

## Death, Brain Death, and Persistent Vegetative State

### The Concept of Brain Death and its Appeal

For most of human history, there was no perceived problem in determining whether a person was alive or dead. If the person had stopped breathing and had no heartbeat, he was considered dead. During the twentieth century, however, techniques were developed that made it possible to resuscitate some people who had stopped breathing and whose heart had stopped beating. With the invention of mechanical ventilation, oxygen could be forced in and out of the lungs of people unable to breathe on their own, and in many cases this has been sufficient to stimulate the person's heart to beat and thus to maintain the functioning of the body as a whole for an indefinite period, even in the absence of any indications of consciousness. At the same time that increasing numbers of mechanically ventilated but unconscious patients began to divert medical resources away from people who could have benefited from them more, there was also a growing demand for organs for newly-developed transplant surgeries. These conditions prompted a debate in medical circles about how to determine when a patient had died and could thus be removed from expensive life-support systems, thereby making both the support systems and the patient's organs available to others. This debate resulted in a surprisingly abrupt transition from universal acceptance of the traditional cardio-pulmonary criterion of death to near-universal acceptance of brain death.

Brain death is understood as the irreversible cessation of functioning in the brain as a whole. It is compatible with the presence of isolated instances of minor, residual functioning in certain areas of the brain. The practical utility of this criterion was immediately obvious: if a patient on a ventilator who appeared to be alive nevertheless tested positive for brain death, he could be declared dead, removed from the ventilator, and treated as a source of organs for transplantation. That he had appeared to be alive could be explained by the claim that the various somatic functions were being generated and sustained externally rather than being constitutive of life in the organism.

Although there is a strong consensus throughout the world in both medicine and law that brain death is death, that view has been and continues to be vigorously contested by some philosophers and a few skeptics within the medical community (Singer, 1994; Shewmon, 1998). Before examining the challenges that have been posed, we should try to get clear about the concept of death, so that we can understand what brain death is supposed to be the criterion *of*.

It seems a necessary truth that the only entities that can die are ones that have been alive. Since life is a biological phenomenon, it has seemed to most commentators that death must be a biological phenomenon as well. Since the late 1960s, when most of the world adopted brain death as the criterion of death, the orthodox view has been that death is necessarily a biological event that involves the cessation of integrated functioning in an organism (or, derivatively, in an organ).

Yet all these assumptions are false. Consider the way the concept of death is used in the claim attributed to Jesus that 'whosoever liveth and believeth in me shall never die' (John 11:26). If our concept of death were univocal and essentially biological, we would have to understand Jesus as asserting that those organisms who believe in him will never cease to function biologically in an integrated way. Yet we all understand that what he meant is instead that the people who believe will never cease to exist. (Since we know

that some people believe in Jesus and yet all human organisms cease to exist, it follows that those who believe what Jesus says in the quoted passage cannot consistently believe that we are organisms. Many such people believe we are nonphysical souls. I will return to this later.)

This shows that our concept of death allows for the possibility that death is not always a biological event, and thus that it does not always involve the cessation of integrated biological functioning. Sometimes 'death' refers to a biological event, but sometimes it refers to the ceasing to exist of a person. Suppose there were a person who had survived the biological death of his body but became so tiresome in the afterlife that God finally decided to annihilate him forever. He would then die in the sense intended in the quotation from Jesus.

The ceasing to exist of a living entity is not always aptly describable as death. When a unicellular organism, such as an ameba, undergoes binary fission, it ceases to exist but does not *die*. It does seem that there is no nonbiological concept of death in the case of nonconscious organisms such as amoebas. And just as amoebas show that living beings can cease to exist and thus cease to be alive without dying, so corpses show that living beings can die, biologically, without ceasing to exist. So while all biologically living entities may cease to exist when they die and vice versa, the concepts of death and of the ceasing to exist of a living entity are distinct, though overlapping.

