

Certifying death: The brain function criterion

**Ethical issues in organ donation
Discussion paper No. 4**

National Health and Medical Research Council

NHMRC

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ISBN 0 642 27224 7

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Publication approval number:2071

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- Donating organs after death: ethical issues
- Ethical issues in donation of organs or tissues by living donors
- Ethical issues raised by allocation of transplant resources
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Publications and Design (Public Affairs, Parliamentary and Access Branch)
Commonwealth Department of Health and Family Services

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Introduction

In current Australian medical practice and relevant legislation, a person is said to be dead when there is either irreversible cessation of the circulation of blood or irreversible cessation of all function of the brain. When death is determined in the second way, a person is commonly said to be 'brain dead'. Though the certification of death using a brain function criterion has been closely linked to issues of organ donation and transplantation, the concept of brain death was not developed purely to subserve the interests of transplantation. Although the technological possibilities for transplantation and for maintaining bodily functions in patients with profound brain injuries developed somewhat contemporaneously, at the time when brain death was first described, transplantation was exclusively concerned with the use of organs from subjects in whom cardiac arrest had already occurred and the traditional criteria for death had been met. While most organ donation after death currently occurs from patients certified as dead using the brain function criterion, it is increasingly possible to transplant organs from 'non-beating heart donors' who may or may not also meet the brain function criterion. It is important, therefore, to note that someone who has difficulty accepting the concept of brain death may have no difficulty accepting organ and/or tissue donation after the certification of cardiovascular death.

The concept of brain death has generated considerable debate since it was first described in the 1950's and 60's. Widespread discussion in medical, legal and bioethical literature about the precise meaning of 'brain death' along with debates about its application continue. This paper examines the brain function criterion for death with particular regard to its relationship to organ donation. Part A first describes the concept of brain death which underlies current Australian practice. It then considers in more detail the development of this concept, its relation to the nature of the human person, Australian practices for certifying death by reference to loss of brain function, and debates about the notion of brain function itself. Part B examines some of the contemporary challenges which have been raised against this understanding of the brain function criterion and against its practical application.

This paper does not seek to persuade readers to accept the concept of brain death, but aims simply to explain what it means and why it forms the basis for one of the legal definitions of death in Australia.

A. Brain death and current Australian practice

1. Life, death and the certification of death

Death must be defined before it can be determined and certified. The certification of death is a quasi-scientific process depending on reasonably objective assessments¹. The definition of death, however, lies in the philosophical rather than the scientific domain because it involves judgments about the nature of the human person and about what it is for someone to be alive or dead.

The terms 'alive' and 'dead' are used in different ways in different contexts, and with considerable social, cultural and historical overtones. In the context of Australian legislation the concept of 'brain death' concerns what it is for a human person to be alive or dead. Various philosophical justifications for a legal definition of death in terms of loss of all brain function have been put forward. The most widely accepted view emphasises the unity of mind and body in the living human being. On this view, the death of a human person is understood to consist in the irreversible loss of the integrated and coordinated life of the person as a single living organism. When this functional unity is lost irreversibly, the person has died, even if 'life' continues at the sub-personal level of cells, individual organs or isolated physiological systems.

In the light of this definition of death, medical science seeks to delineate those clinical characteristics which indicate with certainty the loss of all brain function. The concept of 'brain death' is not intended to introduce a novel kind of death, but to identify the irreversible loss of the organic unity and integrated activity of a living human person. Since the term 'brain death' is now well established it will be used in this paper, despite its frequent misuse and despite rival interpretations of it.

2. The traditional clinical markers of death

The past thirty years have seen a reappraisal of both the meaning of, and the criteria for, the certification of human death. The need for this reappraisal has

¹ This paper is one of four in a series on the ethics of transplantation. The others are: *Donating organs after death: Ethical issues*; *Ethical issues in donation of organs or tissues by living donors*; and *Ethical issues raised by allocation of transplant resources*.

resulted from (i) the development and widespread application of medical technology to support and replace failing human organ systems and (ii) the need to resolve controversy surrounding organ donation for purposes of transplantation. These technological advances have challenged traditional and conventional attitudes to death and dying.

There have been three traditional clinical markers for death: the absence of consciousness, cessation of breathing and, once the importance of the circulation was appreciated, the cessation of cardiac function. These markers are associated with different views of the nature of the human person. While reference to the 'breath of life' has been historically pervasive, since the seventeenth century, especially, some philosophers (following Descartes [1596-1650]) have tended to equate consciousness with 'the person'. In criticising this idea, other philosophers have emphasised the importance of the human body and the embodiment of the person in the natural world.

The precise relationship among these three clinical markers of life and death has only become important in recent times. Previously any ambiguity or uncertainty in the assessment of these clinical features was not especially important because they were so closely linked. That is to say, if any of breathing, circulation or consciousness ceased, cessation of the other two would rapidly follow. Any clinical uncertainty was of no particular importance.

Medical technology has now severed the links among these three features. Mechanical ventilators can now support respiratory function for an indefinite period after breathing has ceased. Cardiac function can be suspended therapeutically for long periods and restored uneventfully. Cardiac function can also be successfully restored after it has ceased spontaneously. The development of artificial hearts and of cardiac transplantation has allowed people to live on, and indeed to live well, long after their own hearts have been replaced. Reliable mechanical ventilators have enabled patients with spinal cord injuries to continue to be conscious, interactive and intellectually functional in the absence of any form of spontaneous breathing. These technological advances have necessitated a re-evaluation of the centrality of breathing and cardiac function to the understanding of life and death.

