

מאמר זה חלק ממאגרי המידע המקוונים של המכון ע"ש ד"ר פ. שלזינגר
לחקר הרפואה עפ"י התורה

מאמר זה ומאמרים נוספים ניתן למצוא באתר הבית של המכון:
www.medethics.org.il

ORGAN TRANSPLANTATION AND DEFINITION OF THE MOMENT OF DEATH -- JEWISH PERSPECTIVES

Prof. Avraham Steinberg, MD

**Director, The Center for Medical Ethics, The Hebrew University
Hadassah Medical School**

&

**Department of Pediatrics, Shaare Zedek Medical Center
Jerusalem, Israel**

Organ transplantation is the procedure of replacing diseased organs, parts of organs, or tissues by healthy organs or tissues. The transplanted organ or tissue can be obtained either from the patient himself (= autograft), from another human donor (= allograft) or from an animal (= xenograft). Transplanted organs may be artificial or natural, whole (such as kidney, heart and liver) or partial (such as heart valves, skin and bone).

1. artificial organs and parts

The use of artificial organs for transplantation poses no *halakhic* problems as long as the prospects for success are greater than the risks. Hence, there are no *halakhic* objections to the transplantation of heart valves, bone parts and joints, and the use of dialysis.

Nowadays, artificial heart transplantation is not permissible because of serious medical complications and low success rates. If these problems can be overcome, artificial heart transplantation will be ethically and *halakhically* permissible.

2. animal organs (xenograft)

If it becomes possible to use tissues and organs from animals (even non-*kosher* animals) for transplantation, there are no *halakhic* objections to their use to save human lives.

Medical science, however, has not yet advanced to the point of being able to use either artificial organs or animal organs on a routine basis. Therefore, the only sources

for organs are live or deceased human beings or fetuses. The *halakhic* as well as legal and ethical concerns revolve around the donor, the recipient and society in general.

3. live donor transplants

In general, one considers the use of an organ from a live donor only if the following conditions are met:

- surgery to remove the organ is not dangerous
- the donor's life can continue normally after the donation
- the donor will not need prolonged and chronic medical care
- the success rate in the recipient should be high.

In each case, informed consent must be obtained from the donor.

Several types of tissues/organs can be obtained from live donors, such as kidney, blood, bone marrow, lobes of lung and lobe of liver. In this presentation, however, I shall discuss only the major ethical-*halakhic* issues concerning the donation of a kidney.

Following kidney donation, the donor remains with only one kidney and there is a small danger associated with the procedure. Hence, the main *halakhic* question when using a live donor for kidney transplantation is whether or not a person is permitted or obligated to endanger his life somewhat in order to save the life of another person who is in grave danger. Some Rabbis prohibit kidney donation from live donors. Other Rabbis allow it as an act of piety but do not require it. Yet other Rabbis rule that it is not only allowed but required; otherwise, one violates the precept, *thou shalt not stand idly by the blood of thy fellow man*.

At times, the closest tissue type matched donor is someone legally unqualified to give consent. In such cases, it is prohibited in Jewish law to take that kidney for transplantation. A boy less than thirteen years old cannot legally give consent since his transactions such as purchases, sales, and gifts, have no legal validity in Jewish law. Nor can the parents consent on his behalf, because they do not own his body. Similarly, a mentally retarded person cannot consent nor can his guardian consent for him because a legally incompetent person has no obligation to fulfill precepts including the saving of life and one may not endanger his life, even a little, to perform the transplant. The only exception is if the transplant might directly benefit the donor and it is done specifically for his benefit and that no other solution exists to provide him that benefit.

Payment for organs can take several forms: direct payment to a donor person by a needing recipient; compensating the donor in various ways other than money; payment by governmental agencies or other public funds to the donor.

There is no fundamental *halakhic* prohibition to the receipt of financial compensation for a tissue or organ. One Rabbi, however, expressed opposition to such an act because it offends one's moral sensibility. According to this view, commerce in human organs is contrary to the basic framework of our ethical and spiritual value system and may lead to serious negative social consequences. The poor may feel coerced into becoming spare parts providers for other humans in order to support themselves. By contrast, other Rabbis have stated clearly that there is nothing wrong from any *halakhic* or moral point of view in receiving reasonable compensation for the act of self-endangerment, and by doing so one still fulfills adequately the commandment to save life.

