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# Definition and Criteria of Clinical Death

Robert F. Rizzo, Ph.D. and Joseph M. Yonder

## Synopsis

*Using the 1968 Journal of the American Medical Association article on brain death by the Ad Hoc Committee of the Harvard Medical School and the 1972 JAMA report by the Task Force on Death and Dying of the Institute of Society, Ethics and the Life Sciences on a re-examination of brain death as springboards for a contemporary view of clinical death, the authors present the ambiguities and problems intrinsic to these articles and concurrently propose an alternative in the form of a working hypothesis for clinical death as it relates to care of the terminal patient.*

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## Clinical Death

With technical progress in the care of the sick and dying comes a number of problems and a need to reexamine traditional presuppositions, concepts and procedures. Advances in chemical and mechanical means for sustaining life have raised questions concerning the clinical definition of death and the tests for determining when clinical death has occurred. Though these questions have important relevance to a wide range of legal as well as personal

and medical matters, they have immediate bearing on the role of the physician in his relationship of trust and service to the patient and community and on the quality care of the terminal patient. These are our major concerns in reexamining the definition and criteria of clinical death.

Medical technology has challenged the moral and medical criteria for determining death. Technical advances in health care have led some to put emphasis on "brain death" rather than on heart and respiratory cessation as the criteria for diagnosing clinical death. The strain of moving from heart and respiratory cessation to brain death reveals the inadequacy of present medical and moral guidelines in the face of an increasingly sophisticated technology. Deeply woven in the culture of our society, there emerges the central question of the controversy. Are we really interested in the quality care of the patient and particularly the terminal patient?

In the care of the dying, a redefinition of clinical death and its criteria would mean that doctors would withdraw extraordinary measures for sustaining life much soon-

er, allowing the patient to die with dignity and in peace. By "extraordinary measures" is meant all artificial life-sustaining procedures. We are defining "extraordinary" as has been commonly understood by many moralists. In *Medico-Moral Problems*, Gerald Kelly, S. J., gives the traditional, moral definition as follows:

By these we mean all medicines, treatments, and operations, which cannot be obtained or used without excessive expense, pain or other inconvenience, or which, if used, would not offer a reasonable hope of benefit.<sup>1</sup>

It should be noted that the phrase "reasonable hope of benefit" means traditionally reasonable hope of substantial or real benefit. It signifies reasonable prognosis of eventual recovery from a debilitating illness or of carrying the patient over a temporary crisis, factors which

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offset the pain, inconvenience and expense of the procedures. Whether a measure is extraordinary or ordinary cannot be decided in the abstract. The circumstances of each case must be carefully examined before a prudent judgment can be made. According to a number of moralists, if an artificial measure offers no hope of substantial benefit in a particular clinical situation, it is considered extraordinary even though it may not be of an experimental nature.<sup>2</sup> We could relate the moral distinction between extraordinary and ordinary measures to the general care of the terminal patient and the rights of the patient to decide for or against extraordinary measures as morally defined. Here we limit ourselves to making the obvious conclusion that a diagnosis of clinical death based on a new set of criteria would mean the withdrawal of all artificial life-sustainers at an earlier stage of terminal care.

The fundamental question confronting us in the redefinition of clinical death is whether death is a process or an event. Technological advances have provoked a reconsideration of the traditional definition and tests. Clinical death has customarily been defined in terms of cessation of heartbeat, respiration and reflexes.

As Vincent J. Collins points out, there are three possible ways of looking at death: clinical, biological and theological.<sup>3</sup> Clinical death has been customarily identified by the cessation of the functioning of certain organs, a fact which signi-

fied the dissolution of the integrated organism we call human life. Clinical death has never been in theory or practice identical with complete biological death. For such a death entails the death of all organ systems. It is obvious then that biological death is a process more or less gradual, depending on the circumstances. Even under the traditional criteria, after clinical death was pronounced, some organs and tissues were still alive, continuing a metabolic function for however brief a time. In practice, this fact had little relevance. But the point that bears repeating is that practically and theoretically clinical death and biological death are not identical even under the traditional procedures. As regards theological death, it is defined as the moment the soul leaves the body. Catholic theology theorized that the soul did not leave the body immediately upon clinical death but lingered for a short time. The obvious uncertainty of such speculation eliminates the possibility of using the concept of theological death as a relevant tool in reexamining medical procedures and establishing a working clinical definition of death. Biological and theological death must be regarded in theory and practice as distinct from clinical death.

