

# Hirhurim - Musings

## Death by Neurological Criteria

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### Death by Neurological Criteria: A Critique of the RCA Paper and the Circulation Criteria

Guest post by [Dr. Noam Stadlan](#)

I want to thank Rabbi Student for the opportunity to address his audience. In the interests of full disclosure, during my career spanning (so far) 22 years as a resident and a practicing neurosurgeon I have declared a significant number of patients dead based on neurological criteria. I am also a member of the board of the Halachic Organ Donation Society, although what I present here represents only my own views. My goal is not to embarrass or defame anyone or any institution and I apologize to anyone who, after reading this article, feels embarrassed or defamed. I encourage them to address any points where they feel I have made errors. On the other hand, poskim, rabbis, and the interested public need to have access to all relevant information in order to make the best decisions possible. I also apologize in advance for being lengthy, but a significant amount of information is necessary to grasp the outlines of the topic.

The RCA and the Va'ad Halacha deserve our thanks for devoting a large amount of time and effort to this project. Defining death is not easy, even in the secular world. Thousands of papers have been published in journals devoted to medicine, science, philosophy, and ethics. The Halachic discussion adds another layer of complexity. The amount of effort needed to produce some coherence from this mass of information is staggering, and the Va'ad should be applauded for tackling this difficult topic. However, the paper ended up being very one-sided and surprisingly incomplete. My presentation will address this topic at length. I will also provide support for the idea that the classic Halachic criterion for death, circulation, no longer produces logically coherent results in the era of modern medicine and that an alternative is necessary.

This discussion is divided into ten sections. The first three briefly explain brain death criteria from a historical and physiological perspective. The fourth addresses what relevance this has to Halacha. The fifth through eighth raise specific issues with the RCA paper. The ninth makes what I think is a vital point that must be addressed in any coverage of this topic. And the tenth raises a number of questions to those defending the RCA paper.

### I. Brain Death Criteria

Until the mid 1950's, the human body could be seen as an interdependent whole. In other words, each organ depended on the intact function of every other organ for survival. The heart had to deliver blood to the entire body. The brain

had to tell the lungs to move, thus providing oxygen to the blood. Similarly the liver, kidneys, and all the other organs had to do their job. Failure of any organ resulted in the inevitable failure of every other organ.

The most obvious sign of life was neurological function. A person who was awake and talking was obviously alive. If a person did not appear to have neurological function (did not respond to stimulation such as pain and did not have reflexes), then further observation was done to see if other signs of life were present or absent. The next most obvious signs were breathing and pulse, since they can be observed or palpated (or, in the case of breathing, seen as the fogging of a mirror held in front of the mouth). If human tissue does not receive a supply of oxygen via the blood stream, it will soon cease to function, and after more time, it will irreversibly lose the ability to function.[1] Therefore, if the heartbeat was absent and the person was not breathing, it could be assumed that the rest of the tissue in the body would soon be irreversibly lost. Since failure of the heart or the act of breathing resulted in the irreversible loss of the functions of the entire body, in the premodern age it was not necessary to consider which organs and tissue were needed in order for the entire collection to be considered a human being (a point I will return to later).

In the 1950's mechanical ventilators came into common usage. These machines pumped air into the lungs. Even if the brain did not signal the lung muscles (diaphragm) to move, the machine blew air in and out of the lungs and the body could get oxygen to the tissues. This created for the first time the possibility that the brain could cease to function, but the rest of the body could continue to function. (The heart has its own internal pacemaker, so even without the brain or any other outside influence it will continue to beat and pump blood as long as the heart muscle receives a supply of blood and oxygen). A short time later, bypass pumps and heart transplants became a reality, and a few decades later artificial hearts. With these developments, the person's own heart was no longer necessary for circulation in the body. In fact, a machine can supply circulation to any piece of tissue that had arteries and veins.

The first reports of what was to become 'brain death' were in the late 1950's. Doctors observed that some patients who were attached to the ventilators had no observable brain function and did not breathe on their own (they were totally dependent on the ventilator). CT and MRI had not been invented, and the studies available at that time were EEG and angiography. EEG consists of placing electrodes on the skull and measuring the electrical function of the brain. It does not pick up the function of each cell, just when enough are working together for the activity to be measurable through the skull. Angiography consists of injecting a dye that shows up on x-rays into an artery (either in the groin or the neck) and then taking x-rays of the skull to see which arteries fill with the dye. They observed that many of the patients without observable neurological function did not have electrical activity on EEG and the arteries inside the skull did not fill with dye. At autopsy the brains showed a typical pattern of damage, which at first was attributed to the ventilator, so it was called 'respirator brain.' Only later was it realized that the damage was wrought by a lack of blood flow to the brain.

In 1968, a group of physicians met in Boston, analyzed all this type of data, discussed it, and produced a list of steps known as the Harvard criteria. The question the criteria were designed to answer was this: Under what circumstances can we have certainty that a person has irreversibly lost observable brain function? The list includes 1. There has to be evidence of major damage to the brain, 2. It is necessary to rule out any other conditions that can cause a temporary loss of brain function such as certain medications, low temperature, and low blood pressure, 3. A list of reflexes that are present in a functioning brain have to be totally absent, 4. There can be no brain mediated response to stimulation.[2] They also recommended that if available, an EEG should be done, and the EEG, if done, should show an absence of activity.

The stated basis for declaring death based on these criteria was: "An organ, brain or other, that no longer functions and has no possibility of functioning again, is for all practical purposes dead." It should be clear that the goal of the criteria was to enable a prediction of whether any function at all would return (the goal was not to predict who would have absent blood flow or who would not have EEG function). A number of similar criteria were published by various groups and gradually the idea of 'brain death', or more accurately, death based on the cessation of neurological function was accepted. In 1981 the Uniform Determination of Death Act, which became the basis for most state laws defining death, codified that death could be determined either with the cessation of circulation and respiration, or by the irreversible cessation of function of the entire brain

Over the years many papers have been published describing findings in patients who have been declared brain dead. Since there never was a single uniform set of criteria for death, it is not surprising that a number of different criteria have been used. It is important to keep in mind that death, whether it is termed brain death, circulatory death, or any other sort of death, is actually a label that is applied to a person. To quote Rabbi/Professor Michael Broyde, death “from a legal point of view, is when society no longer accords a person the rights associated with being a human being.” In 1995 the American Academy of Neurology published standards that are recognized by many as the reference standard. These standards were reaffirmed in an article published in June of this year. Despite that, there still is some variability in standards, and that will be addressed. After reviewing the literature, this most recent article affirmed that not a single case of recovery of function had been reported when appropriate criteria were used.

New technologies, as they became available, were applied to study brain dead patients. These can be divided into categories: studies that provide images of the brain such as CT or MRI; blood flow studies such as different types of nuclear flow studies, transcranial Doppler ultrasound, and PET scanning; and biochemical data such as measuring the levels of oxygen, carbon dioxide, glucose and other chemicals in the brain. In addition, measurements of possible function, such as the brainstem evoked potentials and other electrical tests have been used and tested.

## **II. Blood and Oxygen Flow**

Blood flow is vitally important to function, as well as a consideration in the Halachic realm, and it is important to understand more about it. The skull needs to be viewed as a box with rigid sides and it contains only a fixed amount of space. It cannot expand. The skull normally contains the brain, blood vessels, and cerebrospinal fluid (CSF). Normally there is plenty of space inside the skull for the contents. However, blood clots, tumors, and abscesses will take up space. In addition, when the brain is injured, it swells. As more space is occupied by swelling or blood clots, the pressure inside the skull rises. The blood flowing into the skull is propelled by the pumping pulsations of the heart- blood pressure. The rise in pressure in the skull results in resistance to the forward flow of blood into the skull, resulting in less blood flow. Less blood flow results in more brain damage, which results in more swelling, and a cycle becomes established until the pressure inside the skull is equal to the blood pressure trying to force blood into the skull. At this point, theoretically, blood flow to the brain ceases.

The reality is a bit more complex. The testing for blood flow does not measure each red blood cell, so no matter what the method, even if no blood flow is seen on the study, theoretically there can be some flow below what can be observed. In an experiment done in cats, even when a standard study[3] shows no blood flow, a very small amount of blood flow is seen on the microscopic level. But, the amount of flow is not enough to allow the surrounding brain to function. The electrical measurements from the surrounding brain, despite the small amount of flow, gradually disappears.[4]

Living cells, including those in the brain, require oxygen and fuel (glucose). The cells use the glucose and oxygen and produce carbon dioxide as a waste product. One of the ways the cells use the fuel is in forming a compound called ATP. Biochemical analysis[5] of patients who have fulfilled criteria for brain death reveal:

1. Absent brain tissue oxygen levels (oxygen being necessary for the cells in the brain to survive)
2. Zero or near zero brain tissue glucose levels (glucose is the fuel used by the cells, no fuel means that the cell cannot survive)
3. No oxygen utilization and no carbon dioxide production (functioning cells use oxygen and produce carbon dioxide. The absence of this process indicates that function has ceased as best as can be determined)
4. Absent ATP signal in a small study (ATP being essential for energy utilization)

There is much more data showing that all measured biochemical activity in the brain dead brain is markedly abnormal.

Another interesting study measured the amount of energy used by a patient. Brain dead patients use approx. 25% less energy than expected, corresponding to the fact that the brain receives approximately 20% of the blood flow. In other words, the brain in the patient who was brain dead did not use any energy. In fact, in patients who started off with

some function and some blood flow, the amount of energy used by the body decreased as the measured blood flow to the brain decreased. It reached the 25% below normal level when the studies showed absent blood flow to the brain.

The measurements of the oxygen levels reveal an important piece of data. A number of patients, both with brain function and without were monitored. The level of oxygen in those who were brain dead was zero. In the patients who had some function and were not brain dead, a few had oxygen levels that reached zero, but they climbed back up in less than half an hour. Any patient who had oxygen levels of zero for more than half an hour never regained any function and was brain dead. If the levels stayed at zero for less than half an hour, there was the possibility of recovery. This shows that the process of irreversibly losing brain function requires more than a few moments.

The blood flow and oxygen data reveal that the process of losing function and of the reversible becoming irreversible takes some time. When circulation is absent in the entire body, it is assumed that irreversible cessation of function has occurred after 5-10 minutes. With the lack of blood flow to the brain as seen on testing, it appears that the process takes longer.[6]

### **III. Hypothalamic Activity**

One final consideration prior to proceeding to the next section is the issue of hypothalamic function. The brain interacts with the rest of the body (and the world) in one of two ways. The usual way is by transmitting impulses via nerves (also termed synaptic transmission because it travels from one nerve to the next over a small gap called a synapse.) This is how the brain sends signals down the spinal cord to the body, and how it sends signals to the nerves that exit the brainstem (these are termed cranial nerves). The hypothalamus is an area in the brain that connects to the pituitary gland. The part of the pituitary gland connected to the hypothalamus secretes chemicals (hormones) into the blood. One chemical (among others) controls how the kidneys control urine output, among other functions.[7] Some patients fulfilling the criteria for brain death suffer from lack of this hormone, while others still have normal or relatively normal function of this hormone.

The anatomic explanation for this possible function of the hypothalamus lies in the way blood flows to the brain and surrounding structures. There are arteries that travel into the skull but not usually to the brain (external carotid arteries. The arteries that supply blood to the brain are the internal carotid arteries and the vertebral arteries), and since these arteries travel in the structurally more solid linings of the brain (dura) they may be protected from the increased pressure in the skull. Branches of the external carotid artery can supply blood to the pituitary gland. In addition, the first branches of the internal carotid arteries once they enter the skull travel to the hypothalamus and the pituitary gland. Therefore, if there is even a small amount of forward travel of the blood (when the heart pumps the blood surges forwards, when it relaxes, the blood goes back to its place, a finding described as ‘to and fro flow’) it could reach just the pituitary and the hypothalamus.

