Is the Concept of Vital Motion a Halakhic Definition of Death?

By: NOAM STADLAN

Introduction

A definition gives the meaning of a term by specifying all the properties required to come to that definition, that is, the necessary and sufficient conditions for belonging to the set being defined. Definitions can go wrong by using ambiguous statements. Failure to precisely elucidate terms can result in fallacious definitions. Fallacies of ambiguity appear to support their conclusions only due to their imprecise use of language. Once terms are clarified, fallacies of ambiguity are exposed. [1]

A definition of death needs to define the border between life and death and establish criteria for how an individual patient can be classified as alive or dead. The terms of the definition need to be precisely defined and the underlying assumptions need to be identified. As currently constituted, the concept of 'vital motion' in Halakhah is not a definition. It is a non-specific term that simply renames the idea that 'there is something about the body that makes it alive.' Its use on a practical basis is possible only by leaving terms vaguely defined and by employing assumptions that are not accurate in the era of modern medicine.

Background

When is a person dead? In the pre-modern era of medicine, death could be identified with the cessation of circulation because two related assumptions could be made:

After circulation was lost, all the functions in the body would cease and all tissues would soon die; and, circulation in the body could not be restored once the person's heart had irreversibly ceased to function. (The heart is dependent on the circulation that it supplies to itself. If the heart

[1] Adapted from Logical Fallacies: <http://www.logicalfallacies.info/ presumption/begging-the-question/> and Wikipedia <http://en.wikipedia.org/wiki /Intensional_definition> accessed 5/13/13.

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ceases to function, it, similar to the other tissues in the body, suffers damage that soon becomes irreversible. Artificial circulation in the form of machines and transplants was not available and value of CPR (cardiopulmonary resuscitation) was not known.)

With these assumptions, an exact concept of what defined life and death was not necessary, and it was reasonable to label a body as dead when the heartbeat had been absent for a specific period of time. Under pre-modern assumptions, cessation of heartbeat was equivalent to irreversible cessation of circulation and was also equivalent to the loss of function of all the tissues of the body. There was no need to decide which function or set of functions defined life, since they all stopped at essentially the same time, and that time could be identified as the time of death.

In the modern era, tissues from a body can be preserved independent of other tissues from the same body, and machines can provide circulation. Because machines can provide circulation in the body, cessation of heart function is not equivalent to cessation of circulation, and certainly not equivalent to irreversible cessation of circulation. CPR and machines can provide circulation to any tissue with arteries and veins. It cannot be assumed that all the tissues of the body cease to function when the heart stops, and it cannot be assumed that loss of function in one organ implies loss of function in a different organ. Because machines can provide circulation, blood can be circulating in a body that all agree is alive, and blood can be circulating in a body where all the tissues are dead and where all agree the person is dead. Therefore heartbeat and even circulation by themselves are not adequate determinants of life and death.[2] Absent circulation does not automatically mean loss of function or loss of potential function. The only completely reliable indicator of loss of function of an organ is the actual loss of function of that organ. The only completely reliable indicator of irreversible loss of function is loss of function under specific conditions known to result in an irreversible loss. A definition of death independent of circulation therefore requires identification of tissue and/or function that is essential for life, and whose absence means death. Most of those who define Halakhic death as the absence of circulation

[2] See: <http://text.rcarabbis.org/problems-with-defining-death-as-the-irreversible-cessation-of-circulation-what-would-we-measure-and-why-by-noam-stadlan -md/> accessed 12/2/13. In retrospect Rabbi Bleich's position was interpreted in a way that he may not have agreed with. Nevertheless, the point of the article regarding circulation is not affected.

(with or without the absence of respiration) have not as yet addressed the fact that their definition depends on assumptions that are not true.[3]

Current Ideas in Halakhah

The current Halakhic discussion includes two[4] at least somewhat well-articulated approaches to the definition of death that claim to be independent of circulation: the cessation of respiration in the context of cessation of neurological function (respiratory brain death- RBD), and the irreversible cessation of vital motion.

These are concepts of what constitutes the essence of human life—when brain based respiration or vital function are present, the person is alive, and when they are irreversibly absent, the person is dead. In order to determine if a particular person is alive or dead, it is necessary to have specific tests that will identify whether that essence is present or not.