Sophisticated technological care of the patient is the major cause in the reexamination of traditional criteria. Since the heartbeat and respiration can be artificially maintained for a time by chemical stimulants and mechanical devices as the

respirator in spite of the evident breakdown of the organic whole and its own support systems, the rethinking of clinical death and its tests needed only a prod from necessity, a factor which technology provided. Moreover, the use of the electroencephalograph has turned attention to the cessation of brain functions or brain death as a definitive indication of clinical death, despite the presence of artificially maintained heartbeat and respiration. The shift from heart death to brain death is a good example of how technical progress can open new horizons and thinking but also create a set of problems and new opportunities for decision.

#### The Isoelectric EEG

For those who have kept abreast of the discussion surrounding the reevaluation of clinical death, there are certain general points that emerge from writings of the subject. The eliminating of heartbeat as a definitive sign of human life is generally accepted by those who focus on brain death. The isoelectric EEG is regarded as a confirming rather than a determining sign. For example, Francis D. Moore writes:

A flat EEG is not enough. There must be something that can be seen by the unaided eye which tells the observer that the brain is damaged, extruded, divided, or destroyed. Then, with the total cessation of neural activity of the brain, the state of the other organs can be whatever suits the recipient best. Even if the heart is still beating, there is no question for the coroner or the lawyer. The donor is dead.<sup>4</sup>

The Report of the Ad Hoc Committee of the Harvard Medical School says essentially the same but more

specifically by laying down detailed criteria and mode of procedure in the definition of brain death.

A patient in this state appears to be in deep coma. The condition can be satisfactorily diagnosed by points 1, 2 and 3 to follow. The electroencephalogram (point 4) provides confirmatory data, and when available should be utilized.<sup>5</sup>

Briefly the well-known criteria are the following:<sup>6</sup>

1. Unreceptivity and unresponsivity to even the most painful stimuli.
2. No spontaneous muscular movements or spontaneous respiration or response to stimuli such as pain, touch, sound or light, verified over at least an hour.
3. Absence of cerebral and spinal reflexes.
4. The flat EEG verified by competent specialist.

In the case of a patient on a mechanical respirator, the Report states precisely the procedure as follows:

The total absence of spontaneous breathing may be established by turning off the respirator for three minutes and observing whether there is any effort on the part of the subject to breathe spontaneously. (The respirator may be turned off for this time provided that at the start of the trial period the patient's carbon dioxide tension is within the normal range, and provided also that the patient had been breathing room air for at least 10 minutes prior to the trial.<sup>7</sup>

With the exception of two conditions, hypothermia (temperature below 90 F or 32.2 C) and coma resulting from central nervous system depressants, the failure of these tests, repeated at least 24 hours later, indicates brain death. The

Report offers these criteria as suggested guidelines which a doctor could follow in diagnosing clinical death.

The flat EEG is therefore presented as confirmatory rather than a determinative indication of clinical death within the context proposed by the Report. It is at this point that our problem begins. We are attempting to establish criteria for clinical death, while recognizing biological death as a process not wholly identical with clinical death. In this context, we must ask whether the death of the cerebral cortex or neocortex signals human death, even though other parts of the brain may still be functioning for a time. We are posing this question in regard to the quality of terminal care. The Report does not help us to answer the above question directly because it introduces criteria which relate to the functioning of other parts of the brain and of the central nervous system in general. This is evident in its focus on spontaneous breathing, cerebral and spinal reflexes, and response to stimuli. It is clear then that brain death means for the Harvard Committee total cessation of brain functions or "total brain death" and not simply cessation of the neocortical functions. The Committee has reintroduced all the traditional criteria with the exception of heartbeat in a patient on a mechanical respirator. In the case of such a patient who fails all the above tests, heartbeat is not regarded as a definitive sign of human life since it is artificially maintained. Commenting on the Har-

vard Committee Report, the Task Force on Death and Dying of the Institute of Society, Ethics, and the Life Sciences makes the following observation:

The new criteria are meant to be necessary for only that small percentage of cases where there is irreversible coma with permanent brain damage, and where the traditional signs of death are obscured because of the intervention of resuscitation machinery. The proposal is meant to complement not to replace, the traditional criteria of determining death.<sup>8</sup>

Perhaps the elimination of heartbeat as a definitive sign of life in certain cases might seem to some a revolutionary step. But in practice the proposals of the Harvard Committee do not amount to a real change in the evaluation of death. In contrast, we would propose the question whether there is human life in the event of the death of the neocortex as indicated by neurophysiological signs.

In this area, there is sufficient ambiguity and lack of clarity. For example, the Task Force (mentioned above), in attempting to clear up ambiguities surrounding the meaning of death, notes that we are talking of "the death of the human organism." It then goes on to state:

It may make a considerable difference which of the two terms—"human" or "organism"—is given priority. Emphasis on the former might mean that the concepts of life and death would be most linked to the higher human functions, and hence, to the functioning of the central nervous system (CNS), and ultimately, of the cerebral cortex. Emphasis on the latter might mean that the concepts of life and death would be most

linked to mere vegetative existence, and hence, to the functioning of the circulatory system and the heart.<sup>9</sup>

This analysis adds to the ambiguity by ascribing the higher functions or human functions to the CNS and cerebral cortex in the same breath. For part of the brain or part of the CNS is largely involved in controlling vegetative functions in all vertebrates. C. U. M. Smith in *The Brain*, for example, describes the functions of the medulla in this fashion:

The medulla itself, although relatively undifferentiated—it still shows the four functional columns of the spinal cord—is of considerable importance in the body's economy. It is from this part of the brain that many of the vital automatic activities of the viscera are controlled. For example, nerve centers in this structure regulate the activity of the heart, lungs and alimentary canal; the caliber of the arterioles in many parts of the body; the metabolism of carbohydrates; the osmotic pressure of the blood. These nerve centers are, however, themselves often governed by centers further forward in the brain.<sup>10</sup>

The CNS, therefore, is too broad a phrase to designate what controls higher human functions. We offer the hypothesis that human death should be related to the cessation of functions distinctly human since breathing, heartbeat and circulation are vegetative processes shared by other animals.

From the evidence accumulated from a battery of psychological, neurological and physiological tests, Aleksandr Luria in *High Cortical Functions* states that "the cerebral cortex, the most highly organized part of the entire central nervous system, has come to be regarded as



a high-level center for analysis and integration of signals received by the organism from its internal and external environment.<sup>11</sup> The higher mental functions are dependent on the integrated functioning of various centers of the cerebral cortex or neocortex.<sup>12</sup> The functioning of the cortical centers cover a wide range of phenomena from the processes of perception and movement to complex systems of speech and intellectual activity. Since the brain operates as an integrated whole with its systems neurally interrelated, the neocortex certainly does not perform its higher tasks independently from other parts of the central nervous system. However, with its death, it is equally certain that the remaining systems cannot substitute for the neocortex to effect the integrated operations that result in the higher mental functions associated with human perception, understanding and judgment. From all clinical evidence, the death of the neocortex marks the end of the physiological basis for human consciousness, that is, a consciousness unique in its powers of reflection. It signals the end of the brain as a dynamic integrated whole and presages in most cases the imminent death of other cerebral systems.

### Two Exceptions

In order to point up the relevance of our hypothesis and line of reasoning, we would like to cite some findings and conclusions presented in an article entitled "Neocortical Death After Cardiac Arrest," which appeared in *Lancet*. At the outset, the authors note that it

is generally accepted that a patient with severe brain damage resulting from head injuries, cerebrovascular accident or cardiac arrest pronounced dead in the presence of an isoelectric EEG (strictly defined), lack of reflex reaction and mechanically sustained respiration and cardiac functions. They go on to present the cases of two patients with irreversible brain damage after cardiac arrest who were expected to die but survived for five months with a flat EEG.