There are a number of ways that the possible presence of pituitary gland function does not have to hinder the concept of being ‘brain dead’. This function is one of secretion of hormones, something that many glands perform, among them the thyroid, adrenal, etc. It is not an output that uses the brain’s unique attribute, which is synaptic transmission. Therefore, if secretion of hormones is a function that is going to be used as a criterion for life, it is necessary to discuss if secretion of hormones by other glands also qualifies as life. Secondly, from a halachic point of view, this is not a function that is visible to the eye by examination of the body. It is a function that is noticeable only by measuring the chemical content of the urine.[8] In addition, possible function in the hypothalamus is NOT an indicator that other parts of the brain could be functioning, since, if part of the hypothalamus is functioning, this function is a result of the particular blood flow that is unique to the hypothalamus. Finally, if a set of halachic criteria mandate that in order to be declared brain dead there needs to be an absence of hypothalamic function, testing can be done for this function, and a significant number of patients will be found to have absent hypothalamic function.

There is much more data that has been published, and I refer the interested reader to the summary available here: [link](#). I must add that this summary was sent to Rabbi Bush in 2008 and that Rabbi Student has in his possession the email documentation.

## IV. Defining Death

In summary, modern medicine can identify a pool of patients who have the following characteristics:

1. No observable neurological function on repeated exams
2. Apnea (no spontaneous breathing)
3. No blood flow to the brain as determined by a variety of examinations[9]
4. When criteria 1 and 2 are fulfilled, there has never been any return of function
5. The brain of the patients will show biochemical changes consistent with no function (as discussed above)
6. It can be demonstrated that the brain is not using any energy
7. The patient probably will not have any function demonstrable on EEG, BAER or other such testing, and these tests can be done if necessary to confirm (those that do have function can be eliminated from the pool if deemed necessary)
8. Testing can be done to eliminate from the pool patients who have hypothalamic function if it is deemed necessary to eliminate those.

And so the question is: Are these patients considered dead by Halacha? According to the criteria of the Chief Rabbinate, the answer is yes. Because this set of criteria focuses on the cessation of brain stem function, the possible presence of some hypothalamic activity is not relevant, and minimal activity on EEG, if present, is not relevant either.

Applying the concept of physiological decapitation is a little more complex. The testing for blood flow reveals no flow, although there can be some minimal flow that is below the sensitivity of the study. If present, it can only be observed by drilling a hole in the skull and implanting a laser Doppler probe. However, the amount of blood flow, if present, is not adequate to sustain the function of the brain. This blood flow can be termed inadequate flow, which we will define as blood flow that is not adequate to sustain the function of the tissue to which it flows. As noted above, tissue requires oxygen and glucose. If the blood flow is not adequate to supply oxygen and glucose, the tissue ceases to function.

The ‘traditional’ approach to defining death is with the absence of circulation. However, those who advocate this approach actually need to define what they mean by circulation. Is circulating water adequate for the presence of life? If the blood flow is infinitesimally small, but present (perhaps using a pump, rather than a heart made of tissue) is the person still alive? Is there a minimum pressure, an amount of oxygen, an amount of glucose that needs to be present in the circulation in order for it to be considered present by Halacha? After consideration of these questions it should be clear that while the idea of adequate flow seems to be a new concept in the discussion of blood flow to the brain, in reality it has been an unstated assumption all along when circulation has been used as a criterion for life and death. Essentially the word circulation has been assumed to mean adequate circulation. If that is not the case, then a body attached to a pump that is pushing water through the body needs to be considered as an alive human being.

The other way to approach physiological decapitation is to address not the actual blood flow, but the outcome. Decapitation results in the cessation of neurological function. The group of patients described above, if they have no hypothalamic function on testing and a flat EEG, do not have any observable or measurable[10] neurological function. The lack of function then would be the equivalent of decapitation and the person could be considered dead. If that is accepted, the next step would be to decide if the EEG testing or the hypothalamic testing was actually necessary. That decision would hinge on whether Halacha recognizes any of those findings as signs of life.

## V. RCA Document

How does the RCA document address the situation described above? One might expect that a paper entitled “Halachic Issues in the Determination of Death and in Organ Transplantation, Including an Evaluation of the Neurological ‘Brain Death’ Standard” would address this topic in a substantial way. It unfortunately does not. The medical section of this paper consists only of a list of reasons to oppose the neurological criteria of death. If the title had been “A list of reasons to oppose ‘brain death’” then the contents would have fit the title. But the title and introduction do not give the reader any inkling that the paper will present the data supporting only one side of the argument.[11]

Part of the subheading states “This study is designed to assist members of the RCA in the process of psak Halacha and is itself not intended as a formal ruling.” Furthermore, the introductory paragraphs tell us that a study such as this must be ‘based on respect for and reliance upon medical knowledge, demonstrated scientific truth and the role of careful clinical measurements and observation.” And finally, that this was “an unfettered search for the truth.” I will demonstrate that the medical section of the RCA paper is not an unfettered presentation of the truth. Not only does it present only the facts supporting just one side of the debate, but some are not factually correct, and some that are correct are presented in a way that misleads the reader to inaccurate conclusions. A close reading of the presentation of the medical information reveals that there is a description of the physiology which is obviously useful. However, the discussion that follows features only problems with the neurological criteria. The few statements of support are followed with refutations, while the statements opposed to neurological criteria remain unchallenged.

The RCA paper does not contain:

1. Any reference to the biochemical data that describe the chemical environment in the brain with no blood flow.
2. Any mention of the data showing that the brain after brain death does not participate in the use of energy, nor information from another study discussing the temperature differences between a live brain and a brain dead brain.
3. Any reference to the studies showing that no patient, once declared dead by brain death criteria, has ever regained function or breathing.
4. While hypothalamic function is discussed in the RCA paper, the possible reasons that it may not jettison the concept or declaration of brain death are not discussed

The RCA paper quotes a number of sections verbatim from the White Paper developed by the President’s Council on Bioethics in 2008. However, the RCA paper does not quote the parts that defend brain death. For example, the first paragraph of Section D on page 16 represents the end of a lengthy quote from the White paper. The RCA paper does not include THE VERY NEXT WORDS of the White Paper, which begin a defense of the neurological criteria for death. Also left out is a key paragraph from page 45 of the White Paper:

Alongside these challenging findings, however, are facts that confirm the diagnostic and pathophysiological distinctiveness of total brain failure. Patients with this degree of injury are, indeed, singled out by the battery of tests (bedside and laboratory) first outlined and recommended by the Harvard committee in 1968. Moreover, no patient diagnosed with “total brain failure” has ever recovered the capacity to breathe spontaneously or shown any sign of consciousness—including the minimal and ambiguous signs routinely displayed by patients who emerge into the vegetative state.

## **VI. Other Omissions**

On Page 19 the RCA paper discusses the “existence of organized activities in the bodies of ‘brain dead’ patients”. The guidelines published in 1981 stated that one of the underlying philosophical bases for accepting brain death was that the death of the brain signified the loss of ‘integrative’ function of the brain. In other words, the brain was seen as the master controller of the body and that loss of brain function should result in failure of the rest of the body soon thereafter. Therefore, the ability to support the body of a brain dead patient over a long period of time would be inconsistent with this definition.[12] Indeed, an analysis of reports of ‘brain dead’ patients found 175 who had ‘survived’ over a week after being declared ‘brain dead,’ including one for a period of years.[13] However, a closer evaluation showed that the criteria for the declaration were either flawed or absent[14] in most if not all of the reports. Despite the flawed criteria and the long support of the body, none of the patients regained any neurological function. A recent study of over 1000 ‘brain dead’ patients revealed that most of the bodies could not be supported for more than a week, but some could be supported for a longer period of time, up to 60 days.[15] Long term survival of the body after brain death should not be surprising. The ventilator can supply lung function indefinitely. The heart, as long as it is supplied with the proper oxygen, fuel and nutrients, will beat on its own with its internal pacemaker, even if it is removed from the body. Hormones can be replaced. In most ‘brain dead’ patients, the blood pressure drops and cannot be raised back to normal over the long term, even with medication. However, advances in blood pressure support, hormone replacement, and other measures have combined to allow for longer term somatic support.

While the RCA paper points out the long term survival and possible ability to gestate a fetus, it neglected to mention the other facts mentioned here, especially the fact that even with long term somatic survival, there never was any change in neurological function.[16]

Page 22 of the paper features a discussion of the pathology of the brains of brain dead patients. The paper quotes a well known article (Wijdicks 2008). The article establishes that when the brains of those declared brain dead are examined with routine staining methods, not every cell is dead, and indeed many areas do not appear significantly abnormal. However, it does not reference the editorial/commentary that appeared in the same journal.[17] The commentary gives a number of possible explanations for the findings. One possible explanation is that the staining process does not adequately classify the cells as dead or alive. Being classified as not-dead by pathological staining methods does not necessarily imply that a cell is capable of functioning. It is true that the neuropathology of brain dead patients does not conclusively reveal the death of every single brain cell, or even the majority in some cases. However, these pathological findings do not imply the possibility of return of function. No patient who has been declared brain dead by valid criteria has ever experienced a return of any neurological function, no matter what the final pathology revealed.

## **VII. Errors in Fact**

On Page 18 of the paper it is stated: “the autonomic nervous system, hemodynamic response and stable blood pressure may all be maintained in the ‘brain dead’ patient.” The autonomic function comes from the spinal cord; in brain dead patients it has never been shown to come from the brain. I am not sure what is referred to as ‘hemodynamic response’. However, there have been reports of blood pressure changes with head bending and these have been shown to be autonomic (spinal) reflexes, and therefore are NOT signs of brain function. Stable blood pressure does not imply a functioning brain or hypothalamus. None of the functions mentioned prove the existence of any brain function, nor has there been any proof in the scientific literature that these functions are signs of brain function.

Page 18 “the hypothalamus continues to function after the diagnosis of ‘brain death’, serving both neurological and endocrinal functions.” There is no proof that the hypothalamus is serving anything but endocrine function at the most. Some have used the presence of stable temperature and blood pressure to assume neurological output from the hypothalamus, but this is conjecture at best and certainly many other more logical explanations exist.[18]

## **VIII. Inaccuracies and Imprecise Discussions**

The article presents information that is not accurate in the context of modern technology and the article itself references the proof:

On Page 21 it states: “Radionuclide angiography.... Its disadvantage is that posterior fossa circulation is not evaluated.” However, a paper that the RCA document refers to in a different paragraph specifically states that “it is likely that SPECT [a particular type of imaging done with radioactive tracers- my explanation] has improved imaging characteristics over planar imaging and appears to be the only imaging method THAT CAN BE USED TO VISUALIZE THE BRAINSTEM CLEARLY [my capitalization. The brainstem is the part of the brain in the posterior fossa that previous techniques had difficulty visualizing.]”.[19] Visualizing this area clearly was a possible source of error with older methods, but this is not a problem with the modern methods. In addition, different tracers that came into use in the 80’s and 90’s were able to visualize the posterior circulation better than the older tracers. The paper only makes a statement regarding the problems with the older method, and does not note that these problems no longer exist with the newer method.

Since, as noted, there are a number of different sets of criteria for brain death, a discussion of these criteria can focus either on one specific set of criteria, or on all the sets as a group. If the discussion centers on all of the criteria as a group, then certain problems may pertain to one specific set of criteria, but not to others. It would be important and intellectually honest to acknowledge that certain objections do not apply to certain criteria.[20] The question that actually needs to be answered is: “Does Halacha accept cessation of neurological function as death and if so, under

what circumstances?” The RCA paper instead lists reasons why SOME patients who SOME consider dead by neurological criteria may not be dead by Halachic criteria.