The danger to a living person in giving up an organ in exchange for money is no different than the danger of many professionals such as firemen, policemen, soldiers, security personnel and the like, who risk their lives in return for a salary. Hence, in a world where no act is required to be performed in an altruistic way, there is no moral justification to require such an approach to organ donation. Moreover, all people involved in the organ donation are paid (physicians, nurses, hospitals, social workers, etc.) except for the person most involved in the donation, namely the donor. Nonetheless, in practical terms, society is responsible to regulate and control the transactions in such a way that donors will not be abused, exploited or coerced in any shape and form (i.e., no direct contact between donor and recipient, reasonable monetary compensation that by itself should not be the only incentive for organ donation, adequate monitoring and control of the psycho-socio-cultural match between the donor and recipient, etc.).

4. cadaver donor transplants

The *halakhic* considerations in the use of cadaver donors concern those relating to autopsy. These questions include the following:

the prohibition of deriving benefit from the dead; the violation of the precept of burying the dead and not delaying the burial of the dead; the prohibition of desecrating the dead by making an incision in the donor to remove an organ, and others.

All these apply only if the tissues or organs are needed but not absolutely essential to save the recipient's life. Most rabbinic decisors, however, rule that if the transplant is done as a life-saving procedure, all the above-mentioned prohibitions are waived.

Jewish law is lenient in allowing organ transplants from the deceased if the following conditions are met:

- the needy recipient is at hand
- the recipient's life is in danger
- the donor consented during his lifetime to the use of his organ(s) for transplantation.

Most Rabbis nowadays allow cadaver organ donations if the above conditions are fulfilled and that is the current custom. Some Rabbis consider it to be a very meritorious act (*mitzvah*) to donate one's organs for transplantation to needy recipients after one's death. It is also a *mitzvah* for relatives of a deceased to consent to the donation of the deceased's organs for a needy patient at hand.

Some Rabbis require the donor's consent prior to death in order to permit the transplant even for a dangerously ill needy recipient. Other Rabbis say that to save a life, this requirement of prior consent may be waived. In each instance, however, the family of the deceased should give consent. On the other hand, the family cannot grant permission in circumstances where Jewish law does not allow it. Even if the donor gave consent while still alive, some Rabbis rule that the family may object if it is not a matter of saving the life of a needy recipient. However, if the organ donation is expected to save life the family's objection is invalid.

All the above-mentioned rules and regulations apply only to a dead donor. It is accepted by all that it is prohibited to hasten death of one person, even by a second, in

order to save the life of another person. Hence, the most crucial and heatedly debated issue concerning cadaveric organ donation is the determination of the moment of death.

5. The deefinition of the moment of death

Death is the irreversible end of life. Biologically, death is a progressive process in which various cells, tissues and organs die at different times depending on their sensitivity to the absence of oxygen and energy sources.

The determination of the exact **moment** of death in an individual person depends on the social-philosophical-legal and religious acceptance of specific criteria, even if some cells or parts in the body are still biologically alive.

A number of different definitions of the moment of death include the following:

- The death of all body cells (biological death).
- Absolute and irreversible cessation of all cardiac, circulatory and respiratory activities and functions (cardiopulmonary death).
- Total and irreversible cessation of all brain activities including the brainstem (brain death).
- Other definitions of death include total irreversible loss of upper brain function, brain absence as in anencephalics, and persistent irreversible coma, but these definitions are not accepted anywhere in the world.

Hence, except for the 'biological' definition of the moment of death (which currently no one accepts it as the legal-social definition), at the moment of death there are still various parts of the body which are alive. Therefore, the moment of death is a social/legal/religious determination rather than a scientific/medical one. From a biological point of view all the definitions of the moment of death are actually arbitrary.

In previous generations, in the absence of resuscitative technology, there was practically no difference in time between the cessation of cardiac and respiratory activities, i.e., heartbeat and breathing. Both occurred within a few minutes of each other with the inability of doctors to change the outcome. Recent advances in medical knowledge and technology have created two new realities relating to the definition of the moment of death:

- Cardiopulmonary resuscitative techniques can now artificially prolong respiration for extended periods, thus also prolonging cardiac activity. This technique, therefore, allows wide separation of the time when spontaneous respiration stops and when the heartbeat ceases
- Advances in surgical techniques and increases in medical knowledge permit organ transplantation. The latter necessitated a new definition of the moment of death.