#### **A Critique of Brain Death**

The most important point to extract from these conceptual preliminaries is that we have two concepts of death: death as the cessation of the processes constitutive of biological life, and death as the ceasing to exist of a conscious being. One may wonder, then, for which of these brain death is supposed to be the criterion. When people have argued that, in human beings, brain death is death, have they meant that it indicates when a human organism undergoes biological death, or that it marks the ceasing to exist of the person? The answer is that they have meant both. They have assumed that when a human being dies biologically, she ceases to exist, or at least ceases to exist *here*. They have thus found brain death a compelling criterion of death not only because it has the practical advantages noted earlier but also, and mainly, because it seems to capture both dimensions of death: the ceasing to exist of the person and the biological death of the human organism. Brain death, they argue, is equivalent to the ceasing to exist of the person because the brain is the seat of consciousness, so that once it is dead, consciousness is no longer possible; and it is equivalent to the biological death of the organism because when the brain as a whole is dead, there can no longer be any internally integrated functioning in the organism. That brain death is sufficient for the irreversible loss of both consciousness and integrated functioning is the main source of its intuitive appeal.

In fact, however, brain death is not equivalent to either the irreversible loss of the capacity for consciousness or the irreversible cessation of integrated functioning in the organism as a whole. The main part of the explanation of why this is so derives from the fact that the cerebral tissues responsible for different functions of the brain are located in different regions. Roughly speaking, consciousness is generated in the part of the brain that is spatially and figuratively higher – the cerebral hemispheres – while the regulation of somatic functions is carried out in the brain stem, the spatially and figuratively lower area of the brain. One highly important difference between these two broad regions of

the brain is that the cerebral hemispheres are significantly more vulnerable to the effects of anoxia, or oxygen deprivation, than the brain stem. If the supply of oxygenated blood to the brain is disrupted, the tissues in the cerebral hemispheres die before those in the brain stem do. Because of this, when a person suffers cardiac arrest but is not revived until after five minutes have passed, it is common for the hemispheres to be damaged while the brain stem remains intact and functional.

The early literature advocating brain death as the criterion of the death of a human being emphasized the fact that brain death involves the irreversible loss of the capacity for consciousness. By highlighting this fact, the early advocates of brain death were appealing to the intuition that the capacity for consciousness is essential to our existence, so that when a person loses all possibility of consciousness or experience, she ceases to exist. The problem, however, is that while brain death is *sufficient* for the irreversible loss of the capacity for consciousness, it is not *necessary*. In some cases in which the brain is deprived of oxygen, the consciousness-generating areas of the hemispheres are wholly destroyed while the brain stem survives, leaving an individual that is permanently nonconscious but whose body may nevertheless continue to function indefinitely with no external life support other than intravenous nutrition and hydration. Such an individual is said to be in a 'persistent vegetative state'.

If, as some early advocates of brain death seemed to suggest, the capacity for consciousness is essential to our existence, it follows that a person who lapses into a genuine persistent vegetative state, in which there is no longer any possibility of consciousness, thereby ceases to exist. Some bioethical theorists have embraced that implication. Some have argued that because the capacity for consciousness is localized in the upper regions of the brain, the proper criterion of death is not brain death but a 'higher brain' criterion, such as the death of the cerebral cortex ('cortical death'). But proposals for higher brain criteria have never been widely accepted; for they imply that a persistently vegetative patient whose body remains systematically functional with little support other than nutrition and hydration is biologically dead. And that seems obviously false.