More formally, Dr. Stuart Youngner suggested that a complete definition of death has three components: "a concept or definition of what it means to die, operational criteria for determining that death has occurred, and specific medical tests showing whether or not the criteria have been fulfilled."[5] The concept therefore is the answer to the question: "What quality is so essentially significant to a living entity that its loss constitutes the death of that entity?"

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3 R. David Shabtai concludes similarly. However, without any explanation, he goes on to claim that "Those who posit strict cardiac criteria for death rarely analyze their position from this perspective. It is likely… they would agree with and adopt R. Bleich's theory… that heartbeat is only an example of continued 'vital motion.' Rabbi David Shabtai, "Defining the Moment: Understanding Brain Death in Halakhah" (New York: Shoresh Press, 2012) pp. 112-113.

4 Many *poskim* have written on the definition of death. The positions presented here are the best developed and I think the most commonly cited. In addition, each serves as a good example for its category: RBD represents the 'brain death' category which includes the physiological decapitation model of Rav Moshe Tendler/Dr. Fred Rosner; 'vital motion' represents the circulation-plus category which includes Rav Hershel Schachter's model. (Admittedly some of the issues addressed here do not apply to Rav Schachter's approach, but other problems with his approach have been discussed previously. See Noam Stadlan, "Conceptual and Logical Problems Arising from Defining Life and Death by the Presence or Absence of Circulation" *Meorot* 8 September 2010. Since Rabbi Bleich has not amplified on the concept of 'vital motion,' this paper addressed vital motion in passing but assumed that there was some equation of vital motion with circulation. However, the critique of Rav Schachter is not affected.)

5 Stuart J. Younger, "Defining Death: A Superficial and Fragile Consensus," *Archives of Neurology* 49 (1992): 570–2.

Amplifying on Dr. Youngner's idea, a complete definition of death requires the following:

1. Tier I Concept: "What quality is so essentially significant to a living human being that its loss constitutes the death of that human being?"

2. Tier II Biological correlates of the concept: what biological state corresponds to a body that contains the presence of the concept, and what state corresponds to a body where the concept is absent?

3. Tier III: specific diagnostic tests to show that what has been identified in tier two has actually been fulfilled.

RBD is presented here as an example of a complete definition and has been described in great detail by Rav Avraham Steinberg.[6] He fills out the tiers of the definition as follows:

Tier I Concept: The neurologically based ability to breathe is the essence of life.[7]

Tier II: "When it is medically obvious that a person has no spontaneous respiration at all and is lying motionless like a stone without any consciousness and no movements or reactions (to stimuli), and if there is clear evidence from the medical testing which is reliable and unanimous in proving complete and irreversible cessation of the functioning of the brain and especially the brain-stem, which is the central control of respiration, one has established the condition known as 'respiratory-brain death,' and this is the *Halakhic* moment of death of a human being."[8]

Tier III: Specific tests (outlined in his book and in the Israel respiratory brain death act). A patient who fulfills all the tests is dead. These tests include documenting apnea, loss of brainstem reflexes, specific confirmatory tests such as blood flow tests, and ruling out conditions that might be reversible but mimic the loss of function.

Rabbi J. David Bleich has been the chief author and advocate for defining life as the cessation of 'vital motion.' From his writings it is possible to fill out the tiers as follows:

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6 Avraham Steinberg, "Respiratory-Brain Death" (Jerusalem: Merhavim, 2012).

7 This concept has been criticized both as a concept and for how it fits with the rest of the definition. A defense is beyond the scope of this paper. For further discussion, see Noam Stadlan, "New Books and Points of Discussion in the Halakhic Definition of Death: *Respiratory-Brain Death* by Avraham Steinberg, and *Defining the Moment—Understanding Brain Death in Halakhah* by David Shabtai." (Meorot, Tevet 2013).

8 Steinberg, "Respiratory-Brain Death," p. 14.

Tier I Concept: Life is defined by the presence of 'integrated vital movement.' Death is the 'cessation of all bodily movement' or 'vital motion.'

