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## The “Birth” and Development of “Brain Death”

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### Introduction

In approaching the controversy of “brain death” (BD),<sup>1</sup> it helps to recall with attention the words of John Paul II who, in his address to the 18<sup>th</sup> International Congress of the Transplantation Society, states that “the death of the person [...] is an event which *no scientific technique or empirical method can identify directly* [italics in original].”<sup>2</sup> Put differently, the event of death – the very moment when the soul departs from the body – cannot be pinpointed with absolute accuracy. However, there are recognizable biological signs based on which physicians can declare that the patient has indeed died.

Edgar Allan Poe’s short story *The Premature Burial* illustrates the human fear of being buried alive (a fact not so infrequent in Poe’s time). Such a fear is nothing but a manifestation of the well-known “universal fear of a premature, mistaken declaration of death.”<sup>3</sup> In our modern days, advanced technology and scientific progress have all but eliminated the possibility of being buried alive. Ironically, the same cannot be said regarding the risk of a premature declaration of death when viewed in the context of organ procurement for transplantation.

This paper aims to analyze the history of BD, thereby bringing to light the reasons why the BD criterion (paradigm, standard)<sup>4</sup> have been a matter of contention since the time of its inception. To this end, this paper will demonstrate the very point which BD defenders have insistently denied, namely, the close inherent link between the “birth” of BD and the growing

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<sup>1</sup> The term ‘brain death’ in this paper refers to whole brain death. Neither the issue of brainstem death nor the concept of ‘higher brain death’ is part of the scope of this paper. The term itself, though ambiguous, is well ingrained in the literature. It is therefore used in this paper as a stand-in for the longer, but more precise expression ‘brain-based determination of death.’

<sup>2</sup> John Paul II, “Address of the Holy Father John Paul II to the 18th International Congress of the Transplantation Society, no. 4.

<sup>3</sup> James F. Childress, “Difficulties of Determining Death: What Should We Do About the ‘Dead Donor Rule’?,” 28.

<sup>4</sup> It is preferable to use the term “BD standard” or “BD paradigm,” instead of the term BD criterion (or criteria) because the term “criteria” actually refers to the clinical tests on the basis of which BD is declared.

needs of organ transplantation. The second part the paper discusses the two main conceptual rationales which have been advanced in defense of BD. Both of these have shown themselves to be falsified by irrefutable empirical medical evidence, however.

### 1. The Birth of “Brain Death,” a Paradigm Shift in the Understanding of Death

For centuries, the established standard for the determination of death consisted in the permanent cessation of respiration and blood circulation (as manifested by the lack of an arterial pulse and heart beat), which is soon followed by other known signs of death such as *rigor mortis* and *livor mortis*. As pointed out by Arnet, prior to 1968:

[The] definitions of death found in various medical dictionaries and cyclopedias revolve around one central theme: the *cessation of all vital functions of the human body*. In formulating the criteria for determining death, these traditional medical definitions do not isolate the function of any one organ; rather, they emphasize the total stoppage of all vital bodily functions, [...] as evidenced by absence of heartbeat and respiration, [...] beyond the possibility of resuscitation. These classical medical definitions of death give no special significance to the vital function of the brain, [rather, they] place *the definition of death on an integrated basis*, stressing the idea of total stoppage of bodily functions [italics added].<sup>5</sup>

In other words, the above passage indicates that the traditional definition of death, which corresponds to the ordinary sense of death, reflects a holistic vision of human beings in which the human person is not reduced to the mind, and then further reduced from the mind to the brain.

The twentieth century, however, witnessed significant technological advances in medicine, in particular in the areas of: (a) organ transplantation, with the development of immunosuppressive drugs and organ preservation techniques, and (b) artificial life support, with the invention of mechanical ventilators and resuscitative measures.<sup>6</sup> The convergence of these two elements was pivotal to the emergence of the brain-death standard.

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<sup>5</sup> William F. Arnet, "The Criteria for Determining Death in Vital Organ Transplants—a Medical-Legal Dilemma," 221-222. Among the dictionaries and encyclopedias referred to by Arnet are the 1951 edition of Blackiston's New Gould Medical Dictionary, and the 1965 edition of Dorland's Illustrated Medical Dictionary.

<sup>6</sup> David Lamb, *Death, Brain Death and Ethics*, 52-53; Margaret Lock, "Inventing a New Death and Making It Believable," 98.

### 1.1 Important Events Leading up to the Harvard Committee's Report

Three notable events set the stage for the Harvard Committee BD proposal: (a) the paper of two French neurologists, Mollaret and Goulon in 1959, (b) the Ciba Foundation symposium in 1966, and (c) the first hearts transplant carried out by Barnard in 1967. Mollaret and Goulon, reported 23 patients with a 'new' type of coma characterized by complete unresponsiveness to any stimuli, absence of brainstem reflexes, lack of spontaneous breathing, muscle hypotonia, rapid progression of cardiovascular collapse, diabetes insipidus, altered thermoregulation, and a flat electroencephalogram (EEG) which remained so until cardiac arrest.<sup>7</sup> All of the described features correspond to what is now called BD. Of important note is that the authors did not presume this condition to be true death but designated it with the term *le coma dépassé* (i.e., beyond coma).

