Defining death in non-heart beating organ donors

N Zamperetti, R Bellomo, C Ronco

Protocols for retrieving vital organs in consenting patients in cardiovascular arrest (non-heart beating donors, NHBD) rest on the assumptions that irreversible asystole (a) identifies the instant of biological death, and (b) is clinically assessable at the time when retrieval of vital organs is possible. Unfortunately both assumptions are flawed. We argue that traditional life/death definitions could be actually inadequate to represent the reality of dying under intensive support, and we suggest redefining NHBD protocols on moral, social, and anthropological criteria, admitting that irreversible (however defined) asystole can only equate a clinically determinable point of no return in the process of dying, where organ retrieval can be morally and socially accepted in previously consenting patients.

Life and death in this context are intended in a strict biological sense (as distinct from anthropological, psychological, and sociological death): the death of a human being is the same as the death of an animal or plant.

The above paradigm might seem ethically, morally, and practically very straightforward. It is not. Actually, NHBD protocols raise major ethical concerns regarding the definition of the donors’ vital status. In this essay, we will argue that clinical criteria can only certify the clinical condition of asystole, whose equivalence to “life” or “death” cannot be defined by medicine alone. This doesn’t mean that NHBD are still alive at the moment of organ retrieval, but simply that medicine alone cannot demonstrate that they are surely dead. In this sense, in our view, NHBD protocols have to be re-established on moral, social, and anthropological criteria, which must be openly formulated, discussed, and accepted.

We suggest that reformulating the policy of organ retrieval from NHBD, taking these issues into account, is in the best interests of donors, their families, recipients, society as a whole, and the long term future of organ transplantation in general.

CAN MEDICINE DIAGNOSE THE STATUS OF NHBD?

Two NHBD subsets exist: the controlled (organ procurement following a planned withdrawal of futile or excessively burdensome artificial life support) and the uncontrolled (retrieval following unsuccessful cardiopulmonary resuscitation).

The most important difference is how the UDDA term of “irreversible” relates to cardiocirculatory function: in the latter subset, “irreversible” means in spite of any possible intervention (a strong sense), while in the former it means spontaneously irreversible (the weakest possible sense) because, for such patients, forgoing of life support is intended as the most appropriate action:

It is legitimate to declare death when it has been established: (1) that circulation and respiration have ceased; (2) that these functions will not resume spontaneously, and (3) that the physician should not resuscitate. . . . That the physician should not resuscitate—even were this possible—is known by the fact that all the patients in...
The two subsets converge in the fact that organs are harvested as soon as possible after asystole. The period of time between asystole and retrieval is, however, variable. Recently, the Institute of Medicine (IOM) surveyed the NHBD protocols. Twenty-nine out of 63 organ procurement organisations answered: only half of them mentioned a specific waiting time (one to five minutes in 12 organisations, no wait after asystole in the other ones). The IOM recommends a five minute interval. Indeed, NHBD protocols continue to be extensively debated.14-17

A recent paper published by the ethics committee of the Society of Critical Care Medicine reports a review (Youngner et al19) which demonstrates that none of 108 patients with apnoea, asystole, and unresponsiveness for at least two minutes recovered spontaneously. It also points out that non-potential organ donors in the intensive care unit (ICU) are often certified dead after much less than two minutes (usually a few ECG screens showing no electrical activity). The consensus of the SCCM ethics committee is that “no less than two minutes is acceptable, no more than five minutes is necessary given the IOM recommendation and the current practice of critical care medicine”.

This conclusion raises some problems. First, it ignores many reports that demonstrate spontaneous restoration of adequate cardiac function after more than five minutes of asystole,19-24 a fact that is most probably grossly under reported rather then being remarkably rare.23,24 Even disregarding those papers, however, it must be noticed that Youngner’s data are seriously flawed from a clinical, methodological, and statistical point of view, so that they provide “the weakest possible evidence for a recommendation”.22 Because this recommendation concerns the weakest possible interpretation of irreversibility, the strength of the final conclusion can be questioned.

Second, the fact that one is bound to die without active intervention does not mean that one is dead. The paper recognises that circulation can be restored in many cases and that non-potential organ donors in the intensive care unit (ICU) are often certified dead after much less than two minutes (usually a few ECG screens showing no electrical activity). The consensus of the SCCM ethics committee is that “no less than two minutes is acceptable, no more than five minutes is necessary given the IOM recommendation and the current practice of critical care medicine”.

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The risk is that of creating socially acceptable criteria for transplantation by using “science” and “medicine” to legalise them, justify them, remove fear of abuse, and create widespread acceptance.

