

Rabbi Bleich's *Review of Halakhic Periodical Literature* is a regular feature of *Tradition*.

## OF CEREBRAL, RESPIRATORY AND CARDIAC DEATH

The conflict between authentic Jewish teaching and societal espousal of so-called "brain death" criteria involves no scientific or factual controversy whatsoever. It does involve disparate views regarding the sanctity of human life, regardless of its quality, and conflicting perceptions of duties owed to the moribund patient.

Judaism regards every life as being endowed with infinite value; Judaism also regards every moment of life, regardless of its quality, as endowed with infinite value. Until all vital forces ebb from the body, as evidenced by total cessation of both respiratory and cardiac activity, human life must be treasured as a sacred gift. The adamancy of halakhic authorities in their refusal to accept "brain death" criteria is not at all an instance of other-worldly patriarchal figures refusing to acknowledge demonstrable scientific verities; it is entirely a matter of insistence upon the sanctity of every moment of human life.

Definitions, by their very nature, are tautologies. A definition of death cannot be derived from medical facts or scientific investigations alone. The physician is eminently qualified to describe the physiological state which he observes. But he can do no more than report his clinical observations. The physician may be called upon to determine whether medical science can, or cannot, be of further aid in maintaining or restoring vital functions. But, when such measures are potentially efficacious in any clinical sense, the question of whether a medical remedy or life-support system should actually be employed on behalf of any given patient involves a value judgment rather than a scientific decision. Similarly, the question of whether a human organism in any particular physiological state is to be regarded as a living person, and hence a deserving beneficiary of medical ministrations, or as a corpse which may be medically abandoned with moral equanimity, is an ethical, religious and legal

question, not a medical one. Accordingly, advances in medical diagnostic techniques, extremely valuable as they certainly are in determining the precise physiological state of the patient and in formulating a prognosis for cure or the absence thereof, can have no bearing upon Jewish teaching with regard to the duties owed a patient in any given physiological state.

The term "death" is descriptive rather than prescriptive; hence its use is entirely a matter of convention. Were there a common consensus to that effect, the term might be withheld until the onset of *rigor mortis*, or it might be extended to include a patient in a terminal coma or swoon.<sup>1</sup> Nevertheless, descriptive application of the term has come to portend extinction of duties of care and preservation of any remaining vital functions. Accordingly, for emotional and associative reasons, ascription of death to a human organism is, in common parlance, not simply description of a particular physical state but also a principled judgment regarding how the organism is to be treated. Pronouncement of death signals, *inter alia*, a call to the *hevra kaddisha* or undertaker, imminent commencement of mourning, notice to heirs that they may succeed to the decedent's estate and a declaration of spousal capacity to contract a new marriage. Those matters are moral, legal and halakhic in nature, not medical. It is perfectly possible to conceive of moral or legal systems in which such matters must abide decomposition of the body, the onset of putrefaction, or *rigor mortis*. Rastafararians do demand the presence of such criteria before permitting interment of the corpse. The requirement imposed by statute in many European jurisdictions as recently as a century ago for the lapse of a seventy-two hour waiting period before burial effectively served to incorporate putrefaction among the criteria required for treating a person as a corpse. Common law, paralleling precisely the provisions of Halakhah, defined death as "total stoppage of the circulation of the blood and a cessation of the animal and vital functions consequent thereupon, such as respiration, pulsation, etc."<sup>2</sup> Absence of evidence of neurological activity in the brain is now the legal definition of death in a significant majority of states. Many physicians and ethicists advocate further reformation of the definition of death so that a nonsapient patient in a permanent vegetative state may be pronounced dead. These conflicting positions involve no factual dispute whatsoever; the controversy is entirely with regard to value judgments and/or received traditions.