During the 1960s, "the burgeoning field of organ transplantation unleashed a strong desire to expand the recipient pool."<sup>8</sup> Yet there were several impediments, notably the limited availability of living related donors and the poor quality of organs from cadaveric donors.<sup>9</sup> Thus, at the 1966 international symposium on *Ethics in Medical Progress: With Special Reference to Transplantation* sponsored by the Ciba Foundation in London, one of the main issues on the agenda concerned the definition of death. "The issue needed to be confronted in order to increase the efficacy of the transplant procedure,"<sup>10</sup> especially since with the traditional cardiopulmonary standard for death, the kidneys (and other organs) deteriorate rapidly when deprived of blood supply upon cessation of circulation. Several discussions were held concerning the issue of equating *le coma dépassé* with death for the purpose of organ procurement.<sup>11</sup>

Guy Alexandre, a Belgian surgeon, advanced five neurological criteria for death which he had already applied, since June 1963,<sup>12</sup> on "patients with head injuries, whose hearts had not stopped, to do kidney transplantations."<sup>13</sup> The criteria were basically drawn from the article of Mollaret and Goulon. There was strong opposition against his approach, however, as several

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<sup>7</sup> P. Mollaret and M. Goulon, "Le Coma Dépassé."

<sup>8</sup> Michael N. Diring and Eelco F. M. Wijdicks, "Brain Death in Historical Perspective," 6.

<sup>9</sup> *Ibid.*, 7.

<sup>10</sup> David J. Rothman, *Strangers at the Bedside: A History of How Law and Bioethics Transformed Medical Decision Making*, 156.

<sup>11</sup> At the time of the Ciba symposium, the terminology 'brain death' or 'brain-dead donor' was not yet invented. Labels such as 'heart-lung preparation' or the oxymoron terminology 'living cadaver' were used instead to refer to such potential donors.

<sup>12</sup> G.P.J. Alexandre, "From the Early Days of Human Kidney Allotransplantation to Prospective Xenotransplantation."

<sup>13</sup> Joseph E. Murray, "Organ Transplantation: The Practical Possibilities," 69.

participants affirmed that “if a patient has a heartbeat he cannot be regarded as a cadaver.”<sup>14</sup> As David Daube rightly points out,

Under the classical definition of death, which should not be lightly discarded, an irreversibly unconscious person whose life depends on a machine is still alive. The doctor may be right to stop the machine and let him die. But until death occurs, interference with his body is illicit: it is not a corpse.<sup>15</sup>

There was also concern that “any modification of the means of diagnosing death to facilitate transplantation will cause the whole procedure to fall into disrepute with the rest of the profession.”<sup>16</sup> At the same time, however, other participants were favorable to Alexandre’s proposal for BD, although they would not have it applied to themselves or their family members.<sup>17</sup> Of note is that the one person who endorsed Alexandre’s idea most enthusiastically was Joseph Murray, a future member of the Harvard Ad Hoc Committee. “Those criteria are excellent,” he stated, “this is the kind of formulation that we will need before we can approach the legal profession.”<sup>18</sup>

The conference closed without reaching any agreement whether death should be redefined or not. What transpired from the Ciba symposium is clear, however, namely that “the shift to cadavers as kidney sources and the superior viability of heart-beating cadaver kidneys impelled transplantation interests in brain death.”<sup>19</sup>

The movement toward redefining the criteria for death, which had begun with the need for better quality kidneys, took an accelerated turn with heart transplantation. The close temporal sequence between the Harvard Committee and Barnard’s pioneering heart transplant cannot be considered a mere coincidence. On December 3, 1967, in Cape Town, Christiaan Barnard conducted the first heart transplant taken from a young woman already declared brain dead by a neurosurgeon.<sup>20</sup> Nevertheless, Barnard did not remove her heart until the “electrocardiogram had shown no activity for 5 minutes,”<sup>21</sup> so as to avoid the criticism that he had killed the

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<sup>14</sup> *Ibid.*, 73.

<sup>15</sup> David Daube, “Transplantation: Acceptability of Procedures and the Required Legal Sanctions,” 191.

<sup>16</sup> Murray, 73.

<sup>17</sup> Mita Giacomini, “A Change of Heart and a Change of Mind? Technology and the Redefinition of Death in 1968,” 1467.

<sup>18</sup> Murray, 69.

<sup>19</sup> Giacomini, 1467.

<sup>20</sup> Michael A. DeVita, Snyder James V., and Grenvik Ake, “History of Organ Donation by Patients with Cardiac Death,” 118.

<sup>21</sup> C. N. Barnard, “The Operation. A Human Cardiac Transplant: An Interim Report of a Successful Operation Performed at Groote Schuur Hospital, Cape Town,” 1271.

donor.<sup>22</sup> Although the recipient “died 18 days later from extensive bilateral pneumonia,” the operation “was hailed throughout the world as a major medical triumph;”<sup>23</sup> thus allowing Barnard to proceed with a second heart transplant within less than a month. The second recipient lived for 18 months, with a questionable quality of life, however.<sup>24</sup> With heart transplants becoming a reality, “medicine [urgently] needed a new standard of death, specifically *brain death*, to determine when organs could be removed from a still-living body [italics original].”<sup>25</sup> On January 4, 1968, Robert Ebert, the dean of Harvard Medical School approved the formation of an ad hoc committee in response to an earlier request from Henry Beecher.<sup>26</sup> According to the dean’s letter, the purpose of the Committee is to study “the ethical problems created by the hopelessly unconscious man ... [and] the necessity of giving further consideration of brain death ... [since] many of the ethical problems of transplantation and other developing areas of medicine hinge on appropriate definition.”<sup>27</sup>

## 1.2 The Harvard Ad Hoc Committee

The Harvard Committee consisted of 13 members including one lawyer, one historian, one theologian (a Presbyterian minister), and ten physicians with expertise in transplantation, neurology, neurosurgery, public health, and anesthesiology (Beecher, the chairman of the Committee).<sup>28</sup> The Committee worked swiftly behind closed doors from March through June and completed its work with the sixth and final draft submitted to the dean on June 25, 1968.<sup>29</sup> It received immediate publication on August 5, 1968.<sup>30</sup> The Committee stated the reason for its work in the very first paragraph of the report as follows:

<sup>22</sup> DeVita et al., "History of Organ Donation by Patients with Cardiac Death," 121.