Tier II: A person is dead with the "total stoppage of the circulation of the blood ***and*** a cessation of the animal and vital functions consequent thereupon, such as respiration, pulsation, etc."[9]
However, elsewhere he states: "cardiac activity occupies no privileged position in the determination of death… it is not the mere presence of the heart or the function of the heart as a unique organ which is the essential indicator of life, but rather the 'movement' of the heart as a form of integrated vital movement of the organism which indicates that life is present."[10]

Tier III: Rabbi Bleich has written numerous papers on the definition of death and related topics. His student, Rabbi/Dr. David Shabtai, has also written extensively on the concept of 'vital motion' and authored an entire book devoted to "Establishing the Moment" of death.[11] Neither one, to my knowledge, has established the exact biological parameters of 'vital motion' (Tier II), nor has either established the specific tests (Tier III) needed to determine if 'vital motion' is present or not. While they both insist that circulation is NOT the critical factor in the determination of life and death, they have not specified any other method for determining the presence of 'vital motion.'

In order for the idea of 'vital motion' to function as a practical definition, it is necessary to identify the biological correlates of the presence of 'vital motion' and propose specific tests for finding its presence or detecting its absence. The inadequacy of the concept of 'vital motion' as a complete and functional definition of life and death is starkly illustrated in a recent paper by Rabbi Shabtai on the topic of donation after cardiac death (DCD)[12]. His discussion reveals: the lack of any specifics for how to determine the presence of 'vital motion' independent of circulation,

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9 J. David Bleich, "Of Cerebral Respiratory and Cardiac Death" *Tradition* 24(3) spring 1989, 44–65. He notes that Halakhah parallels common law precisely, and the statement is a quotation from Black's Law Dictionary (1968).

10 J. David Bleich, "Artificial heart implantation" in *Contemporary Halakhic Problem*s, Volume III (New York: Ktav, 1989) p. 186.

11 See note 3.

12 David Shabtai, "Donation after Cardiac Death: Halakhic Perspectives, *Verapo Yerapeh*" *The Journal of Torah and Medicine of the Albert Einstein College of Medicine Synagogue and RIETS* 4:263–289.

and the dependence on fallacious assumptions in order to apply the concept to practical situations.

The 'dead donor rule' mandates that certain organs can be retrieved only from dead human beings[13]. In an effort to enlarge the pool of available organs for donation, programs have been established to retrieve organs not just from patients who are brain dead, but from those who have died after their circulation has ceased. Two scenarios are presented: uncontrolled DCD (uDCD), and controlled DCD (cDCD). uDCD describes the situation where a patient has suffered a cardiac arrest, the heart has stopped and CPR is initiated. The chest compressions provide circulation to the body. This circulation is usually adequate to keep the organs and tissues of the body from dying.[14] When the heart receives the circulation (and the medications that are usually given along with the CPR) it sometimes restarts. If it does not restart, at some point in time a decision is made that further chest compressions are futile, and CPR is stopped. A declaration is made that the patient is dead, and the time is recorded as the time of death.

Up until the moment when CPR is stopped, the chest compressions provided circulation to the patient's body. Even after the CPR is stopped, circulation could be restarted simply by resuming chest compressions. Alternately, a bypass pump or artificial heart could be implanted. The cessation of CPR does not imply that circulation in the body has irreversibly ceased. In the secular/medical world, CPR is stopped and death is declared when it appears that the heart is not going to restart even with further CPR, and/or the functions of the body have been so compromised (either due to the initial insult that caused the heart stoppage, or by the amount of time the body suffered from lack of circulation) that it seems pointless to continue. In the secular/medical world, the decision to declare death and not to continue the CPR or start other artificial circulation is therefore based not on a uniform set of criteria but on factors including: likelihood of recovery, availability of artificial circulation technology, patient's underlying conditions and/or wishes, value judgments of the physician in charge, and other factors.

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13 Obviously living human beings can voluntarily donate one of paired organs or parts of unpaired organs. The discussion here focuses on cadaveric organ donation- harvesting organs from those who have died.

14 The term 'dying' here is used as shorthand for irreversible loss of function, and is applied specifically to the organs and tissues, not the body as a whole.