This is the context in which the discussions of EEG function and blood flow need to be seen. The paper notes that some patients who have irreversibly lost brain function may still have EEG function or blood flow. The unsuspecting reader would come to the conclusion that this data represents a serious challenge to the concept of brain death. This is not the case. Brain death criteria were designed to identify those who had irreversibly lost observable brain function. They were not designed to identify those without blood flow or EEG. If lack of blood flow or EEG is important to a certain set of criteria, those tests can certainly be added. But the fact that the criteria fail to predict those without EEG function or blood flow cannot be seen as a fallacy in the concept of ‘brain death.’[21]

Similarly the paper notes that frequently (it quotes 1% based on a personal communication) brain death is declared based only on clinical exams, and that confirmatory testing is not done. Again, this does not impugn the concept of brain death. Certainly if halachic criteria mandate confirmatory testing, it would be performed. In addition, the paper fails to note that, for example, the criteria promulgated by the Chief Rabbinate do indeed mandate confirmatory testing. Therefore this objection does not apply to the criteria of the Chief Rabbinate. The unsophisticated reader would have no way of knowing this. The way the paper is written, all sets of criteria are seen as the legitimate targets of all the criticisms.

Pages 20-21 contain statements that the criteria for neurological determination of death vary between institutions. This is a valid issue in implementation, but has no bearing on whether Halacha recognizes someone who fulfills neurological criteria as dead. It does point out the utility in establishing exact guidelines that would correspond with the mandates of Halacha. As a side note, much of the variability is not germane. For example, it is noted that 11 different temperature standards were utilized to determine if the patient’s low temperature contributed to the lack of observable brain function. The threshold for what is considered a low temperature would be a concern if the standard did not rule out the contribution of hypothermia to lack of brain function. As long as all of them mandated that the patient’s temperature was close enough to normal (high enough) so that low temperature (hypothermia) was not a factor, it doesn’t matter if the threshold is set above that or not. For example, the lowest acceptable temperature in any criteria is 90 degrees F. The fact that others set the bar higher is only a problem if it is demonstrated that a body temperature of 90 degrees F can mimic the clinical picture of brain death. Furthermore, the Va’ad could certainly produce criteria of his own to make sure they were halachically acceptable. I would also note that criteria for declaration of death based on circulation criteria are similarly vague or non-existent. How long does one wait after the heart has stopped beating to declare a person dead?

Page 21 contains the statement “These tests (blood flow tests)...are considered by the medical community as appropriate blood flow examinations, but this is not to say that they necessarily have meaning in Halacha.” The paper produces no proof for this statement, and does not discuss it further, leaving it as an unsubstantiated declaration. Certainly a statement as powerful as this should have some justification.

Page 20 contains a discussion of other conditions that result in cessation of respiration. This is not directly relevant to discussions of brain death, but some may see it as a problem for those who give primacy to the function of respiration. As best as I recall, the RCA paper does not produce a balanced discussion of this in the Halachic section, so I would refer the reader to the article by Rabbi Yosef Carmel et al who address this issue and show why it is not halachically relevant in answer 86 from Shut Bemareh Habazak vol 7.[22]

There is much more that can be written, but I will close this section with the case of Zack Dunlap, which the paper mentions on page 22. This case is irrelevant because, as even Wikipedia has accurately reported, “This is clearly a case of negligent misdiagnosis.”

The issue of whether criteria are followed appropriately in declaring someone dead is a very valid concern for everyone, especially those who support the concept of brain death. On the other hand, it is not germane to whether Halacha recognizes neurological criteria for death.[23] If this is a problem with real halachic import, the paper should have followed with a discussion of the halachic aspects of medical error.[24] The paper also engages in a bit of

nonfactual hyperbole by stating that this case “casts a giant shadow over this entire discussion.” The reality is that the popular media contains a few reports like this, and they are indeed a warning that the criteria for declaration of death need to be taken seriously and applied with precision. The fact that none of the cases reported in the media have been seen in the peer reviewed medical literature indicates that there is a high probability that these are not ‘survivors of brain death,’ but patients who have been declared brain dead using inadequate or improperly applied criteria. To reiterate, no patient declared dead using appropriate criteria have ever regained any function.

The paper also does not include a discussion of steps that could be taken to make sure that halachically appropriate criteria for declaring ‘brain death’ would be followed with precision diligence. In 2008 I made a number of suggestions to the Va’ad in this regard, including an offer to set up a group of observant neurologists and neurosurgeons working in concert with RCA rabbinic authorities to step in and review any situation involving the possibility of a declaration of brain death to make sure that appropriate criteria and testing were done.[25]

## **IX. What is a Human Being?**

The topic under discussion is the determination of death of a human being.[26] The RCA paper devotes many pages to the analysis of death but ignores the definition of a human being. As mentioned at the very beginning, prior to the 1950’s it was not necessary to decide what part of the body or what particular function defined the body of a human being. However, when organs can be transplanted and circulation can be provided to any piece of tissue with intact arteries, it is necessary to identify which parts and functions need to be present in order for the entire collection to qualify as a human body.

If circulation is the sole criterion for the distinction between life and death, then any piece of human tissue with circulation needs to be considered a live human being. Circulation pumps can be attached to any tissue with arteries and veins. Therefore, any piece of tissue can have circulation. In addition, since the circulation pump can be attached to a body at any time, in the present age circulation is never irreversibly lost. Hours after a person has lost his pulse and hasn’t been breathing a pump can be attached and that body will have circulation. And, if circulation is the only criterion for life, then that body has to be considered alive. And, by the way, it will live as long as the pump provides circulation, which could be forever.

The only way to avoid these scenarios is to acknowledge that there is more to life than circulation, and in fact circulation has meaning when it is providing support for a particular tissue. And, if that particular tissue has irreversibly ceased to function, the circulation is meaningless. If one examines the way Halacha is applied in the areas of organ transplantation or loss of parts of the body, every body part except the brain can be lost, and the body will still be considered a human body, and that person will still be that particular person.

One can also consider a person who has lost all circulation for an extended period of time, and would be considered dead by standard circulation criteria. It should be kept in mind that the circulation criteria generally state that a person is dead if circulation has ceased irreversibly. A pump can be attached to that body and now blood is coursing through the arteries of the body. The person still might not be considered alive because even though all the anatomic parts are present, the function of those parts has irreversibly ceased. The only logical conclusion from these considerations is that circulation is equivalent to life only when it is supporting a brain that is functioning, or has the potential to function. The corollary is that when the brain has irreversibly ceased to function, circulation is irrelevant.

The RCA paper does note that some poskim would consider as death the situation where every cell in the brain has died, or if frank necrosis has occurred. This position would then logically also have to maintain that as long as one cell is alive, the person is alive. What they may not realize is that live human brain cells can be found in the human brain up to 8 hours after circulation has ceased. In other words, long after a person is considered dead by circulation criteria, there are still live brain cells.[27] These cells can be actually be kept alive in cell culture up to 78 days.[28]

Defining death by the irreversible loss of circulation was obvious to all up until 60 years ago. In the present era the loss of circulation is never irreversible, since a pump or artificial heart can be attached. And, even if we apply the positions of the poskim in the previous paragraph, brain cells are still alive for at least 8 hours after circulation has

ceased. Therefore, the obvious question is: If one still holds by a version of the circulation definition, on what basis is death being declared? It cannot be the irreversible loss of circulation, and if it is less than 8 hours after cessation of circulation it is not on the basis of the death of every cell in the brain.

## X. Closing Thoughts

I understand that this paper will be read and subject to critique by others, perhaps members of the Va'ad Halacha. I welcome the critique and the comments. I would ask (or perhaps challenge) them to address the following questions (and in return I commit to answering any questions they may want to present to me):

1. Please define what tissue and function need to be present for Halacha to recognize a collection of tissue as a human being. For example, is an arm enough to be a human being? A heart, a kidney? Does it have to function? How much function needs to be present?
2. Please give the Halachic definition of death. A person is dead when\_\_\_\_\_
3. Is the only Halachic consideration circulation?
4. If it is only circulation, please explain why attaching a pump to a body that has been pulseless for over an hour does not restore life. Also, please explain, when organs have been moved from one person to another, how we determine who is the donor and who is the recipient? Prior to the transfer there is circulation in both bodies, and after the transfer parts of both bodies are experiencing circulation.
5. If there are other criteria for life and death, please explain what they are in practical terms so that they can be applied in practical situations. For example, Rabbi Bleich notes that a body is alive as long as there are 'vital forces' present, but does not explain what those 'vital forces' are and where they need to be found in order for life to be present. Precise details are needed if these concepts are to be used in real life.
6. The RCA document repeats with approval (page 12) the statement that there really is only one definition of death. If one accepts that lack of circulation is death, and also accepts that brain necrosis (or death of every cell) is also death, doesn't this add up to two definitions of death?
7. Please describe how you would determine death in the following person, and on what basis that determination is made: A patient with an artificial heart (he no longer has a heart made of tissue, it is a mechanical pump and it has to be attached to a power source) falls and has a spinal cord injury, so that the impulses to breath no longer go from the brain to the lungs. He is totally dependent on the ventilator. He thinks normally, can mouth words, daven, etc, but is totally paralyzed from the waist down. One Shabbat morning you find him, and the heart machine is unplugged and the ventilator is unplugged. He will never have return of circulation unless you plug the heart machine in. He will never have return of lung function unless you turn the ventilator on. The moment you plug the machines in he will have return of circulation. At the moment you see him, there is no pulse, no circulation and no breathing. If he is alive, you obviously have to plug the machines in. If he is dead, obviously you are forbidden to do so. For those who use neurological criteria, the following information is useful: If you find him moments after the machines were unplugged, he would be awake, mouthing words (probably 'plug me in'). After 30-60 seconds he would be unconscious, after 5-10 minutes he would have massive irreversible brain damage and irreversible loss of function, after 8 hours all the cells in his brain might be dead. Necrosis would take longer. For those who maintain that Halacha does not recognize the neurological criteria for death, how do you decide when he is dead?

The Halachic discussion contains two basic positions(albeit with some variations on the theme): The line between life and death is defined by circulation, and the line between life and death is defined by neurological criteria. If I have been successful in demonstrating that using circulation is no longer logically coherent, the only position remaining is that death is defined by neurological criteria. Therefore the Halachic argument between circulation and neurological criteria is over, and the discussion of necessity needs to shift to the particulars of the neurological criteria. Either the existing neurologically based definitions of death can be accepted(for example the Chief Rabbinate or the physiological decapitation model), or further possibilities can be explored.

I again want to thank Rav Gil for hosting my comments. I will try to respond to the comment section. I can also be reached at noamstadlan-at-gmail-dot-com for more in depth questions.

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[1] The individual cells that make up the tissue in the body require energy to maintain the wall (membrane) around them. If deprived of energy for enough time, the cell membrane deteriorates and the cell irreversibly ceases to function.

[2] A response to stimulation or the presence of a reflex means that there is an intact loop of neurons. Consider the knee reflex. When the reflex hammer hits the tendon in the knee, a sensory nerve travels to the spinal cord, sends a message to another nerve, and then the message goes out to the muscle which makes the leg kick out. This particular reflex does not need a brain; it only goes through the spinal cord. Other reflexes travel through the brain (primarily the brainstem), and these brain mediated reflexes have to be absent in someone who is a candidate to be declared brain dead. Spine related reflexes can be present in those who are brain dead.

[3] The study was a transcranial Doppler. This is where ultrasound waves are sent into the brain, bounce off of arteries, and the return wave is measured. Flowing blood will change the frequency of the wave, so a measurement of the change in frequency of the ultrasound wave can be translated into the speed of the blood flowing in the artery (The Doppler effect is why the a train whistle or car horn seems to change tone as the vehicle travels towards or away from you)

[4] The issue of quality of circulation will be discussed later.