<sup>23</sup> Raymond Hoffenberg, "Christiaan Barnard: His First Transplants and Their Impact on Concepts of Death," 1478.

<sup>24</sup> Ibid.

<sup>25</sup> Gregory E. Pence, *Classic Cases in Medical Ethics Accounts of Cases That Have Shaped Medical Ethics, with Philosophical, Legal, and Historical Backgrounds*, 44.

<sup>26</sup> On October 30, 1967, Beecher wrote to the dean of Harvard Medical School, Robert Ebert: “Both Dr. Murray and I think the time has come for a further consideration of the definition of death. Every major hospital has patients stacked up waiting for suitable donors.” Note that the dean did not reply to Beecher immediately; the response only came after the news of Barnard’s acclaimed heart transplant. This letter is part of the Beecher manuscripts preserved at the Francis Countway Library of Medicine at Harvard. Currently the records are closed to the public; they are made available only to certain people. The letter is quoted in Rothman, 160-161.

<sup>27</sup> E.F.M. Wijdicks, "The Neurologist and Harvard Criteria for Brain Death," 972.

<sup>28</sup> In the original publication of the Harvard Committee’s report in 1968, the names of the Committee members were not made available. The reprint of the article, which appeared in the *International Anesthesiology Clinics* 45, no. 4 (2007): 113-119, listed all 13 members.

<sup>29</sup> Giacomini, 1474; Wijdicks, 972.

<sup>30</sup> Ad Hoc Committee of the Harvard Medical School, "A Definition of Irreversible Coma."

Our primary purpose is to define irreversible coma as a new criterion for death. There are two reasons why there is need for a definition: (1) Improvements in resuscitative and supportive measures have led to increased efforts to save those who are desperately injured. Sometimes these efforts have only partial success so that the result is an individual whose heart continues to beat but whose brain is irreversibly damaged. *The burden is great on patients who suffer permanent loss of intellect, on their families, on the hospitals, and on those in need of hospital beds already occupied by these comatose patients.* (2) *Obsolete criteria for the definition of death can lead to controversy in obtaining organs for transplantation* [italics added].<sup>31</sup>

At first glance, the Committee's opening statement appears candid and forthright, assuring the reader that its first concern is the burden posed by the 'irreversibly' comatose patients to themselves and their families, and that this concern precedes the need to free up some beds in the ICU (intensive care unit). Organ transplantation, so it seems, was not the main impetus for the Committee's definitional effort; only two references were made to transplant/transplantation in the entire report. In other words, in reading the introductory paragraph of the Harvard report we should ask two questions: (a) 'are the two alleged reasons cited by the Committee sufficiently credible?' and, (b) 'if not, what is the true motivation underlying the Committee's recommendation of irreversible coma as the new standard for declaring death?'

### **1.2.1 Evaluation of the Harvard Committee's Justifications for the Brain-Death Standard**

To advance BD as the new standard for death requires a philosophical rationale to explain why a patient in *coma dépassé* should be considered dead. Yet, as noted by various critics, no theoretical justification was provided in the Harvard Committee's report.<sup>32</sup> A philosophical rationale was not to come until the intervention of the President's Commission in 1981. The two justifications addressed by the Committee pertain solely to the pragmatic and utilitarian order.<sup>33</sup> Both of them raise difficulties, however.

The Committee's first justification concerns the burden which patients in irreversible coma pose to themselves, their families, and hospital resources. It is difficult to see how such a burden requires that a new standard for death be established. As Hans Jonas points out, the question is

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<sup>31</sup> Ibid., 85.

<sup>32</sup> Giacomini, 1477-1478; Martin S. Pernick, "Brain Death in a Cultural Context: The Reconstruction of Death, 1967-1981," 9-12; Josef Seifert (a), "Is 'Brain Death' Actually Death?," 177-178; Robert M. Veatch, "Defining Death Anew: Technical and Ethical Problems," 20.

<sup>33</sup> The Committee's approach, which focused solely on the practical and completely ignored conceptual abstractions, reflects the thinking of its chairman, Beecher, who considers philosophy as useless to intellectual life. For more details see Pernick, 13.

not whether the deeply comatose patient is dead, but rather how should such a patient be dealt with, that is, whether or not to discontinue the extraordinary measures of artificial life support and let the patient die naturally. Hence, “no redefinition of death is needed... [but rather] a redefinition of the physician’s presumed duty to prolong life under all circumstances.”<sup>34</sup> Most importantly, the decision to take the patient off life support must not be motivated by organ donation. Only then, and assuming that other ethical and medical prerequisites are met, one might accept that irreversible coma “is in itself sufficient ground to discontinue the extraordinary means of life support. Yet this does not necessitate calling this state death.”<sup>35</sup> Already before 1968, it had been part of the long-standing (though informal) medical tradition to quietly disconnect the ventilators of patients whose conditions were deemed terminal or irreversible,<sup>36</sup> and to let the dying patient progress to natural death which would soon follow. Such a practice proves that “the discontinuation of extraordinary means of life-support (artificial respirators, etc.) could be justified without maintaining that irreversible breakdown of brain function is identical with death.”<sup>37</sup> The teaching of the Church, in particular the address of Pius XII to anesthesiologists,<sup>38</sup> also confirms that there is “no absolute [moral] obligation to prolong the life of a gravely suffering or irreversibly unconscious patient by extraordinary means.”<sup>39</sup> Once natural death takes place in such patients, the need to free up ICU beds becomes a non-issue. Consequently, organ transplantation, which the Committee claimed to be the lesser important reason, reveals itself to be the very motive why the Committee wanted to advance BD as a new standard for determining death.

