

ORGAN DONATION AFTER CARDIAC DEATH

Rabbi Leonard A. Sharzer

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שאלה

Are protocols for organ donation after cardiac death (DCD formerly called Non-Heart-Beating Donor) permissible under Jewish Law?

תשובה

Introduction

In recent years, hospitals in the United States and elsewhere have begun to establish programs and protocols for obtaining organs for transplantation from cadaver donors who have been declared dead on the basis of cardio-respiratory criteria, that is, cessation of spontaneous heartbeat and respirations. These donors were formerly referred to as non-heart-beating donors to distinguish them from heart-beating donors, whose death had been declared on the basis of neurological criteria (brain death), and whose respirations were maintained by artificial means and whose hearts were still beating. Typically the DCD donors are patients who are unconscious with severe brain injury, but who do not meet the criteria of brain death. Whether the coma is the primary problem (e.g. stroke or trauma victims) or secondary to the end stage of other diseases, they are patients for whom there is no hope of recovery. They are ventilator dependent patients whose surrogate has made the decision to discontinue life support and allow the patient to die.

If, in the judgment of the treating physicians, the patient is likely to expire within an hour of discontinuing use of the ventilator, and if they are otherwise suitable candidates to become organ donors, either the family is asked for consent to remove the organs after the patient has died, or the patient may have previously designated a desire to donate her organs. In some cases, the patient will be moved from the ICU to the Operating Room where removal of the ventilator takes place. The family may be allowed to accompany the patient. The patient may be given an anticoagulant and/or a vasodilator, and may have cannulas (tubes) placed into the femoral (groin) artery and vein. In the ICU or the operating room, the ventilator is discontinued and the breathing tube removed. EKG monitoring continues, and once the heart is electrically silent

(asystole) and there are no spontaneous respirations for a period of two to five minutes¹, the patient is declared dead and removal of the organs begun. If cannulas have been placed, they may be used to flush the organs with a cold oxygenated solution to help preserve organ viability.

Such programs for obtaining organs for transplant raise several legal, social, ethical, and halakhic questions. From an halakhic standpoint, questions of discontinuing use of a respirator in terminal or hopeless situations have been analyzed for nearly 50 years, and although there is by no means unanimity on the issue, I do not propose to readdress it in this *Teshuvah*.² Similarly, the question of post-mortem organ donation has been discussed at length by numerous *poskim* since the procedure became clinically feasible. Although there is somewhat greater agreement on this issue, rabbinic thought is not monolithic here either. Again, I do not intend to re-examine the question in this *Teshuvah*.³ My intent rather is to look at whether, for those who accept the legitimacy of discontinuing life support and post-mortem organ donation, current DCD protocols are halakhically acceptable.

Historical Background Regarding Criteria for the Declaration of Death

Long before people had any appreciation of the role played by the heart or lungs in maintaining life, or even what a pulse or heartbeat was, long before there was any understanding of the circulatory system, or the need of the body for oxygen, people who were not breathing, were unresponsive, and whose hearts did not beat, were recognized as dead. Furthermore, post-mortem organ donation has been a medical fact of life for the last half century, and has been written about by Jewish thinkers for nearly that long. How is it, then, that the issue of organ donation after determination of death by cardio-respiratory criteria has in recent years come under new scrutiny by ethicists and halakhists?

Before trying to deal with the specific questions raised by this approach to post-mortem organ donation, it will be helpful to review briefly the history of organ transplantation, critical care medicine, and our understanding as a society of the nature of death and the criteria by which we assert that an individual is in fact dead.

Organ Transplantation:

In the early days of organ transplantation, methods of immuno-suppression were relatively ineffective, tissue matching was unsophisticated, and rates of rejection high. Therefore, except in the case of identical twins, or closely matched relatives, donation from live donors was rare. The risks were simply too great and the likelihood of success too small to justify taking an organ

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1. A recent report in the New England Journal of Medicine discussed three cases of heart transplantation in infants in which death was declared after 3 minutes in the first patient and after 1.25 minutes in the subsequent 2 patients. This report and its implications will be addressed in the final section of this teshuvah.
 2. See Reisner, AI, A Halakhic Ethic of Care for the Terminally Ill, Responsa of the Committee on Jewish Law and Standards of the Conservative Movement, YD 339:1.1990a and Dorff, EN, A Jewish Approach to End-Stage Medical Care, Responsa of the Committee on Jewish Law and Standards of the Conservative Movement, YD 339:1.1990b for discussions of when it is permissible to remove terminally ill patients from life support.
 3. See Prouser, JH, *Chesed* or *Chiuiv*: The Obligation to Preserve Life and the Question of Post-Mortem Organ Donations, Responsa of the Committee on Jewish Law and Standards of the Conservative Movement, YD 336.1995 for a discussion of post-mortem organ donation.

from an otherwise healthy individual⁴. Therefore the majority of transplanted organs were taken from cadavers. Prior to 1968, these were donors whose death had been declared on the basis of standard criteria of cessation of cardio-respiratory function. After the proposal of a brain death standard of death in 1968,⁵ and passage of the Uniform Determination of Death Act (UDDA) in 1981, allowing death to be declared on the basis of cessation of all function of the entire brain, even if respiration was being maintained by means of a ventilator and cardiac function continued, most cadaver donors were declared dead on the basis of neurological criteria, so-called brain death.

When death is declared on the basis of cardio-respiratory criteria, the organs begin to deteriorate as soon as they are deprived of oxygenated blood while they remain at normal body temperature. Kidneys are more tolerant than other organs of warm ischemia⁶ and were the first cadaver organs transplanted. Once neurological criteria were accepted, patients could be declared dead while their hearts were still beating and their breathing maintained artificially. Therefore, because the organs continued to be perfused with oxygenated blood, they did not suffer ischemic damage prior to removal. These “beating heart donors” enabled the transplantation of organs such as liver, pancreas, lungs, and heart, which would have been rendered unusable in the “non-beating heart” situation.

The Physiology of Life:

In a healthy living person, the heart, lungs, and brain function as an integrated system. The heart pumps oxygenated blood to the brain, which in turn sends neural impulses from the brain stem to cause the lungs to inflate and oxygenate the blood, which then circulates to the heart, which in the presence of oxygen would contract, causing the blood to circulate to the brain, completing the cycle. Until the last fifty years or so, when any component of this system failed, the others would inevitably fail in very short order, and the person would die. The failure could come at any point in the cycle—the brain and brain stem might cease to function as a result of a stroke or head injury—no signal would be sent to the lungs—the blood would not be oxygenated—lacking oxygenated blood, the heart would cease to beat. Alternatively the heart might stop beating as a result of a myocardial infarction (heart attack) or rhythm disturbance (ventricular fibrillation) and cease to beat—no blood would get to the brain—the brain stem would cease sending signals to the lungs and breathing would cease. Finally, the lungs might cease to function as a result of trauma or blockage—the heart lacking oxygenated blood would cease to beat—no blood would circulate to the brain and the individual would become unconscious and the brain would send no more signals to the lungs. Whichever is the initiating organ in this cascade, however, their interrelatedness causes all to fail within seconds to minutes of each other. Historically there was thus never a need to distinguish in what order the organs failed in order to know that the individual was dead.

4. The first successful kidney transplant from an identical twin was performed in 1954 and the first from a cadaver in 1961, both by Dr. Joseph P. Murray and his team at the Peter Bent Brigham Hospital in Boston. For an excellent summary see the text of his Nobel lecture in 1990

http://nobelprize.org/nobel_prizes/medicine/laureates/1990/murray-lecture.html.

5. Beecher, Henry K. 1968. "A definition of irreversible coma: report of the Harvard Medical School Comm to examine the definition of brain death." *Journal of the American Medical Association* 205:85-88.

6. Warm ischemia is the technical term for oxygen deprivation in an organ at normal body temperature.

In mid 20th century, techniques were developed to overcome some failures in one or more components of this system. For example, if the brain, as a result of massive head trauma or a cerebro-vascular accident (CVA or stroke), failed to send a signal to the lung to breathe, a ventilator could be used to take over for the non-functioning brain stem and inflate the lungs directly, which would continue to supply oxygenated blood to the heart, which would continue to beat. Sometimes the need for a ventilator was temporary--required only long enough to allow the injured brain stem to recover. However, if the damage were severe enough that there was no circulation to the brain, the brain cells would die and become liquefied. Prior to the use of neurological criteria to declare an individual dead, patients who were kept on ventilators until their hearts stopped beating were often found at autopsy to have undergone liquefaction of the entire brain.

