likely further compromise recovery of brain tissue. By this time the *treatment will have shifted* from attempting to reduce further neurological damage to the donor *to preservation of his healthy vital organs for the benefit of the recipient.*

#### 4. MULTIPLE CRITERIA—“BRAIN DEAD” BY ONE BUT NOT THE OTHERS

Chaos has occurred surrounding the label “brain death.” The multiple criteria that have evolved worldwide testify to the presence of multiple subsets of this all-inclusive term “brain death.” However, the very diagnosis of “brain death” militates against any further attempt to evaluate outcome of these different critical subsets of legally deceased patients, since their true physiologic death comes when they are utilized for vital organ donation, subjects for teaching or research, (permitted under the Uniform Anatomical Gift Act), or when life-support efforts are discontinued. All subsets utilized life-support measures since their value as a live human is maintained in this manner and justified by the perceived “good.” There has been little interest or effort to study these patients in terms of classification trials to evaluate long-term response/recovery outcomes with present day life-support efforts in subsets of “brain death” patients.

#### 5. NOT BASED ON VALID SCIENCE

Brain-related criteria are not based on valid scientific data. The Harvard Criteria were published without any patient data and there were no references to basic science reports. The Minnesota Criteria<sup>4</sup> evolved from a study of 25 patients. Only 9 had an EEG done and of these, 2 had “biologic” activity in their EEG after they had been declared “brain dead.” Their conclusion: No longer is it necessary to do an EEG.

It seems scientifically invalid not to use an EEG in the diagnosis of “brain death” if any degree of certainty is to be obtained. The British Criteria do not include the EEG.<sup>5</sup> This was apparently due to the influence of the Minnesota Criteria, which do not require an EEG. The National Institutes of Health Criteria were based on a very limited study and, “Accordingly, these criteria are recommended for a larger clinical trial.”<sup>6</sup> This has never been done.

By 1978, more than 30 sets of criteria had been published.<sup>7</sup> Many more have appeared subsequently for various reasons and in different countries. In most cases, physicians are free to choose any one of these. Thus, a patient could be determined to be dead by one set, but not by another.

#### 6. FLEXIBLE CRITERIA

No matter how seemingly rigid the criteria are, the ease with which they can be bent is manifested in the report by the President’s Commission, where it is written: “An individual with irreversible cessation of all functions of the entire brain, including the brain stem, is dead. The ‘functions of the entire brain’ that are relevant to the diagnosis are those that are clinically ascertainable”<sup>8</sup> (page 162). In one sentence, whatever stringency there was has been reduced to no more than

what can be “clinically ascertainable.” Thankfully, there is more physiology taking place in all of us than what is “clinically ascertainable.”

If one uses the Minnesota Criteria, the British Criteria, or the published Guidelines of the President’s Commission, it is not necessary to include EEG evaluation in determining “brain death.” In which case, if the cortex is still functioning, but is wholly cut off from manifesting its activity clinically by damage elsewhere in the brain—something that does occur and which an EEG can clearly show—then this functioning (which could involve memory, feelings, emotion, language skills, etc.) is suddenly considered irrelevant to the person’s life or death. According to the NIH Study, 8% of those declared dead on the basis of criteria that omit the EEG, still have cortical activity when evaluated by non-clinical means (EEG). Thus, action such as excision of a donor’s beating heart causes death in *at least* one out of twelve cases under such circumstances. As Dr. Walker (Clinical Neurosciences, 1975)<sup>9</sup> wrote, this represents “. . . an anomalous and undesirable situation.” The general public might use much stronger words!