The Committee’s second justification states that the “*obsolete criteria for the definition of death can lead to controversy in obtaining organs for transplantation* [italics added].”<sup>40</sup> It is unclear which controversy the Committee was referring to, since prior to 1968 kidneys were taken either from related living donors or from persons whose death was declared according to the traditional cardiopulmonary standard (so-called obsolete criteria, according to the Committee) which at the time was the only accepted criterion of death. Furthermore, according to what is known as the Dead Donor Rule, vital organs can only be taken from dead people. Thus, the only possible controversy which the Committee might have alluded to would be if organs were harvested prior to conventional death, since such an intervention amounts to

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<sup>34</sup> Hans Jonas, "Against the Stream: Comments on the Definition and Redefinition of Death," 55.

<sup>35</sup> Seifert (a), 178.

<sup>36</sup> Margaret M. Lock, *Twice Dead: Organ Transplants and the Reinvention of Death*, 103.

<sup>37</sup> Josef Seifert (b), "Brain Death and Euthansia," 206.

<sup>38</sup> Pius XII, "Address to an International Congress of Anesthesiologists, November 24, 1957."

<sup>39</sup> Seifert (b), 206.

<sup>40</sup> Ad Hoc Committee of the Harvard Medical School, 85.

killing the patient by vivisection.<sup>41</sup> The only way to circumvent the Dead Donor Rule is to have a new standard for determining death such that procurement of vital organs does not leave physicians open to the charge of murder. By introducing the brain-death standard, the Harvard Committee, did not alleviate any controversy. Rather “it created one,”<sup>42</sup> as the Committee attempted “not only to promote organ donation, but also to ... defend the entire medical profession against the public perception that transplant surgeons were organ-stealing killers.”<sup>43</sup> Additional evidence, including the preparatory documents of the Harvard report, further confirms that both of these factors constitute the true impetus for the Committee’s work.

### 1.2.2 Evaluation of the Manuscript-Drafts of the Harvard Committee’s Report

The Harvard Committee manifested its true motivation in its own words and ‘deeds’ (the way the Committee worked). There are at least three notable facts. First, is the biased composition of the Committee itself. At least six of the ten physicians (specializing in neurology, neurosurgery, renal transplantation, and anesthesiology) were BD proponents, while there were none to represent the position of the traditional cardiopulmonary death criteria.<sup>44</sup> Ralph Potter, the theologian member of the Committee, later commented that “it was not a deliberative body.”<sup>45</sup> Second, is the way in which the Committee carried out its work: the Committee worked behind closed doors and in a great hurry. As pointed out by Giacomini, who analyzed the “Committee’s drafts, memos, and work in progress,”<sup>46</sup>

the Committee's hurried work behind closed doors expropriated the question from a host of outside parties who might not keep the interests of transplantation close at heart, among them the news media, the courts. [...] A timely statement would ward off legal challenges to transplantation, and Harvard's successful production of the "first" statement would preempt any competing groups' claims to authority in the area. [...] The urgency clearly was *not* on account of the clinical problem of the “hopelessly unconscious patient,” who by 1968 had existed uneventfully in hospitals for years [*italics in original*].<sup>47</sup>

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<sup>41</sup> Such was the case of Bruce Tucker who on May 24, 1968, suffered a severe traumatic brain injury and was brought to the Medical College of Virginia Hospital, then a renowned center for organ transplantation. Within 24 hours he was declared dead (despite normal vital signs) after a five minute apnea test. The heart and both kidneys were harvested without any attempt from the hospital to contact the patient’s brother (whose business card was in Tucker’s wallet) for permission. For more details, see Veatch, 19-20; Lock, "Inventing a New Death and Making It Believable," 100.

<sup>42</sup> Teresi, 94.

<sup>43</sup> Pernick, 9.

<sup>44</sup> Teresi, 132.

<sup>45</sup> Wijdicks, 975.

<sup>46</sup> Giacomini, 1466.

<sup>47</sup> *Ibid.*, 1475.