Under what circumstances is the patient undergoing resuscitation Halakhically dead and it is Halakhically permissible to terminate CPR?[15] Application of a complete definition such as the RBD criteria is relatively straightforward. The patient is dead when he has irreversibly lost consciousness and brainstem function including the ability to breathe. Either the Tier 3 RBD tests can be applied or a different set of tests and observations can be done until the physician is satisfied that the patient has irreversibly lost consciousness, brainstem function, and ability to breathe. The important point is that RBD provides a specific biological state identified as death (brain damage to the point that the loss of brainstem function, breathing and consciousness is irreversible), and testing can be designed to identify that state.

As noted above, CPR is sometimes stopped when further CPR is deemed futile in terms of restarting the heart. At this point every organ in the body may have irreversibly ceased to function, or many organs may have the potential to function. The only certainty is that the heart will not restart on its own.[16] Application of RBD criteria again is straightforward. The patient is dead when the brain has suffered the requisite amount of damage.

Prior to analyzing how R. Shabtai applied the concept of 'vital motion' to uDCD, it is necessary to discuss the difference between 'permanent' and 'irreversible' loss of circulation.[17] Irreversible loss of circulation is understood as the situation where circulation can never be restarted to the best of our knowledge and understanding. Permanent refers to the situation where the function has been lost and will not be return on its own. But the function could be restored by intervention from people or forces extrinsic to the body. However, a decision external to and not necessarily dependent on the body has mandated that action will not be taken to restore the function.

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15 The discussion here assumes that CPR is only discontinued when the patient is dead according to Halakhic criteria. After reading this and the following discussion it will be apparent that CPR is frequently discontinued despite the patient not meeting Halakhic criteria for death. I am not aware of a specific in depth discussion of the topic in the Halakhic literature.

16 For example, a patient could suffer a massive heart attack that destroys the heart muscle to the point that it loses the capacity to function again. When the heart stops, circulation ceases and the rest of the body begins to lose function. If circulation is restored with timely CPR, as long as the time without circulation is minimal, the rest of the body retains function.

17 JL Bernat. How the distinction between "irreversible" and "permanent" illuminates circulatory-respiratory death determination. J Med Philos. 2010 Jun; 35(3):242–55.

Consider a person whose heart has stopped. If it does not restart within a minute or two, it almost certainly will never restart on its own. If a decision is made not to provide resuscitative care for the patient (perhaps due to a DNR order), the loss of heart function and circulation is permanent. However, neither the loss of heart function nor the loss of circulation is irreversible. The heart could be restarted with CPR. Even if the heart could not be restarted, circulation could be re-established via mechanical pumps. Furthermore, the determination of permanent loss of function does not necessarily imply irreversible damage to the organ.

It is also necessary to understand the place of circulation in the concept of 'vital motion.' In discussing artificial hearts, Rabbi Bleich states: "cardiac activity occupies no privileged position in the determination of death…it is not the mere presence of the heart or the function of the heart as a unique organ which is the essential indicator of life, but rather the 'movement' of the heart as a form of integrated vital movement of the organism which indicates that life is present…..vital movement…is the essence of life, whether such movement is produced by a natural heart or by an artificial organ is of no moment."[18] In other words, it appears that a flesh-and-blood heart can contribute to 'vital movement,' but 'vital movement' can be present even when a flesh-and-blood heart is not present.

How can the concept of 'vital motion' be applied to the uDCD patient? If the declaration of death is based on the irreversible cessation of 'vital motion,' how is that practically determined?

The question of when CPR can be stopped in consonance with Halakhah is not addressed in the article. An answer to this question would require a determination of how the presence of 'vital motion' can be identified under conditions where circulation is being supplied artificially. Since 'vital motion' has not been defined independent of circulation, this presents an unmet challenge.

Rabbi Shabtai begins his discussion by stating that "in uDCD, the question of whether or not the patient is dead is not overly complicated. Once resuscitative efforts have been deemed to have failed, the patient's heartbeat and respiration can certainly be described as having irreversibly stopped."[19]

Death here is being equated with the irreversible cessation of respiration and heartbeat. But according to Rabbi Bleich, irreversible cessation of heartbeat is not the equivalent of death, since circulation can be supplied by other artificial means. And the patient remains alive as long as

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18 Bleich, "Artificial Hearts."