In an historic confluence of medical trends, these clinical findings regarding patients on respirators were noted at a time when immuno-suppressive drugs to prevent or ameliorate rejection of transplanted organs were becoming available and organ transplantation was becoming a clinical reality. Clinical tests were developed (and have changed over the years) to determine whether or not there was any function of the entire brain including the brainstem. These patients would all eventually experience loss of cardio-respiratory function as well with no possibility of recovery, but if that were allowed to happen on its own, the organs would be useless for transplantation. The medical profession and society at large agreed that such individuals could be declared dead by neurological criteria while their hearts were still beating. This phenomenon came to be known as “brain death.” Because it was now considered to be both legal and ethical to remove organs from patients whose brains were no longer functioning despite the continued presence of cardiac and respiratory activity, it became possible to remove not only non-vital organs, such as the kidneys, but vital organs, such as the heart, lung, and liver.⁷

Whether these findings satisfy the halakhic criteria for the declaration of death has been hotly debated, and while most *poskim* accept neurological criteria for the declaration of death, there are a number of respected halakhic authorities who do not.⁸ Although the status of Brain Death in *halakhah* is not the subject of this paper, it is important to mention it for two reasons: First, because all authorities, regardless of their position on Brain Death, accept cardio-respiratory criteria, that is cessation of heartbeat/circulation and spontaneous respirations, for the declaration of death. In fact, those who deny the validity of neurological criteria insist on it. Second, there is a misconception that neurological criteria have replaced cardio-respiratory criteria for the

7. Society accepted what has come to be known as the “Dead Donor Rule,” which states in principle that organs may be removed from an individual only after that individual has died, and the removal of the organ may not be the cause of death.

8. See Nevins, DS, **עַד הַיֵּכֶן הוּא בּוֹדֵק?** Contemporary Criteria for the Declaration of Brain Death, Responsa of the Committee on Jewish Law and Standards of the Conservative Movement, OH 329/YD 370. Also Tendler, MD, Halakhic Death Means Brain Death, Jewish Review 1990; p. 6 ff. and Breitowitz, Y, The Brain Death Controversy in Jewish Law, Jewish Action 1992; Spring, 62-66. See also Bleich, JD, Time of Death, Judaism and Healing, Ktav 2002, who rejects the concept of brain death based on any functional test but requires evidence of destruction of all brain tissue. The Israeli chief rabbinate recently (Sept 09) affirmed sufficiency of neurological criteria for declaration of death. See <http://www.forward.com/articles/115450/>

declarations of death.⁹ Fewer than 1% of all deaths are declared on the basis of neurological criteria. The overwhelming majority of deaths, whether from cancer or AIDS or trauma, whether at home or in a hospital ICU on a cardiac monitor, or at a crime scene, are declared when the individual is found to have no heartbeat, no spontaneous respirations, and (in cases where CPR is attempted) does not respond to resuscitative efforts.¹⁰

The question, therefore, is: if cardio-respiratory criteria are universally accepted for the declaration of death, why is there an ethical or halakhic question about DCD? All the early transplants from non-heart-beating donors were *uncontrolled*.¹¹ (Some transplantation services are working on techniques for obtaining organs from uncontrolled non-heart-beating donors. This may pose new ethical challenges but is not the subject of this *teshuvah*.)¹² When a patient¹³ was declared dead, the family was notified and, if the person was suitable to be an organ donor, permission would be requested, and the deceased taken to the operating room where the organ(s) would be removed. In current DCD situations, we are dealing with *controlled*¹⁴ non-heart-beating donors, that is, patients whose dying is controlled in order to maintain viability and function of the organs to be transplanted. Let us then look at these protocols in greater depth to see what problems they raise.

Protocols for Donation after Cardiac Death (DCD)

Following a 1997 recommendation by the Institute of Medicine in its report, *Non-Heart-Beating Organ Transplantation: Medical and Ethical Issues in Procurement*, that “efforts be undertaken to develop consensus and consistency in non-heart-beating donation practices and protocols,” the Department of Health and Human Services undertook a study which culminated in a report, *Non-Heart-Beating Organ Transplantation: Practice and Protocols*, published in 2000.¹⁵ Among the recommendations in this report were: 1) That all organ procurement organizations (OPOs) should explore the option of non-heart-beating organ transplantation. 2) The decision to withdraw life support must be independent of and prior to any discussion about organ transplantation. 3) The focus of end-of-life care should be on the patient and the family.

9. See for example CCAR Responsa 5763.3, *Hastening the Death of a Potential Organ Donor*, in which the author opines that DCD protocols are not permissible because they are not based on a diagnosis of brain death which, the author writes, is the only acceptable criteria for diagnosis of death today.

10. In a setting in which cardiac monitor is available, the most common confirmatory finding is a flat-line or isoelectric EKG, indicating irreversible loss of electrical cardiac activity.

11. Organ donors who have been declared dead according to cardio-respiratory criteria are classified into four groups according to what are known as the Maastricht criteria: i. dead on arrival; ii. failed resuscitation; iii. withdrawal of life support; iv. cardiac arrest following brain death. Only those in category iii are controlled. See Kootstra G, Daemen JH, Oomen AP. Categories of non-heart-beating donors. *Transplant Proc* 1995; 27: 2893-2894

12. Personal communication Dr. Sander Mendelson.

13. These were all patients who died in the hospital as it was unrealistic to harvest organs from those who died outside quickly enough to maintain organ viability.

14. The term “controlled” is used here to distinguish these protocols from the uncontrolled non-heart-beating donations that occurred in the past. It is certainly true that donations from heart-beating or “brain dead” donors occurs in a controlled manner.

15. Committee on Non-Heart-Beating Transplantation II: The Scientific and Ethical Basis for Practice and Protocols, Division of Health Services, Institute of Medicine, “Non-Heart-Beating Organ Transplantation: Practice and Protocols,” National Academy Press, Washington, DC, 2002.

A variety of protocols for DCD have been developed at different transplant centers.¹⁶ There are, however, features that are common to all. As stated above, the decision to withdraw or withhold life-sustaining treatment must be made by the patient or surrogate prior to and independent of a discussion of organ donation. Furthermore, from the time of the decision accepted standards for end of life care should be maintained. An anticoagulant (heparin) and a vasodilator (Regitine) are administered prior to removal of life support, and cannulas may be placed in the femoral artery and vein. In some protocols patients are also given antioxidants and agents such as mannitol, a diuretic.¹⁷ Use of the respirator is discontinued and the breathing tube is removed. Once the EKG is electrically silent or arterial monitoring shows absence of circulation, or both, a waiting period is observed (typically two to five minutes),¹⁸ at the end of which the patient is declared dead. Upon declaration of death, a cold oxygenated fluid is flushed through the femoral cannulas and the organs are removed.

Issues Raised by DCD Protocols

Questions raised in relation to DCD generally fall into two categories, 1) ante- and post-mortem interventions in patient care and 2) the timing and appropriateness of the declaration of death.

Ante-mortem interventions. In many protocols, potential donors are given an anticoagulant (Heparin) and a vasodilator (Regitine). The purpose of these two drugs is to increase perfusion to, and prevent intravascular clotting within, the organ(s) to be used for transplantation. However, because anticoagulants can cause bleeding in some patients, there is concern that they may hasten or cause the patient's death by increasing the severity of an already present intra-cranial bleed, for example, or cause hemorrhage in another part of the body. According to Bernat et al., "administration of heparin is the current standard of care and a key component of the best practice...The use of heparin is considered controversial on the basis of theoretic concerns that it may hasten the death of the Donor. Nevertheless, there is no evidence that heparin causes sufficient bleeding after withdrawal of treatment and thus, causes death."¹⁹

Vasodilators have the effect of lowering blood pressure, and there is a similar concern that the lowering of blood pressure may be enough to hasten cessation of cardio-respiratory activity, but again there seems to be no empirical evidence that this occurs. If cannulas are to be placed in the femoral artery and vein for organ perfusion after death, even though the patient is unconscious, he may be given a local anesthetic during cannula placement. Is there a possibility that this intervention could hasten the patient's death? Here also there does not appear to be any evidence to suggest that this occurs. Finally, at the time of discontinuation of artificial respiration, the patient may be given morphine to prevent any reflex reaction to the deprivation

16. See "Sample Policy for Organ Donation after Cardiac Death" developed by the American Society of Anesthesiologists in June, 2007.

17. Bernat, JL, D'Allesandro, AM, et al., Report of a National Conference on Donation After Cardiac Death, *Am J Transplant* 2006; 6(2):281-291.

18. The transplantation center at the University of Pittsburgh, one of the first centers to develop guidelines for DCD required waiting two minutes after the onset of asystole. Other centers used longer waiting times such as 4 or 5 minutes. The basis for the longer time appears to be related more to societal acceptance than any scientific or medical criteria.

19. *op cit*, Bernat, D'Allesandro, et al.

of oxygen. Again a question is raised whether this can hasten or contribute to the person's death, and the answer has been negative.

Post-mortem interventions. Once the donor is declared dead, following cessation of heartbeat, circulation, and respiration, all of which occur within seconds of each other, a waiting period of two or five minutes is observed, after which cold oxygenated fluid is instilled through the femoral cannulas. At some transplantation centers,²⁰ following the two or five minute waiting period, normothermic extracorporeal perfusion is performed to maintain viability of the abdominal organs prior to removal. This technique must include inflation of an intra-aortic balloon so that the fluid perfuses only the intra-abdominal organs because of concern that the perfusion might result in reanimation of the heart.²¹

The second category relates to the question of the appropriateness of the declaration of death. Are these patients really dead? The Uniform Declaration of Death Act (UDDA) of 1981 states "an individual who has sustained either (1) irreversible cessation of circulatory and respiratory functions or (2) irreversible cessation of all functions of the entire brain, including the brain stem, is dead." The biggest issue here is how to define irreversibility. According to the Bernat report,²² "DCD donor death occurs when respiration and circulation have ceased and cardiopulmonary function *will not resume spontaneously*. (emphasis in text)...When life-sustaining treatment is withdrawn, based on the limited data available, spontaneous circulation does not return after 2 minutes of cessation of circulation."