A person unfamiliar with the extensive rabbinic literature concerning this topic may well ask whether Judaism cannot accommodate a neurological definition of death. Support for such a position might be adduced from a superficial reading of the Mishnah, *Oholot* 1:6: "And likewise cattle and wild beasts . . . if their heads

have been severed, they are unclean [as carrion] even if they move convulsively like the tail of a newt (or lizard) that twitches spasmodically [after being severed from the body].”<sup>3</sup> Destruction of tissue as the result of liquefaction, it may be argued, is tantamount to severance or excision of such tissue. Consequently, there is indeed a measure of cogency in the argument that total liquefaction of brain tissue is tantamount to physiological decapitation.<sup>4</sup>

Decapitation, however, involves physical severance of the entire brain from the body. Physiological decapitation, then, must also be defined as physiological destruction of the entire brain. That phenomenon has simply never been observed. To be sure, autopsies performed on patients pronounced dead on the basis of neurological criteria reveal that the brain has become a spongy, liquidy mass. In colloquial medical parlance this phenomenon is categorized as “respirator brain” because the condition is found in patients sustained on a respirator for a lengthy period of time and is the result of lysis or liquefaction of the brain. However, total lysis apparently does not occur in such patients; only a portion of the brain turns to liquid. It is indeed the case that tissue degeneration resulting in lysis is progressive in nature and consequently it might be assumed that at some point the entire brain will liquify. Nevertheless, that phenomenon is not present at the time “brain death” criteria become manifest. There is no diagnostic method for determining when total lysis has occurred, nor has total lysis ever been observed upon autopsy. Although the neurological causes are obscure, there is strong reason to believe that cardiac activity ceases long before total lysis could possibly occur. Systemic death, including cardiac arrest, virtually always follows no later than two to ten days subsequent to manifestation of brain death criteria.<sup>5</sup> For reasons not fully understood by medical science, life, as conventionally defined, cannot long continue after brain function has been so seriously compromised.<sup>6</sup> Thus, “brain death,” although not synonymous with death itself, is a harbinger of impending death.

The foregoing description of the physical state of the brain at the time of “brain death” is freely conceded by medical advocates of adoption of brain death criteria. Research scientists who support acceptance of neurological criteria for pronouncement of death argue, not that those neurological criteria establish that brain tissue has been destroyed, but that those criteria serve to establish that the brain has ceased to function and hence, although physically the brain remains intact, irreversible lack of functionality should be equated with excision or “death” of that organ. Thus it is not physical destruction of the brain but the physiological dysfunction of the organ that is equated with decapitation.

For halakhic purposes, dysfunction of an organ is not the equivalent of its destruction or excision. A male whose testes have been removed is forbidden to cohabit with a Jewess of legitimate birth; a person whose testes remain intact but have been rendered dysfunctional suffers no such liability. Similarly, an animal whose liver has been removed is a *treifah* and its meat is forbidden; the meat of an animal whose liver performs no physiological function is permissible. Excision is defined as removal, either as a result of trauma or surgical procedure. Alternatively, it is defined as degeneration of tissue either through necrosis to the degree that it becomes either "tissue which crumbles in the finger" (*basar she-nifrahk be-tsiporen*)<sup>7</sup> or through "decay" to the degree that it becomes "tissue which a physician scrapes away" (*basar she-ha-rofeh gorero*),<sup>8</sup> e.g., gangrenous tissue.<sup>9</sup> The brain tissue of a patient pronounced dead on the basis of neurological criteria does not match, or even approximate, these levels of degeneration.<sup>10</sup>