19 Shabtai, "Halakhic Perspectives," p. 265.

'vital motion' is present. Perhaps he is equating irreversible cessation of heartbeat with irreversible cessation of circulation. But Rabbi Shabtai has already acknowledged that irreversible cessation of circulation is not an independent criterion for death in the era of modern medicine.[20] In addition, in the situation described, the failure of circulation may be permanent, but it certainly is not irreversible. Rabbi Shabtai both in this paper[21] and elsewhere[22] rejects declarations of death based on permanent but not irreversible cessation of circulation. Perhaps most importantly, the failure of the flesh-and-blood heart and lungs does not necessarily imply that the rest of the body has failed. The function of circulation and respiration can be supplied by machines, and the rest of the body can theoretically continue to function as usual (see note 15).

Rabbi Shabtai addresses this possibility (providing artificial respiration and circulation) but claims that it is not Halakhically relevant because it is not the physical flow of blood that defines life, but "the person's natural capacity and ability to effectively circulate oxygenated blood"[23] that is Halakhically significant. This is a direct contradiction of Rabbi Bleich's position: "…vital movement…is the essence of life, whether such movement is produced by a natural heart or by an artificial organ is of no moment." [24]

Rabbi Shabtai goes on to state that once CPR is stopped, the "uDCD patient will never show signs of vital motion ever again,"[25] but does not supply any proof for this statement. When CPR is stopped, the entire body (with the exception of the heart and perhaps the lungs) could have the potential to function. Attaching the patient to machines that supply circulation of oxygenated blood could produce a person considered alive by all. This statement that there will never be vital motion makes sense only if an additional incorrect assumption is made: Failure of the heart to restart implies that the entire body has lost the potential to function. Under this assumption, vital motion, whatever it is, has been lost along with the entire body. As noted above, this assumption is not correct, but the concept of 'vital motion' cannot be employed without it.

Since 'vital motion' has not been defined without recourse to circulation, it is impossible to apply the concept and determine if the patient is Halakhically dead when the paramedics declare him dead after CPR fails

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20 See note 3 above.

21 Shabtai, "Halakhic perspectives," p. 285.

22 Shabtai, "Defining the Moment," p. 66.

23 Shabtai, "Halakhic perspectives," p 266.

24 Bleich, "Artificial heart," p. 186.

25 Shabtai, "Halakhic Perspectives," p. 269.

to restart the heart. The advocates of 'vital motion' are depending on the paramedics to decide if/when the heart will not restart, and then relying on two false assumptions from the pre-modern era of medicine: the cessation of circulation is irreversible, the rest of the body functions have irreversibly ceased to exist.

Controlled DCD (cDCD) describes the situation where the heart is beating but the patient requires a ventilator to provide oxygen to the circulating blood. The patient and family wish to discontinue care,[26] and the ventilator is stopped. Deprived of oxygen, the tissues of the body will start to fail, and eventually the heart will stop. Deprived of circulating blood, the tissues will fail at an even faster rate, and eventually every cell in the body will cease to function and will die. At what point in time along the path of cellular and organ failure is the patient dead? What tests or information are needed in order to make that determination?

The application of the RBD criteria provides excellent guidance in the determination of death under the cDCD situation. The patient is dead when there is irreversible cessation of respiration in the context of brain damage. The usual Tier 3 criteria cannot be used because they were designed for a patient with intact blood flow. However, it is still possible to establish when a patient has suffered the requisite amount of brain damage. Experimental data[27] suggest that the brain damage required to fulfill criteria for death occurs after 10 minutes of warm ischemia (lack of blood flow at/near body temperature and no medications have been given that protect the cells from the effects of lack of oxygen). The RBD definition provides a specific functional state identified with life and with death. The loss of circulation by itself is not the determining factor, only the loss of function caused by the loss of circulation. The determination of death is made independent of circulation and in reference to a specific biological state.