[5] This is done either with microdialysis or simply measuring the concentration of oxygen or carbon dioxide in the blood. Microdialysis consists of putting a thin tube in the brain, instilling a little fluid, letting that fluid equilibrate with the tissue around it, then removing it and chemically analyzing the fluid.

[6] This point actually became relevant in practice. One of the leading researchers in brain death recently published an article advocating for declaring brain death based on only one exam. (Recall that the original criteria mandated two exams, and even the 1995 criteria recommended a second exam). There was an article I just became aware of that was published online last month that claims to document 2 cases of patients who started breathing after being declared dead (Can. J. Anaesth. 2010 Oct; 57(10):927-35). I have seen the abstract but not the actual paper. However, they were declared dead based on only one examination. A second examination was not done and a blood flow study was not done. When the blood flow study was done, they had some blood flow. This report does not cast doubt on the concept of brain death. It does illustrate however that 2 exams and a confirmatory study are necessary in order to be sure that not only is function absent, but that it is irreversible.

The criteria for brain death started with 2 exams, and then the period between the exams gradually lessened, until recommendations began to appear advocating for only 1 exam. This is not unexpected as there is a desire to identify as precisely as possible the parameters under which brain death occurs. Obviously, if this paper is accurate, the parameters need to go back to mandating 2 exams and a confirmatory study. I would emphasize that this paper does not invalidate the concept of brain death, but illustrates the process of defining the parameters. Erring on the side of more time and a confirmatory study would seem prudent at this juncture. A similar process occurred with determining death by circulation, with the now famous edicts mandating that a body be observed for 3 days prior to burial. Those who would want to use this data to impugn the concept of brain death would need to address the 38 cases of reported recovery after the determination of death by circulation criteria (J R Soc Med 2007; 100:552-557).

[7] There is another part of the pituitary gland which controls other functions.

[8] Similarly the other functions of the pituitary are only measureable by testing the blood for hormone levels. They are not functions that are observable to the naked eye.

[9] There are patients who have no observable brain function who still have some blood flow. The mechanism for this is discussed in the 2008 paper. Whether these patients should be considered dead according to Halacha depends on the criteria being used and the theory behind the criteria. For those that focus on function, persistence of flow does not present any problem.

[10] Measureable here means by methods from outside the skull. Obviously it is possible to insert probes into the brain and try to determine if any cell is functioning. Since there are billions of cells in the brain, this would be quite an endeavor. Ultimately it is necessary to decide if a single cell or a small group of cells in the brain deserve the label of human life. I address this in a number of other areas and the consequences of this approach in the Meorot paper.

[11] The paper does give a reason for the one sided halachic analysis (yes, I realize the paper states specifically it is not being one sided, but the reality is that the analysis is one sided. It may be one sided for a valid reason, but that doesn't change the fact that it is one sided), but specifically this statement addresses the halachic discussion, implying that the medical data is not similarly biased. I would note that the stated basis for the one sided halachic analysis is quite weak. They need to explain halachically exactly what constitutes a Hiddush, why something accepted for over

25 years by the chief rabbinate and hundreds of rabbis constitutes a Hiddush, and if there is a basis in Halacha that mandates that a Hiddush be treated in the manner that they proceed to do. The claim that there is new medical data, while it appears in other sources, is not accurate. Concerns regarding hypothalamic function, somatic survival and pathology were present in the medical literature prior to the 1991 RCA decisions. Indeed, some of them go back to the 70's and early 80's, which is prior to the publication date of Rav Moshe Feinstein's final teshuvot on the topic. It is true that articles in the medical/philosophical literature have placed more emphasis on these findings, but to state that the data is new is factually incorrect. These references had been supplied to the Va'ad and are available on request.

[12] Similarly, the ability of a brain dead body to gestate a fetus would be inconsistent with this underlying philosophical concept.

[13] Alan D. Shewmon, "Chronic 'brain death': Meta-analysis and conceptual consequences," *Neurology* 51:6 (1998) 1538-1545.

[14] Eelco F M Wijdicks, James L. Bernat, "Chronic 'brain death': meta-analysis and conceptual consequences-correspondence," *Neurology* 53:6 (1999) 1369-70.

[15] Beshar At-Attar, Faissal Shaheen et al, "Implications of ICU Stay after Brain Death: The Saudi Experience," *Experimental and Clinical Transplantation*, 4:2 (2006). The study contains some of the data, and the rest was unpublished but communicated via email by the authors of the paper to this author.

[16] I understand that a case can be made that the survival of the body after brain death very rarely is more than 3 days. I have not personally analyzed the data and so cannot make a statement regarding that. Since I haven't appreciated how it would be germane to the debate I have not examined the topic in more detail. However my data here should not be seen as a refutation of that statement until all the criteria can be examined more fully.

[17] Gustavo Saposnik, David Munoz, "Dissecting Brain Death: Time for a new look" *Neurology* 2008; 70:1230-31.

[18] It is my impression that these claims have been made in other papers/contexts, so I am not accusing the Va'ad of making up the claims, but at best it is the recapitulation of the mistakes of others, something which I think could have been avoided.

[19] Zuckier, Lionel and Johanna Kolano, "Radionuclide Studies in the Determination of Brain Death: Criteria, Concepts, and Controversies" *Seminars in Nuclear Medicine*. 38:268.

[20] The study should have taken the "best case scenario" for a declaration of death and determine if met halachic standards.

[21] These facts would be pertinent if appropriate specific brain death declaration required absent blood flow or absent EEG and a particular set of criteria did not test for them. However, the RCA paper does not discuss the specifics of any set of criteria. The data it reports on EEG may be inaccurate for at least 2 reasons. I have not had a chance to read it 'inside', but he quotes as a source a pediatric textbook, and the situation with children is somewhat different than adults, and data from children cannot be generalized to adults. Secondly, as pointed out by Christopher Pallis back in the 1980's, many patients who have no function who start off having some activity on EEG frequently lose that EEG activity. So the presence or absence of EEG depends somewhat on what time in the process the EEG is done.

[22] Some of the rationales there may not be totally medically defensible, but enough of them are.

[23] To say that Halacha does not recognize a neurological criteria for death because of concerns about those implementing them is similar to stating that strawberries are traif because of concerns that people will not check them adequately.

[24] As for example, Rabbi Avraham Steinberg does. See *Encyclopedia of Jewish Medical Ethics*, volume II, page 705, note 71. Feldheim publishers, 2003.

[25] I would add that all the physicians I have spoken to (admittedly not a scientific survey) would be pleased beyond belief to have assistance from someone who understood not only the complex medical situation but also the religious beliefs and mandates of the patient and family. Far from an unwelcome intrusion, this would be seen as a very useful resource in dealing with this difficult problem.

[26] I have discussed this topic in more detail from a somewhat different point of view in a paper recently published by Meorot available here: [link](#) (PDF).

[27] *FASEB Journal*, 2002; 16, 54-60.

[28] This issue is discussed in great detail in the Meorot article.

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## 179 Responses to *Death by Neurological Criteria*

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1. Jerry on December 13, 2010 at 9:36 pm

“in the contemporary era, circulation is reversible so long as non-decomposed arteries are present. Therefore, I would argue in favor of a delay of burial until the arteries become sufficiently decomposed to prevent reinstatement of circulation.”

I don't know if this makes any sense because I'm not a medical expert, so please correct me if I'm wrong: If a person is hooked up to a pump, but is brain dead by the criteria endorsed by Noam (i.e. where function has never been recovered), wouldn't allowing the arteries to decompose by unhooking the pump (thereby allowing circulation to expire) constitute murder under this rule?

2. Noam Stadlan on December 14, 2010 at 12:21 am

yes. you can also take it to more extremes such as discussing embalmed bodies where the arteries will never decompose. Hopefully the realization will dawn that premodern poskim, when they referred to irreversible cessation of circulation, had a model where 1. when the person's heart stopped there was no way to have circulation and 2. there was a unitary model of the human body, so that when the heart ceased to function, every other organ also ceased to function. Therefore brain death is not contrary to that position if you take into account the scientific assumptions that underly the Halachic position. I think that it is necessary to move the focus from the circulation to whatever anatomy or function the circulation was meant to support.

3. Shalom Spira on December 20, 2010 at 6:12 pm

Some of the comments are still being reloaded by R. Student, but until the reloading is complete, I will just summarize them, in case any clinicians need immediate answers to a piku'ach nefesh question that may arise:

(a) There is a dispute between RMF and RSZA whether deactivating a lifesupport machine constitutes an act of homicide. Thus, I agree with R' Jerry and Dr. Stadlan that – if one assumes a brain dead patient is alive because of continued circulation – one should not deactivate the lifesupport machine.

(b) I agree with Dr. Stadlan that an embalmed patient is definitely dead. This is because the embalming process drains the patient of blood and replaces it with a different liquid, thereby ensuring that circulation (of human blood) has ceased irreversibly.

(c) R' Mor observed that, given the above facts, both RMF and RSZA would agree (albeit for different reasons) that one can deactivate the lifesupport machine of a brain dead patient. RMF says this because he regards a brain dead patient as dead (-not found explicitly in any written pesak but in an oral decision transmitted to us by RDF and RMDT), and RSZA says this because he permits deactivation of a lifesupport machine in the case of a gossess (and RSZA holds that, if a brain dead patient is alive, then he is a gossess). Thus R' Mor quite fairly asks whether one can therefore deactivate the lifesupport machine of a brain dead patient, seeing as both RMF and RSZA agree to this.

4. Shalom Spira on December 20, 2010 at 6:20 pm

And now my response to R' Mor's excellent question: In Eruvin 7a, Rav Sheizvi explains that if two disputes among poskim regarding a mitzvah di'oraita are both unresolved and are both conceptually unrelated, one should be stringent regarding both disputes, even though this results in a situation where one is contradicting both poskim. Because the two disputes between RMF and RSZA are both unresolved as well as conceptually unrelated (one being the definition of death, and the other being the definition of homicide), Rav Sheizvi's principle tells us to be stringent regarding both. This is certainly true regarding so weighty a matter as piku'ach nefesh, where even multiply compounded doubts are adjudicated to the side of life, as per the mishnah in Yoma 83a.

5. mor on December 21, 2010 at 10:44 pm

I am not so sure that the gemara in Eirubin applies to this situation. Basically, in the gemara the situation is that tana A says you need condition X to make a kosher eiruv and tana B says – no you don't, but you do need condition Y. So we are told that it is laudable to take care of x and y. The clause about conceptually unrelated is just brought in because if they are based on a mutually exclusive understanding of halacha then it would be silly to be choshesh for both of them (so it is silly to try to eat at the seder a shiur of chazon ish in the kidei achilas pras of – um – the meikel one).

Over here RSZ is saying you need condition x in order to unplug someone from a ventilator (in his book this is a gosses) and RM says that in order to be allowed to unplug someone from a ventilator you need...condition x (because in his book this person is dead). In other words, over here you can say mima nofshach, and you cant say that in eirubin.

6. mor on December 21, 2010 at 10:49 pm

I do seem to remember something about leading a camel from both ends which might support you more than this gemara in eirubin but I can't remember where it is.

7. mor on December 21, 2010 at 10:52 pm

I think that may have been an exceptional case where the two chumros were conceptually related but applied anyway – end of Shabbos?

8. Shalom Spira on December 22, 2010 at 5:25 pm

Yi'yasher kochakha, R' Mor, for your analysis.

I agree with you that, in a case of a 'mimah nafshakh', there is no reason to be strict like both poskim, and in fact the gemara in Eruvin 6b-7a is telling us that it is wrong to do so, as a function of "hakesil bachoshekh holekh". However, the case at hand does not seem to me to be one of a 'mimah nafshakh' (though others are free to disagree with me). I think it is theoretically possible to hold on the one hand that a brain dead patient is alive (given the cow lactation and Eli Hakohen debates among the Acharonim which preceded RMF & RSZA), and to also hold on the other hand like RMF that deactivation of lifesupport (in the case of living patient) constitutes homicide. Cow lactation, Eli Hakohen and the definition of homicide, are all distinct issues. Hence, Rav Sheizvi's principle appears germane.

