Brain death: a finished discussion?

Edison Moraes Rodrigues Filho 1, José Roque Junges 2

Abstract
This article is a narrative review of the main authors who establish objections to the use of the concept of brain death as a synonym for death. It focuses on their biological and philosophical inconsistencies of the concept and proposes the discussion of the topic using the epistemological concepts of Popper and Kuhn. The article adopts the concepts of biopower and biopolitics as tools in the analysis of brain death, especially in relation to the inevitable intersection with organ donation and transplants.

Keywords: Brain death. Bioethics. Transplantation.

Resumo
Morte encefálica: uma discussão encerrada?
O presente artigo faz revisão narrativa dos principais autores que estabelecem objeções à utilização do conceito de morte encefálica como sinônimo de morte, com foco em suas inconsistências biológicas e filosóficas. Propõe a discussão do tema recorrendo aos conceitos epistemológicos de Popper e Kuhn. Utiliza os conceitos de biopoder e biopolítica como ferramentas de análise da morte encefálica, especialmente no que concerne a sua inevitável intersecção com a doação e transplantes de órgãos.


Resumen
Muerte cerebral: ¿una discusión cerrada?
Este artículo es una revisión narrativa de los principales autores que establecen excepciones a la utilización del concepto de muerte cerebral como sinónimo de muerte, centrándose en sus inconsistencias biológicas y filosóficas. Se propone la discusión del tema usando los conceptos epistemológicos de Popper y Kuhn. Utiliza los conceptos de biopoder y de biopolítica como herramientas en el análisis de la muerte cerebral, especialmente en relación con la intersección inevitable con los trasplantes de donación de órganos.


1. Doutorando vitangel@terra.com.br 2. Doutor roquejunges@hotmail.com – Universidade do Vale do Rio dos Sinos, São Leopoldo/RS, Brasil.

Correspondência
Edison Moraes Rodrigues Filho – Rua da Gávea, 64/casa 3, Ipanema CEP 91760040. Porto Alegre/RS, Brasil.

Declaram não haver conflito de interesse.
Brain death: a finished discussion?

Death was recognised only by cardiorespiratory criteria in the past. The techno-scientific advances of the twentieth century, such as the advent of mechanical ventilation and intensive care, made possible the support of cardiorespiratory function in victims of severe and irreversible neurological damage. Parallel to that, the development of organ transplants also influenced directly and indirectly the discussion on the fate of those patients, leading to the creation of a neurological death criteria. In Brazil, the diagnosis of brain death is confirmed by two clinical exams and a supplementary examination, as required by the Resolution 1,480/97 of the Federal Council of Medicine (Abbreviated as CFM in Brazil - Conselho Federal de Medicina) 1.

Most advocates of brain death as a synonym for death of the organism share the same paradigm that the term “cerebral death” refers to an irreversible biological phenomenon, which results in the permanent interruption of the life of the organism 2. This premise provides moral support for the removal of organs from people considered dead, what is known as dead donor rule 3. The idea that death is the permanent cessation of the integrated functioning of a body and that brain death is a sufficient criterion for determining when such interruption occurs is also part of this vision.

The main reason for this belief comes from the fact that the brain is considered irreplaceable, as well as being the main integrator of the whole organism 2. Another argument is that, ultimately, every death is cerebral, causing irreversible cessation of cardiorespiratory functions 3. However, despite being widely used and established in several countries as a criterion for death of the organism, both for the suspense of vital support as well as organ donation, the diagnosis of brain death still remains a subject of controversy as a synonym for death of the organism 4.

These divergences manifest themselves in the different criteria that are used worldwide to define brain death. Based on various philosophical principles, these parameters stipulate variable intervals between clinical trials, various assignments of the professionals in charge of carrying out such tests and whether or not the execution of additional procedures are necessary 5. A certain uneasiness is still frequent among the professionals involved, especially among critical care physicians, at the time of suspension of life support or at the time of filling in the death certificate 6,7.

Despite the fact that this uneasiness is generally attributed to the lack of knowledge about the method 8, philosophical and biological doubts persist and should not be underestimated as they can, even if intuitively, be the answer for this discomfort. In this review, we discuss the concept of death, especially the brain death, the biological and epistemological inconsistencies of this classification, in addition to the “necessity” of this diagnosis as a way to provide organs for donation and transplantation purposes.