Some authors seem to suggest that, in fact, this is what happened with the brain death criteria.25-27 This hypothesis is indirectly confirmed by R Cranford, former chairman of the ethics subcommittee of the American Academy of Neurology, who, writing about persistent vegetative state (PVS), stated that:

> It seems that permanently unconscious patients have characteristics of both the living and the dead. It would be tempting to call them dead and then retrospectively apply the principles of death, as society has done with brain death.18

Even Henry Beecher, chairman of the Harvard committee, mixed up scientific, moral, and operational criteria, when he stated (in 1971):

> At whatever level we choose to call death, it is an arbitrary decision. Death of the heart? The hair still grows. Death of the brain? The heart may still beat. The need is to choose an irreversible state where the brain no longer functions. It is best to choose a level where, although the brain is dead, usefulness of other organs is still present. This we have tried to make clear in what we have called the new definition of death.18

The discussion of this problem is far beyond the scope of this paper and the disposable space. Nor do we think it is in anybody’s interest to call into question the righteousness of the concept of brain death 35 years after the Harvard criteria. Anyway, the mere fact that such issues exist forces us to be beyond reproach in our reasoning, keeping the different levels of discussion clearly separate, avoiding the mixing of what is scientific, what is moral, and what is operational.

A relevant factor is that the cardiorespiratory definition and criteria of death come from centuries of human experience.
when the cardiorespiratory functions were neither restorable nor supportable. Furthermore, for the first time in history we have the possibility of interfering in the process of dying with manoeuvres which are of no utility for the patient but which can greatly help others. In this sense, those criteria could be inadequate nowadays.

On the other hand, if death cannot be defined or identified by medicine alone, then medical knowledge and clinical states could become the tools for moral and social decision making. We suggest that we should move away from an unattainable certification of biological death, as the _sine qua non_ for organ donation; we should openly admit that NHBD death cannot be defined at a time when organ retrieval is possible and that all we are able to define are socially, morally, and scientifically acceptable criteria for organ donation. Such criteria should be the object of wide debate (social, scientific, moral, ethical, and legal). They should also be the subject of constant review, as scientific progress and changes in moral paradigms are likely to require timely modifications. The only possible alternatives are either to abandon NHBD protocols or to maintain a scientifically untenable approach, pretending that NHBD are biologically dead.

In other words, if we want to continue to support organ transplantation from NHBD it’s necessary to acknowledge the purely and typically moral and anthropological nature of the concept of death.

The challenge is to admit that medicine can only identify clinical situations (such as irreversible asystole) and stimulate a social discussion to establish if it is socially acceptable to retrieve vital organs from consenting patients in such a condition.

The real problem, consequently, can be formulated as follow: can we retrieve vital organs from patients if we cannot scientifically demonstrate their vital status, and in this way save other patients’ lives?

It might seem better to avoid introducing the interests of a third party in such a discussion. Anyway, the fact that demand for viable organs was a major motivation for the implementation of NHBD protocols is well attested. Thus it might be better not to hide this issue but to clearly include it in the discussion of the problem.

The two relevant factors, therefore, are the interests and dignity of the donors and the vital needs of the recipients. Unfortunately, people in desperate need of vital organ exist. But thankfully there are also people who wish to donate their organs when they are no longer useful to themselves. In this sense, those criteria could be inadequate nowadays.

Other authors are much more radical, deeming it reasonable and feasible to remove organs for transplantation (with the permission of the patient or surrogate) when the patient is either permanently unconscious or when death is imminent. Arnold and Youngner, for instance, wrote:

> What if, instead of continually gerrymandering the line between life and death, we simply ask, “Are there some patients whose quality of life is so unacceptable and whose death is so imminent (by fate or their own decision) that we may take their organs before they die?”

The difference is that they all move within the strict dichotomy alive/dead, assuming that if a patient is not completely dead, he/she is still alive. Their position can be seen as an implicit violation of the dead donor rule and equated to euthanasia or active killing. Our position is that the traditional concepts of life and death are simply inadequate in the settings in which we have to make decisions, in the face of the continuing progress of resuscitation techniques, and the social needs represented by modern transplant medicine.

In addition to our observations, the theory formulated by I. Emanuel is very interesting and somewhat similar. Assuming that in the process of dying there is no describable threshold event or state that clearly separates life and death, this author produced an asymptotic model which admits the reality of residual states of life and in which a bounded zone of life cessation can be defined. The persistent vegetative state (upper limit) and the irreversible asystole (lower limit) could bound such a zone. Death could be declared any time within the bounded zone, according to the patient’s informed position:

> A person’s life must be considered ceased for any individual whose cardiorespiratory function has irreversibly...
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ceased, and can be considered ceased for any individual having neurological function no more than in persistent vegetative state if he or she or his or her proxy clearly indicate the wish that life be considered ceased in such a state. 19

Even this stance admits the current impossibility of medicine to determine reliable clinical signs of instantaneous death, but anticipates a sort of patient based, self tailored definition of death (with all its social, moral, and legal implications).

CONCLUSIONS

We have argued that it is not possible to define exactly at which point death occurs for the purpose of transplantation. because there are no scientifically tenable criteria to do this at the time when organ retrieval is possible. We believe that it is in the best long term interests of donors, recipients, their families, society at large, and transplantation medicine to be honest to ourselves, our patients, and society and admit that the only thing we can do is to openly formulate moral, social, and scientific criteria for organ retrieval.

As other authors have suggested in different ways, such formulation might involve a full reassessment of the organ donation process and of the definition of what society should accept for the process to occur. Our proposal is that, for the time being, it should rest on the currently applied criterion of irreversible (however defined) asystole, with the open admission that it does not define "death" but only a moment in the process of dying where organ retrieval can be allowed.

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