3. Profound neurological injury

Brain death must be understood in the wider context of neurological injury in general. A profoundly injured brain in a body whose heart continues to function is one of the more difficult consequences of the application of medical technology. Before the advent of this technology, any severe brain injury, and certainly the destruction of the brain, would inevitably result rapidly in cessation of cardiac and

respiratory function. This is no longer so. Indeed, with the development of modern intensive care, it is now commonplace for patients with profound neurological injury to be managed with mechanical ventilation during their terminal illness.

Profound neurological injury is always relevant to decisions to limit or withhold medical treatment. Irreversible coma, even if the patient is not dying, has a crucial bearing on judgments about whether a treatment option would be futile, overly burdensome or would offer no proportionate benefits to the patient. Continuing inappropriate treatment in these circumstances may be an indignity to the patient (even if the patient is unaware of it) and may cause considerable distress to relatives. It almost invariably provides considerable distress to medical and paramedical staff who see their skills and the community's resources being used in the pursuit of disproportionate or futile ends. There are also significant resource implications in terms of both the actual cost and the opportunity cost of the application of scarce resources to a patient for whom consciousness cannot be restored.

In short, the decision to withhold or withdraw treatment from a severely brain injured patient may be appropriate, irrespective of whether the patient has been diagnosed as 'brain dead'.

Not every profound neurological injury leading to irreversible coma entails that brain function has ceased irreversibly. The development of the concept of 'brain death' has involved identifying the clinical criteria in addition to coma which indicate that integrated brain function has been lost. Although irreversible coma is the most evident manifestation of brain death, and so is often erroneously equated with it, it is important to emphasise that certifying death by the brain function criterion marks not merely the loss of consciousness, but the disintegration of the human person.

4. Irreversible cessation of brain function a valid criterion of death

The development of a brain function criterion for the determination of death recognises the centrality of brain function to any understanding of what it is for a human person to be alive. In the absence of brain function it is impossible for a person to continue to live as an integrated and coordinated organism. Total and irreversible loss of all brain function is thus a valid medical criterion of death. Previously this criterion could be diagnosed indirectly by cessation of breathing or circulation. The development of the concept of 'brain death', that is to say, the understanding of the significance of the loss of all brain function, now means that the direct demonstration of loss of brain function is a true criterion of death.

Certifying death in terms of the loss of brain function thus makes explicit what was the underlying significance of the traditional markers of death. Previously, breathing and circulation were central to the conception and certification of death: if either ceased, permanent cessation of brain function would follow. It has been necessary to develop a brain function criterion for death because technology both has severed the absolute dependence of brain function on spontaneous breathing and circulation, and has enabled breathing and circulation to be maintained artificially in the complete absence of brain function.

A functional criterion for death is very different from a structural or biological criterion. Given that cells can stay alive for short periods of time at least in biopsy specimens on laboratory benches and that whole organs may, if transplanted, continue to function long after the host body has been buried or cremated, it is implausible to think of the life of a human being as being merely the sum of the lives of its parts. So the definition of death cannot reasonably depend on the demonstration of the death of all of the cells which make up the human person. It is because of the centrality of brain function (and in particular of consciousness as its highest manifestation) to our understanding of what it is to be a person, that this concept has become a central focus of the clinical definition of death.

Human consciousness is dependent on the function of both the cerebral hemispheres (the 'higher brain') and the reticular activating system in the brain stem (the 'lower brain'). Destruction of either of these structures will result in permanent unconsciousness. Lower brain function also includes functions such as coughing, gagging, pupillary responses, reflex eye movement and breathing which can be simply and reliably assessed even in unconscious patients. If brain stem function is intact, the person continues to live and it is much more difficult to determine if coma is due to higher brain destruction and is therefore irreversible.

Patients in coma as a result of destruction of the higher brain may retain the ability to open their eyes and the capacity to breathe independently of a mechanical respirator. Patients with coma due to lower brain destruction retain no such capacities, are totally dependent on mechanical respirators and inevitably succumb, usually quite quickly, to cardiovascular collapse as the modulating effect of the brain stem on cardiovascular function is absent. Irreversible loss of consciousness may be due to partial or total brain injury. For the determination of brain death, irreversible coma must be due to injury to the brain so severe as to cause loss of all brain function.

5. Legal recognition of the brain function criterion for death

Difficulties in making a determination of death have been recognised since ancient times. Modern and ancient literature is replete with examples of the ambiguity involved in recognising the point of transition between life and death. While historically this has led to considerable concern about mistaken diagnosis and premature burial, substantive difficulties in the determination of death have only arisen through the impact of modern technology on conventional criteria.