What is death?

Every definition of death should grasp the common sense of the word used by anyone, not being primarily a legal or medical term 9. But here we will hold to the biological paradigm, which definition is the permanent loss of critical functions of the organism as a whole 10. Organism as a whole is an old concept of theoretical biology 11 regarding the unit of an organism and its functional integrity, and not simply the sum of its parts - a concept that brings in its core the notion of critical functions 12.

Critical functions are those without which the body can not function as a whole, namely the control of respiration and circulation, the homeostatic and neuroendocrine regulation as well as the conscience. Death, therefore, would mean the irreversible loss of all these functions 13.

The current concept of death implies the irreversible loss of cardiorespiratory or brain function (brain “as a whole” or brain stem, according to the country in question) as a condition to attain the loss of all these critical functions 10. It is interesting to highlight that the irreversible loss of cardiorespiratory function must be natural, since it is possible to keep it artificially - which often happens in practice - for varying periods of time 9.

Another key aspect, but difficult to answer, is whether the death is an event or a process. The Harvard Medical School Committee had a decisive influence on this issue when, in 1968, they chose to define it as an event 14. It is not surprising that several laws and medical guidelines have adopted the same classification after that decision 15.

One of the problems that can afflict the professionals involved in such situations is that the idea of death as an event seems to hurt the common sense. This is also reflected in the literature, in view of the extensive resumption of the discussion of death as a process 16-19. In a very general way, it can be said that death begins at birth. More practically, however, it would be possible to consider that,
even when extremely short, this process still takes a lapse of time, not exact, in the linear view of time.

**Inconsistencies of the biological diagnosis of brain death**

There are several ways in which functions of various organs of the body and subsystems may be integrated in order to maintain homeostasis and resist entropy. Integration may occur from a central integrator, an organ which receives signals from various other organs and subsystems, processes them, and then returns these signals to the subsystems, coordinating the various functions of the parts of the organism. Proponents of brain death argue that the only central integrator possible is the brain because it is irreplaceable in implementing these regulatory functions.

Another possible way to integrate the functions of various organs is through the decentralised interaction in which the parts are coordinated through the ability to feel, receive and process signals between each other. Shewmon argues that this form of integration and decentralised operation can occur between the parts of an organism without any participation of the brain. The author cites numerous cases involving the high neck section, isolation of the brain by Guillain-Barre syndrome or even death brains with artificially-induced respiration, in which there was a high degree of functional integration in the absence of regulation by the brain or by any other central integrator.

Shewmon completes his examples mentioning that organisms with dead brain have the same functions of unquestionably living patients in intensive care units (ICU), and managed to keep these functions with little external support. It is also noteworthy that a study conducted by histopathological findings suggested that even when clinical guidelines for brain death were properly implemented, more than 60% of donors didn’t have or had only minor structural changes in the brainstem in autopsies.

The risk of an incorrect declaration of brain death increases as the pressure increases to “gain” time in the removal of potentially viable organs for donation. In this scenario, it is not surprising that supporters of transplants are advocating that confirmatory tests should not be performed in order to avoid delay. More worrying is what was revealed in a study involving 142 pediatric donors with beating heart, in which, after having passed through 294 neurological examinations, it was found that in only one of them the documentation of all components of the test was complete, only 26% had the apnea test properly performed, only 15% had two clinical examinations with appropriate time interval between them and only 58% had undergone confirmatory angiography. Similar results were also found in studies with adult donors. Published data showing such inconsistencies in Brazil was not found.

The basic issue is that the diagnosis of brain death can actually be only a prognosis of irreversibility which is arbitrarily set in a period preceding the biological death and extending in a spectrum that ranges from simple completion of a clinical examination consistent with brain death, as in Finland, until the completion of three clinical tests over a period of 24 hours, together with further examination, as it happens in Greece. Therefore, to describe the same situation, this range goes from the simple acceptance of brainstem death as a diagnosis of brain death and therefore the death of the organism, to the demand of the death of the brain as a whole.