During the 1960s, the term brain death began to be discussed. This term refers to the irreversible cessation of all brain functions including spontaneous respiration while cardiac function and blood circulation remain intact. Since then there has been nearly universal acceptance of the concept of brain death in the Western world.

Most countries in the world and most physicians and philosophers accept brain death as death, both socially and legally. There are, however, groups who still oppose brain death as a definition of death, for various reasons:

- The Japanese consider brain death before cardiac standstill to be an unnatural premature definition of death which interferes with their cultural rites surrounding death.
- In India and China, certain religious groups oppose the concept of brain death.
- Some American Indian groups also oppose brain death for religious and cultural reasons.
- Denmark is the only Western country whose Ethics Board advised against adopting the brain death definition of death because of the emotional perception that a person whose heart is still beating is alive, but they nevertheless permit organ harvesting from brain-dead persons.
- A few Western philosophers and physicians also do not accept brain death but require cessation of the heartbeat.

In **Jewish law**, the matter is in dispute among rabbinic authorities. A rather stormy controversy among orthodox Jewry in Israel and in the United States is still ongoing. Many national and international conferences have been held to discuss this topic. Many essays and treatises and several books have been written on brain death in Jewish law.

Brain death, which represents the total, absolute and irreversible cessation of brain and respiratory functions, is established by a series of tests, which are very reliable. Thus, for this determination one must satisfy the following:

- identify the cause for the irreversible brain damage
- rule out potentially reversible causes such as serious metabolic or hormonal dysfunctions, and various poisonings
- perform all the confirmatory tests at normal body temperature and normal blood pressure

Brain death requires the following clinical manifestations:

- coma or total lack of response to the environment including painful stimuli
- absolute absence of brainstem reflexes
- absolute absence of spontaneous respiration (apnea)

According to these criteria, any person who is still able to breathe spontaneously is alive. Therefore, patients in a persistent vegetative state (PVS), anencephalic newborns, patients with severe dementia or other serious brain disease, are not considered or defined as being dead.

There is, however, a school of thought which is quite articulate and may be growing, that is supporting cerebral death as adequate for a determination of death. They argue that sentience determines personhood, humanity and life. This radical change in thinking would consider as dead individuals in the permanent vegetative state and

anencephalic babies. Thus far this definition has not been adopted by any official body, to our knowledge.

For the Jewish legal definition of death, a number of prerequisites exist:

- The activity or the organ whose ceased function defines the moment of death must have done so absolutely and irreversibly
- The person resembles a corpse and does not move any limb
- The person is unconscious and has no cognition.

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.

The **philosophical basis** for the acceptance of brain death is that the entire brain including the brainstem is the source of personhood in terms of cognition, intellect, free will and sensation, as well as the site of integration of all the body’s vital functions. The brain thus makes a person into a complete human being as a unified unit. If the brain ceases to function, the integrated functioning of the various body organs is lost even though each may continue to function independently.

This approach, however, presents some difficulties: personhood in the usual manner of definition does not exist in the newborn; yet by all criteria he is considered alive, and killing him is murder. The integrative function of the brain has been challenged recently by proving prolonged survival of the body in brain-dead persons with intensive treatment -- ‘chronic brain-death’.

The *halakhic* definition of brain death as defined by the irreversible cessation of respiration thus differs from the medico-legal definition of brain death which considers the status of the brain itself to determine whether a person is dead or alive.

In a pluralistic society, a universally accepted definition of death can be legislated for society's needs (inheritance, murder, discontinuation of treatment, use of organs for transplantation, etc.). However, one must also allow a minority to differ from the norm established by the majority.

Indeed, some people object to the brain death definition for various reasons:

- **Emotional**, such as the feeling that a warm body with a beating heart cannot be defined as a corpse.
- Concern about the **slippery slope**, whereby the definition of death may be expanded to include cerebral or upper brain death even if the brainstem is still functioning (i.e., spontaneous respiration is still present). This cerebral death definition would include patients in a persistent vegetative state (PVS) or permanent coma, patients with severe dementia, and anencephalic newborns. These attitudes raise concern for the slippery slope whereby different and changing definitions of death will develop due to changing social needs.
- **Scientific**, because even if the brainstem is irreversibly damaged, some cells of the brainstem and other parts of the brain may still be functioning; hence, there is no medical proof for 'whole' brain death.