Regarding cDCD, R. Shabtai states, "the most central issue of this entire endeavor is determining the moment of death precisely."[28] However, he makes no attempt to define death with any precision, and the words 'vital motion' do not appear in the discussion entitled "Determining the Moment of Death." If death is indeed the irreversible cessation of

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26 The Halakhic and ethical issues are important but not the topic of this paper

27 P Stiegler, M Sereinigg, A Puntschart, T Seifert-Held, et al "A 10 min 'no-touch' time—is it enough in DCD? A DCD animal study." Transplant International, 2012, April; 25(4): 481-92.

28 Shabtai, "Halakhic Perspectives," p. 279.

'vital motion,' the lack of mention of 'vital motion' in a discussion of determining the moment of death illustrates how the term lacks useful meaning.

The discussion instead focuses entirely on circulation and heart function. R. Shabtai describes situations of permanent (but not irreversible) cessation of circulation and maintains that they are descriptions of death, something that he previously specifically rejected. He writes, "Essentially, the question is whether Halakhah determines death when the heartbeat irreversibly stops beating—meaning that it cannot be restarted—or when it stops beating and is not subsequently restarted, regardless of the reason."[29]

Here irreversible cessation of heartbeat is equated with irreversible cessation of circulation- a false assumption. The approach consonant with the Halakhic rejection of the concept of 'permanent cessation of circulation' would be to acknowledge the possibilities of sustaining circulation with machines and incorporate that reality in the practical discussion of the determination of death. It is discussed somewhat later on a theoretical level, but the actual determinant of life and death, 'vital motion,' remains undefined.

History of 'vital motion'

Vital motion or vital force was the name given in the pre-modern age to the mysterious force responsible for motion or biological functions that could not be otherwise explained. It was, by definition, unexplainable. Living tissue contained 'vital motion.' 'Vital motion' was present because the tissue was living. The presence of vital motion could not be proven without reference to vital motion. As a result it became the subject of ridicule, and as science has advanced, the use of the term 'vital motion' as an explanation for biological phenomena has diminished to the point of extinction. Replacement of the term 'vital motion' with the term 'life force' illustrates the circular nature of the concept. A person is alive when he contains life force, and life force is present when the person is alive. And, when every organ and tissue has irreversibly ceased to function, the life force is gone and the person is dead. If Rabbi Bleich has this concept of vital motion in mind, there does not seem to be any practical way to define it further. One practical ramification is that there would be no basis to explain why continued human life is considered present when some body parts are sustained by circulation, but life is not present when other parts are sustained by circulation. The idea that an organism contains vital

[29] Shabtai, "Halakhic perspectives."

motion breaks down when the parts of the organism can be sustained in the absence of other parts. It becomes necessary to define more precisely what an organism is or isn't, and what life is or isn't.

Recently the idea of vital motion has been adapted by some to include the idea of integrated function (which seems to be similar if not identical to the concept of 'emergent properties').[30] This describes the situation where the whole appears to be greater than the sum of the parts. Perhaps it is this 'integration of function' that Rabbi Bleich refers to with the designation of 'vital motion.' One further option is to view human life from a strictly biological/organismal[31] point of view, where integrated function in the organism is considered the essence of life.

Bioethicists outside of Halacha have also disagreed regarding the definition of death. Aside from 'brain death,' one common concept has been to identify death with the 'cessation of integrated function.' This has been advocated by Robert Truog and Franklin Miller.[32] Perhaps not coincidentally, Truog and Miller have also not defined 'integrated function' with any sort of precision and have not specified what tests and results are needed in order to determine if a person is dead or not. In their writing, 'integrated function' can be described only as a concept, and is quite lacking as a functioning definition of death.

Dr. Alan Shewmon has also defined death as the cessation of 'integrated function,' and has produced perhaps the only attempt to define it. He states: "A probably valid criterion close to the moment of death might be something like: 'cessation of circulation of blood for a sufficient time (depending on body temperature) to produce irreversible damage to a critical number of organs and tissues throughout the body, so that an irrevocable process of disintegration has begun'… I do not believe that the critical number of organs and tissues can be universally specified, as it will no doubt vary from case to case; surely the brain is included, but not *only* the brain."[33]

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30 For example see: <http://plato.stanford.edu/entries/properties-emergent> accessed 12/4/2013.