Do these criteria agree with halakhic criteria for the declaration of death? From an halakhic standpoint, how are we to understand the notion of irreversibility? Does irreversibility refer to auto-resuscitation? That is, are we to wait a sufficient time following the onset of asystole and apnea such that there is no possibility the heart will resume beating or the person will start breathing spontaneously? Or must we wait until there is no possibility the heart can be resuscitated or breathing can be restored even through medical intervention, i.e., until CPR will no longer be effective?

If the individual has signed a donor card during his lifetime, may we assume that permission has been granted for declaration of death by either neurological or cardio-respiratory criteria and that all proposed medical interventions that facilitate organ donation and do not hasten death are

20. Magliocca, JF, Magee, JC, Rowe, SA, Gravel, MT, Chenault, RH, 2nd, Merion, RM, Punch, JD, Bartlett, RH, Hemmila, MR: *Extracorporeal support for organ donation after cardiac death effectively expands the donor pool*. J Trauma 2005, 58:1095-1101.

21. See Rady, MY, Verheijde, JL, McGregor, J, *Organ Donation after circulatory death: the forgotten donor?* Critical Care 2006; 10:166-169 in which the suggestion is made that the cessation of cardiac and neurologic activity is not necessarily irreversible if when post-mortem extra-corporeal perfusion is used to support organ viability, care must be taken to avoid cerebral and coronary resuscitation. This, however, begs the question which is whether the heart or brain are capable of auto-resuscitation. If a decision has been made not to resuscitate the patient, clearly any post-mortem activity must be carried out in a way which does not do so inadvertently.

22. *op. cit.*, Bernat, et al.

permitted as well? Alternatively, is specific informed consent by the patient or her surrogate required for DCD (controlled non-heart-beating donation)?²³

Do DCD protocols interfere with standards of end-of-life care? What is the effect on the family of the dying person? Who has medical responsibility for the patient once artificial respiration is discontinued? How are we to understand these interventions according to the paradigm of the *goseis*?

Yoma 85a Revisited

The locus classicus for halakhic discussions regarding criteria for determination of death is B Yoma 85a which deals with a building which has fallen on Shabbat and there may be people buried beneath the rubble.

תנו רבנן: עד היכן הוא בודק? עד חוטמו, ויש אומרים: עד לבו. בדק ומצא עליונים מתים - לא יאמר: כבר מתו התחתונים. מעשה היה, ומצאו עליונים מתים ותחתונים חיים...אמר רב פפא: מחלוקת ממטה למעלה, אבל ממעלה למטה, כיון דבדק ליה עד חוטמו - שוב אינו צריך, דכתיב כל אשר נשמת רוח חיים באפיו. מס' יומא פה:א

Our Rabbis taught: How far does one search? Until his nose. Some say: Up to his heart. If one searches and finds those above to be dead, one must not assume those below are surely dead. Once it happened that those above were dead and those below were found to be alive...R. Papa said: The dispute arises only as to from below upwards, but from above downwards, if one had searched up to the nose, one need not search any further, as it is said: *In whose nostrils was the breath of life.* Yoma 85a

The *Mishnah* has stated that if there is even a possibility that someone is buried under the rubble, we are obligated to violate the laws of Shabbat to remove the rubble. If someone is found alive, we continue to remove rubble to extricate the person [regardless of how severely injured he is or how poor his prognosis], but if he is dead, we cease digging and leave the corpse until after *shabbat*. The *gemara* then asks how we determine whether the person is alive or dead. A *baraita* is cited in which there appears to be a dispute as to whether we determine whether a person has died based on respiratory or cardiac criteria, i.e., whether he has stopped breathing (up to his nose) or whether his heart has stopped beating (up to his heart). Rav Papa resolves the dispute by saying it is only relevant when the digging reveals the person feet first. The traditional understanding of this *sugya* is that if the chest area is uncovered first, as would be the case if he is discovered feet first, and the heart is found to be beating, the person is alive. If, however, no heartbeat is discernible, we must continue digging to reach his nose to see if he is

23. These questions pose interesting challenges and have not yet been addressed by civil law. Most DCD protocols require specific consent even in situations where the patient has a signed donor card. There may come a time when donor cards specifically include (or exclude) DCD. In the meantime, families considering organ donation should be advised that DCD is halakhically acceptable. See conclusion #4.

breathing in order to determine if he is dead. However, if his head were uncovered first, and he is found not to be breathing, he is determined to be dead and is left until after *shabbat*.²⁴

Some *poskim* understand this passage to mean that the *gemara* posits absence of respiration as the sine qua non of death, privileging it over absence of cardiac function. Thus a detectable heartbeat can indicate life, but lack of a detectable heartbeat does not prove death. This is the understanding favored by Rabbi Daniel Nevins in his Teshuvah, **עד היכן הוא בודק?** Contemporary Criteria for the Declaration of Brain Death.²⁵ He argues that cardiac criteria have less significance than respiratory criteria based, in part, on the verse quoted in B Yoma 85a, כל אשר נשמת רוח חיים באפיו בראשית ירכב *All in whose nostrils was the breath of life* Genesis 7:22, as well as texts in which an animal or person is declared dead on the basis of lack of respiration despite the presence of *pirkus*, which he understands to include heartbeat. In addition he cites the examples of the headless chicken, the one who is *nikra k'dag*, and the fetus *in utero*. Thus he asserts that we can accept a diagnosis of brain death because it results in a positive apnea test²⁶, preserving the traditional rabbinic understanding of the relationship between breathing and living.²⁷

Rabbi Moshe Tendler understands this passage conversely:

The question is not whether a person can or cannot breathe, but only why he can't breathe. Why can a fellow who is under debris and not breathing be declared dead? Because the brain died. Otherwise we would have an obligation to try to revive him using C.P.R. And what does C.P.R. do? Bring a person back to life? No! C.P.R. is effective only when the brain has not died; it is only when C.P.R. does not work that the

24. There are *girsaoth* which substitute “navel” for “heart.” In a 2007 Essay, *Nostrils, Navel or Heart? Significant Textual Talmudic Variations Concerning Signs of Life*, Alexander Tal reviews textual variants of this *sugya*. He suggests the following reconstructed version as being the most likely original version:

Our Rabbis taught: How far does one check? Until [one reaches] his navel. Some say: Until his heart. If he checked and found those above to be dead, he should not say: Those below are surely dead. Once it happened and they found those above dead and those below alive. R. Papa said: The dispute is only from below upwards, but if from above downwards, since he examined his head, he need not check any further, as it is said: *All in whose nostrils was the spirit of the breath of life*.

Rabbi Tal assumes that the searcher is still looking to establish life or death based on respirations, and the question is whether when digging from below upwards one can rely on the absence of abdominal breathing or must continue in order to examine the chest for signs of breathing, but if digging from above downward, if no signs of respirations are found at the nose, one need not continue to examine the chest also. One might equally interpret this *girsah* as accepting either cardiac or respiratory criteria, that is if one reaches the nose first and there is no breathing, the person is dead, and if one reaches the abdomen first, one must continue to the chest and if there is no heartbeat, the person is dead.

25. Nevins, DS, **עד היכן הוא בודק?** Contemporary Criteria for the Declaration of Brain Death, Responsa of the Committee on Jewish Law and Standards of the Conservative Movement, OH 329/YD 370

26. An apnea test is performed to substantiate the diagnosis of brain death. After a period of breathing pure oxygen, the ventilator is turned off. The patient is monitored for spontaneous respirations and the level of carbon dioxide in his blood is checked. Since an elevated carbon dioxide level is a powerful stimulus to spontaneous respiration in an individual with a functioning brainstem, the absence of spontaneous respirations indicates loss of function of the brainstem and such an individual, assuming he exhibits loss of higher brain functions as well, is deemed to be dead. Absence of respiratory movements is considered a “positive” apnea test, i.e., indicative of brain death.

27. I will shortly suggest an interpretation of these texts that does not privilege either respiratory or cardiac criteria over the other. However, for purposes of the discussion at hand, there would be no disagreement regarding the declaration of death, since it is made after both respiratory and cardiac activity have ceased.

patient is, indeed, dead. In such an instance, the individual suffers from an irreversible respiratory failure which stems from an irreversible cause—the death of the brain. Brain death is the finest criteria of death according to *halakha*, precisely because the classic criteria of irreversible respiratory and cardiac arrest are dependent upon death of the brain.²⁸

In other words, for Rabbi Tendler, it is not that we accept the idea of brain death because it will result in a positive apnea test; rather we accept absence of respirations as a criterion for declaring death because it indicates absence of function of the brain stem.