What is now known as ‘brain death’ was described as early as 1959 under the name of ‘coma dépassé’ (literally, a state beyond coma).² Its codification and incorporation into legislation have only occurred more recently. In 1968 an ad hoc committee of the Harvard Medical School published a definition of death applicable to “those comatose individuals who have no discernible central nervous system activity”.³ The committee contained representatives of five faculties of Harvard University including the Medical School, the School of Public Health, the Divinity School, the Graduate School, and the Law School. This broad representation has resulted in the report of this committee being widely accepted and extensively endorsed throughout the world as ‘the Harvard criteria’ for certification of death using the brain function criterion. For the Harvard committee ‘irreversible coma’ was still the central notion. The committee cited two reasons for the need for this new criterion for death: (i) the burdens occasioned by the continued treatment of those “whose heart continues to beat but whose brain is irreversibly damaged” and (ii) controversy in obtaining organs for transplantation due to “obsolete criteria for the definition of death”.

Eight years later the Medical Royal Colleges and their Faculties in the United Kingdom released a statement which equated permanent functional death of the brain stem with brain death and thus with death itself.⁴ Although the Royal Colleges accepted advice from the Transplant Advisory Panel, they did not list facilitation of transplantation as a motivating factor in the development of a new criterion for death. These US and British documents have informed medical practice in most English speaking western countries ever since.

Both the Harvard ad hoc committee and the Medical Royal Colleges and their Faculties of the United Kingdom opted for a demonstration of both unconsciousness and permanent loss of brain stem function as necessary prerequisites to the determination of death. Presumably these requirements relate not only to the clinical certainty with which brain stem function can be assessed but also to the

² P Mollar et M. Goulon, “Le coma dépassé” (mémoire préliminaire). Rev. Neurol. 101 (1959): 3-15.

³ “A Definition of Irreversible Coma”, Journal of the American Medical Association 205/6 (August 5 1968), pp. 85-88.

⁴ “Diagnosis of brain death”, British Medical Journal (13 November, 1976), pp. 1187-1188.

socio-cultural unpreparedness to accept as dead patients who breathe spontaneously and may open their eyes, as may be the case with patients who have suffered isolated cerebral hemispheric destruction, but have not lost all brain stem function. While the UK and the US definitions both require loss of consciousness, the original difference between these definitions with respect to brain function — between whether loss of brain stem function or loss of brain stem and cortical function is required — persists to this day (see Part B. s.3 (b) below).

In 1977 the Law Reform Commission in Australia recommended a definition of death which requires not just brain stem death, but the “irreversible cessation of all function of the brain of the person”. Legislators in the USA and in Australia have maintained this understanding of brain death. In the USA, the President’s Commission for the study of ethical problems in medicine emphasised both consciousness and the integrative or organising function of the brain with respect to other bodily functions.⁵ This was enacted in the Uniform Determination of Death Act as “irreversible cessation of all functions of the brain including the brain stem”.⁶ In Australia, the recommendations of the Law Reform Commission have been enacted in legislation in most of all the States and Territories with the exception of WA. Thus in Australian law, death is generally defined as either irreversible cessation of circulation of blood in the body of the person or irreversible cessation of all function of the brain of the person⁷.

6. Australian practice for certifying death by reference to loss of brain function

The clinical criteria employed to determine death using the brain function criterion are designed to provide ‘practical’ or ‘moral’ certainty (that is, certainly beyond any reasonable doubt) that the person has died. Since this certainty may be attained in a variety of ways, the procedures at different Australian hospitals may vary slightly. Nonetheless, based on the statutory definition of death (where applicable) and on professional codes of practice, the certification of death by reference to loss of brain function has become reasonably standardised in Australia along the following lines.

Two doctors of prescribed experience are required to undertake the certification where organ donation is to occur. The experience and standing of the doctors are usually carefully specified. Neither doctor should be caring for a potential organ transplant recipient. Generally, one of the two doctors must be a specialist with

⁵ President’s Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioural Research, *Defying Death: Medical, Legal and Ethical Issues in the Definition of Death* (Washington DC: US Government Printing office, 1981).

⁶ See President’s Commission, p. 2.

⁷ Western Australia has not adopted a statutory definition of death.

training and experience in the necessary procedures. The doctors must first establish that certain prerequisites have been met. The patient must have sustained a brain injury which is sufficiently severe to account for the irreversible loss of brain function. Usually this requires special radiological investigations such as computed tomographic ('CT') scans. There must be certainty that the neurological dysfunction could not be caused by drugs or metabolic conditions such as hypothermia, hypoglycaemia or hyponatraemia.

After an appropriate period of observation, during which routine assessment has detected no evidence of brain function, the two doctors independently document that brain function has irreversibly ceased. To do this, careful examination of the patient is required to ensure that the patient is completely unconscious and has lost all reflex function involved in coughing, gagging, eye movement, blinking and pupillary responses. Finally, the complete absence of any attempt to breathe is established by careful observation of the patient during a period of several minutes while he or she is disconnected from the mechanical respirator. As a further assurance of irreversibility, formal testing may be repeated up to twenty-four hours later.

The final test, called the 'apnoea' (absence of breathing) test, usually entails the demonstration by a blood test that the level of carbon dioxide has risen beyond the level which normally provides a potent stimulus to breathe. Irreversibility is established in the light of the nature of the injury causing the brain injury, the period of observation prior to the performance of the formal testing, a period during which the complete absence of brain function in response to standard clinical testing is established, and finally by repetition of the testing process where necessary.