Just as a person may irreversibly lose the capacity for consciousness without being brain dead, so in principle a human organism could suffer the irreversible cessation of integrated functioning without the person ceasing to exist. This could happen if the brain stem were to be destroyed, causing the loss of integrated functioning, while the cerebral hemispheres survived in a functional state. But this never in fact happens. If the brain stem is destroyed and external life support is not provided almost immediately, breathing and heartbeat stop, blood ceases to reach the brain, the cerebral hemispheres begin to die, and the capacity for consciousness is soon lost. If external life support *is* immediately provided so that oxygenated blood continues to reach the cortex, it is not a case involving cessation of integrated functioning. There is also an area of the brain called the 'reticular formation' that is located primarily in the brain stem that functions rather like an 'on-off' switch for the generation of consciousness in the cortex. If the reticular formation is destroyed, spontaneous consciousness is no longer possible. So for consciousness to be preserved, the destruction of the brain stem would have to spare the reticular formation, which is highly unlikely.

We can nevertheless imagine a case in which all of a person's brain stem except the reticular formation is destroyed and in which the only external support provided is a

machine that delivers a continuous supply of oxygenated blood to the person's cortex. This could be done. Decades ago, scientists were able to maintain consciousness in the severed heads of monkeys by keeping their brains perfused with blood. The same could in principle be done, at least for a limited period, with a person's cortex and reticular formation inside his own head, even after the rest of his brain stem and indeed the rest of his body had died. This would be a case in which integrated functioning in the organism would be irreversibly lost even though brain death would not occur until later, and the person would not only not cease to exist but would even remain conscious.

Many people are reluctant to draw conclusions from examples that are merely hypothetical. But to show that brain death is not equivalent to the loss of integrated functioning in a human organism, we can appeal to real examples. These examples do not show, as the hypothetical example attempts to do, that integrated functioning can cease without brain death occurring; rather, they show that brain death can occur without the cessation of integrated functioning. There are several documented cases in which after a pregnant woman has been reliably diagnosed as brain dead, her body has been kept systemically functional for a number of months to enable the fetus to develop and later be delivered alive (Singer, 1994: 9-16). Yet the most surprising case of which I am aware is that of a four-year-old boy who was diagnosed as brain dead but whose mother refused to accept that he was dead and insisted that he not be removed from the ventilator. When a neurologist, Alan Shewmon, examined him fifteen years later, in the late 1990s, he found that there was no blood flow within the cranium and indeed that the entire brain had dissolved and 'been replaced by ghost-like tissues and disorganized proteinaceous fluids'. Nevertheless, during those many years in which he was officially brain dead, the boy had 'grown, overcome infections and healed wounds' (Shewmon, 1998: 136).

Those who hold that brain death is death are obliged to describe the examples cited above as cases in which *corpses* support fetal gestation, maintain immune functions and adjust them to the presence of a fetus, metabolize nutrients, excrete wastes, retain reproductive potential, and so on. They have to say that what appears to be integrated systemic functioning is not really integrated and so is only a simulacrum of life. Their assumption is that if these various functions are not internally regulated by the brain, they are not integrated in the way necessary for the presence of life. But this assumes that the internal integration of somatic functions has to be centralized in order for there to be life. But what the cases just cited show is that with a minimum of external support – a ventilator, a daily hormone injection, nutrition, and hydration – the various organs and subsystems constitutive of a human organism are capable of decentralized integration. That is, they achieve effective coordination by sending, receiving, and processing signals among themselves.

Despite the evidence of these cases, many people continue to assert that regulation by the brain is necessary for functioning in the organism, however seemingly integrated it may be, to count as life. It seems that this has ceased to be an empirical claim and has instead become a *conceptual* claim, a claim about the concept of life in a human organism. Given the evidence of the cases just cited, it seems charitable to interpret recent defences of brain death as claiming that unless the integration of functions in a human organism is both internal and centralized in the brain, it *necessarily* cannot be constitutive of life in the organism.