31 As opposed to, for example, a personhood point of view, where the death of the person is the death of the human being. In general, person-based views correspond to variations on brain death, and organismal views produce definitions of death based on cessation of circulation or integrated function.

32 FG Miller, RD Truog, "Decapitation and the definition of death," *Journal of Medical Ethics*. 2010 Oct; 36(10): 632-4.

33 D. Alan Shewmon, "Mental Disconnect: 'Physiological Decapitation' as a Heuristic for Understanding 'Brain Death'," *Working Group on the Signs of Death,* 11-12 September 2006*,* ed. H.E. Msgr. Marcelo Sanchez Sorondo (Vatican City: Pontifica Academia Scientiarum, 2007), pp. 292–333.

The first obvious problem with this formulation is the lack of specifics. Which organs are included? What exactly constitutes integration? The second problem, as Dr. Shewmon acknowledges in the same paper, is that this formulation allows for the creation of two people from one. The third problem, one that Dr. Shewmon does not address, is that of multiple organ transplants. If the heart, lungs, kidney and liver from a donor are transplanted to a recipient, the donor organs are all producing 'integrated function.' Why would the donor not be considered alive, since his organs are fulfilling the criteria for life-integrated function?

The issue of personal identity deserves passing mention. If the criteria for life are the same as for personal identity, then when the collection of human tissue known as a particular person no longer qualifies for the label of life, it also no longer qualifies to be identified as that particular person. For example, if one accepts RBD and believes that personal identity covariates with the brain, then the identity dies with the person. However, if the criterion for life is different from the criterion for identity, it is possible to form two novel categories of human tissue: a collection that qualifies as being an alive human being but does not have a particular identity, or a collection that qualifies as a particular identity but is not considered alive. Those who define life as the presence of 'vital motion' must also define identity as the persistence of vital motion or face the problems mentioned. Therefore they would be forced to posit that when enough organs are moved from one body to another, the identity is of the hybrid is associated with the person who supplied the vital motion, not the one who supplied the brain activity. Therefore, transplant of multiple organs poses a significant unaddressed problem. The 'vital motion' concept also fails to explain why conjoined twins (body with two heads) are considered Halakhically to be two people.

Halakhic sources for the concept of 'vital motion'

Rabbi Bleich stated in 1989 that 'vital motion' has always been the definition of death. However, in an earlier paper[34] vital motion as a Halakhic concept does not appear.[35] In fact he specifically states: "The sole criterion of death accepted by Halakhah is total cessation of both cardiac and respiratory activity." Furthermore, in the later paper the Mishnah in *Ohalot* (1:6) is used to transform the concept of death as the cessation of circulation into the concept of death as the cessation of 'vital motion.' But this source is not mentioned in the earlier paper at all. The specific conscious

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34 *Bleich*, "Establishing criteria of death." *Tradition* 1973, 13(3) pp. 90-113.

35 The term appears as a quotation from Black's law dictionary but not in the Halakhic discussion.

use of cessation of vital motion as the definition of death based on the Mishnah in *Ohalot* seems to be quite recent.

The Mishnah in *Ohalot* discusses how a decapitated body is considered ritually impure (*tameh*) even if there is movement in the body such as twitching of the tail. The debate centers on the exact meaning and implications of the term '*pirkus*.' Rabbi Bleich claims that *pirkus* means absent vital motion. Even if the chicken is running around without a head or the lizard's tail is twitching, the vital motion has ceased. If we assume that Rabbi Bleich is referring to some sort of integration, the claim makes no sense. The heart is pumping, the muscles are moving, the rest of the bodily organs are functioning at that moment, and the only difference is that the head is not attached. True, as he notes, the blood is rapidly leaving the body and soon there may not be any function, integrated or otherwise. But at that particular moment, integrated function is certainly present. Furthermore, if a tourniquet was applied to the neck and then the head was removed, the body would continue to function indefinitely, with all of the integrated function of the body intact. However, according to the Mishnah, the body would be classified as dead. Therefore the identification of *pirkus* with lack of integrated motion is not tenable.[36]

Conclusion:

A definition establishes the boundaries of a category. As currently constituted, the concept of 'vital motion' does not provide guidance for when a person is dead or alive. The practical application of 'vital motion' depends on linking it to the presence of circulation and on assumptions that are not always true.