Occasionally, clinical testing of brain function cannot be reliably completed and so death according to the brain function criterion cannot be established on clinical grounds alone. This might be so if anaesthetic drugs have been administered as part of normal treatment or if injury to the head prevents the very detailed clinical examination required. If this is the case, then death may be established by demonstrating that all blood flow to the brain has ceased. An angiogram of brain blood vessels or a radio-isotope study is required to be sure that blood flow to the brain has ceased.

7. Questions about 'brain function'

Since the original formulation of the concept of brain death in the late fifties and early sixties, more sensitive neurological tests have been developed. These developments have led to some of the controversy about the precise meaning of 'the cessation of all brain function' in the determination of brain death.

The ad hoc committee of the Harvard Medical School wrote “an organ, brain or other, that no longer functions and has no possibility of functioning again is for all practical purposes dead”. This is the principle which was also espoused by the Law Reform Commission in Australia and is the tenet on which certification of death legislation has been founded and has achieved widespread although not universal consensus. Although the term ‘function’ was not defined precisely, the Law Reform Commission and the President’s Commission recognised that electrical and metabolic activity of cells may continue after an organ has ceased functioning. Both thus spoke of function rather than activity. But the lack of a precise definition of ‘function’ has occasioned some controversy about the application of a brain function criterion, and the clinical tests for it, in the determination of death.

In particular, it has been pointed out that patients who fulfil the clinical criteria for loss of all brain function as it is commonly assessed may nonetheless exhibit some persistent neuroendocrine activity, as well as spontaneous and inducible electrical activity. It has thus been suggested that the current clinical criteria for assessing brain function do not establish that all brain function has been lost, that is, that death has occurred, but only that death will occur in the near future.

This objection, however, depends on an interpretation of the words “all function” which seems not to accord with the meaning the legislation sought to express. It is significant that the Law Reform Commission did not seek to define “function”. Neither did it define how function should be assessed. In fact, it very specifically recommended that detailed criteria should not be enshrined in legislation and that specific guidelines in accord with best, current, professional procedures were preferable to detailed legislation. Guidance as to what was intended by the Law Reform Commission is provided by its use of the term “function” rather than “functions” or “activities”. Further guidance is perhaps provided by the Commission’s explanatory sentence in relation to irreversible cessation of all brain function. “The patient can never again have consciousness, memory, knowledge, thought, feeling, sight, hearing, touch, speech, or any other sense of any kind.” This would seem to indicate a notion of “function” far beyond mere cellular activity, or even isolated physiological activity, a notion more suggestive of coordinated activity directed toward integrated and conscious human existence.

The organic process of dying and decay is a continuous one extended over time. Thus even when death occurs in the conventional sense of a sudden and recognisable cessation of circulation and breathing, not all cells and organs die simultaneously. Skin, bone and corneas may be retrieved many hours after the occurrence of death in the conventional sense and used for transplantation as viable tissues. This perception of dying as a process rather than an event is even more understandable when medical technology is used further to prolong the survival of some organs and tissues as others progressively cease to function.

From a philosophical and ethical perspective, the death of a human being consists in its dissolution as a single living entity. With respect to the organic process of dying, the certification of death is the certification that a critical point in this process has been passed, not that the process is at its end. The critical point, marked by the loss of all clinically-detected brain function, is the point after which the integrated life of the individual has ceased irreversibly, even if isolated activity in the brain persists. Some persisting endocrine activity does not constitute clinically detected brain function as envisioned in legislation governing the brain function criterion.

Just as the life of a composite organism cannot reasonably be seen as the sum of the lives of each of its component parts, so the function of the whole cannot reasonably be seen as the sum of the functions of each of its component parts. In requiring the cessation of all function of the brain, the brain death criterion focuses on what is central to the organic unity of the living human person. This ‘singular’ notion of function equates well with the Law Reform Commission’s explanatory statement noted above. The President’s Commission was also aware of this problem of differentiating function from activity. It suggested that function should be considered as an activity which is organised and directed. Of course, this begs the question somewhat in that a philosophical judgment about the value of direction depends on that to which direction leads. Many biological processes are legitimately seen as organised and directed. However, the production of a particular chemical product by no matter how well structured a process does not amount to the integrated functioning of a human being. Of course, if a sufficiently reductionist view of ‘function’ is used then the utility of a functional criterion collapses entirely and the problem of persistent cellular and organ function in explanted tissue and cold ‘lifeless’ bodies remains.

B. Discussion of challenges to the brain function criterion

Having considered the understanding of brain death which underlies Australian legislation and current medical practice, this paper next considers some of the challenges that have been raised against the theory and practice of determining death by the brain function criterion. Four distinct kinds of challenge may be distinguished.

Challenge 1

“Brain death is not death”

A first set of challenges to the identification of the death of human being with the irreversible cessation of brain function derives from the idea that brain dead individuals do not appear to be dead.

Because of the technological support that can be given to the brain dead body, it may continue to manifest many of the outward signs of life. Since life and death are not hidden events, a body which manifests sufficient evidence of organic organisation and life cannot be considered to be dead. Moreover, if the bodies of brain dead individuals can be kept alive for long periods of time, does this not indicate that they are not, in the ordinary and traditional sense of the word, dead?