**Death of the brain as a whole as a criterion for brain death**

The point of view of the death of the brain as a whole professes that the loss of integrative activity of this organ with other subsystems leads inexorably to cardiorespiratory collapse, since this loss establishes a progressive state of entropy and organic disintegration. However, several other functions resulting from activities between integrated subsystems of the organism which are not dependent on cerebral control persist for indefinite time, according to the type of neurological insult and level of critical support offered. It is worth mentioning the functions that remain despite the diagnosis of brain death: circulation, hormonal balance, temperature control, digestion and metabolism, waste disposal, deep healing, combat to infections, growth and sexual maturation in children and adolescents, and even the ability, in victims of catastrophic brain events, to carry out a pregnancy to term.

A fundamental paradox of the definition of death through brain criteria, identified by Joffe, consists in stating that the arrest of cerebral functions is the final event of the three forms of death (cardiac, respiratory and cerebral itself) and, at the same time, affirming that brain death leads to death by loss of integration with consequent respiratory arrest and circulatory collapse, because if brain
death leads to death, then it is not the death of the organism properly said.

Shemie 29, for example, opposed the arguments of the critics of brain death, stating that these would wish that there is a clear dividing line of death, which, as required, could only happen, according to the author, with the death of all cells. But, apparently, what is desired by critics of the brain death concept constitutes a clear dividing line of death of the organism by irreversible loss of integrative capacity, a condition which today can be defined only through circulatory arrest 28.

**Brainstem death as brain death**

Joffe 30 discusses the criterion of death of the brain stem as a sufficient criterion of brain death, characterised by the irreversible loss of consciousness capacity also associated with the irreversible loss of ability to breathe. This criterion proves to be problematic as it is disturbing that consciousness may be preserved but be inaccessible due to the etiology of neurological damage. In addition, according to the author, it is not always clear that the loss of the ability to breathe should be spontaneous.

**Ontological criteria of brain death**

According to Joffe 30, the ontological criterion of death, also known as neocortical death, is not without its problems when one wants to diagnose death by the loss of the characteristics that make us human beings. There are no reliable methods to assess the absence of these features, according to the author, and it is impossible to determine the potential of reversibility of such cases.

Objectively, this parameter requires only irreversible loss of consciousness. However, accepting such a concept would result in numerous theoretical and practical problems, such as to admit that the individual could be declared dead before his or her organism was dead, a situation that would imply to authorise the burial, cremation or performing of autopsies on ill patients who are in permanent vegetative state, despite breathing and displaying movements or even spontaneous eye opening 31.

**Donors with stopped heart**

The possibility of using donors with stopped heart and assisted death brings even more debatable dimensions of the ethical point of view, as it seeks to interfere directly in the dying process, anticipating the final event with a view to the removal of potentially viable organs for donation. The question of the removal of organs after death of the organism in such cases is “resolved” by the establishment of an arbitrary time criterion of absence of auto resurrection for an assisted cardiorespiratory arrest 28.

This period, according to Joffe 28, can go from 2 minutes, in Pittsburgh, USA, to over 20 minutes, in Sweden. For the author, this death linked to organ donation, time manipulated, also hurts the criterion of irreversibility, which must be understood as the inability to reverse the fact, not as a prior decision not to try to reverse a cardiorespiratory arrest. Bernat 10,32 suggests the term irreversible for the impossibility of reversion characteristic of brain death, and the term permanent for situations in which the reversion will not be attempted, a condition which would classify the donation as stopped heart.

It is important to highlight that the reintroduction of the concept of donor with stopped heart results from the progressive reduction of brain-dead donors in some countries, consequent to the requirement of use of helmets by cyclists and motorcyclists and the improvement of the care of severe traumatic brain injury victims 33.

**Is brain death a dogma?**

It is possible to search in the philosophy of science some epistemological considerations to support this argument. Initially, the unique contribution of Karl Popper 34 in addressing Hume’s induction problems and Kant’s demarcation can be highlighted. At the confluence of these two analyses, Popper concluded that induction would not be a reliable scientific method in the field of natural sciences, since the repeated occurrence of events in the past is no guarantee of repetition in the future.