This claim raises an unavoidable question – namely, *how much* of the integration of somatic functions has to be done by the brain for the organism to count as alive? The answer at one extreme is that *all* the functions normally regulated by the brain must be so regulated for the organism to be alive. But this is clearly false. A patient with a lesion to the respiratory center in the brain stem requires permanent external ventilation to survive, but no one doubts that such a person is alive. Nor can one say, at the opposite extreme, that the organism remains alive as long as *any* regulative functions continue to be carried out by the brain. For, as I noted earlier, there are various minor functions of the brain whose persistence does not exclude a diagnosis of brain death. If the continuation of those functions were incompatible with brain death, the diagnosis of brain death might in many cases have to be delayed until the patient's organs had deteriorated to the point of being unusable for transplantation. For this and other reasons, no one has ever been seriously tempted to define brain death as the cessation of *all* functions in the brain.

Yet any point along the spectrum between these two extremes would seem arbitrary as the point at which too few bodily functions are regulated by the brain for life to be present. If some functions are being regulated by machines while others are being regulated by the brain, so that the great majority of functions are occurring in a coordinated way, that would seem to be sufficient for the presence of life, especially if consciousness is among those functions. Indeed, one point on which everyone agrees is that if a human being remains conscious, he or she is not dead. But imagine a case in which the regulation of one somatic function after another is taken over from the brain by a machine. First one regulatory function of the brain is lost and taken over by a machine, then another, and another, and so on until the only brain function that remains is the one that cannot, at least not yet, be replaced by a machine: consciousness. While the brain continues to generate consciousness, the person is not dead. But now suppose that this last remaining function also ceases, and irreversibly so. When this happens, brain death occurs. Proponents of brain death claim that it is at this point, and only at this point, that the person dies, even though all the other functions of the organism continue to be carried out in an internally coordinated way, though ultimately at the prompting of machines.

Yet notice that in this case, the transition from life to death with the cessation of the final brain function – consciousness – has nothing to do with the cessation of somatic regulation by the brain stem. All regulatory functions were previously taken over by machines. If some degree of regulation of somatic functions by the brain were necessary for life in an organism, this person would have been dead before he lost the capacity for consciousness. The cessation of consciousness alone is not the difference between *biological* life and death *in the organism*, as defenders of the brain death criterion themselves acknowledge when they refuse to consider a patient in a persistent vegetative state to be dead.

This scenario in which the last brain function to survive is consciousness is similar to the earlier hypothetical example in which the cerebral cortex alone outlives all the other constituent parts of the organism. As such it may be dismissed as unrealistic. But there are numerous actual cases in which the relevant features of this case are present – namely, the maintenance of consciousness in the absence of *any* regulation of somatic functions by the brain stem. Examples include cases in which the spinal cord is completely severed just below the brain stem ('high cervical transection'), and cases in which swelling and compression in the same area prevent the transmission of any signals

between the brain and the rest of the body (as in some cases of Guillain-Barré Syndrome). In these cases, the person is conscious but wholly ‘locked in’, while all somatic functions normally regulated by the brain must be prompted externally. Yet because the person is conscious, no one claims that the organism is biologically dead on the ground that its manifold functions are being prompted by a ventilator and integrated in a decentralized manner as the various organs and subsystems respond to signals from one another. So the truth seems to be that *no* degree of regulation by the brain is necessary for biological life in the organism. If it were a necessary truth that some degree of regulation by the brain were necessary for life, people who are wholly locked in would be dead but conscious – not conscious in some otherworldly afterlife, but in their own dead body.

Before turning to other matters, I will conclude this critique of brain death by advancing one further argument. Recall that brain death involves the death of the brain ‘as a whole’ but does not exclude some isolated, residual forms of functioning. The idea that brain death is death thus implies that we remain alive as long as the brain maintains a certain level of functioning but die when it loses that level of functioning. What this means is that a certain level of functioning in the brain is a necessary and sufficient condition of our remaining alive. If that is true, it seems that that level of brain function is a necessary and sufficient condition of our *being* alive. The idea that brain death is death must also, therefore, imply a certain account of when we *begin* to be alive, or ‘when life begins’. That is, if we can *continue* to live only if we have a certain level of brain function, then we cannot *begin* to be alive until that same level of function is initially achieved. Yet I think there is literally no one who believes this. While there have been a few people who have accepted that *we* begin to *exist* when the developing human brain achieves a level of functioning sufficient to exclude a diagnosis of brain death, no one has seriously proposed that the developing human organism does not become biologically alive until that point. That is, no one claims that a human embryo in which the brain is forming but has not yet become active is an inanimate entity, or that it is not a biological individual at all but a mere aggregate of living cells or tissues. But if a human embryo one month after conception is a living human organism even though none of its functions are regulated by its brain because it has no brain, and even though it requires external life support in the form of a woman’s uterus, why then is a brain dead but fully functional human organism sustained by a ventilator not also alive?