“If the heart still beats and the body still breathes (even with a ventilator) and the body is warm and organs are maintained (somewhat) then it is a fiction to say the body is dead. Death is not a hidden thing: it is manifest, and such a body is manifestly still alive”.⁸

This view emphasises the visible signs of life. It accepts that “once the balance of the body is lost, once the system has fallen and the pieces are scattered” the person is dead.⁹ But it does not accept that evidence of brain function loss as assessed by the current criteria is enough to overturn the presumption that a warm and breathing body is in fact alive. The implication of this view is that the cessation of bodily functions that is necessary for death is much more extensive than is currently required, so extensive as to make any prolongation of the life of organs and systems impossible.

⁸ David Albert Jones, “Nagging Doubts about Brain Death”, *Catholic Medical Quarterly* (February 1985), p. 12.

⁹ Jones, p. 12.

Discussion

The image of the warm, ‘living’ body of the brain dead individual is a powerful one, and it is unlikely that all people, even health care professionals, will easily accept that the brain dead individual is simply dead. As noted already, those who do not accept the brain function criterion for death may nonetheless accept organ donation from all who meet the traditional cardiac criterion for death, including brain dead individuals from whom external ventilation is removed long enough to demonstrate the absence of spontaneous breathing and circulation. Furthermore, it is true that as intensive care procedures are able to substitute for more and more of the brain’s functions, it is possible to maintain a brain dead patient for long periods in such a condition that many will find it hard to accept that the patient is dead.

However, those who accept the brain function criterion may distinguish between two different ways of thinking of a ‘living’ human body. On the one hand, the body of a living human being is not simply a collection of warm interconnected and functioning organs. It manifests an intrinsically ordered and co-ordinated life which depends on the combined functioning of numerous physiological systems, in particular the nervous system and the endocrine system. Advocates of the brain death concept argue that a brain dead body, on the other hand, lacks this intrinsic unified organisation, even though it may retain some degree of organisation as well as the appearance of life, thanks to ventilators and other medical technologies. It is significant that the recent survey conducted by the Australian Transplant Co-ordinators Association found that over 80% of respondents believed that their family member died when his or her brain stopped working.¹⁰

While some people have concluded that organs should not be removed from patients who meet the brain death criteria because they believe that they are still alive, others draw a very different conclusion. They suggest that the concept of brain death was not introduced because its proponents really believed that such patients were actually dead, but rather as a “convenient fiction” which enables ventilator support to be withdrawn from patients, and allows organs to be transplanted in good condition.¹¹ On this view, death is the absence of consciousness and personality, and what the brain death criterion purports to identify — death as dissolution of the living individual — is of no real philosophical or ethical importance.

On this view, the integrating function of the brain is not crucial to human life because the “co-ordinated forces of modern intensive care medicine have replaced the role of the brain in regulating the body”.¹² The brain is only thought to be

¹⁰ ATCA, 1995, National Donor Family Study Report (Q.33), p. 23.

¹¹ Peter Singer, *Rethinking Life & Death* (Melbourne: Text Publishing Co., 1994), p. 35.

¹² Singer, p. 31.

crucial because of its link with “our consciousness and our personality”.¹³ Acceptance of the brain function criterion reflects an “ethical” judgment that “what really matters is the irreversible loss of consciousness”.¹⁴ On this basis it has been proposed that the following two questions need to be separated: When does a human being die? and When is it permissible to remove organs from a human being for the purpose of transplantation? Once these issues have been separated, it has been argued that it is not necessary for a person to be dead for transplantation to be permissible.

By now it should be clear that the thrust of the above argument is radically to challenge the importance of organic integration to the existence of the human person. This paper has sought to explain the significance of human death in a way which is consistent with current legislation about the brain function criterion. On this understanding, which is the longstanding and traditional understanding of the human person, the person is not a mind in a body (as Descartes claimed), but is a unity of mind and body, a living individual who is a centre of both physical and psychological activities. From the organic perspective, it is possible to think of replacing different organs and maintaining life and even, to a limited extent, substituting for the organising functions of the brain. Yet, the difference between the function of the brain and the functions of all other organs lies in the uniqueness of the brain’s integrating role “as supreme regulator and co-ordinator”.¹⁵ If the dynamic organising function of the brain is irreversibly lost, then there is no living human body, and so no living human person. To the extent that the organs and tissues of a brain dead individual can be maintained, it is merely as organs, tissues and partial systems, and not as the body of a living person.

Challenge 2

“Brain death is death, but the current clinical criteria do not reliably establish brain death”

(a) The irreversibility of brain death

One of the earliest controversies surrounding the brain function criterion for death related to the ‘irreversibility’ of brain function loss. There were accusations in the popular press that patients fulfilling the brain function criterion for death as applied in the United Kingdom were capable of and, indeed, had made complete recoveries.

¹³ Singer, p. 32.

¹⁴ Singer, p. 50.

¹⁵ D. Lamb, *Death, Brain Death and Ethics* (London: Croom Helm, 1985), p. 75, quoted in Peter McCullagh, *Brain Dead, brain absent, brain donors* (Chichester: John Wiley, 1993), p. 19.