Moreover, as a rejection of currently accepted criteria of "brain death," the foregoing is superfluous, indeed a form of "overkill." Currently accepted neurological criteria of death, singly or in combination, demonstrate only that specific neurological activities have ceased. For example, absence of elicitable reflexes confirms just that phenomenon and nothing more; absence of reflex activity does not demonstrate that all electrical activity has ceased. Even a flat EEG—which is not regarded as an absolute requirement for establishing brain death—demonstrates only the absence of elicitable brain waves; it does not rule out the possible presence of electrical activity below the sensitivity threshold of the apparatus. A British physician has candidly stated that "in the usual clinical context of brain death there is no certain way of ascertaining (other than by angiographic inference) that major areas of the brain such as the cerebellum, the basal ganglia, or the thalami, have irreversibly ceased to function."<sup>11</sup> Other medical researchers report that hypothalamic-pituitary function is maintained after the diagnosis of "brain stem death."<sup>12</sup> "Brain Death" criteria do not suffice for the diagnosis of permanent and irreversible cessation of all function of the brain stem. But most significantly, total neurological dysfunction is entirely compatible with continued cellular metabolism; unless metabolism has ceased the tissue perforce remains alive.

Theoretically, blood flow studies and radioisotope scanning might be employed to show that perfusion of the brain has ceased. Cellular decay of the neural tissue of the brain does indeed commence upon cessation of blood flow. Nevertheless, such techniques are inadequate for determining death in a manner consistent with halakhic requirements for a number of reasons:

1. Although cellular decay of the brain does commence upon cessation of circulation of the blood, an indeterminate period of time is required for decay of the brain to become complete. Cessation of the flow of blood to the brain cannot in itself be equated with total cellular destruction of the brain. At present, there is no scientific method that serves to establish how much time must elapse following cessation of perfusion for total cellular decay to result. Moreover, as earlier indicated, it is entirely likely that, physiologically, cardiac activity must cease well before this phenomenon could possibly occur.

2. These techniques, in their current state of refinement, simply do not demonstrate that even perfusion of the brain has totally ceased. Investigators responsible for the development of these techniques claim only that such methods may be used to indicate cessation of circulation to the cerebrum, which is the seat of the so-called "higher functions" of the human organism. They are careful to describe the phenomena which they report as "cerebral death" rather than as "brain death."<sup>13</sup> These phenomena are entirely compatible with some degree of continued circulation and perfusion of the medulla and the brain stem. In fact, in the original studies, radioisotope techniques did not demonstrate total cessation of circulation to the cerebrum, but only that affected circulation had decreased below the level necessary to retain its integrity. The scanning methods employed in those studies did not indicate that all circulation to even a part of the brain, i.e., the cerebrum, had been interrupted, but only that the rate of flow is below that necessary to maintain functional integrity. Thus, in a summary of findings which form part of one of such studies, these techniques are described as "indicative of significant circulatory *deficit* to the cerebrum."<sup>14</sup> Those studies indicated the presence of up to approximately 24% of normal predicated blood flow.<sup>15</sup> More recently another researcher has claimed that the isotope angiography which he employed is capable of showing termination of carotid circulation at the base of the skull,<sup>16</sup> but at the same time he frankly concedes that posterior circulation may continue with the result that "persistent perfusion and survival of the brain stem" remains a distinct possibility.<sup>17</sup> Another study involving a small number of pediatric patients utilized both the isotope bolus technique and cerebral angiography and somewhat surprisingly demonstrated persistent EEG activity despite negative blood flow studies.<sup>18</sup> The authors of that study candidly acknowledge that some circulation, either supplied by the external carotid system or in the form of limited cerebral perfusion, must have been present albeit undetected by blood flow studies.<sup>19</sup> Yet another recent study reports that spontaneous respiration was observed in

two patients in whom cerebral blood flow studies demonstrated no cerebral perfusion.<sup>20</sup> That finding is truly remarkable and demonstrates the inherent compatibility of negative blood flow studies with even the classic indicator of life.<sup>21</sup>

Moreover, it must be emphasized that blood flow studies are neither a legal requirement for pronouncing a patient dead on the basis of neurological standards nor are they routinely performed as a matter of medical practice.<sup>22</sup> Other neurological criteria are even less satisfactory than blood flow tests as halakhic criteria for establishing that cellular decay of the brain has occurred. Those criteria serve to establish only irreversible cessation of neurological function in the lower regions of the brain; they do not constitute evidence that even a portion of the brain has been destroyed. *Oholot* 1:6 can, at most, be cited only to substantiate an argument that destruction of the entire brain is tantamount to death. Since radioisotope scanning techniques, even if employed, *do not* show termination of blood flow to the brain stem any discussion of the validity of "brain death" in Jewish law is rendered entirely theoretical by virtue of the fact that, at present, the requisite criteria demanded by the advocates of that position are simply not demonstrable in a clinical setting.