Third, and most important, is the evidence coming from the earlier drafts of the Harvard report and the memos between the Committee members. The language in these documents shows explicit connection between BD and the need for organs, thereby revealing the centrality of organ transplantation as the true impetus for the Committee's work. For instance, in one of his correspondences (quoted by Wijdicks) to Beecher in late 1967 regarding organs, Murray wrote:

The next question posed by your manuscript, namely, "Can society afford to lose organs that are now being buried?" is the most important one of all. Patients are stacked up in every hospital in Boston and all over the world waiting for suitable donor kidneys. At the same time patients are being brought in dead to emergency wards and potentially useful kidneys are being discarded.<sup>48</sup>

Likewise, the necessity of BD for the advancement of organ transplantation was explicitly expressed in several of the manuscript drafts, of which some of the key passages are quoted by Giacomini. For instance in the conclusion of the first draft of April 11, 1968, we read the following:

The question before this committee cannot be simply to define brain death. This would not advance the cause of organ transplantation since it would not cope with the essential issue of when the surgical team is authorized—legally, morally, and medically—in removing a vital organ...<sup>49</sup>

Similar language is found in the manuscript draft of June 3<sup>rd</sup>; it reads:

With increased experience and knowledge and development in the field of transplantation, there is great need for the tissues and organs of the hopelessly comatose in order to restore to health those who are still salvageable.<sup>50</sup>

It is clear that the above language, as dean Ebert himself recognized, shows that Beecher and the Committee "wish to redefine death in order to make viable organs more readily available."<sup>51</sup> In the final report, the wording in the earlier drafts was toned down and replaced with the wording of the dean, who suggested that it would be better to indicate that "obsolete criteria for the definition of death can lead to controversy in obtaining organs for transplantation."<sup>52</sup> This statement of the dean stands as the secondary reason (stated in the opening paragraph of

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<sup>48</sup> Wijdicks, 972. The connection between the need for organs and brain death is explicit in this correspondence. Nevertheless, Wijdicks maintained that the Committee acted "without special interest." The passages quoted by Giacomini from the drafts of the Harvard report are not mentioned in Wijdicks' paper.

<sup>49</sup> Giacomini, 1474.

<sup>50</sup> *Ibid.*, 1475.

<sup>51</sup> *Ibid.*; Pernick, 9.

<sup>52</sup> Giacomini, 1474.

the Harvard Report) for the Committee's recommendation of BD as a new criterion of death. In other words, organ transplantation, the factor which had been all along the driving force behind the Committee's endeavor, was now given a muted expression, to appear merely as something of secondary importance.

Nevertheless, the revised and guarded language in the final report could not fully veil the Committee's real motivation. Put bluntly, the introduction of 'BD' allow surgeons to remove organs from patients with irreversible coma without risking to be accused of homicide or euthanasia.<sup>53</sup> Even Peter Singer, whose utilitarian philosophical outlook is well known, affirms that "the brain death criterion of death is nothing other than a convenient fiction."<sup>54</sup> The notable lack of transparency, already present from its very beginning, is one of the main reasons why the concept of BD still remains a contentious issue today. Although it is widely practiced and has contributed to the booming of organ transplantation,<sup>55</sup> opposition has been steadily mounting from various quarters, including, medicine, philosophy, and social sciences, among others.

## **2. The Development of "Brain Death," a Post Hoc Justification: President's Commission and Bernat's Doctrine of the Supremacy of the Brain**

Following its introduction by the Harvard Committee, the brain-death standard was adopted quickly without significant resistance in North America and Europe, facilitated by the fact that "disputes by experts about the status of brain death were erased from both general medical and public attention by a judicious use of the powerful metaphor of the 'gift of life.'"<sup>56</sup>

It was not until 1981 that a conceptual rationale to justify the Harvard BD standard became available and "promulgated" by the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research which was appointed "to study the ethical and legal implications of the matter of defining death, including the advisability of developing a uniform definition of death."<sup>57</sup> In its 1981 *Report on the Medical, Legal and Ethical Issues in the Determination of Death*, the Commission "chose as their conceptual

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<sup>53</sup> Seifert (a), 178; Seifert (b), 206.

<sup>54</sup> Peter Singer, "Is the Sanctity of Life Ethic Terminally Ill?", 347.

<sup>55</sup> Between Jan 1, 1988 and May 31, 2014, according to the available statistics in the United States, there were 474,267 organ transplants from dead donors (the great majority of whom were declared dead by the brain-death standard) as compared to 130,168 from living donors. In particular, there were 58,039 heart transplants. Dead donors account for nearly 80% of kidney transplants. The above data are available at <http://optn.transplant.hrsa.gov/latestData/rptData.asp>.

<sup>56</sup> Margaret Lock, "Living Cadavers and the Calculation of Death," 137.

<sup>57</sup> President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Defining Death: A Report on the Medical, Legal and Ethical Issues in the Determination of Death*, 1.

foundation the analysis of death” published earlier in the same year by James Bernat, one of the most influential BD proponents.<sup>58</sup> Subsequently the Pontifical Academy of Sciences also adopts Bernat’s justification of whole BD,<sup>59</sup> culminating with its formal declaration in 2006 that “brain death is not a synonym for death, does not imply death, or is not equal to death, but ‘is’ death.”<sup>60</sup>

## 2.1 Bernat’s Thesis in Defense of “Brain Death

Bernat’s doctrine of whole BD rests on several important premises, namely that death is a biological phenomenon, and that it is an irreversible event. Bernat’s recognition that death is not a process but an event, is in full concordance with the Judeo-Christian understanding of death. Metaphysically speaking, death is the separation of the soul from the body. Hence it is an instantaneous event “which *no scientific technique or empirical method can identify directly* [italics original].”<sup>61</sup> The corresponding biological phenomenon, which indicates that death has occurred, can be recognized, however. This phenomenon is referred to as somatic disintegration, manifesting in various confirmatory signs which man over millennia has learned to recognize.