Actually, R. Mordechai Tendler, in his testimony at HODS, reports that even RMF only regarded deactivation of the lifesupport machine as safek homicide, recognizing the cogency countervailing argument that the machine is completely extraneous to the patient (and since it did not exist in the time of Chazal, the machine is irrelevant to the life of the patient). But even so, safek homicide is still prohibited, and so there is no practical clinical difference created by the homicide being a mere safek.

Thank you, as well, for your kind support from the case of leading a camel in two directions. I believe you are referring to the mishnah “harei zeh chamar gamal” in Eruvin 52a (where a person is proverbially stuck between a camel and a donkey).

9. mor on December 23, 2010 at 12:17 am

I don't think that is it. I remember that it was talking about being machmir for two conflicting opinions. I could be confabulating.

Where can I find the discussion about lactating cows and Eli Hakohen?

10. Shalom Spira on December 23, 2010 at 6:43 pm

Thank you, R' Mor. I will keep my eyes open to investigate where else conflicting stringencies materialize in the Oral Torah.

Thank you, as well, for inquiring regarding the lactating cows and Eli Hakohen. It certainly demands presentation before the public to see whether my thesis has merit.

(1) LACTATION: the starting point of the lactation discussion is R. Shabtai Rappaport's interview on the HODS website. RSR (31:49-37:28 into the interview recording) presents what seems to me to be the most persuasive reading of the Chatam Sofer. CS says three times that death is defined by irreversible apnea (-once in the paragraph that begins “vineichazei anan” and twice in the paragraph that begins “vilomar nafal mapolet shanei”). Then CS says three other times that death is defined by irreversible cardiopulmonary arrest (-once in the paragraph that begins “vihineh harivash” and twice in the paragraph that begins “aval kol she'achar shemutal ki'even domem”). How do we explain the internal contradiction within CS? RSR answers that CS means that breathing=life, but that as long as the effects of the last breath are \*enjoyed\* (even if the patient is not presently breathing), the patient is still alive. Hence, CS envisaged heartbeat as a manifestation of the continued enjoyment of breath (since the heartbeat is only possible because the patient previously inhaled oxygen, thereby providing the cardiac myocytes with the oxygen necessary for oxidative phosphorylation to occur within their mitochondria, enabling the production of adenosine triphosphate and the contraction of those same myocytes), and so heartbeat is indeed a sign of life.

Accordingly, RSR extrapolates from CS that when a patient is brain dead and has been on the lifesupport machine for several hours, it is clear that all the enjoyment from the oxygen that he autonomously respired (before the patient became brain dead) has already been exhausted, and therefore the patient is dead.

My hypothesis is that the correctness of RSR's extrapolation will hinge upon the dispute among the poskim regarding the applicability of “zeh vizeh gorem” (ZVG) to lactating cows on Pesach. Namely, there are some poskim who permit drinking milk on Pesach from a cow that eats chametz the entire holiday (even though chametz is asur bahana'ah) because of the fact that the cow also ate chametz before Passover begun (when chametz was mutar bahana'ah), and so it is a situation of ZVG. The food that was eaten, even a long time ago, continues to halakhically maintain a natural impact upon the life of the animal. Presumably, then, by the same token, if a brain dead patient is being ventilated by a respirator, his heart is presently beating – not only thanks to the oxygen being presently pumped into him by the respirator – but also because of the oxygen he originally breathed before he became brain dead. In other words, I am hypothesizing that those poskim who apply ZVG to temporally separated elements (and therefore justify the Passover consumption of the milk) would presumably categorize the brain dead patient's heart beat as being naturally fuelled by his own respiration, whereas those poskim who refuse to apply ZVG to temporally separated elements (and therefore forbid the Passover consumption of the milk when predicated solely on ZVG grounds) will categorize the brain dead patient's heartbeat as being artificial and hence irrelevant.

11. Shalom Spira on December 23, 2010 at 6:49 pm

To elaborate: To elaborate: ZVG, subject to a tannaitic dispute on Avodah Zarah 49a, is accepted as a normative principle by the Rambam, Hilkhos Avodot Kokhavim 7:14 and Shulchan Arukh, Yoreh De'ah 142:11. Rashi to Avodah Zarah 49a (s.v. mai lav ha) explains that even if an animal has recently been fed exclusively with idolatrous foods, ZVG dictates that the animal be permitted on account of the kosher foods it ate many days previously.

Accordingly, the Rema to Yoreh De'ah 60:1 rules that an animal that has been nourished by forbidden foodstuffs is itself permissible, whereas an animal that was nourished entirely (for its whole life) by forbidden foodstuffs is prohibited. The apparent difference between the two cases is that the former is an instance of ZVG, whereas the latter is not. The Shakh (se'if katan no. 5) understands that the Rema speaks only of forbidden foodstuffs whose benefit is also enjoined, whereas the Bi'ur HaGra (se'if katan no. 1) explains that the Rema is referring to all non-kosher foods, even ones whose benefit is permitted. Either way, we see that it is possible for an animal to begin its life eating kosher foods, then to switch to an exclusive diet of forbidden foods, and still retain the status of a permitted creature because of the permitted food it ingested a long time ago. The food ingested long ago continues to impact upon the life of the creature.

Shu"t Avnei Mil'uim no. 7 (paragraph that begins with Uvimordekhai) explicitly articulates this point, observing that, according to the Mordekhai (one of the key sources for the Rema's ruling), the two factors for ZVG need not be simultaneous. The Avnei Milu'im proceeds to observe that the Rambam (Hilkhos Ma'akhalot Assurot 16:24) apparently disputes this contention with his ruling that a pot of food cooked, first by the fuel of orlah or kil'ei hakerem and then by the fuel of permitted wood, is actually forbidden. The Avnei Milu'im concludes that the matter requires further analysis. [However, it may be simply noted that the Rambam's fact pattern is not quite the same as the Mordekhai's. In the Rambam's situation, the food was already partially cooked by the single-handed effects of a forbidden fuel before the permitted fuel was even introduced. That partial cooking can never be reversed and so renders the food irrevocably contraindicated. In the Mordekhai's situation, a living creature continues to be affected by food that was ingested long ago. Thus, the Mordekhai's basic principle is not contradicted by the Rambam. Moreover, the Rambam actually holds that even an animal has been fed its entire life with forbidden foodstuffs is kosher, as is evident from Hilkhos Issurei Mizbe'ach 3:14. Thus, the Rambam must certainly distinguish between a pot of cooking food and a living creature!] In any event, the Rema rules like the Mordekhai.

Of course, this alone does not demonstrate that the oxygen inhaled by a brain dead patient a long time ago (before he became brain dead) necessarily impacts on his present heartbeat in the eyes of Halakhah. Perhaps dead meat is a static object that is regarded as the cumulative effect of all the ingredients of the animal when the animal used to be alive, whereas a live human heartbeat is a dynamic phenomenon which depends only on the present ingredients the patient is receiving. However, since some poskim do apply ZVG to the question of drinking milk from a live cow on Passover, it becomes evident that (in their opinion) even present physiology is halakhically regarded as the effect of past ingredients.

Although one may object that, without the artificial ventilator, the patient's heartbeat would stop, exactly the same is true for the animal. Without having eaten chametz in recent days, the cow would have surely stopped producing milk, yet the cow's milk is still regarded as the life-product of not only the chametz it is eating on Passover, but even of the food it ate before Passover commenced. Mutatis mutandis, the heartbeat of a brain dead patient could be considered as natural (according to the side of the debate that permits the milk on Pesach).

## 12. Shalom Spira on December 23, 2010 at 9:01 pm

To offer specific names: The following opinions believe that food eaten by a cow before Passover continues to halakhically impact upon the cow's physiology during the holiday of Passover: R. Shneur Zalman of Lublin in his Shu"t Torat Chessed no. 21, R. Aryeh Leib ben Moshe of Plotzk, in his Magen Ha'elef to Orach Chaim no. 448 (se'if katan no. 10), R. Avraham Danzig in his Nishmat Adam (no. 9), R. Yehudah Assad in his Shu"t Yehudah Ya'aleh, Orach Chaim no. 127, R. Yehudah Leibish Landau in his Yad Yehudah al Shulchan Arukh Yoreh De'ah (hashmatot vichidushim lihilkhot ta'aruvot, siman no. 103, oti'ot nos. 2-3), and R. Aharon David

Deutsch in his Shu"t Goren David no. 35.

In this student's opinion, it is also the view of R. Joab Joshua Weingarten in his Shu"t Chelkat Yo'av (mahadura tinyana, no. 20). R. Weingarten's approach is somewhat complex in this regard. Discussing the problem of milking a chametz-eating cow on Passover, he commences the paragraph "vi'af dilikh'orah yesh lomar" by suggesting that ZVG should, at first glance, not combine the food an animal ate a long time ago with the food it recently ate. This is certainly true for the Rambam who rules that slaughtering a misukenet with an idolatrous knife renders the animal prohibited. The lifeforce of the animal before it became a misukenet does not combine with the knife to trigger ZVG. Rather, we say that, if the animal had not been slaughtered, it surely would have imminently died (like any misukenet) and so the single cause for the existence of the consumable meat is the idolatrous knife (thus rendering the meat forbidden). However, R. Weingarten then reverses himself because, in point of fact, the halakhah follows the Rashba that a misukenet animal slaughtered by an idolatrous knife is mainly permitted (with the exception that one should throw money into the Dead Sea that is worth the value of renting a knife – see Shakh to Yoreh De'ah no. 10, se'if kattan no. 5, and Taz, ibid., se'if kattan no. 3). Thus, R. Weingarten concludes that ZVG does apply to input factors into an animal's life that are temporally removed from one another, and he is willing to use this as a justification to permit the cow's milk on Passover. Accordingly, R. Weingarten should be counted among the poskim who hold that food an animal ate before Passover continues to physiologically impact upon the animal during Passover.

According to this school of thought, it should follow that the oxygen inhaled by a patient before he became brain dead could possibly be regarded as continuing to impact upon his heartbeat even after he becomes dependent upon the ventilator, such that the heartbeat of a brain dead patient could be regarded as a "natural" heartbeat, in compliance with R. Rappaport's chiddush.

The following opinions dispute the foregoing and believe that food eaten by a cow before Passover does \*not\* continue to halakhically impact upon the cow's physiology during the holiday of Passover. The Pri Megadim in his Eshel Avraham at the end of Orach Chaim no. 448 is only willing to invoke ZVG if the cow ate chametz and non-chametz during Pesach itself. The implication of the Pri Megadim is that he would not be willing to rely on the food that was eaten before Pesach. Indeed, such an inference is explicitly enunciated by R. Chaim Sofer in his Shu"t Machaneh Chayim III, no. 20 (paragraph that begins "umah yakru bi' einai"). R. Sofer cites R. Shlomo Ganzfried as having espoused this view, and proceeds to embrace it himself.

Similarly, R. Jacob Meshulam Orenstein, in his Yeshu'ot Yaakov to Orach Chaim no. 448 (se'if kattan no. 9) only allows relying upon ZVG when an animal eats chametz as well as non-chametz on Passover itself.

Likewise rule R. Mordechai Benet in his Shu"t Parashat Mordekhai, Orach Chaim no. 22 (paragraph that begins with vi'akatei) and R. Eliezer Fleckles in his Shu"t Teshuvah Me'ahavah III, no. 325.

According to the latter school of thought, it should follow that the oxygen inhaled by a patient before he became brain dead does not physiologically contribute to his heartbeat while he on the ventilator, and so the heartbeat of a brain dead patient is not a "natural" heartbeat.