Discussion

These stories have never been substantiated in scientific journals. The most likely explanation of reports of patients who have recovered from coma is that they have not fulfilled the strict criteria for the establishment of ‘brain death’. No patient who has fulfilled the strict brain function criterion for death has ever been documented to have recovered. The brain function criteria listed in the statement of the Medical Royal Colleges and their Faculties of the United Kingdom seek to identify those patients with no possibility of even partial recovery from coma. Twenty years later, this basis remains well established.

(b) *The accuracy of the current clinical assessment of loss of all brain function*

It is now clear that patients fulfilling the brain function criterion for death as it is currently assessed may retain some neuroendocrine activity and spontaneous and inducible electrical activity. It also seems clear that with careful medical management, some such patients could be maintained on mechanical ventilation and other artificial supports for quite long periods of time. This has led to a questioning of the reliability of the clinical assessment of brain function and to the suggestion that the clinical assessment of the loss of all brain function indicates not that death has occurred but only that it will inevitably occur in the near future. It has even been argued that current practice falls outside the strict bounds of Australian law.¹⁶

Discussion

This challenge was touched upon briefly above. Several different issues need to be distinguished:

i) *Are the current criteria sufficient reliably to assess brain function?*

The functional attributes of the brain which have been felt to be important for the establishment of death based on a brain function criterion have varied little throughout the world. The medical consultants to the President’s Commission in the USA were specific in reporting that the “functions of the entire brain” that are relevant to the determination are those that are “clinically ascertainable”. The Medical Royal Colleges in the UK and professional bodies in Australasia have consistently endorsed clinical criteria in the assessment of brain function. In spite of the reported controversies concerning the clinical assessment of brain function, these clinical criteria have been reiterated in recent times by the Medical Royal

¹⁶ Eg both by Peter Singer p. 36, and by Nicholas Tonti-Filippini, Submission to Australian Health Ethics Committee Transplantation Ethics Working Party (March 1995): The Need to Review Australian Organ Procurement Practice, pp. 15-18

Colleges and their Faculties in the United Kingdom, by the American Academy of Neurology and by professional societies in Australia and New Zealand. The criteria as currently applied in Australia establish the irreversible cessation of the functions of the brain that are assessed and the presence of irreversible coma. These criteria establish irreversible loss of both brain and brain stem function, and fulfil the legal requirement for death.

ii) Do the current criteria fail to detect some brain function?

‘Brain death’ usually occurs as a consequence of a massive brain insult which causes brain swelling and an increase in intracranial pressure. This usually results in the death of all the brain cells as the pressure becomes too high to allow blood flow into the cranial vault. Occasionally, small nests of cells survive this process even in patients who fulfil current clinical criteria for the establishment of a determination of brain death. These make no significant contribution to the function of the brain as a whole in spite of the fact that their persistent activity may be detectable by a variety of investigational techniques. This evaluation derives from a particular conception of the term “function” but one that is consistent with that espoused by both the President’s Commission and the Law Reform Commission.

iii) Do the current criteria meet the legislative requirement for loss of all brain function?

As noted above (A. s. 7), the term “all function of the brain” as it is enshrined in Australian legislation is not clearly defined. It is, therefore, difficult to show that the means by which the brain function criterion is currently assessed violate either the spirit or the letter of the legislation. Moreover, current practice is true to the philosophical groundings of both the concept of a brain function criterion and the statute. Most importantly, it is the presence of injury to the brain sufficient to cause loss of all brain function that is crucial to the use of the current clinical criteria. The criteria do not assess brain function ‘in isolation’, but in the context of massive injury. It is in this context that the irreversible loss of brain function is reliably assessed by the current criteria.

While a legislative refinement of the concept of “all function of the brain” might be desirable, it is the argument of this paper that an understanding of the concept of death implicit in both the current definition and in current practice should be sufficient to allay fears that the current criteria are inadequate. What is most desirable in the short term is the careful use and dissemination of the current clinical criteria, along with an understanding of their philosophical presuppositions.

Challenge 3

“The Australian legal formulation of brain death is too strict and should be changed”

(a) *A higher brain function (neo-cortical) criterion should be adopted*

Some argue that the philosophical basis for current practice and for the general acceptance of any brain function criterion relies on the cardinal importance of consciousness to the essence of human personhood.¹⁷ This would be better reflected in a ‘higher centre’ brain function criterion rather than a whole brain criterion. On this view, brain stem function has no special philosophical significance, a contention which is supported by the abandonment of the conventional respiratory and cardiovascular criteria for the certification of death (given that these are largely ‘lower’ brain functions). Indeed, it is argued that these traditional criteria for death were important only in that they subserved consciousness and were necessarily abandoned when it became clear that consciousness could be restored or preserved after breathing and circulation ceased. Another argument for this proposal maintains that only when “there is the capacity for organic (bodily) and mental function present together in a single human entity is there a living human being”.¹⁸ This view appeals to the ‘integration’ of mind and body as what is distinctive of the human being; when either is lost, it is suggested, the person is dead.

In support of this proposal, it has been argued that even the current brain function criterion involves some distinctions between which ‘functions’ are acknowledged as relevant and which are not (eg isolated cellular activity). A further move to make ‘higher brain’ functions the critical ones for assessing death simply recognises the centrality of awareness and cognition to the essence of human existence: it is argued that this makes more sense than does attention to “all” functions of the brain and brain stem or decisions about which ‘functions’ are significant.¹⁹

Discussion

This proposal would involve a radical shift in the understanding of the human person. The traditional understanding implicit in current legislation recognises the mind-body unity of the human person, and hence the importance of the ‘integration’ of mind and body. Yet it is only as a living, bodily organism that a

¹⁷ Singer, p.50.

