

## Medical and Philosophical Aspect on “Brain Death”

**Karakatsanis KG\***

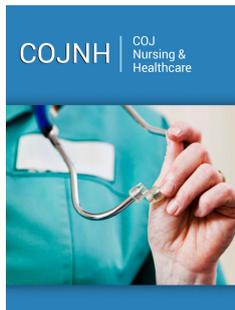
Former Professor of Nuclear Medicine, Greece

### Abstract

The objective of this manuscript is to show that in “brain dead” patients it is not possible to prove either the existence of a totally damaged brain or the absence of the soul and the content of consciousness. Furthermore, another objective is to show that the concept of “brain death” is a utilitarian construct which does not have any firm medical or philosophical foundation. To achieve this goal, we present known and novel arguments from the medical literature and unknown arguments from the philosophical literature. We conclude that there are multiple self-evident inconsistencies inherent in the concept of “brain death”, thereby invalidating this diagnosis both on biological and philosophical grounds.

**Keywords:** Brain death; Consciousness; Soul; Philosophy; Theology

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**\*Corresponding author:** Karakatsanis KG, Former Professor of Nuclear Medicine, Aristotle University of Thessaloniki, Thessaloniki, Greece

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### Introduction

The concept of “Brain Death” (“BD”, here in after) was introduced in the medical literature for purely utilitarian reasons [1], that is:

- A. To lessen the “burden” on patient’s relatives, on hospitals, and on those in need of hospital beds and
- B. To eliminate all obstacles in obtaining vital organs for transplantation [1].

The Ad Hoc Committee of the Harvard Medical School which introduced the term “BD” was well aware that the “brain dead” patients were not really dead but instead deeply comatose individuals who had no “discernible” central nervous activity [1].

### The Clinical Diagnosis of “BD” and the Criteria for “BD” Determination

The entity of “whole brain death” or “whole brain failure” [2] is impossible to be diagnosed by the clinician who examines the comatose patient for any signs of brain stem function. It is obvious that one cannot test for any cerebral function by clinical bedside examination because the tracts of passage to and from the cerebrum, through the brain stem, are invariably destroyed or non-functional in “brain dead” patients [3]. Furthermore, the great problem concerning the definition of “Brain Death” is that “There is insufficient evidence to determine the minimally acceptable observation period to ensure the neurologic functions have ceased irreversibly” [4]. Thus, it follows that one cannot diagnose the “whole brain death”!

The criteria for “brain death” determination, according to the Ad Hoc Harvard Committee, were drawn up by Professor Raymond Adams and included “A permanent state of complete unresponsivity and complete unresponsivity, the latter included all responses, whether brain stem, spinal or cerebral in origin” [5]. Consequently, all spontaneous movements and elicitable reflexes must be absent in the state of “BD”.

### Spontaneous Movements in “Brain Dead” Patients

However, it has been found over the years, that the «brain dead” patients exhibited various spontaneous movements; the defenders of “BD” unable to interpret the mechanism of these movements, claimed that these movements are spinal reflexes and that they are compatible with the diagnosis of “BD” [6]. Nevertheless, it should be noted that the researchers of the NINCDS collaborative study in the USA for “BD”, in 1980, claimed that many of the aforementioned spontaneous movements - which occurred in 5-10% of the “brain dead” patients- could not be identified by the examiners as recognized reflex patterns [7].

## The Importance of “Complex Spinal Automatism” During The “Spinal Shock”

If the brain stem is destroyed or non-functional - which is always part of “BD”- the facilitatory pathways through it are interrupted; all impulses - including the facilitatory impulses to the spinal neurons- are blocked. As a consequence, all skeletal muscle reflexes integrated in the spinal cord are completely blocked in the initial stage of “spinal shock” [8]. Therefore, the presence of these “complex spinal automatisms” in “brain dead” patients during the phase of “spinal shock” is an undisputable evidence that the brain stem is, at least partially, functioning. Hence, the diagnosis of “BD” is invalid [3].

## Inconsistencies in “BD”

The multiple definition-criteria and criteria-tests inconsistencies [9] (maintenance of real electrocerebral activity, uptake of lipophilic radiopharmaceuticals, presence of integrated hypothalamic-endocrine functions, even maintenance - rarely- of some brain stem reflexes and evidence of response to environmental stimuli, maintenance of stable hemodynamic state for a few days, gestation of fetuses by “brain dead” mothers for up to 107 days [10], the inaccuracies of the clinical tests to accurately diagnose necrosis of the brain stem) in many patients who meet the current clinical criteria for the diagnosis of “BD” invalidate this diagnosis.