## 7. “BRAIN DEAD” PREGNANT MOTHERS

It is worrisome to note that “brain dead” pregnant mothers given *modern* life support efforts have survived for as long as 107 days until delivery of a normal child.<sup>10</sup> Yet, in the usual prospective donors there often seems to be a utilitarian based urgency to declare “brain death” and move ahead with vital organ transplantation. Transplant cardiologists know it is important to protect and preserve the vital organs by this urgency, but one must wonder: could it be that it is also urgent to move ahead before any signs of *recovery of brain function* would appear and embarrass the physician who had declared death? It is of interest that in “brain dead” victims of homicidal assault, lawyers rarely file charges until the victim is truly and certainly dead. In similar manner, to our knowledge undertakers never embalm until “brain dead” patients are truly and unequivocally dead. Sometimes common sense overrules utilitarian reason!

## 8. CESSATION OF FUNCTIONING, FUNCTION, FUNCTIONS OR DESTRUCTION

If there is an irreversible loss of all the characteristic functions of the brain, must we say that the brain has been wholly destroyed?<sup>1</sup> “Destroy” is used in its primary sense: “to break down or disintegrate the basic structure of,” “to disrupt or obliterate the constitutive and ordered unity of.” “Destruction” does not imply abruptness or physical violence. For the brain, “destruction” implies such damage to the neurons that they disintegrate physically, both individually and collectively. The converse, of course, is obvious: the total destruction of the entire brain does imply irreversible cessation of every kind of brain function and functions, but not loss of life. (T.K. in Shewmon’s meta-analysis.)<sup>11</sup>

There are evidently many varieties of reversible cessation of brain-functioning known. Most of these are nondestructive. But we know of no medical principle that requires that a nondestructive cessation of function or functions must always be reversible. There is no evident contradiction in supposing the existence of permanent synaptic barriers, permanent analogs of botulinus toxin, or yet other mechanisms that would block all brain functioning while leaving the brain’s neuronal structure intact and ready for action (at least until such time as the effects of this nonfunctioning on the rest of the body might react back on the brain in a destructive manner). Therefore, there is no reason to think that cessation of function, whether reversible or irreversible, necessarily implies total or even partial destruction of the brain; still less, death of the person.

Thus, the statutes that have sought to turn a loss of brain function into a general criterion of death are all vitiated by a fundamental category mistake: they take *that which functions* to be simply identical with the act of functioning. Yet, if something irreversibly ceases to function, its existence is not necessarily extinguished thereby; it merely becomes permanently idle. Nonfunction, no matter what qualifiers are used with it, is not the same thing as destruction. The few existing pathological studies of brains in “brain dead” patients do not confirm diffuse damage; in fact some specimens have been reported as showing only minor changes.<sup>12</sup>

In any case in which all functioning of the brain has irreversibly ceased, destruction of the brain and death will follow fairly quickly unless therapeutic action is taken. But if proper supportive action is administered, such an irreversible lack of brain function might last for a long time before the patient would begin to suffer destruction of brain tissue.

In such circumstances one would certainly not be free to treat a patient as dead. So long as we are dealing solely with cessation of function, we are dealing with a living patient. If, further, he happens to be dying, by this very fact he is alive and not dead. Whatever room there may be for discussion, pro and con, concerning obligations to maintain the supportive action that prevents the situation from deteriorating, at least as long as destruction of the brain has not occurred, the patient is alive.<sup>13</sup> As far as we can now know, there would even remain some possibility that in some cases a successful therapy might be found, but at present there are no markers or studies by which these patients can be selected. This is the primary reason we call for studies to evaluate these patients *scientifically*, not just for their body parts.

## 9. IRREVERSIBILITY: NON-EMPIRICAL CONFUSION

In addition to confounding what functions with its functioning, the criteria for “brain death” introduce further obfuscation through the use of the term “irreversibility” and its cognates. Now, irreversibility as such is not an empirical concept and cannot be empirically determined. Both destruction of the brain and the cessation of its functions are, in principle, directly observable; such observations can serve as evidence. Irreversibility, however, of any kind, is a property about which we can learn only by inference from prior experience. It is not an observable condition. Hence, it cannot serve as evidence, nor can it rightly be made part of an empirical criterion of death.