Although the situation may have been somewhat different when the notion of brain death was first introduced, virtually all of those who now defend the notion of brain death do so because they think it indicates when a human organism is no longer biologically alive. They recognize that the death of the brain as a whole is not necessary for the irreversible loss of the capacity for consciousness. While some argue that we cannot know with complete *certainty* that that capacity has been lost until brain death occurs, that is an unstable view. For anyone who is seriously open to the possibility that consciousness may persist in the brain stem after the entire cortex has died must also be open to the possibility that it may persist in the lower parts of the central nervous system after both the cortex and the brain stem have died.

### **What Kind of Entity Are We?**

The claim that a human organism ceases to be biologically alive only at brain death is of serious *moral* interest only if the biological death of a human organism is also the

death or ceasing to exist of a person, or a person's ceasing to exist *here*. Yet the biological death of a human organism is necessarily the death of a person only if we *are* (in the sense of being identical with) human organisms. But recall that I noted earlier that those, including most Christians as well as most devotees of other major religions, who believe that we survive the biological death and decomposition of our bodies cannot consistently believe that we are biological organisms. I think it is true that we are not organisms, though not because we survive biological death. We do not need to imagine a disembodied afterlife for ourselves to see that we are not identical with our organisms, for life itself in some of its more bizarre manifestations provides sufficient evidence. There are various anomalous conditions that show that we cannot be organisms.

One such condition is dicephalus. Dicephalic twinning is a radically incomplete form of conjoined twinning in which two heads, each with its own brain and its own separate mental life, sit atop a single body. In some cases, there is very little duplication of organs below the neck; there is one circulatory system, one metabolic system, one reproductive system, and one immune system. In these cases, there are two persons but only one human organism. The two twins cannot both be the organism because that would imply that they are not distinct individuals but one and the same person. Each twin's relation to the organism is the same; therefore there can be no reason to suppose that one of them is the organism while the other is not. It seems, therefore, that *neither* of them is identical with the organism. If dicephalic twins are essentially the same kind of thing that we are, then we are not organisms either.

Some people argue that dicephalic twins are really two distinct but overlapping organisms, and in support of this contention point to the fact that in known cases there is some duplication of organs within what appears to be a single body. They must then confront a different form of conjoined twinning known as craniothoracopagus, in which there is one brain and one head, below which there appear to be two bodies, each with its own set of organs, though in one documented case the hearts and upper gastrointestinal tracts are fused. To the best of my knowledge there has never been a case of craniothoracopagus in which the twins have survived infancy, but that of course does not show that survival is physically impossible. If such twins were to survive, there would be one brain, one mind, and therefore one person. But by the criterion for individuating organisms suggested by those who claim that dicephalic twins are two organisms, it seems that there would be two organisms. For there would be two nearly complete sets of organs, either of which could in principle be separated from the other and from the head, leaving a complete living organism behind. But if there would be one person and two organisms, that person could not be identical with both organisms, and there would be no basis for claiming that he or she would be identical with one but not the other. Again, the correct conclusion seems to be that the person would not be identical with either of the two organisms. Since that person would be essentially the same kind of entity that we are, it seems that we cannot be organisms either.