In case one, eye-opening, yawning, with associated movements, spontaneous respiration and certain reflex activities at brainstem and spinal cord levels were present; while in case two the resumed central nervous system activity was restricted to spontaneous respiration and certain brainstem and spinal cord reflexes. In both cases, neurophysiological investigations led to the conclusion that the neocortex was dead while certain brainstem and spinal centres remained intact. Subsequent detailed neuropathological analysis confirmed this prediction in each case.<sup>13</sup>

Without going into all the details of the cases and of the testing, we would like to point up observations and conclusions relevant to our discussion.

Case one and two were clinically identical except for the fact that in case one brainstem and spinal reflex activity was not in evidence until the second day after the arrest and respiration was sustained by mechanical ventilation for 17 days.<sup>14</sup> The diagnosis of "neocortical death" was made from a "persistently isoelectric E.E.G. and the absence of sensory evoked responses in the

neocortex, together with the resumption of spontaneous respiration and of certain brainstem reflexes."<sup>15</sup> The authors distinguish "neocortical death" from "brain death" or "total brain death" in which instance there is no reflex activity and no spontaneous breathing along with an isoelectric EEG. In each case, the neuropathological evidence confirmed the neurophysiological data which indicated the death of the neocortex with the continuation of certain brainstem and spinal functions for five months. This confirmation prompted the authors to propose that "it is likely that a systematic study of sensory evoked cortical potentials and the EEG as soon as possible after cardiac arrest could identify the existence of neocortical death earlier than was possible in the present cases."<sup>16</sup> As in other cases of isoelectric EEG, the presence of depressant drugs in the system must be taken into consideration in evaluating the tests. To remove any doubts, "neocortical death could be confirmed by the appropriate neuropathological examination of a biopsy specimen (a 1-1.5 cm. cube) taken from the posterior half of a cerebral hemisphere."<sup>17</sup>

The study of these two cases brings the authors to ask the fundamental question we have raised, namely, whether with the evidence of death of the neocortex and consequent irreversible loss of consciousness and accompanying higher mental functions there is still human life. They ask this question for the same reasons indicated above. The way

we answer it will affect the continuation of intensive care for the patient with respect to his rights to die with dignity. It is obvious to them as well as to us that the Harvard Committee Report is concerned about criteria for establishing total brain death with its particular focus on reflex responses and spontaneous breathing which are indicative of cerebral functions carried on in spite of neocortical death. Thus, the Harvard Committee makes clinical death dependent not on the cessation of the higher human functions or on the death of the physiological bases for these functions but on the cessation of vegetative functions shared by other animals. It is this feature which we find inadequate.

We must not only deal with the state of the art as it is now but as it will progress. Therefore, the eventual problems of defining brain death could easily threaten the quality of life for the patients with terminal conditions. From the *Lancet* article, there is the prospect of countless individuals being maintained after their neocortex is dead. As techniques and instrumentation improve, the patient without higher neocortical functions will be maintained for longer periods and with greater frequency.<sup>18</sup> Because of the Harvard Committee Report's focus on spontaneous breathing and reflexes as definitive signs of human life, it is in fact relegating a neocortically dead patient to a "vegetative" existence promoted by machinery and drugs.

We feel there are three reasons

for upgrading the criteria for clinical death: (1) the patient's right to die with dignity and the attendant care of the terminal patient; (2) the hardships imposed upon the family and workers surrounding the patient; and (3) the unfairness of withholding organs from those who need them desperately. The primary and major reason of dignity really involves both care of the terminal patient and clinical death. If we have no suitable criteria for clinical death as indicated in terms of neocortical death, then patients of the type described above could become even more prevalent as medical techniques prolong their vegetative existence. At the same time, their families will suffer not only the expense but also the anguish of the long wait until a cardiac arrest or super infection destroys the vegetative drives. There is also the possibility that care of the patient will be left to the efficiency of machines and therefore depersonalized. Moreover, those in need of transplants will necessarily have to wait, even though this could be a death knell for many. Thus these three reasons present strong evidence for the need to re-evaluate the traditional criteria, even as updated by the Harvard Committee, and then the need to establish new criteria for clinical death.