## Confirmatory Tests in “BD”

Looking through the various “confirmatory” tests (EEG, transcranial Doppler, auditory and somatosensory evoked potentials of the brain stem, classical cerebral angiography, spiral computerized tomography, brain scan with lipophilic radiopharmaceuticals, MRI and MRA, Positron Emission Tomography), one ascertains that not one of these tests has the necessary -100%- positive predictive value (the chance of having a disease given a positive test result) for the pronouncement of human death [3].

## Discrepancies in the Diagnosis of “BD”

After 50 years since the concept of “BD” was introduced in medical literature, and 25 years after the initial explicit guidelines for this diagnosis were drawn up by the American Academy of Neurology [6], major “disturbing” discrepancies were present among the leading neurologic clinics in the USA “which may have consequences for the determination of death and initiation of transplant procedures” [11]. A surprising number (13%) of institution’s guidelines for the apnea testing did not specify that spontaneous respirations be absent during the apnea test [11]. One could perhaps imagine what may happen in the “non leading” neurologic institutes or -even worse- in general hospitals all over the world.

The case of Jahi McMath is very interesting and important because two death certificates were issued for this patient! The first

one was issued in California, in December 2013, and the second in the state of New Jersey in June 2018. This case raises serious questions whether the state of “BD” is always irreversible and whether the diagnostic criteria of “BD” should be modified in order to ensure the necessary prerequisite of irreversibility [12].

## Neuropathologic Findings in “BD”

Interesting, but very disturbing for those who accept the concept of “BD”, are the findings of a neuropathologic study conducted in “BD” patients. In the majority (~60%) of cases of “brain dead” patients the brain stem was almost normal or, more precisely, only 0-5% of the neurons of the examined brain stems showed ischemic changes [13]. Obviously, it is impossible to coexist clinically “dead brain stem” with almost normal neurons. These researchers, instead of questioning the reliability of clinical criteria they used to diagnose “BD”, simply concluded that neuropathologic examination could not serve as a criterion for the diagnosis of “BD” [13].

## Consciousness in “BD” Patients

Concerning the question whether the “brain dead” patients are conscious, there are different considerations. Most researchers identify “consciousness” with arousal without examining what happens to the content of consciousness or awareness; thus, they consider that the only necessary prerequisite for the presence of the content of consciousness is the interaction of the brain cortex with the ascending reticular activation system [14]. Since the late anatomical structure in “brain dead” patients is being considered non-functional by most researchers, they speculate that the “brain dead” patients are not conscious. However, it is not elucidated what happens to the preformed content of consciousness [15] in these comatose apneic patients.

For the time being, there are not established criteria for the diagnosis of the loss of the content of consciousness because consciousness is a subjective experience [16], the content of which is not susceptible to evaluation and measurement because there are no clinical methods available for assessing self-awareness [17]; thus, the diagnosis of “BD” -which is based on the putative absence of “consciousness”- is based on an unproved hypothesis.

Additionally, the irreversibility of consciousness loss, for the time being, is not possible to be diagnosed with certainty [18]. The clinical state of “BD” is certainly different from that of the persistent vegetative state; nevertheless, they have one common characteristic, that is the (putative) loss of the content of consciousness; however, there are indications that the preformed content of consciousness had not been lost during the time the patients were in persistent vegetative state [18,19]; thus, by analogy, one can conclude that the view, according to which there is irreversible loss of the preformed content of consciousness in “brain dead” patients, is unfounded.

## The concept of “BD” is Unacceptable to Psychology, Philosophy and Theology [20]

The brain is the necessary organ for the expression and manifestation of mental phenomena, but does not constitute the cause and source of the spiritual phenomena of the mind, such as will, thought, judgment, emotion etc. In order for any sensation to be grasped, the perception of an appropriate stimulus from the sense organs alone does not suffice, but the activation of the brain is also required. It was a well-known fact in antiquity that no sensation whatsoever can be produced if the soul does not focus its attention on the stimuli and on the information which reaches the sense organs [20].

