

Diagnosing “Brain Death” in Intensive Care

Călin Mitre*, Ileana Mitre

“Iuliu Hațieganu” University of Medicine and Pharmacy, Cluj-Napoca, Romania

Death represents a biological state which appears at the end of life and can be defined by the halting of all life-sustaining biological functions.

Medically speaking, death represents the irreversible loss of consciousness associated with the irreversible loss of breathing [1].

Throughout its history, humanity has been interested by the mystery surrounding the end of life, and especially of finding out precise means of diagnosis.

But how can we medically diagnose the phenomenon of death?

Currently there are three means of diagnosis [1]:

- Somatic diagnosis - it focuses on external signs, visible on inspection (rigor mortis, decapitation, decomposition);
- Cardiovascular diagnosis - entails a diagnosis of irreversible cardio-respiratory arrest - the most used in hospital environments, including ICUs. The diagnosis will be made after 5 minutes of ECG asystole [2]. For these criteria to be certain, they must be preceded by brain death.
- Neurologic diagnosis - it first appeared in the middle of the XX century, after the appearance of organ transplant and the development of life support techniques in ICU (mechanical ventilation, vasoactive medication). It also brings a new dimension to the concept of death in saying that the organ responsible for integrating all bodily functions as well as modulating its relationship with the surrounding environment is the brain. Naturally, if all brain functions come to an end, especially at the level of the brainstem, irreversible loss of consciousness, loss of relation to the surrounding environment, cardio-respiratory arrest and finally disintegration of the entire organism will follow.

Even if it is considered as the death of the whole brain (whole brain death) - North America criteria [3], or just of the brainstem (brainstem death) - U.K. criteria [4], the diagnosis of brain death raises many discussions.

In reality, not all the brain functions will be simultaneously shut down. Although some subcortical integrated systems remain working for a brief period of time, such as ADH secretion, and even if some time there is a minimal activity in some isolated cerebral centres, these do not modify the brain death diagnosis. Moreover, the integration of some structures of the entire organism such as: Elimination, detoxification and recycling of cellular wastes throughout the body; energy balance, involving interactions among liver, endocrine systems, muscle and fat; successful gestation of a foetus in a (brain-dead) pregnant woman etc. can still function for some time even if the person is brain dead. Their presence will not be able to change the diagnosis but will produce confusion. This is why, for a better clarification of the neurological situation, in the bioethics board president report, the preferred name for brain death is “total brain failure” [5].

The brain death concept considers a patient that is taken as dead, but whose organs that are sustained with the help of mechanical ventilation and hemodynamic maintaining techniques, are viable and can be transplanted (“patient already dead” or “heart-beating cadaver”).

Actually, this situation is that of a cadaver that instead of being buried is artificially kept in an ICU bed. With some exceptions, this situation is unacceptable for the patient and disconnection from the artificially life supporting machines is recommended. Of great importance is the irreversibility of ending the neurological functions [6].

Which could be the effects of the neurological brain death diagnosis for ICU patients?

- Organ harvesting for transplant;
- Interrupting the life support and futile therapeutically measures to patients that are not included in the transplant program [7].

Both situations have raised numerous controversies related to ethics and correct management of the patient. Nowadays, the deontological conduct, as well as the medical one, especially related to the irreversibility

* Correspondence to: Călin Mitre, “Iuliu Hațieganu” University of Medicine and Pharmacy, Str. Victor Babeș Nr. 8, 400012 Cluj-Napoca. E-mail: cmitre2001@gmail.com

of ending the neurological functions, is well defined in the case of organ transplantation. However, not the same can be said for a brain-dead patient or for the one with an untreatable disease, and who is kept alive only with cardiopulmonary resuscitation devices.

■ CONDUCT IN A BRAIN-DEAD PATIENT NOT SUBMITTED TO ORGAN TRANSPLANT OR BEYOND THERAPEUTICAL RESOURCES

Nowadays the death diagnosis in the ICU is made on cardio-pulmonary criteria, with the brain death diagnosis being a secondary one. The brain death diagnosis must follow a rigorous protocol and is generally done only for organ harvesting. In the absence of this situation the brain death diagnosis is only a simple clinical diagnosis.

Although theoretically it represents a diagnosis of death that allows for organ harvesting, it is not as efficient in solving other situations such as the “do-not-resuscitate” order (DNR), of ending an already started treatment (Withdrawing-Wd); to not start or enlarge the treatment (Withholding-Wh).

The DNR order implies letting the heartbeat and respiration stopping without any intervention of the medical staff. In case of a severe prognostic, in patients beyond therapeutically manageable situations, this is a usual order [7]. In some cases the continuity of useless treatment can harm the patient. In these situations, most authors agree that life support can be withdrawn. In a French study, 777 (14%) of 5589 patients admitted in the ICU, and 584 (52%) of 1132 patients dying in the ICU had their treatment Wh or Wd [8].

These decisions must take into consideration, apart from the medical responsibility, some ethical rules:

1. The action will always be done for the good and interest of the patient, for his/her right to a decent life.
2. A clinical treatment is useless when, in the evolution of the disease, it is:
 - Ineffective - unable to change the natural evolution of a disease or its trajectory towards death;
 - Non-beneficial - unable to satisfy any good or value perceived by the patient or his or her surrogate;
 - Disproportionately burdensome to the patient, physically, psychologically, or financially [9].
3. The desire of the patient is mandatory (if it can be

obtained). Some studies show that in only 23% of the cases it is practically achievable [8].