In brief, to regard the irreversibility of cessation of brain function (at best, a deduction from a set of symptoms) as synonymous or interchangeable with destruction of the entire brain (one but not the only possible cause of these symptoms) is to commit a compound fallacy: identifying the symptoms with their cause and assuming a single cause when several are possible.

Perhaps the strongest argument against the identification of irreversible cessation of all brain functions with death is this: those who initially accepted “brain death” did not really accept the identification themselves. The Harvard Committee was well aware of their intent and actions by clearly stating that they recommended that the patient be declared dead before any effort is made to take the patient off a respirator. Their reasoning for this recommendation was to provide legal protection to those involved, “Otherwise, the physicians would be turning off the respirator on a person who is under strict, technical application of law, still alive.”

For, if “irreversible cessation of all brain functions” were merely other words for saying “complete destruction of the entire brain,” why would there be the least hesitation on the part of the proponents to drop all reference to “brain function” and to ease their opponents’ fears by substituting “complete destruction of the entire brain?” But, in fact, the proponents have vigorously resisted efforts to make this replacement. Yet surely, no function of a brain could survive that brain’s complete destruction. Unfortunately, valuable evidence to settle these questions could have been obtained if the brains were studied at the time of organ harvesting over the years since 1968.

We may be permitted to wonder what lies behind this resistance to the identification they themselves have so constantly used and without which their basic arguments collapse. If the only brain functions remaining were firings of a few isolated neurons or the like, perhaps all this would not matter much. But since death is to be constituted by irreversible cessation of all brain functions as determined in accordance with one of the more than 30 disparate sets of criteria within acceptable standards of medical practice, and since one or more of the other sets might not be fulfilled, there is nothing to prevent *any* of the characteristic functions of the component brain parts from being declared “peripheral.” For it is certain that no one of them can be declared to be that function that alone makes the whole person live. Cortical activity was evidently regarded as peripheral by the Minnesota criteria when reticular formation function has ceased, and by the British criteria when the brainstem’s functions are gone due to structural damage. Many today argue that midbrain activity or brainstem activity is peripheral once the cortex has ceased to function. There is no limit to what real functions may be declared peripheral when the only non-peripheral function is imaginary. There continues to be no global consensus,<sup>14</sup> and unresolved issues remain worldwide.<sup>15</sup>

Further, if complete destruction of the brain were what really is intended, then why is so much written concerning indefinite ventilation of “cadavers” and the like? If a patient whose whole brain has been destroyed is on a ventilator, then, even by the older criteria, with only rare exception would he survive more than a week. If, however, his brain is not

destroyed but merely nonfunctioning, then ventilatory support *should* be continued, at least as long as there is any chance of effecting a recovery or even of seeking an as yet unknown way to reverse his presently irreversible lack of function.<sup>13</sup>

## 10. RECENT INVESTIGATION

Elegant and innovative research by Dr. Cicero Coimbra<sup>16</sup> in brain-injured animals using criteria similar to “brain death” confirms that with modern day technology, varying degrees of recovery can occur. We do know that the major vital organs have the ability to regenerate cells and/or shift performance to other normal or less compromised areas of the same organ. A good example is the myocardium, which we know can occasionally either regenerate or recover “stunned” or “hibernating” myocardium to improved levels of functioning.<sup>17,18</sup> We know that the brain can be “stunned” in many ways. A prospective study of “brain dead” patients could have a high cost, but markers for those with potential for partial or even total recovery might be identified. Obviously, the potential would be very worthwhile for those who would otherwise die following removal of their vital organs or utilized as subjects for research/teaching or simply to have life-support measures discontinued.

Many theological and religious aspects were not presented here, but we have presented our commentaries on these recently.<sup>19</sup>

## 11. CONCLUSIONS

Brain related criteria for death, from initially using the term, “brain death,” right up to the present time, was not and has not been based on studies that would be considered valid for any other medical purposes. The Harvard Committee had an agenda. The criteria were published without any patient data. And things have only gone downhill from there. “Brain death” is not true death. Further studies are indicated, but can anything be done to change something false to be the truth?

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