There is one more form of conjoined twinning that is relevant here: craniopagus parasiticus. In cases of this sort, one conjoined twin is fully developed but the other, which is joined to the first at the head, has failed to develop a body, and is thus, as the name suggests, a second head that draws life support from an organism to which it is attached but over which it exercises no control. The second brain, in other words, has no regulative functions with respect to the organism that sustains it, so that the death of this

brain might have no effect on the organism. There are only eleven recorded cases of this phenomenon but two have occurred in the twenty-first century. In one case in Egypt, the second head was surgically removed but the remaining twin died a little more than a year later from an infection of the brain. Before the parasitic head was removed, it was observed to smile and blink, but apparently no one seriously tested for the presence of consciousness. But whatever was true in this actual case, it is clearly possible that there could be a case in which the brain in the parasitic head would be fully developed and capable not only of consciousness but self-consciousness. If that were to occur, there would then be a clear instance of a single organism supporting the existence of two persons. One might claim that the person whose head was connected directly to the organism would be identical with that organism, but that would mean that there would be at least one person – the person associated with the parasitic head – who was not identical with any human organism.

One might think that this poses no challenge to those who believe that we are organisms. For they could simply say of the person, or self-conscious being, resident in the second head that he or she is a special case. That one person is not identical with an organism is compatible with all other persons being identical with their organisms. But the problem is that any person could in principle become a parasitic head. Suppose I had an identical twin whose blood was of the same type as mine and whose immune system would treat me as self rather than other. My head could be surgically attached to my twin's body and sustained by its blood supply. This has been done in animals (Browne, 1998). The head of one monkey has been transplanted onto the body of another. The resulting creature did not survive long but when the head regained consciousness after the surgery it tried to bite the surgeon – quite reasonably in my view. If my head were similarly attached to my twin's body, I would survive but would be no more a distinct organism than the parasitic head is in actual cases of *craniopagus parasiticus*. But if I would not be an organism then, I cannot be identical with an organism now. For it is a matter of logic that if I am identical with something now, I cannot cease to be identical with that thing and yet continue to exist.

It think these arguments, which mostly appeal to actual phenomena, show that we cannot be human organisms. But if that is right, my death or ceasing to exist need not be the same as the biological death of my organism. I might, for example, cease to exist before my organism dies. Many religious people believe that their organism will die but that *they* will neither die nor cease to exist at that point – though they may cease to exist *here*. They are able to believe this because they also believe that they are essentially nonphysical substances – souls – that are the immediate subjects of consciousness and mental activity.

But the idea that we are souls is a highly precarious foundation for our beliefs about the nature of death. Anyone who believes that we are souls and that we begin to exist separately from the body at brain death had better have good answers to the following questions. Do animals have souls, and if not how can one detect the presence of the soul in a human embryo while being confident of its absence in a chimpanzee? Assuming that souls do not come in degrees, so that the possession of a soul is all-or-nothing, when in the course of evolution did our ancestors begin to be endowed with souls? Was there a detectable difference between the parent who lacked a soul and the child who had one? If the soul can survive the death of the human organism and retain its full psychological

capacities in a disembodied state, why are one's psychological capacities or states affected at all by what happens to one's brain? What happens to the soul of an embryo that divides and is replaced by two new embryos? What happens to the soul when the tissues connecting a person's cerebral hemispheres are surgically severed, creating two separate centers of consciousness, each capable of experiences inaccessible to the other? And what reason is there to suppose that the soul departs from the body at brain death rather than, for example, at the onset of persistent vegetative state?