13. mor on December 24, 2010 at 12:41 pm

1. I am not impressed with R. Rappaport's modern analysis of the Chasam Sofer's teshuva. It is very clear to me that the "inconsistency" in his language is due to the fact that he had a quite correct understanding of the metzius of his time period, and that when he was writing, irreversibly stopped respiration = irreversibly stopped heartbeat. We are in general not so midayek on the language of achronim and the fact that he shifted his phraseology a bit in the course of writing the teshuva does not bother me at all.

2. I am puzzled by your assumption that the machlokes regarding zeh vizeh gorem can be applied to respiration. It seems to me to be a machlokes about a specific metzius (can food eaten a while ago still contribute to milk later) and not a machlokes asking such a general question as "can any kind of outside element assimilated by an animal continue to have an impact on that animal after a long time."

3. Based on the above, I think that your analysis has a very tenuous connection to the opinion of the Chasam Sofer, and no connection whatsoever to the opinions of Rav Moshe and Rav Shlomo Zalman or the interaction between the two. I still fail to understand how this has anything at all to do with applying the principle of mima nofshach.

14. Shalom Spira on December 26, 2010 at 11:00 am

Thank you, R' Mor, for your insights and analysis.

Regarding the first issue, I could be wrong but it seems to me that we are both articulating the same conclusion as RSR. Viz., there were no lifesupport machines in the Chatam Sofer's time, and so, for the Chatam Sofer, absence of respiration = absence of circulation, because the very last manifestation of respiration was the continued circulation that was the beneficiary of the final breath taken. The question thus becomes, if today we can prolong the circulation past the time it would have been expected to cease based on autonomous respiration, is that circulation still of any importance to the Chatam Sofer? That's what leads me to the second issue, regarding which I admit that I have zero experience (yet) in terms of the milking cow metzi'ut, so I don't know for sure, but my impression is that if a cow goes a few days into Pesach without eating anything, in all cases the lactation will 100% cease.

Regarding the third issue, you are correct, neither RMF nor RSZA ever mentioned bovine lactation in their discussions of brain death. But it seems to me that the conflicting assumptions they adopt vis-a-vis breathless circulation correspond with the unresolved debate regarding bovine lactation. Namely, as orally reported from RDF and RMDT, RMF axiomatically held that breathless circulation is meaningless and is not a sign of life (and therefore that a brain dead patient is dead if breathlessness could be confirmed). Moreover, assuming one is willing to combine the oral record of RMF (as reported by RDF and RMDT) with the written record of RMF, then RMF attributed this position to the Chatam Sofer, as he writes in the final sentence of the first paragraph of IM YD 3:132. By contradistinction, RSZA invokes the Chatam Sofer to mean that breathless circulation is a sign of life, and therefore that a brain dead patient is alive, [unless it can be further be proven that all brain cells have died - which, based upon his controversial interpretation of Eli Hakohen - RSZA regards as virtual decapitation. Although breathless circulation is normally a sign of life for RSZA, nevertheless decapitation spells instant death, as per Sotah 45b, even in the face of continuing circulation.)] (Source: Shulchan Shelomoh, Erkei Refu'ah II, pp. 26-28. N.B. On p. 18 and p. 32, RSZA attempts to attribute this position to RMF, as well. In response, I would submit that while the written record of RMF is amenable to RSZA's efforts to harmonize RMF with his own view, the oral record - as communicated to us by RDF and RMDT - renders such a harmonization impossible. RDF and RMDT have clearly testified that RMF held that breathless circulation is irrelevant. Surprisingly, RMF wrote IM 3:132 in a manner of double entente, such that we are completely dependent on oral testimony to verify what the responsum means or does not mean.)

Ergo, it seems to me that RMF grasped the assumption that the cow's lactation is only attributed to "ba'asher hu sham" - what the cow is currently ingesting, whereas RSZA grasped the assumption that the cow's lactation is legally viewed through a historical perspective: don't just look at what is fueling the lactation now, without remembering that the cow would never have reached this point if it hadn't eating chametz before Pesach.

15. Shalom Spira on December 26, 2010 at 11:03 am

Sorry... that last phrase should read "if it hadn't been eating chametz before Pesach". Thank you.

16. Shalom Spira on December 27, 2010 at 5:53 pm

## (2) CONTROVERSY REGARDING INTERPRETING THE EPISODE OF ELI HAKOHEN:

The gemara in Chullin 20b-21a defines the parameters of decapitation in the context of establishing death. [Thus, this gemara supplements Sotah 45b which equates decapitation with instant death, even when the decapitated human keeps running following his decapitation.] On 21a, Rav Yehuda in the name of Shmuel declares that the breaking of the neckbone plus most of the accompanying musculature renders a human being

anatomically decapitated. The gemara proceeds to ask that Eli the High Priest is recorded by I Samuel 4:18 to have died simply as a result of a broken neckbone, without anatomical decapitation. The gemara explains – ziknah shanei – a geriatric patient is different than all other patients. Due to his seniority, Eli was killed through a breaking of the neck alone. Thus, decapitation can occur in even a non-anatomical manner in a sensitive patient. From the outside, Eli appeared as anatomically normal as any other individual, but the blow to his neck rendered him “physiologically decapitated”, as RMDT has beautifully elucidated it.

Accordingly, if this gemara is taken at its face value halakhah lima’aseh, it would emerge that even if breathless circulation is a sign of life (-which, as explained earlier, is subject to controversy between RMF and RSZA), a brain dead patient would still be halakhically dead, because the brain dead patient has been physiologically decapitated.

Rambam (Hilkhhot Tum’at Met 1:15) and Shulchan Arukh (Yoreh De’ah 370:1), omit any reference to physiological decapitation. Both of those sources simply rule that the breaking of the neckbone with most of the accompanying musculature (i.e. anatomical decapitation) renders a person dead. There is no mention of the ziknah shanei principle, and hence no mention of physiological decapitation. But the Shakh to Yoreh De’ah 370, §5, does say that “mashma” – it is implied – by Chullin 21a that in a geriatric patient a breaking of the neck will itself suffice to render the patient dead. The Shakh also cites the Yam Shel Shelomoh to that effect.

R. Isaiah Pick Berlin, in his Omer Hashikh’chah, no. 48, asks why the Rambam and the Shulchan Arukh omit any reference to the ziknah shanei principle. Moreover, the Shakh – who does finally cite the ziknah shanei principle – only says “mashma” (as quoted above), as though there is some doubt about the correctness of the ziknah shanei principle. In light of these incongruities, R. Berlin concludes that the Rambam must have possessed the alternate version of the gemara in Chullin 21a which is presented by the She’iltot of Rav Achai Ga’on (Parashat Emor, no. 103). There, the gemara (as presented by the She’iltot) uses Eli the High Priest as the proof that breaking of neckbone plus the majority of the accompanying musculature renders a patient dead. Eli was anatomically decapitated according to the She’iltot’s version of the gemara, not physiologically decapitated. There is no such concept as physiological decapitation according to the She’iltot’s version of the gemara. The Rambam accordingly follows the She’iltot. And out of respect for the Rambam, continues Omer Hashikh’chah, the Tur and Shulchan Arukh may have followed his approach. And that may be why the Shakh used the hesitant word “mashma”, because he knew there is an alternate version to the gemara which rejects the concept of ziknah shanei. [However, Omer Hashikh’chah is careful to add: "I do not insist kablu da’ati (accept my opinion) in the intention of the Shakh". Thus, it does not sound as though Omer Hashikh’chah is certain about his thesis.] Moreover, concludes Omer Hashikh’chah, even the Yam Shel Shelomoh quoted by the Shakh apparently recognizes the doubtfulness of physiological decapitation, because he never questions the Rambam’s omission thereof, whereas he does question the Rambam’s omission of another aspect of the same sugya. The Yam Shel Shelomoh held that, lichumra, one should be concerned that maybe ziknah shanei exists (like our version of Chullin 21a), and also that maybe ziknah shanei does not exist (like the She’iltot’s version of Chullin 21a).

The Netziv, in his Ha’amek She’elah commentary upon the She’iltot (ibid., §8) reaches exactly the same conclusion as the Omer Hashikh’chah. He says the Rambam and the Shulchan Arukh follow the She’iltot.

R. Binyamin Hirsch Auerbach, in his nineteenth century Nachal Eshkol commentary upon the so-called Sefer Ha’eshkol (Hilkhhot Tum’at Kohanim, p. 185), goes even a step further. According to the Nachal Eshkol, there is no halakhic dispute. Everyone agrees (-both our version of the gemara as well as the She’iltot’s version-) that there is no such concept as physiological decapitation. That is obviously the case for the She’iltot: Eli suffered a broken neckbone together with the majority of his accompanying musculature. But even according to our version of the gemara (i.e. that Eli only suffered a broken neckbone), what ziknah shanei means is (as explained by the Ran al Ha-Rif) that in a geriatric patient, a broken neckbone suffices to cause a cessation of all residual motion (pirkus) in the patient. I.e., a broken neckbone suffices to cause immediate, irreversible cardiopulmonary arrest in a geriatric patient. Concludes the Nachal Eshkol, “and as the juvenile and as the senior [are concerned], they have the same law”. [Full disclosure: I have heard that the Sefer Ha’eshkol is

reputed to be a forgery. I claim total ignorance on this subject, and I also don't know whether this affects the trustworthiness of the Nachal Eshkol. For discussion, see especially the Seforim Web Log article of Dr. Marc B. Shapiro of August 2, 2007, with the comment of Mori ViRebbi R. Kaplan at August 5, 2007, at 2:00 p.m.]

R. Jacob Gesundheit, in his Tiferet Ya'akov commentary on Chullin 21a, also addresses physiological decapitation. He is surprised by the fact that "the Rambam and the poskim do not mention" the principle of ziknah shanei. He says that, if not for Rashi, he would explain the sugya as follows: At first glance, the gemara's challenge to Rav Yehuda in the name of Shmuel from the story of Eli seems strange. Why do we not simply assume that the High Priest's broken neck caused him to experience cardiopulmonary arrest and that is what killed him? Thus, it is not that the mere broken neck constituted death, but that it triggered death. Moreover, if the mere breaking of the neck was assumed by the challenger in the gemara to constitute death, why does the verse say regarding the High Priest, "and his neckbone broke and he died"? The breaking of the neck was death! There is no need to add "and he died", as if the death was subsequent to the breakage! Therefore, the shakla vitarya should be explained like this. The challenger in the gemara indeed assumes that breaking the neck is not death (which is why the verse states "and his neck broke and he died" – they were two separate events: the breaking of the neck, and then death by cardiopulmonary arrest). But now the question is: why did Scripture even bother to mention that Eli's neck broke? Let the verse simply state: "And he fell from his chair and he died"! It must be because Eli broke his neck plus the majority of the accompanying musculature, and the chiddush of the verse is that even this did not halakhically constitute the death of the High Priest (only the subsequent cardiopulmonary arrest that was instantly triggered). And if so, then this refutes Rav Yehuda in the name of Shmuel's statement that the breaking of the neck plus the majority of the accompanying musculature constitutes death. To which the gemara answers: No! Ziknah shanei! Eli only broke his neck, without the surrounding musculature. But you would have thought, since he was a senior citizen, that a mere breaking of the neck constitutes death in his case, and therefore Scripture comes to teach the chiddush that even in the case of a senior citizen, a person is not decapitated until the neckbone is torn together with most of the surrounding musculature. Thus, it emerges that, according to the Tiferet Ya'akov, there is no such concept as physiological decapitation.