### 2.1.1 Biological Death and Organism as a Whole

With regard to when must the patient be declared dead, however, Pope Pius XII taught that “the answer cannot be deduced from any religious and moral principle.”<sup>62</sup> Therefore, the determination of death “does not fall within the competence of the Church.”<sup>63</sup> Rather, it falls to the competence of the medical field to identify “*the biological signs that a person has indeed died* [italics original],”<sup>64</sup> that is, to judge with as much precision as possible “which particular physiological phenomena are sufficient indicators of death as defined on the concept-level.”<sup>65</sup>

Death is the privation of life. Biologically-speaking, both concepts of life and death need to be understood at the level of the organism as a whole and not at levels above or below the

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<sup>58</sup> James. L Bernat (a), "The Whole-Brain Concept of Death Remains Optimum Public Policy," 36.

<sup>59</sup> Carlos Chagas, ed. Working Group on the Artificial Prolongation of Life and the Determination of the Exact Moment of Death, 113. See also “Final Considerations Formulated by the Scientific Participants,” in *The Determination of Brain Death and Its Relationship to Human Death*, 81.

<sup>60</sup> Antonio Battro et al., “Why the Concept of Brain Death is Valid as a Definition of Death: Statement by Neurologists and Others,” XXI.

<sup>61</sup> John Paul II, no. 4.

<sup>62</sup> Pius XII.

<sup>63</sup> Ibid.

<sup>64</sup> John Paul II, no. 4.

<sup>65</sup> D. Alan Shewmon (a), "You Only Die Once: Why Brain Death Is Not the Death of a Human Being," 476.

organism.<sup>66</sup> In other words, there is a “distinction between the life of the organism itself from the life of its component parts or subsystems.”<sup>67</sup> Thus, Bernat’s defense of BD begins with the biological definition of “death as the permanent cessation of functioning of the organism as a whole.”<sup>68</sup> Defining death in terms of the organism as a whole is a definition that is: (i) applicable to other higher animal species (mammals), (ii) valid across cultures, and (iii) unlikely to be altered by future technological advances. Hence as Culver and Gert state,

Death is a biological phenomenon and should apply equally to related species. When we talk of the death of a human being, we mean the same thing as we do when we talk of the death of a dog or a cat. This is supported by our ordinary use of the term death, and by law and tradition. It is also in accord with social and religious practices and is not likely to be affected by future changes in technology.<sup>69</sup>

Organism as a whole does not require the organism to be whole or complete, as long as it can “continue functioning despite loss of some of its subsystems.”<sup>70</sup> As pointed out by Bernat, “individual subsystems may be replaced (such as, by pacemakers, ventilators, pressor) without changing the status of the organism as a whole.”<sup>71</sup> Bernat further adds: “When a higher organism is comatose, proof of the functioning of the organism as a whole may still be evident, such as temperature regulation.”<sup>72</sup> Indeed, on the basis of Bernat’s own statement, it should be considered that a patient in deep coma, with absence of reflexes, supported by the ventilator and pressor medications, still remains a human organism as a whole.

The above notions regarding (i) organism as a whole, and (ii) death as an event, are notions accepted by both sides of the BD debate.

### **2.1.2 Bernat’s doctrine: the Brain as Central Somatic Integrator**

Despite the correct global understanding about organism as a whole, Bernat and other BD advocates hold an oversimplified, reductionistic conception of the organism as a whole, in which the emphasis is on the control of the whole by a specific part of the whole, in this case

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<sup>66</sup> It is not the scope of this paper to explain the biophilosophical notion of “organism as a whole.” Suffice it to indicate that a human person is an organism as a whole; likewise a cat is an organism as a whole. An organ, e.g., a kidney, is not an organism as a whole.

<sup>67</sup> James L. Bernat (b), “Revisiting the Definition and Criterion of Death,” 29.

<sup>68</sup> Ramellini, “Death in the Biological Literature of Life,” 21.

<sup>69</sup> Charles M. Culver and Bernard Gert, *Philosophy in Medicine*, 182.

<sup>70</sup> James L. Bernat (c), “The Definition, Criterion, and Statute of Death,” 47.

<sup>71</sup> James L. Bernat et al., “On the Definition and Criterion of Death,” 390.

<sup>72</sup> *Ibid.*

the brain. The assertion of the brain as the supreme master and central integrator of the body is expressed most forcefully in the following two passages:

It is primarily the brain that is responsible for the functioning of the organism as a whole: the integration of organs and tissue subsystems by neural and neuroendocrine control of temperature, fluids and electrolytes, nutrition, breathing, circulation, appropriate responses to danger, among others.<sup>73</sup>

The brain is necessary for the functioning of the organism as a whole. It integrates, generates, interrelates, and controls complex bodily activities. A patient on a ventilator with a totally destroyed brain is merely a group of artificially maintained subsystems since the organism as a whole has ceased to function. [...] In all cases, despite the most aggressive support, the adult heart stops within 1 week, and that of the child within 2 weeks.<sup>74</sup>

In other words, for Bernat and brain death defenders, it is from the brain that the body owes its integrative unity. From this thesis flows the conclusion that “the criterion of death that best fulfills this definition [the definition of death as the permanent cessation of critical functions of the organism as a whole] is the irreversible cessation of all clinical functions of the entire brain.”<sup>75</sup> Echoing Bernat’s words, the 1981 President’s Commission also argued that the brain holds primacy not only because it is responsible for consciousness, “but also as the complex organizer and regulator of bodily functions. [...] *Only the brain can direct the entire organism* [italics added].”<sup>76</sup> As evidence for the centrality of the brain, the Commission pointed out that in patients with brain death, “even with extraordinary medical care, [the somatic] functions cannot be sustained indefinitely – typically, no longer than several days.”<sup>77</sup>

## **2.2 From the 1981 President’s Commission to the 2008 White Paper of the President’s Council on Bioethics**

The last two decades of the 20<sup>th</sup> century and thereafter have provided ample evidence that, contrary to popular belief – the belief spread by BD advocates, including 1981 President’s Commission – and medicolegal acceptance of BD worldwide, the brain is not the critical system responsible for the somatic integration of the organism.