I think that there are no good answers to these questions and that there is no reason to suppose that we are souls (McMahan, 2002:7-24). What are we then? Here is one way to think about this problem. Imagine that you discover that you are in the very early stages of progressive dementia. As the dementia advances, you will gradually lose both the particular elements of your mental life – your memories, character traits, and so on – and even your basic psychological capacities, so that if your body continues to function long enough, you will eventually lose any remaining capacity for consciousness. When can you expect to cease to exist? It seems clear that you will continue to exist as long as your brain continues to generate consciousness, and indeed as long as your brain retains the capacity to generate consciousness. As long as there is a subject of experiences present, or if it is possible to revive a subject of experiences in your body, there is evidently *someone* present, and there is no reason to suppose that that would be anyone other than you. But will you still be there after your brain irreversibly loses the capacity for consciousness? What will remain at that point will be a living human organism with no capacity for consciousness or experience. But I have argued that we are not human organisms. If that is right, that organism cannot be you. And it is hard to identify anything else that might be you. I think we should conclude that you ceased to exist along with the capacity for consciousness. That suggests that you are essentially an entity with the capacity for consciousness – a mind.

Each of us is a mind, a subject of consciousness, which is sustained by the functioning of his or her brain, which is in turn sustained by the functioning of his or her organism. But we are not identical with our organisms. Because our organisms are living biological entities, they can die. The common view, which I have no grounds for disputing, is that an organism dies with the irreversible cessation of coordinated functioning among its various parts. The best criterion for determining when this occurs is probably irreversible cardio-pulmonary failure. According to this view, a human organism can remain alive after brain death, as in the cases of the pregnant women whose bodies continued to support fetal gestation for months after they had suffered brain death. But nothing of significance hinges on this because what matters is when *we* die or cease to exist. If we are entities that essentially have the capacity for consciousness, then we cease to exist when we irreversibly lose that capacity. The best criterion for when this happens is some form of "higher brain" criterion, of the sort I mentioned earlier.

### **Persistent Vegetative State**

In suggesting that a higher brain criterion is the correct criterion for determining when we cease to exist, I am not making the mistake of those who have proposed a higher brain criterion as *the* criterion of death. They assumed that the death or ceasing to exist of a person is equivalent to the biological death of a human organism. They were therefore forced to say that when a person loses the capacity for consciousness by lapsing into a persistent vegetative state, her organism ceases to be biologically alive, which is

obviously false. By contrast, I think we must distinguish between the person and the organism and thus between the death or ceasing to exist of the person and the biological death of the organism. As I noted earlier, our language already contains the distinction between the two concepts of death – that is, between the ceasing to exist of a person and the biological death of an organism. It therefore has the conceptual resources to articulate what I think is the correct view of a patient in a persistent vegetative state – namely, that the person has ceased to exist because she has irreversibly lost the capacity for consciousness, but that her organism remains alive. Only by recognizing that the person and her organism are different entities can we properly understand both the personal and the biological dimensions of death.

If persistent vegetative state involves the ceasing to exist of the person but not the biological death of the organism, can it be permissible to remove a persistently vegetative patient's organs for transplantation? This would involve the killing of a human organism and the killing would be intentional in a familiar sense. Many people would therefore see the extraction of the patient's organs as murder. But I think this is a mistake. A human organism that does not and cannot support the existence of a person, or a subject of consciousness, does not have interests or rights. To end its life is no more objectionable morally than to kill a plant, provided that what is done does not contravene the interests or rights of the person who once animated the organism.

This will seem shocking to many. But consider this. The *only* difference between a genuinely persistently vegetative patient (that is, a human organism in which the capacity for consciousness has been irreversibly lost) and a fully functional but brain dead organism sustained by a ventilator, is that some of the former's functions are regulated by the brain stem whereas those same functions in the latter are triggered by the combination of the ventilator and the decentralized action of other body parts. How can *that* be the difference between murder and permissible killing?