3. The performance of radioisotope scanning is of no therapeutic benefit to the patient. In light of the halakhic prohibition against moving even the limb of a *gosses* lest the patient's death be hastened thereby it would be difficult, to say the least, to perform such procedures upon a moribund patient without violating applicable halakhic strictures. The identical objection applies to at least some, if not most, of the various other neurological diagnostic procedures employed in pronouncing "brain death."

The term "brain death" carries with it a certain emotional cachet and appeal. In point of fact, "brain death" is a misnomer: "Brain death" criteria establish irreversible neurological dysfunction, not cessation of metabolic functions; "brain death," when confirmed by blood flow studies, represents the onset of metabolic dysfunction, not necessarily "death" of the neural tissue; "brain death," even when supported by blood flow studies, represents confirmed metabolic dysfunction of only a portion of the brain, not of the brain in its entirety. "Brain death" criteria are not designed, properly speaking, to serve as clinical criteria of death but as proposed criteria for withholding further treatment and for withdrawing life-support systems. This is recognized and acknowledged by physicians who are sensitive to the ethical issues contingent upon this distinction. In a submission to the Working Party on Donor Organs of the Royal College of Physicians, dated January 23, 1987, two British physicians, Drs. D. Wainwright Evans and David J. Hill, correctly urge

that a term such as “mortal brain damage” be substituted for “brain stem death.”

None of this is at all novel. The chairman of the Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death candidly acknowledged, “I was chairman of a recent *ad hoc* committee at Harvard composed of members of five faculties in the university who tried to define irreversible coma. We felt we could not define death, I suppose you will say that by implication we have defined it as brain death, but we do not make a point of that.”<sup>23</sup> Consistent with that view the Harvard Committee’s report setting forth clinical criteria of “brain death” was published under the title “A Definition of Irreversible Coma.”<sup>24</sup> Similarly, the statement concerning brain death issued in Great Britain by the Conference of Royal Medical Colleges in 1976 indicated that “brain stem death” is indicative of a hopeless outcome for the patient and recommended utilization of such criteria for the purpose of removing the patient from a respirator in order to allow the patient to die.<sup>25</sup> Only in 1979 did that body declare that “brain stem death” may be equated with the death of a person. In a Supplementary Statement for the R.C.P. Working Party on Donor Organs, dated January 23, 1987, Dr. David J. Hill writes, “The motives for this change are ethically questionable, as is the logic upon which it is based—[viz.,] the assumption that ‘all functions of the brain have permanently and irreversibly ceased.’ This statement is, to say the least, doubtful. . . .”

Medical scientists employ the term “brain death” even though it is a misnomer because it is a term laymen can comprehend as denoting a physiological state in which any further treatment is not only contraindicated but would be regarded as ludicrous. Introduction of the term “brain death” is a thinly veiled attempt to justify withholding of treatment under the guise of redefinition of terms. The purpose of this lexicographical exercise is to secure moral and emotional approbation for a policy that would otherwise be greeted with repugnance and even indignation. Withholding of treatment has the effect of snuffing out human life. Any *ad hoc* decision to withhold treatment from a dying relative involves a great deal of soul-searching and frequently engenders feelings of guilt. On the other hand, no one advocates medical treatment or continuation of life-support systems for a corpse. Pronouncing a person dead has the emotional effect of removing any aura of further moral responsibility. In a less than fully informed world, semantic sleight of hand may affect popular perception, but it should not be permitted to affect the universe of moral discourse.