### Neocortical Death

Therefore, we propose as an hypothesis that, when there is incontrovertible evidence of neocortical death, then human life has ceased. It appears then that cessation of spontaneous breathing and reflexes

should not be absolutely required in determining clinical death in the face of neocortical death. With the death of the neocortex, human life is ended because the potentiality to reflect consciously is eradicated in the organism. There is enough evidence to call this a practical certainty. If we are looking for absolute certitude that the soul or consciousness has departed from the body, we would never proceed to declare the person dead until every organ is organically dead. We would not follow the Harvard Committee Report. The practical decision is based on practical certitude that human life has ceased. Practical certitude means simply that one is confident that, after careful investigation, there is no rational reason to fear error. It is perhaps here that many physicians are reluctant to define clinical death in terms of neocortical death because of their uncertainty as to the reliability of neurophysiological tests in indicating irreversible cessation of neocortical functions. However, as progress is made in this area through the refinement of techniques, as for example presented in *The Lancet* article, confidence will grow in the methods of testing neocortical death. Our proposal is that, when physicians have practical certitude of the reliability of the tests, the incontrovertible indications of neocortical death suffice as criteria for determining clinical death.

Perhaps what is needed is a philosophical definition of human life and death. Admittedly an adequate and universally accepted concept would be difficult to formulate and

express. But it does seem safe to propose, that when the capacity or potentiality for higher mental functions, for reflective consciousness, ceases, then human life ceases. Physicians must rely on neurophysiological signs of cessation, among which is the persistent isoelectric EEG. They cannot and should not involve themselves in the unanswerable question whether or not the soul or spirit consciousness leaves the body at a particular point in the biological process of death. Now that the heartbeat has been removed at least theoretically as a definitive sign of life in the certain cases, breathing as well as heartbeat must be seen in its proper context. Culturally this will be difficult. For just as the heart has been associated with the seat of life and emotions, so breathing has become synonymous with life. There is no intention to say that heartbeat, breathing and reflexes are unimportant. But they must be seen in their biological context, in their relationship to the organic whole we call human life. When the essential prerequisite for human consciousness no longer exists, that is, when the neocortex is dead, then heartbeat, breathing and reflexes should not be regarded as signs of human life but rather signs of biological life which has lost the organic wholeness that makes it human life and which is in the process of dying organ by organ.

Customarily doctors move from the cessation of vital signs to the realization that the neocortex and then the rest of the brain are dead.

Now with modern techniques, there can be a new situation and order of procedure. The physician can start with the neocortex and proceed to the realization that with its death the biological wholeness which is human life and makes possible human consciousness and personhood is irrevocably gone. Hence human death has occurred even in the presence of some heartbeat, breathing and reflexes.

### Safeguards

But is there not the danger of making a rash diagnosis at the expense of the patient? There is always the danger that every set of principles and procedures will be misused. So there is need for safeguards as well as for some concreteness in establishing criteria. There is the obvious need to verify with practical certitude the death of the neocortex through anatomical and neurophysiological data. As regards the use of the EEG, it is well to note:

However, a great deal of caution and no little expertise is required to conclude that a record is indeed "isoelectric." The number and placement of electrodes, length of the recording and sensitivity as well as filter settings all are crucial in making this diagnosis. EKG and EMG monitoring channels are very helpful in determining artifactual potentials. Even after determining that "electrocerebral silence" is present, its significance must be determined. Repeated tracings at variable intervals have been recommended. Massive overdoses of CNS depressants and hypothermia may erroneously lead to a premature diagnosis of "cerebral death."<sup>19</sup>

There must, therefore, be incontrovertible evidence of neocortical death. But such evidence would



suffice to declare the patient clinically dead. There may still be signs of biological life, that is, of life processes of organs and tissues. However, as stated above, in regard to human death, the focus should be on what constitutes human life and makes possible human consciousness and personhood. If the neocortex is the physiological prerequisite for human consciousness, for the ability to associate, reflect, judge, appreciate and evaluate, then the total cessation of its functions, once deemed irrevocable, offers practically certain grounds for the diagnosis of clinical death.