Even after decades of the societal acceptance of brain death, there is still confusion about this definition. The widespread use of the term 'brain death', indicates some doubt about it representing the usual death. When absence of pulse and breathing was the definition of death, no one used the term 'cardiac death'. It was death. This confusion about the term brain death occurs even among medical professionals. Thus, if one accepts the definition of brain death the term 'brain death' should not be used; rather one should speak of 'death'.

My personal understanding of the *halakhic* principles upon which the moment of death is determined is that the absolute and irreversible cessation of respiration is the correct *halakhic* definition of the moment of death. Based on the above-mentioned criteria, the establishment of the moment of death as being defined as the complete and irreversible cessation of spontaneous respiration is not a change in the principles of *halakhah*. What has changed is the medical technology to establish that the cessation of respiration is absolute and irreversible. Hence, there should be no fear of a 'slippery slope' process if one adheres strictly to this *halakhic* definition. However, as stated above, there are other authoritative Rabbis who define the moment of death differently. This is a legitimate debate no different than any other debate on important principles. One should, however, bear the consequences of their position. Indeed, I witnessed a case in Israel where an infant's heart could be donated to a baby born with left hypoplastic heart disease, yet the parents of this baby refused the donation because, according to their belief, the donor infant was regarded as a live person.

**JEWISH ASPECTS CONCERNING LIVE AND
CADAVER ORGAN DONATION**

PROFESSOR AVRAHAM STEINBERG, MD

**Director, The Center for Medical Ethics, The Hebrew University
Hadassah Medical School**

&

**Department of Pediatrics, Shaare Zedek Medical Center
Jerusalem, Israel**

INTRODUCTION

Organ transplantation is the procedure of replacing diseased organs, parts of organs, or tissues by healthy organs or tissues. The transplanted organ or tissue can be obtained either from the patient himself (autograft), from another human donor (allograft), from an animal (xenograft), or artificially. Transplanted organs may be whole (such as kidney, heart and pancreas) or partial (such as heart valves, partial lobes of lung or liver, skin and bone).

Natural organs or tissues which are currently transplantable include the following: blood and blood products, bone marrow, bone, brain tissue, cornea, heart, kidney, liver, lung, pancreas, skin.

The following organs can be obtained from **live donors**: blood and blood products, bone marrow, kidney, partial liver and partial lung. Other organs for transplantation are obtained from **cadavers**. They include bone, cornea, heart, kidney, liver, lung, pancreas and skin. **Artificial organs** include joints, heart valves, skin substitutes, bone substitutes, artificial kidneys (dialysis) and heart-lung machines (for temporary support during heart surgery).

Certain fundamental Jewish legal (*halakhic*) questions involve all transplanted organs. Others involve only specific organs.

In this paper I shall discuss only the fundamental *halakhic* issues both for live and cadaver organ donations.

LIVE DONOR TRANSPLANTATIONS

In general, one considers the use of an organ from a live donor only if the following conditions are met: surgery to remove the organ is not dangerous; the donor's life can continue normally after the donation; the donor will not need prolonged and chronic medical care; and the success rate in the recipient should be high.

In each case, informed consent must be obtained from the donor.

Several types of tissues/organs can be obtained from live donors. In this paper, however, I shall present only the major ethical-*halakhic* discussions concerning the donation of a kidney.

Following kidney donation, the donor remains with only one kidney and there is a small danger associated with the procedure itself. Hence, the main *halakhic* question when using a live donor for kidney transplantation is whether or not a person is permitted or obligated to endanger his life somewhat in order to save the life of another person who is in grave danger. Some Rabbis prohibit kidney donation from live donors [1]. Other Rabbis allow it as an act of piety but do not require it [2]. Yet another Rabbi rules that it is not only allowed but required; otherwise, one violates the biblical precept, *thou shalt not stand idly by the blood of thy fellow man* [3].