So-called “brain death” criteria simply have no basis in Hala-khah both because the clinical conditions ostensibly posited by

employment of the term simply do not exist and because, even were those conditions to exist, they would not satisfy the halakhic criteria of death. In response to a question concerning one of the ramifications of employment of "brain death" criteria Rabbi Aaron Soloveitchik has aptly and accurately stated, "In order to answer this question I have to have recourse to my imagination. Without recourse to imagination it is impossible for me to assume even for a moment for argument's sake that the Harvard criteria conform to the halachah. . . ."26

## II

Although the halakhic inadmissability of brain death criteria is obvious, there are alternative criteria, even more liberal in nature, for which a much stronger *prima facie* case can be made. A detailed analysis of those criteria is in order because of the erroneous perception, perhaps even in the eyes of some of their advocates, that those criteria are synonymous with a brain death standard without which such procedures could not be successfully performed. Those criteria were formulated in conjunction with a decision of the Chief Rabbinic Council of the State of Israel endorsing liver transplants. In the fall of 1987 the Ministry of Health, after prolonged deliberations, granted permission to the Rambam Medical Center in Haifa to perform liver transplants. One of the issues given careful consideration in the course of those deliberations was acceptance of a brain death standard. Despite phenomenal advances in recent years in both medical science and technology, it is still not possible to perform liver or heart transplants if removal of the donor's organ is delayed until death has been pronounced on the basis of conventional criteria. Delay in removal of these organs results in tissue degeneration that renders the organ useless for transplantation purposes. In the course of those deliberations the Minister of Health turned to the Chief Rabbinic Council in order to ascertain the position of Jewish law with regard to this question. The Chief Rabbinic Council pondered the issue for a matter of months but failed to arrive at a conclusion. In the interim a new Minister of Health was appointed and permission for proceeding with the liver transplant was granted. On 1 Heshvan 5747, after the liver transplant had already been performed, the Chief Rabbinic Council announced its endorsement of so-called "brain death" criteria but stipulated a number of conditions to be followed in pronouncement of death and removal of the organs. That position was formulated in response to a request by Hadassah Hospital in Jerusalem for permission to perform a heart transplant



procedure. The decision of the Chief Rabbinate Council was published in *Tehumin*, VII (5746), 187–192. Pursuant to the announcement of that decision, many prominent and renowned rabbinic decisors issued pronouncements declaring that reliance upon brain death criteria contravenes Jewish law. Rabbinic authorities who publicly announced their opposition to adoption of brain death criteria include R. Eleazar Shach, Rosh Yeshivah of the Yeshivah of Ponevez in Bnei Brak (*Yated Ne'eman*, 12 Kislev 5747); R. Yitzchak Ya'akov Weisz, head of the *Bet Din* of Jerusalem's *Edah ha-Haredit* (*Ha-Modi'a*, 4 Heshvan 5747; *Le-Hoshevei Shemo*, Heshvan 5747; *Ha-Pardes*, Sivan 5747);<sup>27</sup> R. Yitzchak Kullitz, Chief Rabbi of Jerusalem (*Yated Ne'eman*, 23 Adar 5747); R. Eliezer Waldenberg, a retired member of the Supreme Rabbinical Court of Appeals (*Ha-Modi'a*, 4 Heshvan 5747 and 12 Heshvan 5747; *Ha-Pardes*, Kislev, Adar and Sivan 5747);<sup>28</sup> R. Nisim Karelitz, Chief Rabbi of Ramat Aharon (*Ha-Modi'a*, 22 Heshvan 5747); R. Samuel ha-Levi Wosner, Chief Rabbi of Zichron Me'ir (*Ha-Modi'a*, 22 Heshvan 5747); and R. Nathan Gestetner, author of *Teshuvot Me'orot Natan* and *Natan Piryo* (*Ha-Modi'a*, Heshvan 5747).