Another safeguard would be the setting up of a hospital board to review the decisions, especially in cases of potential donors. This would help to refine procedures and eliminate anxiety in the team caring for the patient and the transplant team. As suggested by the Harvard Committee, one precaution would be the distinction between the team of physicians that cares for the patient and thus has the responsibility to declare clinical death and the team which may be involved in the transplant operation.<sup>20</sup> Naturally, the rights of the next of kin must be respected and consent for transplant procedures received after the details of the case are given.

In establishing new criteria for clinical death, medicine should not look to law for a set of guidelines. It is intrinsic to the medical profession that it set the criteria for determining death. Thus the law and the public look to medicine to define and protect the criteria. Of course,

this is accomplished not in isolation but in dialogue with other professions and the general community. But the responsibility bears heavily upon the medical profession to develop standards for prolonging life and determining death. As the Harvard Committee Report states:

No statutory change in the law should be necessary since the law treats the question essentially as one of fact to be determined by physicians. The circumstance in which it would be necessary that legislation be offered in the various states to define "death" by law would be in the event that great controversy were engendered surrounding the subject and physicians were unable to agree on the medical criteria.<sup>21</sup>

George P. Fletcher, professor of law, concurs that physicians through commonly accepted practices establish the criteria for decisions regarding prolonging life and determining death.

By establishing customary standards they may determine the expectations of their patients and thus regulate the understanding and relationship between doctor and patient. And by regulating that relationship, they may control their legal obligations to render aid to doomed patients.<sup>22</sup>

Physicians should see their responsibility in its many dimensions: first and foremost, toward the patient with his right to die in peace and with dignity; secondly, toward the next of kin, who could be spared the ordeal of witnessing the dying of a loved one prolonged by artificial measures beyond the hope of substantial benefit to the patient; thirdly, toward the potential recipient of a transplant. The urgency of re-examining the criteria for

clinical death is more imperative in view of technological advances in intensive care which increase the chances of patient's "survival" for extended periods without a functioning neocortex.

#### REFERENCES:

1. Gerald Kelly, S.J., *Medico-Moral Problems* (St. Louis: The Catholic Hospital Association, 1958), p. 129.
2. See *ibid.*, pp. 128-41. Cf. John J. Lynch, S.J., "Notes on Moral Theology," *Theological Studies*, 22 (June, 1961), 246-48.
3. Vincent J. Collins, "Limits of Medical Responsibility in Prolonging Life," *JAMA*, 206: 389-92 (October 7, 1968), 391.
4. Francis D. Moore, "Medical Responsibility for the Prolongation of Life," *JAMA*, 206: 384-86 (October 7, 1968), 386.
5. Report of the Ad Hoc Committee of the Harvard Medical School, "A Definition of Brain Death," *JAMA*, 205: 85-88 (August 5, 1968), 85.
6. *Ibid.*, 85-86.
7. *Ibid.*
8. A Report by the Task Force on Death and Dying of the Institute of Society, Ethics, and the Life Sciences, "Refinements in Cri-

teria for the Determination of Death: An Appraisal," *JAMA*, 221: 48-53 (July 3, 1972), 50.

9. *Ibid.*, 49.

10. C.U.M. Smith, *The Brain: Towards an Understanding* (New York: G. P. Putnam's Sons, 1970), p. 202.

11. Aleksandr Romanovich Luria, *Higher Cortical Functions in Man*, trans. Basil Haigh (New York: Basic Books, Inc., Publishers, 1966), p. 42.

12. *Ibid.*, pp. 30ff.

13. J. B. Brierley, D. I. Graham, J. H. Adams, J. A. Simptom, "Neocortical Death After Cardiac Arrest," *Lancet*, 2: 560-65 (September 11, 1971), 560.

14. *Ibid.*, 564.

15. *Ibid.*

16. *Ibid.*

17. *Ibid.*, 565.

18. *Ibid.*

19. Gary D. Vanderark and Ludwig G. Kempe, *Primer of Electroencephalography* (Neurosurgery Service, Walter Red General Hospital; Hoffmann-LaRoche Inc., 1970), p. 46.

20. Report of the Ad Hoc Committee of the Harvard Medical School, 339.

21. Report of the Ad Hoc Committee . . . , 339.

22. George P. Fletcher, "Legal Aspects of the Decision Not to Prolong Life," *JAMA*, 203: 119-22 (January 1, 1968), 122.