As for the problem of demarcation between science and pseudoscience, the contribution of Popper 34 was to understand that knowledge, to be considered science, can never be permanently validated and must always be open to potential rebuttal. When the refutation (or fallibility) does not occur, according to the Austrian born British philosopher, the theories would not be considered definitely true, but only temporarily corroborated. A knowledge that is not open to a hypothesis test, in his view, can not be conceived as scientific.

While it is hard to imagine to what extent the theory of brain death as death of the organism can
be submitted to hypothesis testing, the fact that it can not be widely discussed brings a question as to its scientific status, considering Popper’s view on what is and what is not scientific 34.

Later, Thomas Kuhn 35 also contributed decisively and originally to the philosophy of science, when he added a generous dose of irrationality to the scientific procedure. According to him, certain knowledge often takes the characteristics of a dogma (paradigm) called normal science. It is a stage of science when new hypotheses able to refute the dominant theories are not created, therefore scientists work in pre-established lines of research, which quite often had been started by other researchers. It is worrying that the current status acquired by brain death, as a synonym for death of the organism, has become a dogma in our area.

Another form of acceptance of brain death as a synonym for death of the organism occurs in bad faith. The meaning of “bad faith” here refers to the form originally described by Jean-Paul Sartre in the famous chapter 2 of “Being and Nothingness” 36. In the context of this work, the bad faith is the masking of an unpleasant truth 37, seen in our midst as the early closure of the discussion of brain death as synonymous with indisputability. If, on the one hand, it promotes the donation and transplantation of organs, on the other hand, restricts a continuing scientific debate.

The paradox of the bad faith, which makes it different from lie, is in the fact the deceiver and the deceived are the same person, since it is a lie that one tells oneself. The real problem, according to Sartre 36, comes from the bad faith being a dogma 37.

Biopower, biopolitics, brain death and organ donation

The “need” to reify this dogma, hiding unresolved doubts, due to the use of the concept of brain death as a synonym for death of the organism, operates in parallel with the promotion of organ donation and transplantation. This need can be addressed by the help of the theoretical framework of the concepts of biopower and biopolitics.

These concepts were originally coined by Michel Foucault 38 in the first volume of “History of Sexuality”. The idea of biopower joined the reflections of this author on disciplinary practices as techniques of exercise of power, particularly since the eighteenth and nineteenth centuries. Foucault called biopower the management of life as a whole through the power techniques on the biological dimension, and biopolitics the human activity on natural life and the biopower mechanisms to control it.

In the beginning of this period, the power exercised by medicine on human life was not restricted to the adoption of several specific measures, such as establishing rules for birth control, containment of illnesses and endemic diseases, hospital construction and allocation of the “mentally ill” in “insane asylums”, but it was extended to sexuality in general. Subsequently, the biopower started to penetrate the very body of the subjects and their different ways of living 38. The body was subjected to the dictates of biopower and biopolitics, with the interconnection of ideas of life to the idea of death. On the other hand, biopolitics has become the means by which to carry out resistance to biopower attempts to neutralize people 39.

In the past, to die or kill was a gift from the rulers, who hold the power on the life and death of the population. The change in the concept of death in the West established the power of death over life, according to Foucalt, through the biopower. In a brief, it can be said that biopower refers to the actual devices to which one recurs to obtain power over life, while biopolitics is the politics whose objective is to implement and manage the biopower 40. With regard to death in a general sense and the brain death in the case of this article, biopolitics takes on the role of thanatopolitics.

In the first volume of “Homo sacer: sovereign power and bare life,” Giorgio Agamben 41 resumes Foucault’s concept of bio-politics 38, taking advantage of an obscure figure of the Roman law, homo sacer (“holy man” in Latin), a person deprived of all civil rights, and who may be killed by anyone without a punishment for his or her death; Paradoxically, however, that life was considered “sacred” and could not be sacrificed in religious rituals 41.

Agamben named this condition “bare life”, a way of life which does not reflect any rights or duty, and that goes beyond its biological form. Bare life examples can be found in refugees, prisoners of concentration camps, in human subjects, political prisoners, or in people whose autonomy over their life is no longer possible: the case of individuals in a coma and with brain death 41.