Rabbi Tendler's assertion is that the importance of a particular clinical finding must be evaluated in light of the the context in which it is noted. Patients who suffer loss of function of the brain stem (specifically the brain stem respiratory center), also known as “locked-in syndrome,” are unable to breathe spontaneously and require ventilator support.²⁹ They would fail an apnea test, if one were administered, because the brain stem is unable to respond to rising carbon dioxide levels in the blood. Yet their cortical function may be intact. They are conscious, aware, and may be able to communicate through eyelid function. Despite what all would concede to be permanent loss of spontaneous respiration and inability to “pass” an apnea test, no one would consider these patients dead.

The idea of contextualization of the criteria for declaration of death was noted by Rashi in his commentary to the *sugya* in Yoma:

עד היכן הוא בודק - אם דומה למת שאינו מזיז איבריו, עד היכן הוא מפקח לדעת האמת?
How far does he search? - If his appearance is that of a corpse, that is, he does not move his limbs, how far does he continue to dig him out in order to learn the truth (whether he is alive or dead)?³⁰

It is obvious that a victim who is not breathing because a heavy rock is weighing down his chest, for example, but who is otherwise moving or struggling, is not dead. It is only when in all other respects he appears to be dead that absence of respirations confirms the diagnosis of death.

עד חוטמו - ואם אין חיות בחוטמו, שאינו מוציא רוח - ודאי מת, ויניחוהו.
Up to his nose - and if there is no evidence of life at his nose, that is, he is not breathing - he is certainly dead, and they [should] leave him there.³¹

The lack of respirations is intended to be confirmatory evidence of death in one who already appears to be dead. And as to the difference between cardiac and respiratory findings, the difference is not related to importance of lungs over heart, respiration over circulation; rather it is the reliability of the particular finding in determining death.

28. Tendler, MD, *Halakhic Death Means Brain Death*, Jewish Review 1990; pp. 6 ff.

29. In patients who suffer from “locked-in syndrome,” their entire bodies are paralyzed and they are unable to speak or breathe on their own. This condition was the subject recently of a popular memoir and film, titled *The Diving Bell and the Butterfly*, dictated by a French journalist, Jean-Dominique Bauby using his eyelid to communicate.

30. Rashi to B Yoma 85a

31. *Ibid.*

הכי גרסינן: אמר רב פפא מחלוקת מלמטה למעלה - מחלוקת דהנך תנאי, דמר אמר: עד לבו, ומר אמר: עד חוטמו, מלמטה למעלה שמוצאו דרך מרגלותיו תחלה, ובודק והולך כלפי ראשו, דמר אמר: בלבו יש להבחין, אם יש בו חיות, שנשמתו דופקת שם, ומר אמר: עד חוטמו דימנין דאין חיות ניכר בלבו, וניכר בחוטמו.

R Papa said the dispute is from below upwards - This is a tannaitic dispute, where one says up to his heart and one says up to his nose; from below upwards, he is discovered feet first, and one searches toward his head, the first says one must examine his heart, whether there are signs of life, for his soul beats there; and one says up to his nose, because there are times when there are no signs of life at his heart, but they will be present at his nose.³²

It is clear in Rashi's understanding of Rav Papa, that the distinction between cardiac and respiratory findings is their relative reliability in diagnosing death. The presence or absence of breath at the nose was much easier to recognize in ancient times than heartbeat. The heart could be beating very weakly, so that no pulse could be appreciated and yet circulation to the brain stem was adequate to stimulate spontaneous respirations. It should be clear that the Gemara *cannot* be positing a situation where there is no cardiac function and yet spontaneous breathing persists. We know that that is a physical impossibility.³³ Rather, in ancient times, the Rabbis recognized that a person might be alive in the absence of a detectable heartbeat, but not in the absence of discernible breathing.

This idea is found in the Codes as well. Maimonides³⁴ affirms the notion that if there is no evidence of breathing the individual is dead.

בדקו עד חטמו ולא מצאו בו נשמה מניחין אותו שם שכבר מת.

[If] they searched up to his nose, and did not find him breathing, they leave him as is for he is surely dead.

The Shulhan Arukh³⁵ makes the same assertion, namely that an individual found not breathing is dead, regardless of whether he was uncovered feet first or head first.

אפי' מצאוהו מרוצץ, שאינו יכול לחיות אלא לפי שעה, מפקחין ובודקים עד חוטמו; אם לא הרגישו בחוטמו חיות, אז ודאי מת לא שנה פגעו בראשו תחלה לא שנה פגעו ברגליו תחלה.

Even if they found him crushed, such that he cannot live longer than an hour, they search and examine up to his nose. If there are no signs of life at the nose, then he is certainly dead, and it makes no difference whether they found his head first or his feet first.

32. *Ibid.*

33. I am not suggesting that the Rabbis knew that this was physically impossible, rather that despite their lack of understanding of physiology, they were keen observers, and they could never have observed in either animals or humans a situation in which breathing persisted in the face of absent cardiac activity.

34. M.T. Hilkhoh Shabbat 2:19

35. Sh. A. Orah Hayyim 329:4

In the Mishnah Berurah³⁶ this is stated explicitly:

ל"ש פגעו ברגליו - ר"ל דלא נימא דכיון שאין אנו מרגישין חיות בלבו בודאי מת ולא יפקח הגל יותר קמ"ל דגם בזה צריך לבדוק עד חוטמו:

Why does he include the situation where he is uncovered feet first? In order to teach us that we should not say that since we do not find signs of life at the heart, he is dead and we should not uncover the rest of him, rather even in this case he must be examined for signs of life (breathing) at the nose.

In Rabbi Nevins analysis he concludes: "It is clear that the Talmud and the codes of Jewish Law view lack of respiration, not cardiac arrest, as the primary criterion for the declaration of death."³⁷ However, nowhere is cardiac arrest referred to, much less asystole which is fundamentally an electrical finding on a cardiac monitor. Rather it is pulselessness, the absence of a detectable heartbeat, that is cited as being unreliable as an unequivocal sign of death.

Given the technology of the earlier times, presence or absence of breathing at the nostrils was indeed the most reliable confirmatory sign of life, if present, or death, if absent, in a person who otherwise appeared dead. The heart might still be beating and not be detectable by palpation. Even today, lack of a detectable heartbeat is not acceptable as the sole indicator of death. With the use of a stethoscope, which was not invented until centuries later, it might still be impossible to detect cardiac function sufficient to maintain minimal circulation to the brain stem. In our day, however, electrical silence on EKG (cardiac standstill or asystole) is at least as reliable and for most clinicians a more reliable and acceptable criterion for declaring death than absence of respiration. All this is in a context, of course, in which there is no medical intervention, such as a ventilator or pacemaker, to influence the function of part of the neuro-cardio-respiratory integration.

Without medical intervention, all three systems will necessarily fail within minutes of each other regardless of which fails first. In the case of DCD, cessation of respirations typically occurs within a few minutes but may take up to 60 minutes (if respirations continue beyond 60 minutes the patient is no longer a candidate to be an organ donor). Following cessation of respirations, cardiac arrest follows after a period of time, typically not more than 5 minutes and very rarely as much as 10 minutes. This time lag between onset of apnea and cardiac arrest, though, can never occur in the reverse order. When apnea precedes cardiac standstill in the clinical setting, death is never declared until cardiac activity has ceased.³⁸

I would argue that Yoma 85a does not exclude absolute cessation of effective cardiac function as a criterion for the declaration of death when it can be determined with certainty. In the DCD situation, death is declared at the cessation of both respiratory and cardiac activity, which

36.M.B. 329:11

37. *Op.cit.*, Nevins

38. Personal communication from Dr. Sander Mendelson, cardiologist, Washington Hospital Center, Bethesda, MD, who adds that there are clinical conditions such as airway obstruction, barbiturate overdose, lightning strike, and drowning in which there may be no spontaneous respirations, but cardiac and brain activity are present and the person would not be declared dead on the basis of absence of respirations.

typically occur within minutes of each other, and would certainly meet the understanding of criteria of death in Yoma.

Ante-Mortem Interventions and the Status of Gesisah

Anticoagulant and Vasodilator Drugs. The purpose of these drugs is to enhance the viability of the organs to be donated. They are clearly of no health benefit to the patient. The benefit to the patient is in allowing him or her to fulfill the mitzvah of saving a life by being an organ donor. The question we must address from a Jewish perspective is whether they cause or hasten the death of the individual. There are clearly clinical situations, such as an intra-cranial hemorrhage, in which the use of an anti-coagulant might induce more bleeding and bring on death more rapidly. Or a patient may have a very unstable blood pressure, in which case a vasodilator might bring on cardio-vascular collapse. In situations like these, such drugs should not be used at all, or should be used at dose levels the physician feels will not cause or hasten death.³⁹ It is axiomatic, and a clearly stated principle, that the physician caring for the patient at this end stage of life not be a member of the transplant team, so that there is not even the appearance of a conflict of interest.⁴⁰

Analgesics and Sedatives. It is common in taking a patient off a respirator to administer morphine to relieve any reflexive struggle to breathe without ventilatory assistance. Drugs such as morphine also have the effect of depressing respirations. Others⁴¹ have written about the use of morphine and related drugs and the “double effect” phenomenon. It should be remembered that those discussions were in relation to relief of pain in dying patients. In the situation we are dealing with, the patients are unconscious and do not perceive pain. The dose of these drugs used can and should be minimal in order to avoid any possibility of their contributing to the patient’s death.⁴²

Insertion of Cannulas. Placement of cannulas in the femoral artery and vein for the purpose of post mortem organ perfusion has about the same risk as placement of an arterial line such as might be used for the purpose of monitoring arterial blood pressure or an intravenous line for the purpose of administering fluids or drugs. Such procedures are ubiquitous in an ICU setting. Typically the placement will be done at the bedside and may involve the use of a local anesthetic because even though the patient is unconscious, spinal reflexes might cause movement in response to the placement. The difference, of course, is that in the usual ICU situation, those interventions, placement of an arterial or venous line, would be for the patient’s own benefit, where in the case of DCD, they are for the benefit of the organs (and future organ recipient). For

39. Although there is some variability, most DCD protocols require that decisions regarding ante-mortem interventions be made on a case by case basis.