At times the closest tissue type matched donor is someone legally unqualified to give consent. In such cases, it is prohibited in Jewish law to take that kidney for transplantation. Hence, a boy less than thirteen years old cannot *halakhically* give consent since his transactions such as purchases, sales, and gifts, have no legal validity in Jewish law. Nor can the parents consent on his behalf, because they do not own his body. If he is more than thirteen years old, he can freely consent [3]. Similarly, a mentally retarded person cannot consent nor can his guardian consent for him because a legally incompetent person has no obligation to fulfill precepts including the saving of life and one may not endanger his life, even a little, to perform the transplant [4]. The only exception is if the transplant might directly benefit the donor and it is done specifically for his benefit and that no other solution exists to provide him that benefit.

Payment for organs can take several forms: direct payment to a donor person by a needing recipient; compensating the donor in various ways other than money; payment by governmental agencies or other public funds to the donor.

There is no fundamental Jewish legal prohibition to the receipt of financial compensation for a tissue or organ. One Rabbi, however, expressed opposition to such an act because it offends one's moral sensibility [5]. According to this view, commerce in human organs is contrary to the basic framework of our ethical and spiritual value system and may lead to serious negative social consequences. The poor may feel coerced into becoming spare parts providers for other humans in order to support themselves. By contrast, other Rabbis have stated clearly that there is nothing wrong from any *halakhic* or moral point of view in receiving reasonable compensation for the act of self-endangerment, and by doing so one still fulfills adequately the commandment to save life [6]. The danger to a living person in giving up an organ in exchange for money is no different than the danger of many professionals such as firemen, policemen, soldiers, security personnel and the like, who risk their lives in return for a salary. Hence, in a world where no act is required to be performed in an altruistic way, there is no moral justification to require such an approach to organ donation. Nonetheless, in practical terms, society is responsible to regulate and control the transactions in such a way that donors will not be abused, exploited or coerced in any shape and form (i.e., no direct contact between donor and recipient, reasonable monetary compensation that by itself should not be the only incentive for organ donation, adequate monitoring and control of the psycho-socio-cultural match between the donor and recipient, etc.).

CADAVER ORGAN TRANSPLANTATION

The *halakhic* considerations in the use of cadaver organs for the purpose of improving the quality of life rather than saving life concern those relating to autopsy. These issues are the following:

- Does the prohibition of deriving benefit from the dead apply here since the benefit is obtained in an unusual manner? In general, some Rabbis rule that the prohibition of deriving benefit from the dead does not apply when they are derived in an unusual manner, whereas other Rabbis disagree. Some Rabbis rule that the prohibition does not apply at all in circumstances of transplantation since the donor organ functions in the recipient; thus the recipient may be regarded as deriving benefit from the living and not from the dead [7].

- Does one violate the precepts of burying the dead and not delaying the burial of the dead if one transplants an organ from a deceased person? Some Rabbis say there is no violation involved because the transplanted organ is considered alive when it functions in the recipient [7].

- Does one violate the prohibition of desecrating the dead by making an incision in the donor to remove an organ such as the kidney or eye for transplantation? Some Rabbis answer in the affirmative [8]. Some Rabbis say the violation only applies if the donor did not consent thereto during his lifetime [7]. Other Rabbis rule that no violation at all is involved since it is done for a needy recipient [9].

All the aforementioned applies if the tissues or organs are needed but not absolutely essential to save the recipient's life. Most rabbinic decisors, however, rule that if the transplant is done as a life-saving procedure, all the above-mentioned prohibitions are waived. Jewish law is lenient in allowing organ transplants from the deceased if the following conditions are met:

- the needy recipient is at hand, and can be saved right away.
- the recipient's life is in danger.
- the donor consented during his lifetime to the use of his organ(s) for transplantation.

Most Rabbis nowadays allow cadaver organ donations if the above conditions are fulfilled and that is the current custom. Some Rabbis consider it to be a very meritorious act (*mitzvah*) to donate one's organs for transplantation to needy recipients after one's death. It is also a *mitzvah* for relatives of a deceased to consent to the donation of the deceased's organs for a needy patient at hand [10].

Some Rabbis require the donor's consent prior to death in order to permit the transplant even for a dangerously ill needy recipient. Other Rabbis say that to save a life, this requirement of prior consent may be waived [11]. In each instance, however, the family of the deceased should give consent [12].

All the above-mentioned rules and regulations apply only to a dead donor. It is accepted by all that it is prohibited to hasten death of one person, even by a second, in order to save the life of another person. Hence, the most crucial and heatedly debated issue concerning cadaveric organ donation is the determination of the moment of death.