Foucault 38 identified that, in the course of modernity, natural life started to be managed by the power of the state and politics became biopolitics, as the biological dimension of life was gradually occupying the center of the modern political scene.

http://dx.doi.org/10.1590/1983-80422015233085

Rev. bioét. (Impr.). 2015; 23 (3): 483-92

487
Brain death: a finished discussion?

Agamben 41 is interested in how this transformation of life in biopolitics happened. If, before, the power of the sovereign could order death or let live, now, the state can order to live and let die 30.

It is this idea of sovereignty and “sanctity” of life that Agamben 41 uses to define the concept of bare life, making use of the Holocaust phenomenon as an example where the biopower and the sacred man were markedly demonstrated. The biopolitical power over life and death has been transferred to the State through medicine. Agamben believes that the politicisation of life and especially the politicisation of death occurs from the moment when one comes to understand the biological dimension of life and its needs as an integrant part of politics, to the extent that the body is the new subject of politics in modern democracy.

For Agamben 41, with the valorisation of the biological body, biopolitics has become thanatopolitics, understood as a set of devices that allow interaction of medicine with the law through the use of new technologies to prolong life, transforming death in an epiphenomenon of the technology. As a result, the biopower passed from the hands of the sovereign into the hands of the physician and the scientist, and from these, into the hands of the state. The state, in turn, converted biopolitics into biopower and then thanatopolitics, deciding who can live and who shall die, making believe that living organisms belong, in fact, to the government.

The thanatopolitics brought as a consequence the “need” to legislate on life and death, which is the main point of our discussion about what is biological death, especially brain death. The situation of the donor in cases of brain death reminds of the situation of the Agamben’s homo sacer 41: is sacred, to the extent that it can save several lives in this situation, and at the same time can be declared dead without this meaning an infraction; that is, the condition of the person is so inviolable as violable. It is as if the individual were a mere body without meaning, liable to become a means instead of an end in itself.

Agamben 41 understands that individuals identified with the bare life, the sheer physical life, are exposed to the dynamics of biopolitics. Following this line of thought, it can be said that the person declared brain-dead is reduced to bare life as it loses its right to personality, which is transferred to the family, as defined in Article 4 of the Federal Law 10,211 / 2001 42. This means moving to the scope of biopolitics actions.

The relationship between bioethics and biopolitics is narrow, since the birth of both concepts is related to the context of Nazi experiments. However, the paths they followed are irreconcilable: biopolitics is generalising and strips the man, consisting of the most extreme and aggressive manifestation of politics, whilst bioethics is concerned about the natural life and the autonomy of individuals 43.

Maldonado 44 also considers bioethics and biopolitics irreconcilable because it considers the first from the humanitarian perspective and the second as associated with the idea of violence 44. It should also be noted the position of Schramm 49, who advocates the role of bioethics resistance before the attempt to subject it to the pragmatic “needs” of the political reality, which we understand to be the focus of this discussion, as we try to discuss a theme that can be viewed as a way to disturb the process of organ donation and transplants.

Final considerations

Initially, there were two basic reasons why the definition of brain death had become accepted by society: to allow discontinuation of life support in patients with extremely severe neurological injury and to provide organ donation for transplants without the one responsible for the decision being charged with murder 14. The first reason is no longer necessary, since the suspension of life support in patients with prognosis of irreversible neurological damage and unacceptable quality of life can be done through the prior consent of the patient or the patient’s family (in the absence of an instruction previously signed by the patient). However, the second reason remains necessary to comply with that “dead donor rule” 30.

To equate brain death to death of the organism has become a “necessary” mechanism to facilitate society’s acceptance and to legalise the search and removal of organs from donors with a beating heart 45. Although brain death and organ transplantation have presented distinct historical trajectories 46, from the moment that these two concepts converged, the impact of the latter over the former could no longer be underestimated.

Doctors who work in institutions which are renowned for saving lives through transplants are often faced with candidates for transplants who are suffering and dying whilst waiting for organs as well as with the significant improvement in quality of life of patients submitted for successful transplants 30.
Moreover, they are also influenced by the feeling of futility to continue the cardiorespiratory support in patients with brain death, as many times these professionals work pressed by a context of lack of resources.