40. It is important to keep in mind the potential for conflict of interest on the part of many of the stakeholders. Even family members who would not want anything done to hasten the death of their loved one, if they have made the decision to donate her organs, or are honoring the patient’s own request to be a donor, have an interest in having the death occur in a way that makes this feasible.

41. op. cit. Dorff and Reisner

42. In a case in California, a physician who was a member of the transplant team became involved in the care of a potential non-heart-beating donor and allegedly administered a dose of morphine sufficient to hasten the death of the donor and render the organs more useful for transplantation. The surgeon is on trial at the time of this writing and faces a penalty of up to four years in prison.

that reason, we may demand that the risk be vanishingly small in order to permit such procedures.

Status of Goseis. From a Jewish standpoint, we must ask how to evaluate these interventions in the light of the laws relating to treatment of the *goseis*. The classical formulation of the treatment of the the *goseis* is found in the Shulhan Arukh 339:1 as follows:

הגוסס, א הרי הוא (א) כחי לכל דבריו. ב אין קושרין לחייו, ג ואין סכין אותו, ואין מדיחין אותו, ואין פוקקין את נקביו, ד ואין שומטין הכר מתחתיו, ואין נותנין אותו על גבי חול, ולא על גבי חרסית ולא על גבי אדמה, ואין נותנין על כריסו לא קערה ולא מגריפה ולא צלוחית של מים ולא גרגיר של מלח, ואין משמיעין עליו עיירות, ואין שוכרין חלילין ומקוננות, ואין מעמצין עיניו עד שתצא נפשו. ה וכל המעמץ עם יציאת הנפש, ה"ז שופך דמים. ואין קורעין ולא חולצין ולא מספידין עליו, ולא מכניסין עמו ארון לבית, עד שימות. ואין פותחין עליו בצדוק הדין, עד שתצא נפשו.

A *goseis* is (to be considered) like a living person in all respects. One does not bind his jaw, anoint him, purge him, stop up his orifices, remove his pillow, nor place him on the sand, floor, or ground. One does not place a plate on his belly, nor a bit of salt. The announcement [of death] is not made, nor flute players or mourners hired. And one does not close his eyes until he has died. Anyone who closes another's eyes at the moment the *nefesh* is leaving has shed blood. One does not tear one's clothing, remove one's shoes, give a eulogy or bring a casket into the house where the dying person is located until the person has died. And one does not recite *tzidduk ha-din* until the *nefesh* has gone out.⁴³

There are three questions to be addressed: 1) Is the patient/organ donor a *goseis*? 2) If so, at what point does she attain that status? and 3) Do any of the medical interventions violate the laws of the *goseis*? *Gesisah* is often translated as being "in the throes of death," but perhaps a better term is actively dying. The *goseis* is an individual whose death is inevitable within a very short time.⁴⁴ No medical treatment other than what is required to make the person comfortable would ever be appropriate. In the patients under consideration for our purposes, there is an

43. Shulhan Arukh YD 339:1

44. The classical understanding is that a *goseis* will die within three days of attaining that status. It is my view that in the modern era, with the medical interventions currently in use, a time based understanding of *gesisah* is anachronistic. Rather, I believe the term should be applied to those actively dying. There is, in fact, a substantial literature on the actively or imminently dying. See, for example, Moneymaker, KA, *Understanding the Dying Process: Transitions during Final Days to Hours*, J Palliative Med 8(5):1079, October 2005 and Lynch, M and Dahlin, CM, *The National Consensus Project and National Quality Forum Preferred Practices in Care of the Imminently Dying*, Journal of Hospice & Palliative Nursing, 9(6):316-322, December 2007. See also Hallenbeck, JL, *Palliative Care Perspectives*, Oxford University Press, Inc., 2003, Chapter 11: The Final 48 Hours. This phase of the dying process is characterized by specific patterns of breathing, changes in level of consciousness, secretions, skin color changes, bowel and bladder function changes, and more. It generally lasts a matter of hours to a day or two and healthcare workers who regularly care for dying patients recognize when patients enter this final phase. This seems to me to be what the Rabbis were referring to by the term *goseis*. I had the experience and extraordinary privilege of being part of a family vigil when my maternal grandmother and both my parents died at home after long illnesses. Those experiences, in addition to the dying patients that I cared for as a young physician, made it clear to me that active dying is a distinct and recognizable phase of the dying process. The literature referred to above describes, defines, and clarifies active dying in order to guide caregivers, but in terms of recognition, even for lay people, it is like Justice Potter Stewart's comment about pornography--you know it when you see it.

understanding that they will not recover, regardless of treatment, but that they could be maintained on the ventilator for an indeterminate period of time. The fact that a decision is made to discontinue ventilatory support of these patients and allow them to die suggests to me that prior to removal of the ventilator they are not actively dying. I would suggest, then, that these patients are properly considered *gosesim* only after discontinuation of the ventilator.⁴⁵ Furthermore, for patients to be considered candidates to be DCD organ donors, it must be anticipated that they will die within one hour of discontinuing the ventilator. In most protocols, if they continue to breathe and maintain heartbeat for longer than an hour, their organs are not considered usable for transplantation.

The formulation in the Shulhan Arukh says, in essence, until someone is dead, we may not do to that person what we would do after that person is declared dead, whether that be preparing the body for burial, mourning the person, or removing an organ for purposes of transplantation. Moreover, we may not do anything that will hasten the process of dying. It should be emphasized that this is in complete accord with the “dead donor rule,” which states that an organ may not be removed from someone who has not been declared dead, nor may the removal of the organ be the cause of the death.

The administration of anticoagulants and vasodilators and the placement of cannulas occur before removal of the ventilator, and, by my formulation, before the patient is a *goseis*. Regardless of whether the patient has not yet become a *goseis* or is already in that category, and therefore חי לכל דבר, like a living person in all respects, such a person, having chosen to be an organ donor, or whose surrogate has made that determination, consents implicitly to interventions which will not hasten his death but will improve the likelihood of the transplant being successful.⁴⁶ Even so, to reiterate the criteria noted in the previous section, medical interventions may be administered only when, according to best available medical opinion, the likelihood of their hastening or causing death are vanishingly small. Rather than making any specific recommendations in this *teshuvah* about which drugs, when, and in what dose, I would restate the principle that all ante-mortem interventions must be undertaken with the understanding that in the treating physician’s opinion, they will not hasten the death of the patient.

The Lazarus Phenomenon

As noted above, absent medical intervention, cessation of neurological (brain), circulatory (heart), or respiratory (lung) function will occur with a very short time of each other, regardless of which organ failed first. We must ask, therefore, how long does it take to know with certainty

45. Some poskim, such as Rabbi Reisner, base their permission to discontinue the use of the ventilator on the grounds that the person is already a *goseis*. For these authorities, since the person is considered a *goseis* prior to removal of the ventilator, she certainly has that status after removal. The requirement that as a *goseis* the patient be treated as a living person for all purposes is thus pushed back prior to removal of the ventilator, but we have already stipulated that only those ante-mortem interventions are permitted which will not hasten the death of the patient. It is likely that even Rabbi Dorff, who bases his permission to discontinue artificial ventilation on the grounds that the person is a *tereifah*, would consider him to be a *goseis* after removal of the ventilator.

46. If we permit healthy individuals to become organ donors with all the attendant risks, including the possibility of death, it surely must be permissible for a dying organ donor to permit medical modalities which in themselves are very low risk, and will not hasten her death.

that spontaneous cardio-pulmonary activity will not return? Maimonides⁴⁷ warns against closing the eyes of a deceased immediately upon death:

וכל המאמץ עיניו עם יציאת נפש הרי זה שופך דמים אלא ישא מעט שמא נתעלף

Anyone who closes the eyes of the dying as the soul is leaving is guilty of spilling blood. Rather one should wait a short time, perhaps he has only fainted.

It should be noted that often in a faint the blood pressure may fall to extremely low levels and respirations may be extremely shallow and slow. Thus it is easy for an untrained observer to conclude mistakenly that neither heartbeat nor spontaneous respirations are present. The wait suggested by Maimonides is not about waiting for cardiac standstill or apnea to become irreversible, but to exclude a misdiagnosis, that is, to exclude the possibility that cardio-pulmonary function would be judged absent when it was not. This kind of misdiagnosis is not at issue with the sophisticated monitoring available today.