¹⁸ Robert M Veatch, “The Impending Collapse of the Whole-Brain Definition of Death”, *Hastings centre Report*, 23/4 (1993): 18-24.

¹⁹ Veatch, p. 21.

human person is alive, and able to develop and exercise conscious activity. To propose that the ability to breathe and to swallow can be so lightly dismissed is to undermine the significance of integrated bodily life to the understanding of the human person. Tragically, a human person may be gravely debilitated in either mind or body, but massive injury to either on its own does not mean that a person is dead. (It does not follow, of course, that futile or disproportionate treatment may not be withheld or withdrawn from such a patient.)

It is not surprising, therefore, that a higher brain function criterion would obviously face major practical difficulties, especially if it were to be used for proceeding with organ donation for transplantation. Patients fulfilling a higher centre criterion would include those in a so-called ‘vegetative’ state as well as anencephalic infants. Such patients breathe and may swallow and open their eyes. Roving eye movements may give the appearance of interest in the environment. Although it has been suggested that a higher centre criterion could achieve wide public acceptance if underlying issues were better understood, this is by no means clear.

In addition, a higher brain function criterion would give rise to significant difficulties in application. The current criteria can provide certainty about the loss of all brain function. By contrast, certainty about loss of higher brain (or neocortical) function is much more difficult, perhaps impossible, to achieve and would require much longer periods of observation. It is counter-intuitive to suppose that a period of observation of weeks or months is necessary to establish whether or not a patient is dead.

(b) *A lower brain function (brain stem) criterion should be adopted*

Another approach to the empirical and intellectual difficulties associated with the whole brain function criterion is the advocacy of a brain stem functional criterion. This has been recently endorsed by the Medical Royal Colleges and their Faculties in the United Kingdom and appeals to the primacy of consciousness without the ambiguity and uncertainty of the higher centre criterion.²⁰ At the basis of this is a proposed redefinition of death as “the irreversible loss of the capacity for consciousness combined with the irreversible loss of the capacity to breathe”.

Discussion

On its own loss of brain stem function only indicates that brain death will occur (unless cardiac function and cerebral blood flow are maintained), not that it has occurred.

²⁰ See “Criteria for the diagnosis of brain stem death”, *Journal of the Royal College of Physicians of London*, 29/5 (1995): 381-382.

Nonetheless, this approach is very close to current practice in that clinical assessment focuses on brain stem functional assessment. Furthermore, most patients with brain stem destruction have sustained this injury as a result of the destruction of the higher brain centres and so fulfil the current brain function criterion. It is theoretically possible, however, that patients fulfilling a brain stem criterion might have sustained the injury as a result of a process only affecting the brain stem. Such patients would be totally incapable of any interaction with the environment including any sensation or movement or expression. It is not possible to say, however, that they are incapable of thinking. Current practice completely excludes this possibility in requiring, as a pre-requisite to testing, an injury which is sufficient to account for the loss of all brain function.

Challenge 4

“Brain death is death, but can families appreciate this?”

(a) *Misuse of terminology*

Patients who fulfil the brain function criterion for death are commonly said to be ‘brain dead’. This term, unfortunately, suggests that there are two ways of being dead, being ‘brain dead’ and being ‘really dead’. The term ‘brain death’ is also used, incorrectly, in other contexts to describe much lesser degrees of neurological dysfunction than it strictly implies. It has even been used in an allegedly comical sense to deride those who are slow to understand a joke or who fail to see issues in the same way as the speaker. This misuse of the term is to be found in the medical and related professions as much as in the general public. It has led to confusion surrounding the idea of a brain function criterion and its relation to ‘brain death’. It may be that it is too late to reclaim the term for its legitimate use. Whenever it is used, it is important that it is sufficiently qualified to ensure that its meaning is clear, and professional medical bodies may have a role to play in encouraging correct application of the term.

(b) *Family needs and the brain function criterion*

Even apart from confusion over the use of the term ‘brain death’ it can be very difficult for families to fully understand the reality of death based on a brain function criterion. To casual observation, patients fulfilling the brain function criterion for death appear to be sleeping rather than dead. The skin is warm. The chest rises and falls with mechanical ventilation. The heart and the kidneys continue to function. There are even reports that pregnancy may be maintained in patients fulfilling the brain function criterion for death.

This ambiguity is reflected in the way medical and paramedical staff relate to the beating-heart cadaver in the period before organ donation. Nurses will often talk

to such a cadaver as they carry out their nursing care as if the body retained the ability to hear. While it is usual to speak of taking a cold, lifeless ‘body’ to the mortuary after death has occurred in the conventional sense, it is difficult to explain to families that the organ donor’s body, rather than the person, is being transferred to the operating theatre for organ retrieval. Mechanical ventilators, so-called ‘life support machines’, continue the same function after the patient has been declared dead as they did five minutes earlier.

