

Is Death the Death of the Whole Brain?

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Technology currently allows support of the body to keep people alive beyond what was previously possible. This has brought about the existence of states that cause confusion. The 'irreversible coma' (and others) is the closest thing to middle ground between life and death. "Are people in such a state alive?" If so, withdrawing life support would be tantamount to murder. Are they dead? In that case, the body is being kept in a state of suspended animation, which may prevent the family from moving on and starting the grieving process. This has brought about a second type of death, which has been poorly called 'brain-death'. Does this mean there are two ways in which to die? In this essay I will examine the history behind these developments, the definitions of the three standards of death and some of the debates surrounding death. Finally, I will show that the only way that death should be defined is by a Higher-Brain Standard of death.

In the past 50 or so years two events ignited the debate that still rages. The first was the invention of the first ventilator in the 1950's. It was designed when polio was still prevalent and 'iron lungs' were in use. These were giant iron chambers where afflicted people, who were too weak to breathe, were placed. A Dutch doctor, who was observing the nurses and medical students at Copenhagen Medical School working the bellows of the iron lungs, wondered what would happen if the manual labour could be replaced by a machine. Hence the first ventilator was born. This great invention allowed extra respiratory support when patients temporarily needed it in cases such as drug overdose, diabetic comas and the like. However, it created new problems when people were being sustained on them. As the definition of death at the time was cardio-respiratory, it would have meant killing the person if this treatment was withdrawn. As life-sustaining treatment cannot be removed, neither could the ventilator. Another factor was that those patients on ventilators would require specialised nursing care. "They [Directors of Intensive care units] began to have nightmares about wards filling up with permanently unconscious patients, each one needing not only a respirator and a bed, but also skilled nursing care".¹

The second event began circa 1967. At this time, the first heart transplants were being performed. Although generally unsuccessful the operation did have promise. It focused new attention on those who were permanently

on ventilators as "the thousands of permanently unconscious patients filling hospital wards around the world suddenly appeared in a new light. Instead of being an increasingly intolerable burden on a hospital's resources, they could become a means of saving the lives of other patients"¹ "every hospital has patients stacked up waiting for suitable donors"¹ and led to the formation of 'The Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death'. The committee was made up of ten doctors, a lawyer, historian and theologian. Their results were published in August 1968 in the Journal of the American Medical Association. They made two controversial statements:

1. People attached to ventilators were not recognised in law as dead, so they cannot be removed from the ventilator: Not, that these people were actually dead, they were being kept in a state of suspended animation by the ventilator.
2. One of their intentions is to clarify criteria for obtaining organs for transplant.

What makes someone dead?

Who decides who is dead? The obvious answer to this would be: the doctor. Right? But is that actually the truth? Doctors decide that a person is dead by a set of criteria that are set down for them, usually by leaders in that field. As shown by point one above, in this case they did things in an interesting manner. When the law does not recognise someone as dead can you actually say this? However, I believe that if you wish to change the law, you first need to say that they are dead and then change the law to reflect this.

The second point was about the need for transplant organs. Before this time, people were taken to court for their somewhat overzealous removal of organs because by law it was not entirely clear if the person was dead or not. An example of this was the shooting of Pamela James. Her assailant was charged with aggravated homicide for shooting her in the head but when his lawyer discovered that "the time of death listed by the coroner was virtually to the minute coincidental with the time [the transplant team] removed the heart"¹ the charges were reduced in a plea bargain and the case never made it to court.

Despite the above problems, this led to the 'Uniform Determination of Death Act' in 1981, which made every state of the US adopt the same brain-death definition. Indeed, 15 other countries had already done so,



including Britain, where the medical profession had just taken on board an extra set of criteria for certifying a patient dead. What this did was set the definition of death for the whole of the United States of America.

"[Determination of Death]. An individual who has sustained either (1) irreversible cessation of circulatory and respiratory functions, or (2) irreversible cessation of all functions of the entire brain, including the brain stem, is dead. A determination of death must be made in accordance with accepted medical standards."

All this change went through with very little opposition. Indeed, many welcomed the change. Euthanasia activists (on both sides) welcomed it because it gave a more definite standard of death.

Three definitions of death

Below, I explain the cardio-respiratory definition, the whole-brain definition and the higher-brain definition, the latter two being at the centre of the controversy.

The cardio-respiratory standard was the traditional way of looking at death prior to 1967. Once the heart stops beating and the lungs stop taking in oxygen the person is said to be dead. One of the good things about this standard is that it is very easy to tell that death has occurred. You can measure pulse (or not), blood pressure, even the fogging of a mirror when placed over a person's mouth! By ignoring the fact that the hair and nails keep growing for a time after death by the cardio-respiratory standard you can say that the organism is dead. The main problem with this standard is that when a patient will not survive off ventilation you enter a halfway point. They are not counted as dead because they are still breathing, yet you cannot disconnect them as this would take away life sustaining treatment.