Nevertheless, it is recognized that in some small percentage of dying individuals, auto-resuscitation may occur and spontaneous cardio-pulmonary activity may return after a period of documented apnea and, in rare cases, cardiac standstill. All would agree that it is important to delay a declaration of death until such time as auto-resuscitation is not possible. There is disagreement, however, about the length of time necessary to exclude the possibility of auto-resuscitation.

The term “Lazarus Phenomenon” is used in the medical literature to refer to two different phenomena. One is a phenomenon in which a dying person appears to stiffen and sit up, usually just before death. This is an ante-mortem finding and not germane to our discussion. The other use of the term refers to auto-resuscitation of the kind mentioned above. A recent review of all reported cases of delayed return of spontaneous circulation (ROSC)⁴⁸ mentioned times up to 20 minutes and several instances between 10 and 20 minutes.⁴⁹ It should be noted, however, that the Adhlyaman article deals with ROSC following cessation of (failed) CPR with advanced life support, and suggests physiologic mechanisms by which ROSC could occur as late as 20 minutes after discontinuation of CPR. In the situation of a dying patient for whom there has not been, nor will there be, any attempt at CPR, most medical authorities say that auto-resuscitation has not occurred after 2 minutes, and according to the guidelines of the Institute of Medicine, never beyond five minutes.⁵⁰ In a recent report on heart transplantation in infants, the waiting time was shortened to 1.25 minutes on the grounds that auto-resuscitation had never occurred beyond that

47. M.T. Hilkhot Eivel 4:5

48. Adhlyaman, V, Adhlyaman, S, Sundaram, R, The Lazarus Phenomenon, J R Soc Med 2007; 100:552-557

49. Rady and his co workers, Rady, MY, Verheijde, JL, McGregor, J, *Organ Donation after circulatory death: the forgotten donor?* Critical Care 2006; 10:166-169, cite the findings in the Adhlyaman article to challenge the idea that declaring death after five minutes does not violate the dead donor rule. See also Verheijde, JL, Rady, MY, McGregor, J, *Recovery of transplantable organs after cardiac or circulatory death: transforming; the paradigm for the ethics of organ donation*, Philos Ethics Humanit Med 2007; 2:8 where the authors make the claim that although loss of blood flow to the brain for 4-6 minutes damages the cerebral cortex permanently, it takes 10-15 minutes without blood flow for the entire brain including brainstem to cease functioning.

50. Institute of Medicine, *Non-Heart-Beating Organ Transplantation: Medical and Ethical Issues in Procurement*, Washington, DC, National Academy Press, 1997.

time.⁵¹

Establishing the Moment of Death

In his book, Jewish Medical Ethics⁵² published in 1959, Rabbi Immanuel Jakobowitz states in a section on Ascertaining the Moment of Death:

Religious Literature has devoted much attention to the problem of ascertaining the exact moment of death. In Judaism, however, unlike Christianity, this problem has little or no purely religious significance, since there are no sacramental rites to be accorded to the dying prior to the soul's final departure from the body. From the ritual point of view, the only practical distinction in Jewish law between a live and a dead body concerns the rules of defilement [of a priest]...the treatment of the body in preparation for its burial may be commenced almost as soon as life appears to be extinct; only the momentary instant of the "departure of the soul" must be allowed to pass undisturbed (Y.D., *cccxxxix.I*), lest the body was then merely in a swoon.⁵³

Prior to the days of cardio-pulmonary resuscitation, artificial respirators, and organ donation, there was no mention of the notion of irreversibility in relation to the declaration of death. The only "waiting" required was to be sure that the diagnosis was not in error. What has changed in the last half century is the need to contextualize the medical tests or findings that determine whether the criteria for declaration of death have been met. A person on cardio-pulmonary bypass during open heart surgery, whose lungs are not oxygenating his blood, and in whom cardiac standstill has been induced to allow the surgeons to operate on it, is clearly not dead. Even if her heart and lungs had been removed from her body altogether in preparation to receive a transplant, no one would declare such a person dead. A person, a portion of whose brain stem has ceased to function, who requires permanent use of a ventilator, and who would fail an apnea test if it were administered, but is conscious, is not dead. Nor is a person who suffers a cardio-pulmonary arrest and is successfully resuscitated considered to have been brought back from the dead.

The key question for us then is: In the case of a patient who is to be taken off life support and allowed to die, in whom resuscitative efforts have been categorically ruled out, when can we say that the criteria for declaration of death have been met? Our goal is threefold: (1) We do not want to declare dead someone who may spontaneously show signs of life. (2) The same criteria for declaration of death should apply regardless of one's status as an organ donor. (3) The criteria for declaration of death, when it occurs in the context of organ donation, must be and must appear to be, to professionals and to society at large, legitimate, transparent, and consistent with both their moral sense and their common sense.

Professor Avraham Steinberg in a discussion of Jewish perspectives on establishing the moment

51. Boucek, MM, Mashburn, C, Dunn, SM, et al., *Pediatric Heart Transplantation after Declaration of Cardiocirculatory Death*, NEJM 2008; 359(7):709-714

52. Jakobovitz, I, *Jewish Medical Ethics*, New York, Bloch Publishing Company, 1959.

53. *Ibid* pp. 127-128

of death, wrote:

מבחינת ההלכה ברור, שקיים רגע שבו האדם מוגדר כמת, אף על פי שחלק מאבריו ורקמותיו עדיין חיים, אלא שנחלקו הפוסקים בימינו בקביעת האיבר או התפקוד שהעדרו המוחלט הוא הקובע את רגע המוות מבחינה הלכתית. יש הסבורים, שהפסקת פעילת הלב היא הסימן ההכרחי לקביעת המוות, וכל עוד פועם ליבו של אדם הוא מוגדר כחיי גמור; יש מי שסבור, שהפסקת פעילת מחזור הדם הוא הסימן למוות; יש מי שסבור, שעצם הרס המוח כולו, על כל תאיו ומרכיביו, הוא הסימן למוות, גם כאשר הלב עדיין פועם; ויש הסבורים, שהפסקת הנשימה בצורה מוחלטת ובלתי-הפיכה היא הגדרת המוות, אף שהלב עדיין פועם, כשההוכחה הרפואית למצב זה היא הרס המוח, ובעיקר גזע המוחת אבל הסימן ההלכתי למוות הוא היעדר מוחלט ובלתי הפיך של נשימה עצמונית.⁵⁴

In Jewish law, it is clear that there is a moment when death is established even though some body cells and tissues may still be alive. The disagreements among the modern rabbinic decisors relate to the establishment of the organ or function which determines that moment: Some Rabbis rule that a person is considered halakhically dead only after the irreversible cessation of both respiration and heartbeat, i.e., “cardiac death”. One Rabbi rules that the brain is the organ which determines life and death. Therefore, complete destruction of the brain, including all its cells and components, is the definitive sign of death. Indeed, rabbinic sources speak of mortal injuries to the brain causing a person’s death. Other Rabbis assert that the halakhic definition of death is the moment when spontaneous respiration absolutely and irreversibly ceases, even if the heart is still beating. This view opines that the Torah and talmudic Sages define life and death to depend on the function of breathing. However, since respiratory arrest in some circumstances is reversible, *halakhah* requires that the cessation of respiration be irreversible and is so determined according to the best medical knowledge of each era. Nowadays, the irreversibility can be established by the cessation of cardiac function or by the absolute cessation of function of the brainstem. Some Rabbis consider brainstem death to be the equivalent of physiologic decapitation, which is an acceptable halakhic definition of death. Other Rabbis consider brainstem death as the halakhic definition of death because the cessation of spontaneous respiration is irreversible.⁵⁵

Note that regarding irreversibility of cessation of respirations, he states that it is confirmed by cessation of either cardiac or brainstem function. Recall that the mechanism by which cessation of cardiac activity results in irreversible cessation of spontaneous respirations is by depriving the brain stem of oxygenated blood, leading to the death of those cells. The reason the alternative criterion (brain stem death *per se*) is included is to cover the beating-heart scenario. To state his position more succinctly, cessation of spontaneous respirations may be considered irreversible [and the person dead] when it is seen in association with absent cardiac activity or when it is seen in association with absence of function of the entire brain. Note also that this formulation

54. שטינברג, א, קביעת רגע המוות - סקירת עמדות, אסיא נג-נד, עמ' 16-5, 1994.

55. Steinberg, A, Organ transplantation and Definition of the Moment of Death – Jewish Perspectives, www.medethics.org.il

accords with the UDDA which stipulates two criteria, either of which may be used to declare death.

With respect to irreversibility, Dubois⁵⁶ notes a “disagreement over how to understand the concept of *irreversibility*” (emphasis in text) and asks “Does irreversibility mean that the loss of function cannot be reversed in all possible worlds, that it cannot be reversed here and now, or that it will not auto-reverse?”⁵⁷ The Pittsburgh protocol, which requires waiting two minutes following cessation of cardio-respiratory function before declaring death fulfills the third criterion, that it will not auto-reverse, and the recommendation of the Institute of Medicine that the waiting period be five minutes virtually guarantees the same.⁵⁸ Waiting a longer time could satisfy the second criterion as well, that cardio-respiratory cannot be restored here and now, but it is not clear what that length of time would be. Dubois states that “although there are no fixed criteria, declarations of death using CR criteria typically wait for fifteen minutes or more of cardiac arrest and apnea before *retroactively* (emphasis mine) assigning a time of death. For this reason, it is usually safe to assume that patients are brain dead at the time death is certified using CR criteria.”⁵⁹ The problem with this is twofold: first, there is no way of knowing with certainty that any given individual cannot be resuscitated unless one attempts resuscitation;⁶⁰ and second, the longer one waits the less likely will be the success of the transplant.