A living human organism in which all possibility of consciousness has been lost has much the same moral status as a human corpse. We do not think that corpses have interests or rights but we recognize that there are ways in which it would be disrespectful to treat them. Precisely the same is true of a persistently vegetative human organism: there are various forms of respect that it is owed by virtue of its association with the person who once animated it. But just as most of us have concluded that it can be permissible to use a corpse's organs for transplantation, provided that this is not done against the will of the person whose body it was, so we should conclude that it is not disrespectful of a person to take organs from his persistently vegetative organism, even though that involves killing the organism, provided that it is not done against his will. Just as people are now permitted to stipulate that their organs not be taken from their body after their death, so people should be allowed to forbid the taking of their organs for transplantation after they lapse into a persistent vegetative state. But those who would like to donate their organs for transplantation once they have ceased to exist should not be denied the opportunity to save the lives of others in that way. (It is, of course, a different question how long a patient in a persistent vegetative state must be provided with medical care, given that the resources devoted to sustaining this biological life could otherwise be devoted to the needs of persons.)

The most serious moral objection to taking organs from persistently vegetative patients, even with their advance consent, is that at present there is often uncertainty

about their condition. The two most important forms of uncertainty concern the possibility of recovery and the possibility of consciousness of which external observers are unaware. Recent research has demonstrated that some people who had satisfied the clinical criteria for persistent vegetative state had not in fact lost the capacity for consciousness. In this relatively small group of patients, compelling evidence of certain forms of consciousness has been discovered and in at least one case there has been a complete recovery of normal consciousness (Groopman, 2007). These cases have made us more acutely aware both of how serious the problem of mistaken diagnosis is and of the need for more reliable diagnostic criteria. One of the problems is that the sophisticated new neuroimaging techniques that have made these discoveries possible are quite expensive, and are often not covered by medical insurance. With these advanced technologies for exploring blood flow and electrical and other activity in the brain, it is sometimes possible to be quite certain that the capacity for ordinary consciousness has been irreversibly lost. Unless such technologies are used and show that this is the case, it could be wrong to kill a patient diagnosed as persistently vegetative in order to remove her organs for transplantation, even with her advance consent. But if we as a society came to recognize that those who are *known* to have lost the capacity for consciousness have ceased to exist, and that it can be permissible to use their organs for transplantation, we might then find it more economical to deploy the expensive neuroimaging technologies more widely rather than allowing those diagnosed as persistently vegetative to lie largely ignored in nursing homes, consuming vast resources, as we tend to do now. We could then treat those who would be determined to have some chance of recovery and use the organs of those beyond the possibility of recovery to save the lives of others.

The other form of uncertainty is whether some of those diagnosed as persistently vegetative who have no prospect of improvement nevertheless experience some form of consciousness, at least intermittently. We cannot yet entirely rule out the possibility that even in patients whose cortex is wholly dead there might be some dim, flickering, primitive form of consciousness in the brain stem. (Indeed, this cannot be ruled out even in the case of some patients diagnosed as brain dead, since a diagnosis of brain death is compatible with the persistence of various forms of activity in the brain.) If the probability that some rudimentary form of consciousness might persist in the brain stem in patients in a persistent vegetative state were high, or even significant, that should prompt serious consideration of the metaphysical question whether such consciousness would be sufficient for the survival of the person. But since the probability seems very low and the metaphysical significance uncertain, the bare possibility seems insufficiently important to be a serious factor in the formulation of policy.

Some people seem to believe that even in the case of patients in a long-term persistent vegetative state, in which the prospect of recovery is statistically nil, it is nevertheless possible that the person remains robustly conscious though locked in. Many people seemed to believe this about Terry Schiavo, the persistently vegetative patient whose feeding tube was removed in 2006 after an extraordinary legal and political battle during which President Bush made the unprecedented decision to truncate his vacation by flying to Washington late at night to sign legislation prohibiting the removal of the tube (Didion, 2005). The objective probability that there is any ordinary form of consciousness in patients in a long-term persistent vegetative state is negligible. But suppose it were higher. We ought not to allow notions of the sanctity of human life to

deter us from imagining what such a life might be like from the inside. Even if, contrary to fact, we could be sure that it would not involve agonizing pain to which the patient could give no expression, we only have to imagine being buried alive for years or decades to get some sense of how such a life might be lived from within.

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