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<sup>73</sup> Bernat (c), 48.

<sup>74</sup> Bernat et al., 391-392.

<sup>75</sup> Bernat, "A Defense of the Whole-Brain Concept of Death," 18.

<sup>76</sup> President's Commission, 34.

<sup>77</sup> Ibid, 35.

### 2.2.1 Empirical Evidence: Patients with Chronic Brain Death

With respect to the empirical evidence which falsify the thesis of Bernat and the President's Commission, the most important article is Shewmon's 1998 seminal work on survivors with "chronic BD."<sup>78</sup> From the medical literature, the media, and his own clinical practice, Shewmon collected 175 well-documented cases of brain-dead patients with survival of at least one week, that is, beyond the maximum possible 'few days' claimed by brain death proponents. Of these 175 cases, "80 survived at least two weeks, 44 at least four weeks, 20 at least two months, seven at least six months, and four longer than one year."<sup>79</sup> The record survivor was T.K., who though declared brain dead at age four, continued to live on with evidence of normal physical growth for 19½ more years,<sup>80</sup> despite a flat EEG (documented on several occasions), lack of spontaneous breathing and brainstem reflexes, absence of evoked potentials, and no evidence of intracranial blood flow by magnetic resonance angiography.

In science, all that is required to prove a theory to be false is one case. If BD *is* indeed death, which is to say that the brain-dead patient is a corpse, then such a 'corpse' like T.K. certainly demonstrates unusual properties. Shewmon's list of cases cannot be merely dismissed as anecdotes or misdiagnoses. "To dismiss the cases as presumptive misdiagnoses would imply that organ donors are also often misdiagnosed and that brain death declarations are inherently unreliable,"<sup>81</sup> or that the neurologists and neurosurgeons involved in those cases were all incompetent. Rather Shewmon's cases should be taken most seriously since they indicate that there are "many more *potential* cases [which] have never been manifest because brain death is nearly always a self-fulfilling prophecy of somatic demise through organ harvesting or discontinuation of support."<sup>82</sup> Furthermore, the assertion that cardiac arrest soon follows brain death, and that life support can postpone it only for 'a few days at most' is not founded on any empirical evidence, since there has not been a systematic attempt to provide extended aggressive support to brain-dead patients.<sup>83</sup> Those with healthy organs (i.e., without multisystem damage) have the best survival potential; yet they are also the ideal donors to be taken quickly for organ harvesting instead.

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<sup>78</sup> D. A. Shewmon (b), "'Brainstem Death,' 'Brain Death' and Death: A Critical Re-Evaluation of the Purported Equivalence, 126.

<sup>79</sup> *Ibid.*, 135.

<sup>80</sup> Walt F. Weaver, "Unpaired Vital Organ Transplantation Secular Altruism? Has Killing Become a Virtue?," 6.

<sup>81</sup> D. A. Shewmon (c), "Chronic 'Brain Death': Meta-Analysis and Conceptual Consequences," 1542.

<sup>82</sup> *Ibid.*

<sup>83</sup> President's Commission, 35.

Several lessons can be drawn from Shewmon's empirical data. First, "brain death does not necessarily lead to imminent asystole."<sup>84</sup> Yet, brain death advocates have used 'imminent asystole' as a justification for equating brain death with death. Second, at least some brain-dead patients can survive chronically. Once they make it through the first few weeks (the most precarious weeks for any patient with severe brain injury), their conditions stabilize, "no longer requiring sophisticated technological support."<sup>85</sup> Third, and most important, is the following two-fold physiological truth: (a) the so-called integrative functions mediated by the brain are in fact not somatically integrating (they are not responsible for the somatic integration of the organism), and conversely (b) "most somatic integrative functions are not brain mediated."<sup>86</sup>

### 2.2.2 The 2008 White Paper by the President's Council on Bioethics

A central aspect of the 2008 President's Council on Bioethics work, addressing *the Controversies in the Determination of Death* (the title of its white paper), was to reconsider "the philosophical adequacy of the [mainstream] view on brain death,"<sup>87</sup> thereby "clarifying the "troubled relationship between determining death and procuring organs."<sup>88</sup> In its white paper, the Council replaced the ambiguous term BD with the physiologically more correct term "brain failure."<sup>89</sup> Under the weight of Shewmon's work on somatic integration, the Council had to admit that:

If being alive as a biological organism requires being a whole that is more than the mere sum of its parts, then it would be difficult to deny that the body of a patient with total brain failure can still be alive.<sup>90</sup>

In other words, the Council acknowledged that the Commission's rationale of organismic integrative unity is no longer valid because of "the false assumption that the brain is the 'integrator' of vital functions."<sup>91</sup>

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<sup>84</sup> Shewmon (c), 1543.

<sup>85</sup> Shewmon (b), 136.

<sup>86</sup> Ibid., 138. See also Shewmon (d), "The Brain and Somatic Integration: Insights into the Standard Biological Rationale for Equating 'Brain Death' with Death," 463-471.

<sup>87</sup> President's Council on Bioethics, "Controversies in the Determination of Death," 7.

<sup>88</sup> Ibid., 8.