Dubois conceptualized the irreversibility of death as follows:

In this context, it is important to note that irreversibility is neither an event nor a process, but a characteristic of a state...To what does the debate over irreversibility pertain? I suggest that it pertains neither to death as a state nor death as an occurrence, but to when death should be declared. Whether the *state*

56. DuBois, JM, Non-Heart-Beating Organ Donation: A Defense of the Required Determination of Death, *J Law Medicine & Ethics* 1999; 27:126-136

57. He cites the opinion of David Cole (*Statutory Definitions of Death and the Management of Terminally Ill Patients Who May Become Organ Donors After Death*, *Kennedy Institute of Ethics Journal*, 3 (1993): 157-66 at 164) that irreversibility is not part of the ordinary concept of death, a view that I believe is outside any halakhic parameters for declaration of death; and the opinion of Tom Tomlinson (*The Irreversibility of Death: Reply to Cole*, *Kennedy Institute of Ethics Journal*, 3 (1993):157-66 at 164) that irreversibility is part of the ordinary concept of death, and that CR criteria for determining death satisfy the requirements of an *ethical* determination of irreversibility (and hence of death), but not for a determination of *ontologic* death. He further notes that “both defend the Pittsburgh protocol’s criteria for death, but express concerns that the donors will not be brain dead.” *Ibid.*, page 133, note 9.

58. I was privileged to have a conversation with Dr. Brack Hattler, former Katherine DuRoss Ford Chair of Cardiothoracic Transplantation at the University of Pittsburgh Medical Center, in July 2008 shortly before his death, in preparation of this *teshuvah*. He said that despite the “official” wording of the Pittsburgh protocol, they now wait five minutes before declaring death in DCD situations. He further told me that such cases account for less than 5% of the cadaver transplants at Pittsburgh, and although there had been some heart and lung transplants in the past from non-heart-beating donors, there had been none in the past two years.

59. *Ibid.* at note 4.

60. In 1999, a 29 year old physician fell while skiing down a waterfall gully and was rescued 90 minutes later. All reports say that when she arrived at the hospital she was “clinically dead,” but she was successfully resuscitated. To be sure the cold temperature enabled her survival, but prior to this case, most authorities would have said survival was impossible. See www.expeditionmedicine.co.uk/newsletter_july08.php, and www.lifesaving.com/spotlight/rescues/spotlight19.htm.

of death is irreversible is irrelevant to whether death has *occurred*. It is also irrelevant to whether one is *in* the state of death. A state is irreversible only when it becomes permanent, but a person may well be in a given state before it becomes permanent.

If one can be in a state of death before this state becomes permanent, important things follow for organ procurement. Whether or not the irreversibility criterion for legally determining death is met, if a patient is in the state of death, organ procurement can no longer cause death. If death has occurred, it can no longer be caused. In such a scenario, one at most causes the state of death to be medically irreversible a few minutes sooner than would otherwise happen. However, because these donors have chosen not to be resuscitated, they are already in a morally and legally irreversible state of death: assuming that the do-not-resuscitate order is legitimate, it would be immoral and illegal to reanimate these patients. Moreover, if the data by Michael DeVita are correct, by waiting two minutes, we can be confident that the state of death is also naturally irreversible, that is, that the body will not reanimate.⁶¹

Does this formulation accord with halakhic reasoning? As to death not being a momentary occurrence, Rabbi Herschel Schachter⁶² quotes Rabbi Moshe Feinstein as follows:

ומעתה י"ל עפ"י מש"כ באגר"מ (ח"מ ח"א ס"א, ה"ל) דענין גוסס גדרו - שכבר התחיל בו שעת המיתה, כלומר, דהמיתה לא חלה ברגע אחד, אלא שנמשך לאיזה שיהיו זמן...אזי שפיר י"ל שכבר הותחל שעת המיתה, ודינו אז כגוסס.⁶³

Therefore we may say, according to what is written in Igrot Moshe, that in the matter of the *goseis*, that the time of death has already begun, that is to say, that death does not occur in a single instant, but that it lasts over some time...and it would be preferable to say that since the process of dying has begun, the laws of the *goseis* apply.

Now if the law of the *goseis* applies to the individual who has been taken off life support, it would not only be illegal (by secular law) and immoral to attempt any resuscitation once cardio-respiratory function ceased; it would be a violation of *halakhah* as well. This statement should in no way be taken to suggest that CPR is forbidden in cases of (unexpected) cardiac arrest. The mitzvah of *pikuah nefesh* remains paramount and when there is even a remote chance of successful resuscitation and return to a healthy state, it certainly ought to be attempted. Rather in the present context, in which a decision has been made to remove life support and allow a person to die, the dying process should be allowed to proceed unimpeded and without interference. When this person's heart stops beating and he stops breathing, it is not an sudden, unexpected cardiac arrest which requires treatment, but a sign that the person is now dead. If the codes regarding the *goseis* permit us to remove an impediment to the dying process, the corollary

61. Dubois, op cit. p. 130. See also DeVita, MA, *The Death Watch: Certifying Death using Cardiac Criteria*, Progress in Transplantation 2001; 11(1):58-66

62. בדיני מת וגברא קטילא.

63. Here he refers to Maimonides' Commentary on the Mishna: Ohalot 1:46: "הנאבק בתהליך שהגוסס הוא אדם המות". The *goseis* is a person who is caught in the process of death.

is that we are prohibited from introducing the same. As to death being a state, Shachter quotes Rabbi Hershkowitz citing Maimonides:

ובפשוטו ה' נראים דברי מהרי"ץ חיות שהוכיח מדברי הרמב"ם במו"נ (ח"א פרק מ"ב) שאין אי-נשימה הקובע את ענין המות, אלא שבדרך כלל משמש זה כסימן וכהוכחה לדבר שקיים מצב של מות...

It is clear from the words of the Maharitz Hayyot who supported it from the words of Maimonides (Guide to the Perplexed Part 1:42) that absence of respiration is not what establishes death, but rather it is generally a sign and a proof that a state of death exists.

Even if we accept the notion that death is a state, we are still left with the question of irreversibility. Rabbi Breitowitz⁶⁴ maintains that DCD is halachically prohibited on two grounds: first, that the removal of life support from a non-brain dead patient may be an act of murder. As stated above, this issue has been dealt with at length in other writing and is not readdressed in this paper. This entire *teshuvah* is based on the premise that in certain patients it is permissible to terminate use of a ventilator even if they do not meet the criteria of brain death.

His second objection relates to the question of irreversibility:

Second, even if one concedes that withdrawal or discontinuation of life-support may be *halachically* (viz.) sanctioned as an “omission” rather than an affirmative act of murder, the removal of organs within two minutes of disconnection would in itself be an act of murder. Cessation of respiration and heartbeat constitutes “death” only when the cessation is irreversible. If the patient is capable of having breathing and heartbeat restored, the patient is not dead even during the time he is not breathing. Since within two minutes there is still the possibility, albeit remote, of auto-resuscitation (and certainly reconnection to life-support), and within that time the brainstem has not yet been destroyed, removal of the organs might actually be an overt act of homicide even according to those who regard brain-stem death as death.

The most glaring problem with this formulation is that no one advocates removing organs within two minutes of disconnecting the respirator. The waiting time begins with the cessation of heartbeat and respiration, and all the medical data indicate that waiting five minutes eliminates the possibility of auto-resuscitation. Whether or not resuscitation would be possible in any given patient by reconnecting the respirator at that point is unknown and unknowable. Furthermore, I contend that in the situation at hand, any attempt at resuscitation is halachically prohibited. The well known story of Rabbi's maid (B Ketubot 104a) is often cited in discussions of end of life care. It should be noted that once the disciples had momentarily stopped their prayers, which according to the narrative were keeping Rabbi alive, they did not resume them once he had died.

With regard to cardio-pulmonary resuscitation (CPR), one can never say with absolute certainty

64. Breitowitz, YA, *What Does Halachah Say About Organ Donation?*, Jewish Action 2003;

that a given patient could or could not be revived with CPR. In medicine, almost nothing is certain, there are only degrees of probability. Therefore, even if one were to wait until the likelihood of successful CPR were extremely remote, one could not say with absolute certainty that this particular patient could not be resuscitated, other than attempting CPR unsuccessfully. In the patients under discussion, the likelihood of CPR being successful is close to zero. I believe that once cardiac and respiratory activity have ceased for a long enough period that they will not restart spontaneously, that person is dead. But even those who would not recognize patients as dead if CPR likely would restore heartbeat should agree that these patients are dead.