In addition to the decision of the Chief Rabbinate Council, dated 1 Heshvan 5747, that appeared in *Tehumin*, a further letter, dated 23 Adar 5747, together with appended clarificatory comments was subsequently circulated to rabbis in various communities. That letter has been published in *Or ha-Mizrah*, Tishri 5748. A paper prepared at the request of the Chief Rabbinate Council for use in their deliberations that addresses both the medical and halakhic aspects of this issue was prepared by Dr. Abraham Steinberg and was published in the same issue of *Or ha-Mizrah*.

Although reports in the media indicated that the Chief Rabbinate Council had endorsed brain death, a careful reading of the published materials reveals that the term "brain death" is not at all mentioned either in the original decision or in the subsequent explanatory comments drafted by that body. The reference in those documents is to "a person whose independent respiration has manifestly ceased and there is no anticipation whatsoever for its return" who, under such circumstances, is described as dead since "there is no life, nor is there a criterion of life." In their clarificatory comments the Chief Rabbinate Council declared even more explicitly, ". . . death is determined by cessation of respiration and not by destruction of the brain, destruction of the brain demonstrates that there is no independent respiration." In his article, Dr. Steinberg seeks to demonstrate that determination of death as formulated by the sages of the Talmud is dependent solely upon lack of respiration but "since there are many situations in which it is possible to restore

normal respiration it is necessary to support the determination of the sages with proof that respiration has indeed ceased forever. . . . This can be accomplished by means of demonstration of . . . destruction of the brainstem.” The clear implication of that statement is that the determining factor in establishing that death has occurred is cessation of respiration. However, cessation of respiration as an absolute indicator of death must be total and irreversible. Accordingly, since as a result of contemporary advances in medical science there are clinical conditions in which respiration may be restored it is therefore necessary to regard the patient as “possibly alive” until it has been demonstrated that the brain stem has been destroyed. Only then, according to Dr. Steinberg, is it absolutely certain that respiration cannot be restored. Thus, death is intrinsically defined as cessation of spontaneous respiration; neurological criteria serve only to substantiate and confirm the fact that respiratory death has indeed occurred. Accordingly, at the conclusion of his article, Dr. Steinberg entirely negates the opinion that “brain death” is itself an intrinsic criterion of death. Those who erroneously maintain that “brain death” constitutes a valid definition of death for purposes of Jewish law require blood flow studies in order to demonstrate that circulation to the brain has ceased because they equate absence of blood circulation to the brain with physiological decapitation. This requirement is dismissed by Dr. Steinberg as superfluous because, he asserts, it is irreversible cessation of spontaneous respiratory activity that is the determining factor and that phenomenon can be established beyond doubt on the basis of other neurological criteria.

There is little question that if irreversible cessation of respiration were regarded as the sole criterion establishing that death has occurred, the theoretical possibilities that, in some rare instances, respiration might be restored would be disregarded. The clinical symptoms of death delineated by the sages of the Talmud were known by them not to be error-proof. *Masekhet Semahot*, chapter 8, reports that at a time when interment was carried out in hollow crypts in the side of a mountain it was customary to visit the burial site intermittently for a period of days after interment lest per chance some sign of life might be evident. It is reported that on one occasion a person was found to be alive and that the individual discovered to be alive survived for a period of twenty-five years. *Teshuvot Hatam Sofer, Yoreh De'ah*, no. 338, dismisses that narrative as describing a highly improbable event that may occur “once in thousand years.” Cessation of respiration, declares *Hatam Sofer*, must be determined by “experts” and it is not only permissible but obligatory to rely upon such expert determination in order not to delay burial of the deceased. To be sure, when there is a cogent medical possibility

that respiratory arrest is reversible, e.g., when cardio-pulmonary resuscitation is medically indicated, mere absence of respiration cannot be assumed to be dispositive; otherwise no further confirmatory indicators are required.