It may seem that the situations where these assumptions are not true are few and far between, and could/should be overlooked. We do not encounter artificial hearts or bypass machines on a regular basis. The first

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[36] Rabbi Shlomo Zalman Aurebach's famous sheep experiment illustrated how even after decapitation the sheep was able to continue to gestate and deliver a live calf. Obviously the sheep, despite decapitation, still contained integrated function.

Rabbi Bleich might posit that the Mishnah meant that decapitation defines death only when the decapitation results in cessation of circulation. Decapitation without cessation of circulation, under this construct, would not be synonymous with death. But this requires reading a lot of extra information into the Mishnah, and would be yet another example of how vital motion cannot be defined independently of circulation. Perhaps the most straightforward understanding of the Mishnah is that motion in the body, when not attached to a functioning brain, has no meaning. This would also support the RBD concept, where movement of the lungs that is not directed by a functioning brain has no meaning.

response is that the lack of specifics in the application of 'vital function' affects essentially every single declaration of death. When a person is in the process of dying, the 'vital signs' such as pulse, blood pressure, and breathing gradually dwindle and cease. If these are just outward signs of possible life and death, when specifically is the person dead? As noted, the RBD criteria provide guidance. The concept of 'vital motion' fails to provide guidance. Did the 'vital motion' fail irreversibly 5 minutes after the heart stopped? 10 minutes? 20 minutes? 30 minutes? And if circulation happens to be restored at some point with CPR, how can the life and death status of the body be determined? Since every moment of life is precious, the border between life and death needs to be established with as much precision as possible.

The second response is that the dependence on false assumptions is an illustration of how the concept itself is fundamentally flawed as currently conceived. The fact that 'vital motion' has not been defined practically without dependence on circulation illustrates that the authors have failed to identify anything specifically in the body, anatomy or function, which they associate with life. What makes the concept work is the association with cessation of circulation. Essentially any concept, coupled with the cessation of circulation, could be used and achieve the same result. The success of 'vital motion' in producing reasonable results in as many situations as it does, is due not to the concept of vital motion but to the linkage of cessation of vital motion to the cessation of circulation.

Up until even a few years ago, the Halakhic positions on the definition of death included defining death by the cessation of circulation.[37] There is growing acceptance of the fact that this no longer makes sense given the accomplishments of modern medicine. Defining death by the cessation of 'vital motion' was an alternative that claimed not to be dependent on circulation. However, as demonstrated, the concept of 'vital motion' is not an actual definition.

The RBD definition has been criticized for lack of coherence between the concept of life (tier I) and the tests for the determination of death (tier III).[38] The concept of 'vital motion' has been able to avoid this critique by simply not identifying any criteria or tests. If 'vital motion' is a complete definition, the proponents need to identify the biological correlates of it, and list tests designed to identify the bodies that contain it and those that don't. At that point, it may be reasonable to ask questions such as:

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37 Rabbinical Council of America "Halakhic Issues in the Determination of Death and in Organ Transplantation: Including an Evaluation of the Neurological 'Brain Death' Standard," Sivan 5770–June 2010.

38 See note 7.

why is a certain amount of integration or function defined as integrated vital function, but a different amount isn't? Why are certain tests used and others aren't? On what Halakhic basis are these distinctions made? In other words, the method of critique that has been applied to RBD can also be applied to 'vital motion.'

If/when the advocates of 'vital motion' can propose a complete definition of death, with clearly stated and Halakhically justified criteria and tests, the concept may be a logically viable alternative to RBD. As currently presented in the published literature, 'vital motion' is at worst a functionally useless concept that attaches the label of life to an indescribable quality of an organism as a whole without defining any of the terms. And at best it is an incompletely articulated idea of integrated function that so far has defied attempts at more precise definition. Unless the concept of 'vital motion' can be resuscitated, those who oppose brain death or RBD do not appear to have logically viable Halakhic options. ☙