Rabbi Avram Reisner, in *A Halakhic Ethic of Care for the Terminally Ill*, makes the case strongly regarding the appropriateness, or lack thereof, of CPR. Although he is dealing with the case of an individual who suffers a second cardiac arrest following successful resuscitation after a sudden and unexpected cardiac arrest, his reasoning is germane to the case we are dealing with. He writes:

However, subsequent attempts at resuscitation, after it has been determined that no unsupported life is possible, are clearly unnecessary. (Here we refer to a patient who is maintained on a respirator after cardiac arrest and resuscitation, for whom the determination is made that no treatment is possible and the respirator is removed as an impediment to imminent death. When the cardiac arrest ensues it is part of the dying process. CPR intervention will simply prolong that death)...The patient in cardiac arrest presents a figure that is dead by standard legal criteria. Our obligation to heal extends to the ill, but does not extend to reviving those of whom it may definitely be said that dying has set in.⁶⁵

Rabbi Reisner goes on to say, “Halakha has as its established criterion of death: the cessation of breathing and heartbeat, *viz.* respiration and circulation (*Yoma* 85a)...modern advances in resuscitation techniques have rendered the cessation of respiration and heartbeat no longer the final word. This does not affect the definition of death--thus, for instance, a patient in whom resuscitation efforts fail is considered to have died at the original cessation of heartbeat...”⁶⁶

I would suggest, therefore, that in the case of DCD, in which auto-resuscitation is deemed impossible, and external resuscitation, the success of which is unknown and at best extremely unlikely, and more importantly, which is legally, morally, and halakhically indefensible, that such a person may be declared dead. It must be stressed here, however, that the declaration of death on the basis of cardio-respiratory criteria is and must be contextual. In the case cited in Fn 57, for example, in which a woman was rescued, pulseless and apneic, from freezing water after 90 minutes, she was well past the time when auto-resuscitation could occur, but because CPR was attempted and was ultimately successful, no physician would have declared her dead. Similarly, a man who suffers a cardiac arrest on a golf course and is subsequently resuscitated, even if the CPR occurred at a time when there was no possibility of auto-resuscitation, would not be declared dead. Conversely, a patient dying of cancer, for whom attempted resuscitation had been ruled out (DNAR), would be declared dead immediately upon cessation of cardiac and

65. Reisner, *op. cit.* p. 28.

66. *Ibid.*, p. 51.

respiratory activity. The waiting period of 2-5 minutes in the case of organ donation serves primarily as a *s'yag*, reassuring family, medical team, and society that there has been no rush to declare the person dead in order to transplant their organs. Surrogate decision makers have standing to consent to organ donation in the case of DCD, just as they do in the cases of so-called brain death, according to the principle of *zakhin lo la'adam shelo befanav*, that is, it is assumed that whether the decision is the donor's or the surrogate's, both would want the *hiyyuv* of post-mortem organ donation to be carried out in a way that was most likely to assure success of the transplant. After death has been declared, assuming that appropriate consent has been given for donation, the donor's organs may be removed and transplanted into a suitable recipient.

Heart Transplantation in DCD Situation

In August, 2008, Boucek and his co-workers at the Denver Children's Hospital published a series of three cases of heart transplantation in infants in which death of the donor had been declared on the basis of cardiocirculatory criteria.⁶⁷ At the time of publication, this was considered controversial enough that the editors of the *New England Journal of Medicine* took the unusual step of having four bioethicists comment on the article in the same issue of the *Journal*.⁶⁸ The first patient in the series, was declared dead and the heart removed after three minutes of asystole, and in the other two donors after 1.25 minutes (75 seconds) of asystole. Yet for the bioethicists who responded to this article, their primary cause of concern was related not to the waiting time but to the fact that the transplanted organ was the heart. DCD protocols have typically been used for transplantation of organs other than the heart, such as kidney and liver, but had not previously been applied in cases of heart transplantation.

This raised the question for some as to whether the criterion of irreversible cessation of cardiac function could be applied when the heart would subsequently be restarted in the recipient. James Bernat asks but does not answer the question: "Does the fact that a donor's heart is restarted in another patient prove that circulatory cessation was not irreversible? Or should the requirement of irreversibility be restricted to the circulation within the donor?"⁶⁹ Robert Veatch states: "Calling such a heart [which will not autoresuscitate] 'irreversibly stopped' may be defensible if no attempt will be made to restart the heart. However, one cannot say a heart is irreversibly stopped if, in fact, it will be restarted."⁷⁰

For our purposes, this question has been addressed by Rabbi Reisner in his teshuvah "A Halakhic Ethic of Care for the Terminally Ill."⁷¹ He wrote: "What constitutes natural death? The cessation of the integrated functioning of an organism due to natural causes." He was basing his opinion of Capron and Kass:

67. Boucek, MM, Mashburn, C, Dunn, SM, et al., *Pediatric Heart Transplantation after Declaration of Cardiocirculatory Death*, *NEJM* 2008; 359(7):709-714

68. See Bernat, JL, *The Boundaries of Organ Donation after Circulatory Death*, *NEJM* 2008; 359(7):669-671; Truog, RD, and Miller, FG, *The Dead Donor Rule and Organ Transplantation*, *NEJM* 2008;359(7):674-675; and Veatch, RM, *Donating Hearts after Cardiac Death—Reversing the Irreversible*, *NEJM* 2008; 359(7):672-673

69. *Ibid.*

70. Veatch, *op. cit.*, pp. 672, 673

71. Reisner, *op. cit.*, p. 20 and fn 28.

Life is supported by the smooth and integrated function of three principal systems: circulatory, respiratory, and nervous...So long as the integrated function of these systems continues, the individual lives. If any one of them ceases to function, failure of the other two will shortly follow, and the organism dies. Thus death came to be equated with the absence of these two “vital signs,” although what was being detected was really the permanent cessation of the integrated functioning of the circulatory, respiratory, and nervous systems.⁷²

Thus the cessation of cardio-circulatory function for a sufficient length of time that it will not restart spontaneously is a sign that integrated function of the individual has ceased irreversibly and that person has died. We are concerned with the death of the organ donor not the death of the organ. Whether the heart resumes function in a recipient has no bearing on the fact that the donor was dead at the time the heart and other organs were removed.

A second area of concern regarding these three cases was the abbreviated length of time between the cessation of circulation and removal of the organs in two of the cases. Bernat, in his commentary, notes that Boucek and his co-workers shortened the waiting time in one of their cases to 75 seconds based on the fact that “autoresuscitation has never been reported after 65 seconds of asystole.”⁷³ Nevertheless, he says, that although the minimum duration of asystole which ensures that autoresuscitation will not occur is an empirical question, the recommended duration of asystole required for donation after circulatory death should be determined by scientific and public policy considerations.⁷⁴

In a recent survey of Children’s Hospitals,⁷⁵ it was found that although the majority had or were developing policies for organ donation after cardiac death, this was not universal. Moreover there was wide variation among hospitals with regard to several issues including waiting period, with four of the institutions having times between cessation of circulation and removal of organs outside the Institute of Medicine recommendation of 2 to 5 minutes.⁷⁶ As stated above, the criteria for establishing death must be and must appear to be legitimate. The time recommended by the IOM accomplishes this.⁷⁷

Conclusion

Protocols for Organ Donation following declaration of death by cardio-respiratory criteria (controlled non-heart-beating donation) are halakhicly permissible provided that:

1. All ante-mortem interventions are deemed by the treating physician not to hasten or cause the death of the donor.

72. Capron, AM and Kass, LR, “A Statutory Definition for the Standards of Determining Death,” *Law Review* 87 (1972) pp. 87-89, 100-118, cited in Reisner.

73. Bernat, *op. cit.*, p. 671

74. *Ibid.*

75. Antommaria, AHM, Trotochaud, K, Kinlaw, K, Hopkins, PN, and Frader, J, *Policies on Donation After Cardiac Death at Children’s Hospitals*, JAMA 2009, 301(18):1902-1908

76. Three had waiting times under 2 minutes and one had a waiting time over 5 minutes.

77. In a telephone conversation with Dr. Boucek, he told me that his team has changed their waiting requirement to a minimum of two minutes, in line with IOM recommendations, in order to obtain the support of the medical staff in the Pediatric ICU and the willingness of potential donors to donate.

2. Following cessation of respirations and cardiac activity, a sufficient waiting time, as defined by current medical standards, is observed prior to removal of organs for transplantation which, according to medical science, renders autoresuscitation impossible and the success of external resuscitation extremely unlikely. The currently accepted waiting time is between two and five minutes.
3. The treating physicians prior to the declaration of death and the physicians certifying death not be members of the transplant team.
4. The donor or his/her surrogate has given informed consent for donation including any ante-mortem interventions.
5. Standards of end-of-life care, including relief of discomfort for the patient, and sensitivity to the family's need for comfort and closure be observed.
6. *Kibbud Ha-met*, treating the deceased with respect, be observed in all respects following donation.
7. Organs be removed only if they have a significant likelihood of survival in the recipient.

If these conditions are met,⁷⁸ a person may direct that his or her organs be used for transplantation; a surrogate may give permission for retrieval of organs from the deceased; physicians may render care before death according to these protocols, declare death by CR criteria, and remove organs for transplantation.

78. Patients or surrogates may rely on the fact that these conditions are standard in virtually all transplant center DCD protocols. I have included them for completeness and so that anyone who wishes to may question the transplant team directly about them.

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