

# Medicine, Technology, and Religion Reconsidered: The Case of Brain Death Definition in Israel

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## Abstract

The introduction of respiratory machines in the 1950s may have saved the lives of many, but it also challenged the notion of death itself. This development endowed “machines” with the power to form a unique ontological creature: a live body with a “dead” brain. While technology may be blamed for complicating things in the first place, it is also called on to solve the resulting quandaries. Indeed, it is not the birth of the “brain-dead” that concerns us most, but rather its association with a web of epistemological and ethical considerations, where technology plays a central role. The brain death debate in Israel introduces highly sophisticated religious thought and authoritative medical expertise. At focus are the religious acceptance and rejection of brain death by a technologically savvy group of rabbis whose religious doctrine—along with a particular form of religious reasoning—is used to support the truth claims made from the scientific community (brain

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death is death) but challenge the ways in which they are made credible (instrumental rather than clinical). In our case, brain death as “true” death is made religiously viable with the very use of technological apparatus and scientific rhetoric that stand at the heart of the scientific ethos.

**Keywords**

expertise, ethics, epistemology, brain death, religion, STS

In a comprehensive review of the subject of brain death, A. M Capron, a professor of law and medicine, referred to the history of brain death as an issue that is “well settled, yet still unresolved” (Capron 2001, p. 1244). Indeed, despite numerous daily references to it in hospitals worldwide, the definition of brain death still generates fierce controversy and provokes stormy debates both within and outside medical circles. The medicalization of death emphasizes the dual nature of death as both a moment and a process (Aries 1981; Hertz [1904] 1960; Seymour 1999; Turner 1969). For centuries, however, any distinctions between death and dying remained overlooked because the medical definition of death, the cessation of cardiac-respiratory activity, and the lay understanding of death coincided (Timmermans and Berg 1998). Religious traditions played an important role in sanctifying this definition. This concurrence between the realms of science and belief was upset during the second half of the twentieth century with the introduction of neurological tests to determine brain death. While this addition to conventional, traditional protocols surrounding medical determinations of death represented a new phase in the medicalization of death, it also undermined the heretofore well-established accord between the medical and lay definitions of death. In some countries, such as the United States, medicine, law, and religion quickly coalesced in support of a new definition of brain death. In other countries, such as Israel, medicine and religion, or, more precisely, the medical and religious establishments, moved apart, leading not only to tensions but also to unanticipated creative interaction between the two sectors.

This article will explore the relationship between medicine and religion in the debate over brain death in Israel using conceptual, methodological, and theoretical tools from Science and Technology Studies. More specifically, this study will delve into contemporary practices, historical records, and the actors’ own voices in the Israeli debate over brain death in order to examine this issue. Case studies are known to be particularly useful for

refining theories and in challenging universal dogmas, some of which play pivotal roles in contemporary disciplines (Beaulieu, Scharnhorst, and Wouters 2007; Wyatt and Balmer 2007). An in-depth inquiry into this specific issue can help clarify the “cultures of knowledge” involved in such highly contentious debates and shed light on how both religious and lay epistemologies interact with technological authoritativeness.

Highly sophisticated religious interpretations and authoritative medical expertise are engaged in the brain death debate in Israel. At the core of the discussion is the religious reaction to brain death by a technologically knowledgeable group of rabbis. These rabbis’ religious doctrine and particular manner of religious reasoning are used to support the truth claims made from the scientific community that brain death is death, but nonetheless challenge *the ways* of the scientific method of determining brain death by insisting on using instrumental means in addition to the clinical means favored by the medical field. In Israel’s current debate, brain death can be accepted as “true” death on a religious level using the same technological apparatus and scientific rhetoric upon which the scientific approach is based.

For this study, we interviewed key figures involved in the brain death debate in Israel, including officials in the Israeli Ministry of Health (IMoH), hospital managers, rabbis, organ transplant surgeons, and religious and secular ethicists. The interviews took place in 2014 in Jerusalem and Tel Aviv. Also included in this research were the protocols of discussions that took place from 2003 to 2008 in the Israeli Knesset committee seeking a legislative answer for the brain death debate and a review of secular and orthodox press publications on the subject. This study also examined the complex methods and relatively unique circumstances through which self-defined religiously orthodox actors were able to challenge the medical concept of brain death by disentangling themselves from their defined monothetic associations with homogeneous sets of epistemologies, methodologies, and regimes of truth. This inquiry into the struggle in Israel over the last minute of life can help advance the understanding of how technology and religion are intertwined in the concept of death.

## Background

The introduction of respiratory machines in the 1950s may have saved the lives of many, but in doing so, it challenged the notion of death itself. In effect, respiratory machines were endowed with the power to intervene in the natural course of death and to create a unique being: a “living” body with a “dead” brain. In nature, a living creature could not survive without a

functioning brain for more than a few minutes, as the brain's decay would inexorably destroy breathing capacities, advancing a process of deoxygenation and leading to further deterioration until all organ functioning ceased. When respiratory machines are introduced into the dying process, the inevitable cycle of nature can be mitigated. While the brain itself may deteriorate into inactive tissue, mechanical breathing apparatuses sustain many of the body's physiological functions. With this intervention, questions remain as to whether the status of the surviving "entity" is a person, body, corpse, or undefined living organism.