R. Yitzchak Pardo, in his To'afot Re'em commentary on the She'iltot, adopts almost the completely opposite approach. He is alarmed by the contradiction between the She'iltot's version of Chullin 21a and ours. He says tzarikh li iyun tuva (this requires a lot of analysis for me), unless we can say that the version of the She'iltot really means to say as version of Chullin 21a does, but that there are missing words in the She'iltot. Thus, the To'afot Re'em attempts to reconcile both versions, such that everyone will agree with the ziknah shanei principle and that everyone will agree with the concept of physiological decapitation, but he is ultimately uncertain whether it can be done. The To'afot Re'em concludes that the Halakhah indeed is that breakage of the neckbone together with the majority of the accompanying musculature constitutes death. He adds that the Yam Shel Shelomoh also wants to add the ziknah shanei principle, and he refers the reader to the Shakh. However, the To'afot Re'em seems uncertain whether this can be accepted, which is consistent with his previous remark of tzarikh li iyun tuva.

In contradistinction to the previously mentioned Acharonim, the Arukh Hashulchan (Yoreh De'ah 370:1) unreservedly endorses the words of the Shakh, taking them at their face value. Thus, for the Arukh Hashulchan, physiological decapitation is a real concept.

In conclusion, then, we see four approaches to ziknah shanei among the Acharonim who follow the Shakh: (a) It is totally rejected (Tiferet Ya'akov, and also Nachal Eshkol, though due to my ignorance I am not sure whether Nachal Eshkol is reckoned as an authentic halakhic work). (b) It is subject to a dispute between our version of Chullin 21a and the She'iltot's (Omer Hashikh'chah and Netziv, though the Omer Hashikh'chah expresses hesitation about this). (c) It is accepted by our version of Chullin 21a, and it might very well be accepted by the She'iltot, but this is uncertain (To'afot Re'em). (d) It is totally accepted (Arukh Hashulchan).

We now arrive at the question of how RMF and RSZA addressed the episode of Eli Hakohen as a controversial source for the concept of physiological decapitation.

In IM YD 2:174, sec. 1, RMF analyzes Chullin 20b-21a, correcting an error that the Kessef Mishneh rendered regarding the sugya. But RMF himself commits an error (with all due reverence manifest before RMF) in recapitulating the sugya: On p. 286 of that volume of IM, left-hand column, fourteen to twelve lines from the bottom, RMF writes that according to the “ikka di’amrei” in the sugya, Rabbi Assi in the name of Rabbi Mani explains that the mishnah in Ohalot 1:6 refers to the same level of injury as is inflicted upon a korban olat ha’of during the course of melikah according to the opinion of the Rabbanan.

Alas, RMF’s recapitulation of the sugya is contrafactual. The opposite is true: according to the “ikka di’amrei” in the sugya, Rabbi Assi in the name of Rabbi Mani explains that the mishnah in Ohalot 1:6 refers to the same level of injury as is inflicted upon a korban olat ha’of during the course of melikah according to the opinion of Rabbi Elazar the son of Rabbi Shimon (the opponent of the Rabbanan in the sugya).

[Remarkably, R. Yitzchak Ya'akov Weisz, in transcribing RMF's responsum verbatim in Shu"t Minchat Yitzchak V, no. 8, and then offering his own feedback to RMF's correction of Kessef Mishneh, allows RMF's error to pass without comment. Apparently, R. Weisz did not notice that RMF recapitulated the sugya the opposite of how it appears in Shas.]

RMF then rules that physiologic decapitation is indeed death, as derived from Eli Hakohen. This he writes on 287, left-hand column, commencing eleven lines from the top. Says RMF: “Shmuel derives from the verse regarding Eli that breakage of the neckbone in a human renders him dead, except that without seniority it is logical to him [Shmuel] that the human being needs also the tearing of the majority of the surrounding musculature [to be considered decapitated]. For if the breakage of the neckbone were irrelevant for the definition of death, it would not help in the case of a senior, yet the verse says ‘and his neckbone broke and he died’, implying that for Shmuel this made him [the High Priest] dead. And the reason there is no distinction in practical law between a senior and a juvenile is because we are not experts in the measure of seniority. Seniority here does not depend on years, for there are seniors who [are healthy and therefore they] are like juveniles for this purpose, even though they are seniors for other purposes.” These remarks of RMF indicate that RMF accepted the approach of Arukh Hashulchan that Chullin 21a should be interpreted to mean that physiological decapitation = halakhic decapitation, except that RMF adds (writing in 1968) that we are not sufficiently expert to medically diagnose physiologically decapitation.

However, it must be observed that RMF does not recognize – much less refute – the fact that four previous Acharonim (Tiferet Ya’akov, Omer Hashikh’chah, Netziv, Toafot Re’em) and one doubtfully legitimate Acharon (Nachal Eshkol) interpreted the gemara in Chullin 21a either to the contrary or doubtfully to the contrary, and held that physiological decapitation is not death altogether (or is doubtfully not death). Perhaps one may remonstrate that RMF was greater than all four (or five) of these Acharonim put together. But was RMF also greater than the She’iltot of Rav Achai Ga’on which supports these four (or five) Acharonim? It seems to this student that the matter is not simply resolved, and stands as a safek.

In any event, in IM YD 3:132, RMF revisits the concept of physiological decapitation in third paragraph. There, he writes that when a patient is on a lifesupport machine following a trauma, and cannot breathe, then the radionuclide scan should be performed as a “chumra” to ensure that the patient is dead. Assuming one accepts RDF and RMDT’s oral testimony regarding RMF’s position, and therefore that the patient described has circulation, then what here is the “chumra” of conducting the radionuclide test? [I.e. if one explains the responsum as R. Bleich does {and as one possibility advanced by RSZA}, that the responsum is dealing with a patient in circulatory arrest, then the “chumra” is understandable. The chumra is that even though the patient is in circulatory arrest (which matches the classic definition of death from time immemorial), we cannot pronounce death until the brain is diagnosed as being physiologically decapitated (presumably because, until then, there is a chance of resuscitation). But RDF and RMDT reject R. Bleich's interpretation of the responsum, and they hold - based on what they heard from RMF's mouth - that the

responsum deals with a patient who has circulation (just no autonomous breathing). What then is the "chumra" of the radionuclide test?] The chumra is apparently that even though RMF holds by physiological decapitation (as previously announced in YD 2:174 sec. 1), still RMF will not acknowledge that physiological decapitation has occurred until the brain has completely rotten. In other words, in principle, physiological decapitation – as derived from the story of the High Priest according to RMF's controversial interpretation – occurs when the brain is irreversibly dysfunctional, even if the brain has not decomposed. RMF imposes a chumra upon this that he will not acknowledge that physiological decapitation has occurred until the brain has actually rotten, as certified by the radionuclide scan.

In summation, RMF held like the Arukh Hashulchan's interpretation of Chullin 21a, but never addressed the countervailing opinion among the Acharonim. He did impose a chumra on the Arukh Hashulchan's interpretation not to diagnose physiological decapitation until the brain rotted.

18. Shalom Spira on December 27, 2010 at 9:32 pm

As for RSZA, he also (like RMF) interpreted Chullin 21a like the Arukh Hashulchan that physiological decapitation = halakhic decapitation, and he also (like RMF) never seriously acknowledged the Acharonim who oppose the Arukh Hashulchan. This emerges from Shulchan Shelomoh, Erkei Refu'ah II, p. 40, where RSZA writes (as quoted by R. Simchah Bunim Lazerson):

“Therefore I think that if the physicians perform the injections described earlier [of radioactive material, to diagnostically confirm that the brain is irreversibly dysfunctional], it seems to my humble opinion that presumably this is regarded as though his head was removed or the neckbone of the senior was broken – which is considered dead even without [the tearing of] the majority of the surrounding musculature. And even though there are some who express doubts and are concerned, in any event it is almost surely the case [that the patient is dead].” Therefore, RSZA will certify the patient as dead if every single brain cell can be verified to be irreversibly dysfunctional. For RSZA, Eli Hakohen teaches that irreversible dysfunction of the entire central nervous system = decapitation = death.

There is a subtle difference between RMF and RSZA regarding physiological decapitation. Although both affirm the existence of the concept in principle, RMF held we are not experts how to diagnose it in practice (at least in 1968), and therefore (in 1976) held that we need proof that the brain has rotted before physiological decapitation can be confirmed. RSZA, by contradistinction, saw no need to insist upon any decomposition of the brain. For RSZA, it was sufficient to confirm that every single brain cell had irreversibly ceased to function. [I.e. physiological death of each cell suffices, without need for anatomical disintegration.]

Of course, as he indicates on p. 31, in his own lifetime (until he ascended to the Heavenly Academy in 1995), RSZA never was presented with a single clinical case where he felt it could actually be proven that a brain dead patient on a ventilator had irreversibly lost function in every single brain cell. Therefore, RSZA never allowed removing organs from any of the brain dead patients with which he was presented. However, RSZA states that if – in the future – medical diagnostic technology will improve such that it is possible to demonstrate that every single brain cell has irreversibly ceased to function, then the brain dead patient will be known to be physiologically decapitated beyond cavil, and RSZA will authorize removal of organs from the brain dead patient to save other patients' lives.

It seems to this student, kitalmid ha'yoshev bakarka vidan lifnei Rabbotav (and this is only my hypothesis, and others are free to disagree with me), that a safek remains whether to accept to concept of physiological decapitation, because although RMF and RSZA endorsed it [evidently on the strength of Arukh Hashulchan], they never addressed the countervailing opinion of the Acharonim (based on Rav Achai Ga'on) who explained the story of Eli Hakohen to the contrary of Arukh Hashulchan.

19. mor on December 30, 2010 at 6:55 pm

ummm...according to RDF, RMF's acceptance of the concept of brain death was about the cessation of independent respiration being a sign of death, not about decapitation.

20. Shalom Spira on January 2, 2011 at 8:38 pm

R' Mor, thank you for the clarification. You are correct: RDF's testimony is that irreversible breathlessness (even if accompanied by continued circulation) constitutes death. Once we are apprised of RDF's testimony, one could also read this into IM YD 3:132, first paragraph, taking into account RSR's explanation of how RMF understood the Chatam Sofer.

However, independent of the equation apnea=death, RMF coincidentally advocates the position that "physiological decapitation"=death, based on Chullin 21a regarding Eli Hakohen. This RMF submits in IM YD 2:174, sec. 1, and he also seems to be driving at the same point in the third paragraph of IM YD 3:132. In that third paragraph, RMF is explaining that if there is no way to demonstrate breathlessness (-because we don't know whether the patient is autonomously breathing or whether the machine is "breathing" for an already-dead patient), then the alternative is to prove physiological decapitation through the radionuclide scan.

RMDT's testimony regarding RMF is of a more general nature. In the original 1988 symposium where he debates RHS, RMDT testifies that RMF authorized deactivating the lifesupport machines of brain dead patients (-which, for RMF [unlike RSZA] is only permissible if the patient is legally dead). RMDT does not testify what specific reasoning RMF orally advanced in authorizing the deactivation of the lifesupport machine, but now we understand that there are 2 equally possible ways why RMF would allow this: (a) If apnea had been confirmed, the patient would be dead in RMF's eyes; (b) If physiological decapitation had been confirmed, the patient would be dead in RMF's eyes.

In summary, there are two completely distinct ways to die according to RMF: By breathlessness or by physiological decapitation. RSZA disagrees with RMF on the first count, but agrees with RMF on the second count. In this forum, we have suggested that not only is there substantial basis for RSZA to challenge RMF (as a matter of safek) regarding the first count, but there is even substantial basis to challenge the combined assumption of RMF and RSZA (as a matter of safek) regarding the second count.

21. mor on January 8, 2011 at 11:47 pm

Good – that is much clearer. I hate to hock chinik, but what we have over here is: If a person stops breathing independently, R' Moshe says you can disconnect him from the respirator because he is dead, and R' Shlomo Zalman says you can disconnect him because A. he is a gosses B. you are withholding something vs. directly causing his death. Even though their reasoning is different, the two greatest poskim of the past generation agree that you can disconnect a person who has experienced brain stem death from a respirator. Chas v'shalom that this should ever come up for anyone in real life, but I feel that a halachik consensus is always a good thing to be aware of.