The whole-brain standard of death is defined as 'the permanent cessation of the critical functions of the organism as a whole'. It is called whole-brain because in order to be counted as dead by this standard one needs to have both the brain stem and the cerebrum non-functioning. This is demonstrated by the loss of the functions described below. 'Critical' has only been added recently due to evidence of patients considered dead under the whole-brain standard still maintaining secretion of anti-diuretic hormone (ADH) and although this is a function of the brain it is not essential for life. James L. Bernat gives us the critical functions of an organism as a whole in three distinct but complementary biological categories:

1. Vital functions of spontaneous breathing and autonomic control of circulation;
2. Integrating functions that assure homeostasis of the organism, including the appropriate physiologic responses to baroreceptors, chemoreceptors, neuroendocrine feedback loops, and similar control systems;
3. Consciousness, which is required for the organism to respond to requirements for hydration, nutrition, and protection, among other needs.¹

All of these functions must be lost, permanently, for the organism to be classified as dead. If any one of these three functions is clinically present the organism is considered alive.

The higher-brain standard of death can be described as "irreversible cessation of only cerebral and thalamic function." That is to say that once a person has lost all capacity for consciousness and higher function then they are no longer alive. This standard means that it would also include those in irreversible coma, patients who are in a persistent vegetative

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state (PVS), and anencephalic infants. The cerebrum is what occupies most of the cranial cavity and as such is in charge of sensory, motor and so called higher functions as well as their overall integration. These include: thought, reasoning, judgement, emotion and memory. The thalamus is the way station of all of the impulses travelling to the cerebellum and so modulates the sensory signals going to and from the cortex. In conjunction with this the thalamus is said to have some more complex roles, which include blood pressure, instincts, emotions, and intuitions.

Here I would like to continue with some thought exercises. Look within yourself. Do you see yourself as a whole or as two parts? Now look at someone else, a hypothetical Mr A and tell me if you can separate him into any parts. Say for instance the old adage of the body and the mind? Whereas I see myself as a whole, when I look at someone else I would say that there is definitely a body and a mind or organism and person (respectively). Although philosophers count the brain as part of the body, as distinct from the mind, I think that actually giving the brain some sort of substance makes this separation easier. Now, imagine the situation of a 'brain switch' operation – if you switched the brains of two separate people, who is who? Is it the body (the organism) that makes the person or is it the string of memories, the personality or any number of things that you would consider makes up a human being? The brain (person) is the powerhouse of the body (organism). You could even take this one step further: If you could transplant a person's memories, behaviours, quirks, attitudes etc (i.e. someone's mind) into a robot would this robot be a person? Would they still continue to be the person that you knew? What if the operation to do the transplant went wrong and you lost the person. You would be left with just the organism. Devoid of the person that inhabits it. This is an example of what higher brain death is.

Finally try this. Imagine the hypothetical person Mr A underwent surgery in which he was decapitated. At the same time the now separate head was put on a bypass machine to keep the blood oxygenated and flowing. Then the head goes through a second stage of surgery where all parts of the head are removed leaving only the brain, the eyes and larynx while the rest is replaced on the body (this includes the brainstem which is keeping the body's functions going). Mr A's brain portion still has full awareness of his surroundings, his capacity for thinking and experiencing and he also is able to communicate. The body on the other hand is still breathing, it still digests the food that it is given through a feeding tube, and it produces urine. Is the organism dead? According to the higher-brain death standard this person is but under the whole-brain death standard, it maintains one of the three criteria for brain death, i.e. it has control over vital functions of spontaneous breathing and autonomic control of circulation. It also has permanent cessation of cerebral and thalamic function. If one were to maliciously harm the organism in such a way that it did enter a cardiac arrest and it was no longer maintaining these vital functions, is it murder?

What distinguishes us from other species in this respect? Why is it that we can have such confusion surrounding death of humans when there

is no such confusion about death of a carrot, cabbage, dog or cat? The functioning that we are talking about is of extreme importance. It is what defines us as human. Why do you think the term 'persistent vegetative state' came about? It may leave the organism functioning but the person inside is dead. Robert Veatch says "death may be formally defined as the irreversible loss of that which is considered to be essentially significant to the nature of man".²

The above experiments show support for a higher-brain standard of death. Although hypothetical I think that it shows profoundly what it is that we consider being alive and that if this is not present then the affected organism is dead.

There are other reasons why there should be a higher-brain standard rather than whole-brain. They are allocation of resources and organ harvesting for transplant. In the public health system as we know it there are so many health dollars with an ever growing pressure to make them stretch as far as possible. As we have shown above there are more people who would be considered dead if they had a higher-brain standard. Before we adopted a whole-brain standard there were a few hospital managers that were getting a little 'hot under the collar' as hospitals were not allowed to withdraw any life-sustaining treatment. A patient on ventilatory support was considered alive whereas previously they would have pronounced dead. The issue then arose that these patients then required full-time medical care, which is a huge drain on limited resources. As such it would be more beneficial to the health system to adopt a higher-brain standard. The resources saved could be put into other areas that show more positive outcomes. Of course ideally we would like to keep people on life support for as long as possible. We have heard reports of people waking from comas after 10 or more years but it is not feasible unless we adopt a 'user pays' system. If we were to liken life support to medication it would be unlikely that Pharmac would allocate funding for it.