4. The diagnosis must be clear and certain. The prerequisite of the brain death diagnosis is for the patient to be unconscious, apnoeic and mechanically ventilated; there must be no suspicion related to the irreversible neurological damage as aetiology. If the primary diagnosis remains unclear, the patient observation time must be prolonged before deciding the diagnosis [10].
5. There must be a permanent communication with the patient's family, in the spirit of honesty and transparency. We must consider that the family will be suspicious, sceptical or even will fear possible diagnosis errors [11]. An alternative is to not ask for the family's consent but for it to only be informed. This way, confusion and emotional distress of the family can be avoided. Also, the information that patients and their families have related to what will happen is many times wrong and based on the myth that if you wish for something long enough it will also happen, an idea taken from movies and books which in reality has no support [12,13]. Maybe it is better to stop the ventilator despite the objections of the family [14]. This behaviour is, however, debatable because the family needs a gradual preparation in time and a complete information to accept the situation.
6. The legislation must be very precise.

A medical committee formed out of doctors from the same section must agree with the withdrawal or the withholding of the futile treatment.

In many countries the legislation accepts the use of such measures for ending the patient's life. Romanian legislation is ambiguous and there is no legal support for utilising these medical measures. The health law 95/2006 and the patients' rights law 46/2003 have not included the situation in which the patient has an acute unfavourable evolution towards death. Excepting the situation of organ transplantation, where the law is clear and synchronised with international laws, other situations of acute death are not regulated. In these cases, the death diagnosis lies on cardio-pulmonary arrest. Article 13 from the 46/2003 law only specifies that the patient has the right to refuse or stop a medical intervention, accepting in writing the consequences of his/her decision [15]. These legislative directives are not directly related to the terminal or brain-dead patient from the ICU in whom there is the question of

not initiating or stopping the supporting therapy. This could damage the terminally ill patient and the limited resources of the unit. Moreover, the ICU doctor who acts according to the best interest of the patient and within the international guidelines is not protected by the legislation and can be accused of murder [15].

Maybe if the neurological brain death diagnosis would be given not only to the patients that are potential donors, but also in other medical situations, it will allow for the stopping futile treatments in the interest of the patient.

In the particular conditions of our country, the population should be prepared first for this.

Although the French system does not ask the family for permission, only communicates them the decision of the medical staff, we believe that we must permanently discuss and communicate the patient's status with the family, maybe even before radical measures are taken.

All patients must have the possibility (when they are conscious) to express their desire also regarding the possibility of unfavourable evolution.

In conclusion, we consider that a revision of the Health Law to take into account the possibility of an unfavourable evolution of the patient, as well as the recognition of brain death also in non-donor patients as a real death diagnosis, is absolutely needed. At the same time, it is necessary to implement guidelines similar to those used in organ transplantation, that should be strongly anchored in today's realities and that will allow the ICU doctor to take the necessary measures for the good of the patient.

■ CONFLICT OF INTEREST

None declared.

■ REFERENCES

- Gardiner D, Shemie S, Manara A, Opdam H. International perspective on the diagnosis of death. *Br J Anaesth*. 2012;108(Suppl 1):i14-28.
- Academy of Medical Royal Colleges. A code of practice for the diagnosis and confirmation of death. London: Academy of Medical Royal Colleges; 2008.
- Wijdicks EFM. The diagnosis of brain death. *N Engl J Med*. 2001;344:1215-21.
- Pallis C, Harley DH. *ABC of Brainstem Death*. 2nd ed. London: BMJ Publishing Group; 1996.
- The President's Council on Bioethics. *Controversies in the determination of death: A White Paper of the President's Council on Bioethics*. Washington DC; 2008.
- Mollaret P, Goulon M. Le coma dépassé (mémoire préliminaire). *Rev Neurol (Paris)*. 1959;101:3-15.
- Muramoto O. Informed consent for the diagnosis of brain death: a conceptual argument. *Philos Ethics Humanit Med*. 2016;11(1):8.
- Ferrand E, Robert R, Ingrand P, Lemaire F. Withholding and withdrawal of life support in intensive-care units in France: a prospective survey. French LATAREA group. *Lancet*. 2001;357:9-14.
- Pellegrino ED. Decisions at the end of life: the use and abuse of the concept of futility. In: Vial Correa JDD, Sgreccia E, eds.: *The dignity of the dying person: proceedings of the fifth assembly of the pontifical academy for life*, 24-27 February 1999. Vaticano: Libreria Editrice Vaticano, 2000; pp. 219-41.
- Oram J, Murphy P. Diagnosis of death. *Contin Educ Anaesth Crit Care Pain*. 2011;11(3):77-81.
- Rodabough T. The evolution of the legal definition of death. In: Bryant CD, ed.: *Handbook of death and dying*. Thousand Oaks, CA: SAGE Publications, Inc, 2003; pp. 284-92.
- Bael NA. Cardiopulmonary resuscitation on television. Exaggeration and accusation. *N Engl J Med*. 1996;334:1604-5.
- Diem SJ, Lantos JD, Tulskey JA. Cardiopulmonary resuscitation on television. Miracles and misinformation. *N Engl J Med*. 1996;334:1578-82.
- Paris JJ, Cummings BM, Moore MP Jr. "Brain death," "dead," and parental denial- the case of Jahi McMath. *Camb Q. Healthc Ethics*. 2014;23:371-82.
- Cimpoesu D, Rotariu I, Costache I, Petri A. Decizia "de a nu resuscita"(II) etică și lege în resuscitarea cardiopulmonara. *Revista Română de Bioetică*. 2012;10(2):29-41.