These issues operate consciously or unconsciously as conflicts of interest, inhibiting the dispute, by the professionals, of the brain death criterion as death of the organism. It is also possible that doctors simply accept the definition of brain death as true, without knowing its theoretical basis and its potential conceptual problems. Death determined by neurological criteria is a paradoxical death, because it is associated with the physical image of the body’s normal functioning, which creates emotional and cognitive conflicts for many health professionals and relatives of the patient.

For Miller and colleagues, these unspoken conflicts may have the practical effect of the discomfort present among professionals and the discrepancy between practices and standards on the issue of donation after brain death or cardiac arrest, that is, the use of organs according to the dead donor rule. The authors qualify this discrepancy as a moral fiction, identified by the assertion that organs are only removed from organ donors with diagnosed death, since, when making such a claim, one is either denying reasonable doubt of the biological basis of the diagnosis of brain death as death the body, or is admitting to confuse irreversibility after cardiac arrest with the decision not to try to stop the cardiac arrest, concerning the donor with heart stopped.

There are three possible solutions to overcome this moral fiction: change practices, change the rules, or, what usually occurs, continue to act as if these bioethical conflicts don’t exist - a measure that is likely responsible for frequent maintenance of individuals, who are not donors, in brain death under intensive support until cardiac arrest. A shift of the standard alternative would be to define brain death as an undoubted prognostic death of the organism, and not as a diagnostics of death itself. Another possible change from the norm is the solution adopted in Japan since 1997, which allows individuals and families to define the kind of death they think is acceptable according to their beliefs and values, and in an independent way, whether they want to donate organs or not.

It remains paradoxical that the biologisation of death diagnosis in order to objectively define it shattered the concept of death in four possible alternatives: cardiac death, death of the whole brain, rainstem death and ontological death. Another paradox of this search for objectivity is that death has become a subject in the first person, as the irreversible loss of consciousness is important only for those who die - which, according to Holland, had already been perceived by Schopenhauer in “The World as Will and Representation” – without becoming objective in the third person, that is, one where a different person should recognise someone else’s death.

Therefore, brain death, technically defined as an event at the end of the third examination (either clinical or complementary), remains a challenge as a valid concept of human death, since the scientific evidence is insufficient and the philosophical thought is even less convincing. Some authors even consider that neurological or circulatory parameters currently used for the confirmation of death and search for transplantable organs conceals the practice of physician-assisted suicide. The term “physician-assisted death” means intentional actions at the end of life, performed either by consent (such as euthanasia or suicide physician-assisted) as those practiced without explicit consent.

To reduce any definition of death to exclusively neurobiological criteria implies to ignore its anthropological, cultural and religious dimensions, to which many people give more value. Thus, the policies and practice of searching for organs should be consistent with aspects deeply rooted in these dimensions. The concept of death is not simply of biomedical nature, but it is also a result of major sociological influences, being partly a social construct. The elaboration of the idea of brain death as synonymous with the body’s death follows the utilitarian view of death, maybe way too much. To paraphrase Bernard Williams if utilitarianism is right, it will be better that people do not believe in utilitarianism.

This article is not meant to be an indictment of the donation and transplantation of organs, but a proposal for a resumption of discussion, made tacit, concerning the basis the premise of brain death as a synonym for death of the organism. It also aims to warn about the limits that must be guarded against biopower and biopolitics, regarding their influence on life and death. It also seeks to point out another negative aspect of biopolitics: the fact that even when brain death is accepted as a diagnosis of death of the organism, in practice the life of the patient is perpetuated - not infrequently - through the intensive support of those non-dead donors.

However, it is these same biopower and biopolitics that, while managing the fate of the bo-
Brain death: a finished discussion?

References


29. Shemie SD. Clarifying the paradigm for the ethics of donation and transplantation: was ‘dead’ really so clear before organ donation? Philos Ethics Human Med. [Internet]. 2007 [acesso 30 jul 2015];2:18. DOI: 10.1186/1747-5341-2-18


Brain death: a finished discussion?


Participation of the authors
Edison Moraes Rodrigues Filho and José Roque Junges wrote and revised the article jointly.