Heraclitus, the great pre-Socratic philosopher, contends through obscured and seminal reason that man is not rational by nature, but rather he is «by nature irrational»; only the soul, which encompasses him, is rational and echepron (has understanding).” Furthermore, he contends that the inherent with the soul mind (nous, in Greek language) “dresses up” from the soul its rational power [21]. Considering the above, we argue that, according to Heraclitus, it is not the “according to nature” construction of the brain which is the cause of mental phenomena but rather the rational soul with its inherent nous [15].

St. Gregory of Nyssa in his work, “On the making of man” writes: ...for there is one faculty, the implanted mind itself, which passes through each of the organs of sense and grasps the things beyond: this it is that, by means of the eyes, beholds what is seen; this is that, by means of hearing, understands what is said;...that uses the hand for whatever it wills...” [22]. Furthermore, if we take the view of St. John of Damascus that the mind is “the most pure part of the soul” and the “eye of the soul,” [23], it is explained the ancient known saying: “mind sees and mind hears” [24]. Sensation depends on the attention and will of the soul. In the case of severe brain damage, the rational powers of the soul [continue to] exist but are unable to manifest themselves sensibly.

Particularly worthy of note is S. Maximus the Confessor’s explanation of how the soul functions both “in itself” and with the body. In a mysterious and incomprehensible way, the function of the soul with the body consists in the activation of the brain by which it renders communication with the outside world through the senses possible but it also understands the changes in the “internal environment” of the body. One of the characteristic properties of the soul, «its function in itself» is its capacity to carry out complex logical and abstract operations in a most perfect way, when it takes no heed to the stimuli coming in from the external world, a function which is quite dear to it” [25].

In this context, it is very interesting that in Plato’s *Faedo* a similar view -at least superficially- is also expressed: “And indeed the soul reasons best when none of these senses trouble it, neither

hearing, nor sight, nor pain, nor pleasure, but when it is most by itself, taking leave of the body and as far as possible having no contact or association with it in its search of reality” [26].

S. Basil the Great (Father of the Orthodox East Church), going further, considers the coordination (integration) of the functions of each part of the human body as a work of the human rational soul and not of the brain [27]. In another patristic excerpt, this time from S. Maximus the Confessor, we read: “the whole soul permeates the whole body, giving it life and motion... in proportion to each member’s way of maintaining the unity of the body” [28].

Additionally, Aristotle argues that the soul [29] is the cause and origin of the living body, 2) seems rather to hold the body together; at all events, when the soul has departed, the body disperses in air and rots away and 3) imparts motion to animals.

Finally, Galen criticizing Praxagoras and Herophilus contends that the cause of motion in the body is the soul and that the muscles and nerves are simply its organs or instruments. Thus all motion is lost only with the loss of the soul; «I reproach Praxagoras and Herophilus ...in the case of the dead neither the nerves nor the muscles are in the state of suffering all the affections which Herophilus and Praxagoras think they do: all motion has deserted then instantly with the soul, for muscles and nerves are just the instruments of the soul» [30]. Consequently, in the case of severe brain injury (as it happens in “brain dead” patients), the manifestation of the operations of the soul-usually made apparent by means of the brain--is not feasible. This incapacity, however, does not permit us to conclude that the link between soul and body has been dissolved (definition of human death in Theology of Eastern Orthodox Church) and thus that soul is no longer present in the human body.

## Addendum

According to the views of the above great Greek philosophers of antiquity and the Great Theologians of the Eastern Orthodox Church -whose views on the subject under discussion are presented for the first time, as far as we know- it is concluded that the functioning of the rational soul is not dependent on the anatomical integrity of the brain and thus this may exist and function even on a heavily damaged brain.

Therefore, it becomes clear that even if it was possible to diagnose the complete destruction of the brain before the definitive cessation of cardiac functioning, it is impossible to support the idea that in these patients the content of consciousness and the other distinguishing characteristics of the human rational soul are not maintained. Consequently, those who identify the incapacity to manifest and express certain operations of the soul—as happens in the case of “brain-dead” patients- with the death of the human being, degrade man to the level of the brute animals whose “soul,”

exists only as a manifestation of energy or activity being understood only as biological life, through which the functions of the body are carried out; on the contrary, man has a rational soul in both essence and energy [31-37].

## Conclusion

Based on the above arguments, it is concluded that it is unfounded the allegation that in the state of "BD" have irreversibly been lost both, the human soul (with all its functions) and all the biological functions of the brain. Therefore, the diagnosis of "BD" is unfounded and thus incompatible with medicine, philosophy and the Theology of the Eastern Orthodox Church.

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