<sup>89</sup> Ibid., 17-19. The Council rejected the term brain death because: (a) one cannot die of more than one kind of death, (b) the issue is about the death of the human being; it is not about the death of the brain itself, and (c) death *per se* is not a medical diagnosis. The term brain death has been so well entrenched, however, that it continues to be used even after 2008, especially since the Council's intervention itself has made it possible for the practice of the brain-death standard to retain its status quo.

<sup>90</sup> Ibid., 57.

<sup>91</sup> Ibid., 60.

Given that “there is no sound biological justification for [the] neurological standard,”<sup>92</sup> the proper and ethical course of action for the Council should have been to reject the brain-death standard and give the recommendation that patients with *coma dépassé* should be treated as still living persons. Instead, the Council chose to continue to uphold the neurological standard as a criterion for declaring death. To defend it, the Council advanced the rationale of fundamental vital work. Fundamental vital work refers to “the work of self-preservation, achieved through the organism’s need-driven commerce with the surrounding world.”<sup>93</sup> According to the Council, spontaneous breathing and openness to the world (to be receptive to external stimuli, i.e., consciousness) are the two key elements of the organism’s fundamental vital work.<sup>94</sup>

The ‘fundamental vital work’ rationale has not elicited much interest in brain-death circles because it is even weaker than Bernat’s doctrine of the brain as the central somatic integrator. This is also why Catholic BD defenders, even today, still cling to the older rationale, despite the fact that it is no longer viable. The more recent philosophical rationales advanced by Catholic thinkers, namely, Lee and Grisez, Condic, Eberl and Moschella, are basically a sophisticated formulations of Bernat’s doctrine of the brain as central somatic integrator.

Among the several deficiencies of the ‘fundamental vital work’ argument, the most overt flaw is that the definition of a living organism rests solely on the *ad extra* dimension of the organism, namely its capacity to engage in commerce with the surrounding world. The Council conveniently overlooked the entire *ad intra* dimension of the organism itself. The question raised is the following:

Why should immanent work on a holistic level – such as self-development (for instance, of an embryo) and self-maintenance (for instance, internal homeostasis, orderly turnover of cells and tissue components, or teleological repair) – not also count as legitimate examples of ‘fundamental vital work’ of a living organism?”<sup>95</sup>

If we were to accept the Council’s definition of fundamental vital work, then human beings in their embryonic/fetal stage of development would not qualify as living organisms. *In utero*, the placenta functions analogously to the ventilator and feeding tube, and the fetus “has neither breathing [... understood in the sense proposed by the Council], nor a drive to breath, nor

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<sup>92</sup> Ibid., 53.

<sup>93</sup> Ibid., 60.

<sup>94</sup> Ibid., 61-64.

<sup>95</sup> D. Alan Shewmon (e), "Brain Death: Can It Be Resuscitated?," 20.

conscious self-preserving interaction with the maternal environment.”<sup>96</sup> The fetus, however, manifests a whole host of holistic integrative properties (such as the various systems of internal homeostasis) characteristic of living human beings. These properties comprise the *ad intra* dimension, the immanent vital work on a holistic level of the living organism.

## Conclusion

In summary, neither the rationale of the brain as central somatic integrator nor the thesis of fundamental vital work can justify the BD paradigm. Both have shown themselves to be contradicted by empirical evidence and thus proven to be invalid conceptual frameworks. Hence, the proper ethical course that should be followed can be none other than to abandon the brain-death standard altogether, something which the Council itself already stated explicitly:

If indeed it is the case that there is no solid scientific or philosophical rationale for the current “whole brain standard,” then the only ethical course is to stop procuring organs from heart-beating individuals.<sup>97</sup>

The Council even made reference to Jonas who, 30 years earlier, had written:

Moreover, we have sufficient grounds for suspecting that the artificially supported condition of the comatose patient may still be one of life, however reduced ... [T]he only course to take is to lean over backward toward the side of possible life.<sup>98</sup>

In other words, we should apply to brain-dead patients the very principle *in dubio pro vita* (when in doubt, choose life). This is not only because “for physicians the principle *in dubio pro vita* ought to be valid for all men,”<sup>99</sup> but also because the clinical tests which constitute the brain-death standard are themselves inadequate, or even dangerous, to patients with severe brain injury.

Ironically however, the consumerist mentality of organ transplantation to extend lives has allowed BD to remain firmly established especially since it has been endorsed by legislation worldwide and even by the Pontifical Academy of Sciences. In 2006, faced with valid criticisms from many scholars and irrefutable empirical evidence, Bernat reluctantly

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<sup>96</sup> *Ibid.*, 22.

<sup>97</sup> President's Council on Bioethics, 12.

<sup>98</sup> Jonas, 57.

<sup>99</sup> Wolfgang Waldstein, "A Law of Life, Legality vs. Morality," 280. Waldstein quotes this statement made emphatically by the German professor of medicine, Dr. Linus Geisler on June 28, 1995, when speaking to the German Bundestag on the discussion of the proposed *Transplantationsgesetz*.

“acknowledge[d] that [the] whole brain formulation remains imperfect,”<sup>100</sup> all the while defending that BD remains an optimal policy. Bernat’s words in this regard are revealing: “in the real world of public policy on biological issues, we must frequently make compromises [...] to achieve acceptable practices and laws.”<sup>101</sup> Thus, in the final analysis, the justification of BD is merely one of utilitarian practicality supported by the authority of the law.

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<sup>100</sup> Bernat (a), 41.

<sup>101</sup> Ibid.