The second reason to adopt a higher-brain standard is organ transplant. There is no doubt that there was a second standard for death introduced in order to help facilitate the procurement of organs for transplant. Indeed the chairman of the ad hoc committee was himself a transplant surgeon! With more people being pronounced dead with still functioning organs there would be more to transplant. There would be a greater ability to harvest all of the usable organs in the body. There could be one central theatre for the donor and theatres surrounding for the recipients of the heart, lungs, liver, kidneys, corneas etc.

There are problems that exist for the higher-brain standard. The first is that we do not have a definitive test to tell us exactly how much or how well the brain is functioning. We do have ways of looking at the brain. A CT or MRI can show us the structure of the brain. We also have ways of looking at the individual cells within the brain. We are able to do an electroencephalogram, which looks at the electrical activity of the brain, or look at a cerebral blood flow study. Where we have serum creatinine for the kidney or liver function tests for the liver, we have no equivalent test for the brain. We can look at the individual cells but how much can we lose before there is loss of consciousness, loss of integrated function or higher function? However, in the definition of the whole-brain standard of death if any of the three functions are clinically present then the person is considered to be alive. But as one of the whole-brain criteria is loss of consciousness, and that can be tested for: Why can the higher brain not when its only standard is for the same thing?

I have one more point to make. Although this does not differentiate between the brain-death standards it does show why we are yet unable to move towards a higher-brain standard. I think no one yet is adhering to the concept of brain death on an educated level. There have been studies conducted on doctors and nurses who work consistently with brain-

dead patients and in organ transplant teams. The findings all show that there is a discrepancy between what the law states and what the subject thought, with a small but significant majority believing that a person in a persistent vegetative state was dead. "Only 35 percent of physicians and nurses who were likely to be involved in organ procurement for transplantation correctly identified the legal and medical criteria for determining death".³ When asked why it was that they thought that this type of patient was dead some replied that they were terminally ill anyway and that their quality of life was so poor. Another issue raised by the studies was that the terminology that the medical staff used suggested that they thought the patient was still alive: 'the machine is the way that he will have to live the rest of his life'; 'the machine is basically what's keeping him alive', etc. I believe that the reason for this is that these people still hold to the cardio-respiratory standard above brain death. When you see the heart beating and the lungs taking in oxygen and putting out carbon dioxide it is hard to take that that person is dead at face value. An EEG could be broken or miscalibrated. However your eyes do not lie. If we as educated professionals cannot put into practice the theory then how can lay people? If we were to try and move things along faster than lay people can accept there would it be construed as doctors playing god? As a result of this we must take things slowly, one step at a time. Whole-brain death today, higher-brain death tomorrow.

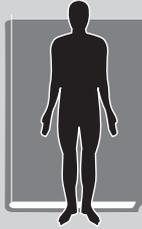
The final problem I think is that we are using non-technical terms that allow some interpretation in situations where educated people will be dealing with the lay public. An example of this is how we use the term myocardial infarction to mean that the patient has had a heart attack, whereas a phrase that possibly could be used is end-stage cerebral failure. Here I am likening it to renal failure but the concept is still the same. The brain is no longer working at a sufficient level to sustain the person and it is at a point where transplant or dialysis is needed (for the kidney at least). Creating such a term would make medical professionals overcome this. There would not be such confusion and the transition could take place faster.

Conclusion

Is death the death of the whole brain? In this essay I have attempted to show that it is not. I have shown that metaphysically we are able to think in terms of higher-brain function. What is holding us back is rather society's acceptance of a change and the consequences that it would bring. It is simply a matter of time before we start to take on higher-brain standards of death?

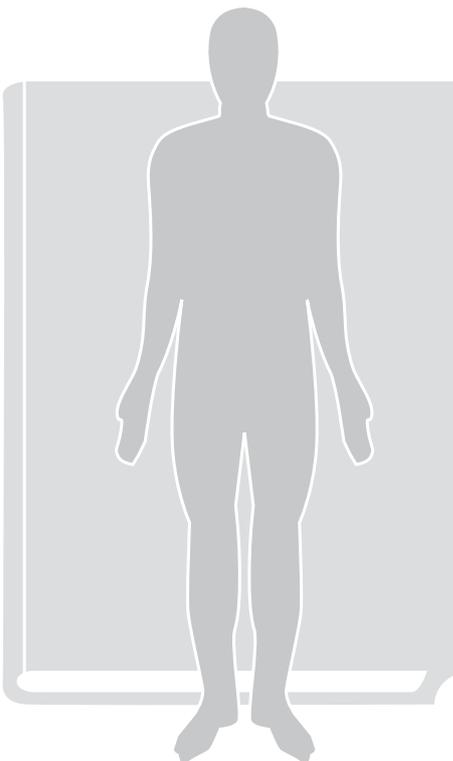
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