22. Shalom Spira on January 10, 2011 at 5:11 pm

Thank you, R' Mor, for your kind words and for keeping the exciting discussion alive. I fully agree with your prayer that we should never be confronted with such situations, and that we should also never require "matnat bassar vadam", as we say in the birkat hamazon. I also fully agree with your observation that RMF and RSZA both permitted deactivating the ventilator of a brain dead patient. Based on the testimony of R. Binyamin Walfish on the HODS website, which I assume we are obligated to accept based on Tosafot to Yevamot 77a, this was also the opinion of RYBS when asked in late 1983 or early 1984. Thus, we have the joint agreement of RMF, RYBS and RSZA – impressive indeed.

But RMF/RYSB and RSZA reached this conclusion for opposite reasons (RMF/RYSB because of their definition of death which RSZA disputed, and RSZA because of the definition of homicide which RMF disputed), and thus Rav Sheizvi's principle in Eruvin 7a presumably requires us to be strict regarding each component dispute, seeing as there is no consensus regarding either of the two component disputes (-and indeed there is cogent reasoning to be stringent regarding each of the disputes). This is especially highlighted by the reasonably-formulated ruling of R. Bleich (presented in his Benetivot Hahalakhah III, pp. 161-178) that there is an obligation of piku'ach nefesh to medically prolong the life of a gosses. So, for R. Bleich, it's not only prohibited to deactivate the ventilator of the brain dead patient, but if the ventilator would become accidentally disconnected, we would be obligated to make the heroic effort to reactivate the ventilator. Accordingly, the dictum that doubts regarding piku'ach nefesh be adjudicated to the side of life (as per Yoma 83a), taken together with Rav Sheizvi's principle, augurs in favour of maintaining the brain dead patient on the ventilator (and reactivating the ventilator should it accidentally stop).

If, lo aleinu, there is a triage situation where I do not possess sufficient resources to save all the patients, I will first endeavour to save the life of a patient who is definitely alive (albeit in mortal danger) before saving the doubtful life of a brain dead patient. This follows from the Pri Megadim to Orach Chaim 328, Mishbetzot Zahav §1: "If one patient is definitely in danger according to the opinion of the physicians, and the other patient is doubtfully in danger, and the medication does not suffice for both, the definite patient takes precedence over the doubtful patient". But when adequate resources exist to treat even the brain dead patient, he must presumably be treated. Moreover, if the brain dead patient is already on the ventilator, he presumably cannot be abandoned (even if the ventilator is needed for a higher triage priority patient) seeing as his treatment has already commenced. [Triage decisions only concern patients whose treatment has not yet commenced.]

23. mor on January 10, 2011 at 6:37 pm

I said

"I am not so sure that the gemara in Eiruvim applies to this situation. Basically, in the gemara the situation is that tana A says you need condition X to make a kosher eiruv and tana B says – no you don't, but you do need condition Y. So we are told that it is laudable to take care of x and y. The clause about conceptually unrelated is just brought in because if they are based on a mutually exclusive understanding of halacha then it would be silly to be choshesh for both of them (so it is silly to try to eat at the seder a shiur of chazon ish in the kidei achilas pras of – um – the meikel one).

Over here RSZ is saying you need condition x in order to unplug someone from a ventilator (in his book this is a gosses) and RM says that in order to be allowed to unplug someone from a ventilator you need...condition x (because in his book this person is dead). In other words, over here you can say mima nofshach, and you cant say that in eiruvim.

You responded

"I agree with you that, in a case of a 'mimah nafshakh', there is no reason to be strict like both poskim, and in fact the gemara in Eruvin 6b-7a is telling us that it is wrong to do so, as a function of "hakesil bachoshekh holekh". However, the case at hand does not seem to me to be one of a 'mimah nafshakh' (though others are free to disagree with me). I think it is theoretically possible to hold on the one hand that a brain dead patient is alive (given the cow lactation and Eli Hakohen debates among the Acharonim which preceded RMF & RSZA), and to also hold on the other hand like RMF that deactivation of lifesupport (in the case of living patient) constitutes homicide. Cow lactation, Eli Hakohen and the definition of homicide, are all distinct issues. Hence, Rav Sheizvi's principle appears germane."

First of all, whether or not it is theoretically possible to follow that theoretical approach is irrelevant to the question of whether or not mima nofshach applies. That is your approach and that is lovely. It doesnt change the opinions of Rav Moshe or RSZA or affect the logical interplay between them.

It seems that in your latest comment you forgot that it was just established that Rav Moshe has TWO reasons for saying that brain death is death. 1. decapitation and 2. cessation of independent respiration. Either one independently would count to make brain death halachic death. You personally don't like the decapitation idea since there is a shitta in rishonim and achronim that would not allow brain death to be considered decapitation. You are entitled to feel that way. That doesn't change that fact that A. I think we can safely assume that Rav Moshe was aware of this shitta and chose to ignore it – perhaps because he was only using it as a tzad lihair B. He had another reason for considering brain death to be halachic death, ie. apnea. Now, you may make a personal choice to follow the shitta that a brain dead patient is still alive while adopting Rav Moshe's psak about disconnecting from a ventilator. That is YOUR prerogative. You can rely on poskim who hold both, like R. Bleich. However, whatever you do or think cannot change what R. Moshe said.

Again, R. Bleich, like you, is entitled to think whatever he wants, but whatever R. Bleich says cannot change the psak of Rav Shlomo Zalman. This is what you are not allowed to do: you are not allowed to say – “What posek x says doesn't make sense to me, therefore his psak doesn't exist, or he must not have said it. That is bad form.” R. Bleich would never be guilty of such a faux pas, and it is not nice to use his words to support such a move.

Rav Moshe said what he said, RSZA said what he said, and you have still failed to satisfactorily address the application of mima nofshach.

24. mor on January 10, 2011 at 6:41 pm

sorry, “that is bad form” belongs outside of quotation marks.

25. Shalom Spira on January 11, 2011 at 11:56 pm

Thank you, R' Mor, for your kind response and important insights. You correctly point out that there is a sfek sfeka likula to declare a brain dead patient dead, and therefore even according to Rav Sheizvi's principle, the brain dead patient could be regarded as dead, based on the axiom in Ketubot 9a that a sfek sfeka likula permits biblical prohibitions. I agree with you – at least if the patient's entire brain (including the hypothalamus) is dead – that there is essentially a sfek sfeka likula to declare a brain dead patient dead: maybe apnea is death, and maybe physiological decapitation is death.

[If the entire brain has died except for the hypothalamus, it's more complicated, since RSZA will say "this is not physiological decapitation", whereas RMDT will say "this is also physiological decapitation". The mechanics behind this dispute are explained in the "Brain Death in the News" forum, in my comment on Dec. 8 at 3:24 p.m., seventh paragraph. Thus, if the hypothalamus is alive, there is a sfek sfeka lichumra: perhaps the living hypothalamus negates the diagnosis of physiological decapitation, and even if not, perhaps physiological decapitation does not exist as a concept altogether.]

Your invocation of the sfek sfeka likula axiom is correct and thus requires me to elaborate further why the brain dead patient should be treated as alive: Yes, it is true – a sfek sfeka likula normally allows us to be lenient regarding a biblical prohibition. However, there are two exceptions of relevance to our case: (1) The twenty-seventh of the thirty-six principles which govern the application of a sfek sfeka likula (as enumerated by the Shakh in his commentary to Shulchan Arukh Yoreh De'ah no. 110) ordains that a sfek sfeka cannot permit a prohibition which is based upon a chazakah. Since the patient has a chezkat chaim, I don't think we can declare him dead on the basis of a sfek sfeka likula alone. (2) The mishnah in Yoma 83a, codified by Shulchan Aruch Orach Chaim 329:3, commands us to attempt to rescue an patient on Shabbat, even when there is a sfek sfeka likula to say that the patient is already dead. This reflects the notion that, based upon “vachai bahem vilo she'yamut bahem”, a sfek sfeka does not operate in the case of piku'ach nefesh. Since the determination of whether the patient should be treated as alive is a matter of piku'ach nefesh, I don't think we can declare him dead on the basis of a sfek sfeka likula alone.

You are correct (and I fully applaud your sentiments to honour the Torah) that it is a highly startling (and uncomfortable) to overturn the ruling of RMF. I have a tradition from my mentor R. Joshua Shmidman that we

say regarding RMF “Shekhinah midaberet migerono shel Mosheh.” However, RMF himself – in IM YD 3:88 – told us to overturn the pesak halakhah of even a leading halakhic authority, when posthumous evidence arises to contradict that leading halakhic authority’s ruling. And so I think treating the brain dead patient as potentially alive is the correct (albeit uncomfortable) decision in good halakhic conscience, following IM YD 3:88.

26. mor on January 12, 2011 at 4:16 pm

I never said anything about sfek sfeka. I am puzzled about how that came to be attributed to me. I think that if a person is brain dead, then mima nofshach, RM and RSZ would agree that he may be unplugged. Not unplugging him would be, like what the gemara says in eirubin, “ksil bichoshech holech.” Also, I wasn’t objecting to the ruling of RM being overturned. As far as I can tell, you are not ignoring his apnea ruling, you are just unwilling to rely upon it alone. I was objecting to the ruling of RSZ being ignored. It is based on the idea that the ventilator is outside of the person. To the best of my understanding, this is not a scientific datum which has been overturned by later discoveries. It is just a way of looking at a metzius which still exists.

27. Leon Zacharowicz MD on January 19, 2011 at 8:41 pm

As a neurologist interested in the topic of brain death in Jewish law for some two decades, I’ve had the privilege of sitting down with many of the world’s leading halachic authorities and learning “the sugya” (literally) as well as discussing these issues with these sages—ranging from leading rabbis of YU to the Eidah Chareidis.

The inescapable reality is that the large majority of internationally recognized rabbinic authorities over the past four decades have been unwilling to accept “brain death,” let alone “brainstem death,” as death in Jewish law.

I’ve invited Dr. Stadlan and Robby Berman and others interested in this decades-long halachic controversy to come to the annual Yarchei Kallah on medical halacha and to sit and learn this sugya, starting with the Talmud, down through modern-day poskim, with our leading authorities. I’ve done this, on multiple occasions. I even translated for Rabb Mordechai Eliyahu ztl on more than one occasion when he gave shiurim on this topic to the yarchei kallah participants.

Rabbi Shlomo Zalman Auerbach, when asked a question about this very topic, reached for his Gemarah. The person who had approached him seemed to express surprise that this giant of Torah scholars would first open the Gemarah, to which Rav Shlomo Zalman ztl reportedly replied something along the lines of “What’s wrong with re-learning this sugya in the Gemarah?” (not an exact quote; this is based on my memory of what was told to me by someone close to him).

In a similar vein, I ask of those interested in this topic, particularly those who advocate so strongly for one position or another: What’s wrong with learning this sugya in the Gemarah, with our poskim, in a yarchei kallah, or similar format?

28. Leon Zacharowicz MD on January 19, 2011 at 8:45 pm

One additional comment: some of those who have brought this controversy to the secular media may not be aware of the fact that the Rav ztl was vehemently against public discussion of sensitive topics such as some of the topics involved in this area. He expressed his concern, over 30 years ago, of the danger that could result were the NY Times or a similar secular newspaper to get hold of such a topic and misrepresent it to the non-orthodox public.

29. Noam Stadlan on February 6, 2011 at 1:20 pm

I guess as the author of the column, I should post the last word. There is absolutely nothing wrong with learning the sugya again, and I wonder why Dr. Z. seems to think that those who disagree with him are not learning the sugya. Indeed, it is necessary to go over all the data regarding brain death; not just the gemara, the rishonim, and acharonim, but also underlying medical assumptions, logic, and current medical/scientific knowledge in order to fully understand the issue.