Perhaps the best expression of the practical difficulty of the concept of ‘brain death’ is that the event which signifies the time of death when the brain function criterion is used, the medical examination, has no relationship to any event which then occurs in the patient or is visible to family and friends. The certification of brain death is a certification of what has happened — irreversible loss of all function of the brain — minutes, hours or even days earlier. This contrasts with the obvious finality of the removal of the ventilator, cessation of the heartbeat or even removal of the heart.

Discussion

These empirical and conceptual difficulties associated with the brain function criterion indicate a need for great care in dealing with the families of affected patients. Acceptance of death by the brain function criterion in the context of organ donation asks much more of a family than does the same diagnosis with a view to cessation of treatment. Community education programs might go part way in helping families understand the issues involved but there will always be a need to provide grieving relatives with the opportunity to deal effectively with their grief and with the particular problems which the brain function criterion engenders.

Detailed explanations with appropriate written material should be provided. Practitioners dealing with families should be trained in the process of explaining the brain function criterion and in grief counselling in general. Families should be provided with the opportunity to ask relevant questions and to have their questions answered in a genuinely sympathetic environment. Sufficient time should be provided to ensure that families really understand the brain function criterion before the issue of organ donation is broached. Families should then be allowed whatever time and assistance are necessary to make a decision concerning organ donation and then to deal with the particular grieving problems over the ensuing days and weeks. They should be offered the opportunity to view the body after the retrieval process has occurred when it has the appearance of being dead.

Conclusion

The need to ensure that the end of human life is recognised and respected in an era of advancing medical technology has challenged traditional ways of thinking about life, death and the process of dying. This paper has reviewed some of the issues surrounding the development and application of a relatively new way of thinking about and determining death. It has sought to explain the understanding of death and of the human person which is implicit in the current legislative definition of death as the irreversible cessation of brain function. This definition has led to considerable community discussion and to reflection on what constitutes the life of the human person. The assumptions and application of the brain function criterion have been criticised and challenged. Continuing discussion of these issues is desirable to ensure that the relevant philosophical considerations and practice are well understood and maintain their community acceptance.

Acceptance is especially important given the close links between the brain function criterion and the practice of organ donation for transplantation. The current shortage of organs for transplantation relative to need has led to calls for increased organ donation which have, in turn, placed pressure on medical practitioners to meet the increased need. It is essential that all aspects of organ donation, including its link to the brain function criterion for death, receive ongoing public scrutiny if the needs of the community with respect to both organ transplantation and dying with respect and dignity are to continue to be fulfilled.

Appendix 1

Transplantation Ethics Working Party

Terms of Reference

The aim of the Australian Health Ethics Committee's (AHEC's) work in this area is to address in a broad fashion social issues not dealt with in the guidelines for donation of cadaveric organs and tissues currently being developed by the National Health Advisory Committee of the National Health and Medical Research Council (NHMRC)¹.

The aim of the overall project is to produce information that:

- a) is both practical and informative;
- b) provides guidance to clinicians, policy makers and support services on ethical aspects of organ donation and transplantation; and
- c) provides a basis for informed community debate.

Membership

Dr Bernadette Tobin (Chairman)
John Plunkett Centre for Ethics
St Vincent's Hospital (NSW)

Dr Joan Asher
General Practitioner (ACT)

Dr Paula Boddington
Department of Philosophy
Australian National University (ACT)

Mr Sam Choucair (Convenor)
Federation of Ethnic Communities' Councils of Australia — Health Network
(NSW)

Reverend Dr Gerald Gleeson
Catholic Institute of Sydney (NSW)

¹The NHMRC report *Recommendations for the donation of cadaveric organs and tissues* was finalised in June 1996 and is currently available for purchase through the Australian Government Publishing Service (AGPS) on phone: 132 447 (freecall).

Dr John Mahony
Department of Renal Medicine
Royal North Shore Hospital (NSW)

Ms Eileen McNally
Department of Social Work
The Canberra Hospital (ACT)

Dr Peter McCullagh
The John Curtin School of Medical Research
Australian National University (ACT)

Dr Ray Raper
Intensive Therapy Unit
Royal North Shore Hospital (NSW)

Mr Ken Reed
Transplant co-ordinator
Royal Perth Hospital (WA)

Mr Russell Scott
Lawyer (NSW)

Professor Ross Sheil
Transplantation Unit
Department of Surgery
University of Sydney (NSW)

Associate Professor Colin Thomson
Faculty of Law
University of Wollongong (NSW)

The National Health and Medical Research Council

The National Health and Medical Research Council (NHMRC) is a statutory authority within the portfolio of the Commonwealth Minister for Health and Family Services established by the National Health and Medical Research Council Act 1992. The NHMRC advises the Australian community and Commonwealth, State and Territory Governments on standards of individual and public health, and supports research to improve those standards.

The NHMRC advises the Commonwealth Government on the funding of medical and public health research and training in Australia and supports many of the medical advances made by Australians.

The Council comprises nominees of Commonwealth, State and Territory health authorities, professional and scientific colleges and associations, unions, universities, business, consumer groups, welfare organisations, conservation groups and the Aboriginal and Torres Strait Islander Commission.

The Council considers and makes decisions on reports prepared by committees and working parties following wide consultation on the issue under consideration. A regular publishing program ensures that Council's recommendations are widely available to governments, the community, and scientific, industrial and educational groups.

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