Death is the irreversible end of life. Biologically, death is a progressive process in which various cells, tissues and organs die at different times depending on their sensitivity to the absence of oxygen and energy sources.

The determination of the exact **moment** of death in an individual person depends on the social-philosophical-legal and religious acceptance of specific criteria, even if some cells or parts in the body are still biologically alive.

A number of different definitions of the moment of death include the following:

- The death of all body cells (biological death).
- Absolute and irreversible cessation of all cardiac, circulatory and respiratory activities and functions (cardiopulmonary death).
- Total and irreversible cessation of all brain activities including the brainstem (brain death).

Other definitions of death include total irreversible loss of upper brain function, brain absence as in anencephalics, and persistent irreversible coma, but these definitions are currently not accepted anywhere in the world.

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 disagreement among modern rabbinic decisors relate to the establishment of the organ or function which determines that moment [13].

- Some Rabbis rule that a person is considered *halakhically* dead only after the irreversible cessation of both **respiration and heartbeat**, i.e., “cardiac death”. Hence, according to this position it is impossible to obtain heart, liver or lung from a donor. By definition such an action constitutes a prohibited act of hastening death. However, in appropriate circumstances one can obtain kidneys, skin, cornea or bones, since these organs are viable and usable even after cardiac death.
- Another 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. In order to satisfy the requirement of this position there is a need for detailed and elaborate investigations.
- 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. According to this definition of death, there is no basic importance to the brain itself other than its control of respiratory function. Therefore, even if

certain specific parts of the brain such as the hypothalamus continue to function, it does not change the definition of death. Hence, according to this position it is permissible to obtain any viable organ, including heart, liver and lung in order to save lives of needy recipients.

REFERENCES

1. Responsa *Tzitz Eliezer*, Part 9 #45 and Part 10 #25:7 and 28; Responsa *Minchat Yitzchak*, Part 6 #103.
2. Responsa *Iggrot Moshe, Yoreh Deah*, Part 2 #174:4; Rabbi J. Dichowsky, *Ne'ot Desheh*, Part 2, pp. 154-156; Rabbi C.D. Halevi, *Assia*, Vol. 4, 1983, pp. 251-259; Rabbi M. Hershler, *Halakhah Urefuah*, Vol. 2, 1981, pp. 122-128; Rabbi S. Yisraeli, *Barkai*, Vol. 3, 1986, p. 36; *ibid.*, *Assia* folio 57-58, 1997, pp. 5ff; Rabbi S.Z. Auerbach, cited in *Nishmat Abraham, Yoreh Deah* 157:4:2; Rabbi Y. Zilberstein, *Halakhah Urefuah*, Vol. 4, 1985, pp. 156-157.
3. Rabbi O. Yosef, *Halakhah Urefuah*, Vol. 3, 1983, pp. 61-63; *Ibid.*, *Yechaveh Daat*, Part 3 #84.
4. Rabbi M. Hershler, *Halakhah Urefuah*, Vol. 2, 1981, pp. 122-128.
5. Rabbi M.D. Tendler, *Mt Sinai J Med* 51:45, 1984.
6. Rabbi S.Z. Auerbach, cited in *Nishmat Abraham*, Part 4, *Choshen Mishpat* 420:1; Rabbi S. Yisraeli, *Assia* folio 57-58, 1997, pp. 5ff.
7. Rabbi I.Y. Unterman, *Shevet MiYehudah*, pp. 313-322.
8. Responsa *Minchat Yitzchak*, Part 5 #8; Responsa *Tzitz Eliezer*, Part 13 #91.
9. Rabbi H.D. Halevi, *Assia*, Vol. 4, 1983, pp. 251-259; Responsa *Yabiya Omer*, Part 3, *Yoreh Deah* #23 Responsa *Mishpetei Uziel, Yoreh Deah*, Part 1 #28-29.
10. Responsa *Iggrot Moshe, Yoreh Deah*, Part 2 #174.
11. Rabbi B. Firer, *Noam*, Vol. 4, 1961, p. 200.
12. Responsa *Iggrot Moshe, Yoreh Deah*, Part 2 #174:3; Responsa *Minchat Yitzchak*, Part 5 #7.
13. For detailed references of the various opinions see Steinberg A: *Encyclopedia Hilchatit-Refuit*, Vol 6, 1998, s.v. *Rega Ha'mavet*, pp. 39-44.