In many clinical situations, brain death criteria are no more necessary to determine that respiratory activity has irreversibly ceased than are blood flow studies. There are many end-stage illnesses in which an absolute determination that spontaneous respiration has irreversibly ceased can be made without benefit of neurological confirmation of "death" of the brainstem. The best examples of such medical conditions are amyotrophic lateral sclerosis (Lou Gehrig's disease) and anencephalus in newborns.

The position that irreversible cessation of respiration is the sole determining factor in pronouncing death leads to a conclusion that would be dismissed by everyone as absurd. Polio, fortunately, is not the scourge that it was some years ago. But the memories of polio victims who were forced to live in iron lung machines for their survival are very vivid. If respiratory activity is regarded as the sole determining criterion of the presence of life it would follow that a polio victim who is entirely dependent upon an iron lung machine or a similar device in order to live would be regarded as dead despite the fact that such an individual is fully conscious and is indeed capable of engaging in intellectual activities requiring a high degree of cognition. Even if the polio victim's loss of respiratory activity cannot be positively diagnosed as irreversible, were respiratory activity to be accepted as the sole indicator of life, his subsequent demise would retroactively establish that death actually occurred upon loss of spontaneous respiration. The response, as might be anticipated, is that irreversible cessation of respiration is designed to be applied as the determining criterion of death only in cases in which the patient is no longer conscious. The problem, however, is not resolved thereby. Nowhere in rabbinic literature is there the slightest hint that consciousness is an indicator of life or that its absence is an indication that death has occurred. Moreover, even if that caveat is accepted, this position yields the conclusion that any nonsapient patient who has suffered irreversible respiratory arrest is dead regardless of the presence of other vital signs including cardiac activity and neurological functions as evidenced by a positive electroencephalogram.

### III

It therefore becomes necessary to examine the talmudic sources that serve as the basis for establishing a definition of death and to

examine the criteria that are delineated for use in making that determination. The primary source of this definition is found in the Gemara, *Yoma* 85a, in connection with suspension of Sabbath regulations for the sake of preservation of human life. The case in point concerns an individual trapped under the debris of a fallen building. Since desecration of the Sabbath is mandated even on the mere chance that human life may be preserved, the rubble must be cleared away even if it is doubtful that a person might have survived under the debris. However, once it has been determined with certainty that the accident victim has expired, no further violation of Sabbath regulations may be sanctioned. The question which then arises is how much of the body must be uncovered in order to ascertain conclusively that death has in fact occurred. Two opinions are recorded. The first opinion cited by the Gemara maintains that the nose must be uncovered and the victim is to be pronounced dead only if, upon examination of the nostrils, no sign of respiration is detected. The second opinion maintains that death may be determined by examination of the chest for the absence of a heartbeat. Thereupon follows a statement of Rav Papa to the effect that there is no disagreement in instances in which the body is uncovered "from the top down." In such cases, absence of respiration is regarded by all as conclusive. The dispute, declares R. Papa, is limited to a situation in which the body is uncovered "from the bottom up" and thus the heart is uncovered first.

It is quite possible to read this statement of the Gemara as indicating that the controversy reflected in these two opinions is with regard to whether absence of a heartbeat is itself to be accepted as a sufficient condition in establishing that death has occurred. Accordingly, the first opinion insists upon examination of the nostrils in order to determine that respiration has ceased because respiration is the sole criterion of life. The second opinion maintains that, while if examination "from the top down" reveals that there is no respiration that in itself may be taken as a sufficient indication that death has occurred, nevertheless when the body is uncovered from "the bottom up" absence of cardiac activity is equally regarded as a sufficient indication that death has occurred. Since both Rambam, *Hilkhot Shabbat* 2:19, and *Shulhan Arukh, Orach Hayyim* 329:4, rule in accordance with the first opinion it might be concluded that respiration is indeed the sole determining factor and therefore irreversible cessation of respiration is both a necessary and sufficient criterion of death.

This analysis, attractive as it may be as a literal reading of the Gemara, is contradicted by Rashi in two separate comments. Rashi introduces the discussion in *Yoma* 85a with the remark that the