While technology may be identified as the primary cause for these complicated issues, it is also the source for resolving many of the quandaries raised. Indeed, the primary question under examination is not the new category of brain death created by respiratory machines but rather the ensuing complex of epistemological and ethical considerations in which technology plays a central role. One of the leading issues that has arisen is that of the organ recovery industry, an industry that has evolved since the nature of brain death has changed. This state of sustained animation, or, perhaps more accurately, prolonged dying, is so critical to both ethicists and medical practitioners because it creates an opportunity to retrieve and later transplant well-oxygenated organs, which are not available from donors whose hearts and lungs have ceased functioning. An example involves the dilemmas associated with removing the heart of a breathing patient/corpse. Removing a heart from the body of a person considered alive would kill the person. However, beneficial to other patients, such an act is utterly inimical to accepted medical practice. This problem was examined in 1968 by an ad hoc committee on brain death at Harvard Medical School. The Harvard Committee and numerous national and international committees since then devoted to the issue have convincingly justified the assignment of a "death" status to a brain-dead individual, even when the heart and lungs are still functioning. Today, most countries have accepted the general principle that a person is pronounced dead upon having lost all brain activity, or all brain-stem activity, although there are some differences among them about the details.

Japan differed from the general consensus, which eventually approved a brain death law in 1997 (Lock 2001). Israel, although typically eager to adopt biotechnological advances, took yet another decade to align itself with the rest of the world in terms of the legal status of brain death definition, and still, resistance remains. The epistemological, technical, and conceptual complexity of the modern definition of brain death never truly fitted into the strongly held and defended Jewish definition of death, which

traditionally involved the cessation of cardiopulmonary activity. In fact, some of Israel's leading rabbis entirely rejected the modern notion of brain death, openly referring to physicians removing organs from brain death individuals as "murderers" (Grodin 1994; Rappaport and Rappaport 1999). Yet, one group of rabbis, closely associated with the state-affiliated Israeli Chief Rabbinate (ICR), has developed a much more nuanced approach to brain death, recognizing its underlying biological and physiological logic and its critical importance in relation to organ donation. Moreover, these more open-minded rabbis have been decisively active in negotiations with the medical establishment, ranging from amicable to discordant ones, all the while adhering strongly to several principles that would make the declaration of brain death entirely acceptable, or kosher, according to religious authority. Most notably, these rabbis have demanded rabbinic supervision and the use of technological instruments in every case where a determination of brain death is sought.

This article claims that this religious legitimization or "koshering" of brain death combines religious authority with faith in the power of technoscientific advances to provide powerful authority for the determination of actual death. Perhaps even more importantly, this approach and its implicit assumptions enable families of potential donors to accept this form of death, even if they may be reticent, for reasons other than commitment to religious dogma, to accept the passing of their still-breathing loved ones.

## **Defining Death**

### *History of brain death*

The phenomenon of patients remaining in a state of complete cerebral death, while supported by respiration machines, was first referred to in 1959 as "coma dépassé," or "beyond coma" (Mollaret and Goulon 1959). While, initially, attention was focused on what was considered the futility of caring for this growing number of patients, eventually more pressing ethical issues arose, such as the need to save the lives of patients who were not "dead" under any definition. Indeed, with the development of organ transplants in the 1960s, these "potential cadavers," "heart-lung preparations," "neomorts," "living cadavers," "reanimation patients" (Hogle 1995; Lock 2001), as patients kept alive only by artificial means were referred to, became feasible sources for fresh and oxygenated organs with the potential to save many thousands of lives. The definition of these brain death individuals as effectively "dead" created a category of cadavers that appeared life-like according

to the most intuitive sense, in that they did not change color, smell, stiffen, decay, nor putrefy, or decompose (Kellehear 2008).

Indeed, advances in transplant medicine made urgent the redefinition of death. However, they could never serve as the ultimate justification for any change in the definition of death. For the neurological criteria to be medically, ethically, and legally acceptable, their epistemic validity had to be grounded independently of any beneficial outcomes they could produce. The recommendations of the Harvard Committee represented the first systematic attempt to provide this necessary foundation by determining that the cessation of brain stem activity was a medically sound basis for determining death.

In the policy-making arena and among the lay public, philosophical considerations about the nature of death have all but disappeared. Given the importance of a proper determination of death, both on the legal level (in order to ascertain when wills or life insurance policies can take effect) and on the emotional level (to enable families to realize when they can begin grieving and cease expecting miracles), this move from philosophical to more certain determinations may not be surprising. However, the basic definition of death has never been entirely settled. While death has been increasingly medicalized over the last two centuries (Bauman 1992), different concepts about its nature, including those not necessarily in accordance with the biological view, such as questions about the presence of a soul, continue to resonate. Death remains at once a spiritual departure and a loss of physiological function, involving a social or personal assessment and a scientific fact.

Similarly, the complicated challenge of determining brain death is encountered at several levels, each involving a different degree of consensus and epistemological complexity. The most abstract level, involving the question of what is death, demands a philosophical undertaking to integrate consensual elements addressing the metaphysics of death. The second level revolves around choosing those philosophical and medical considerations employed in determining the best criteria of death. Such criteria could be irreversible loss of circulatory functions or irreversible loss of spontaneous respiratory functions, reflecting the question of how death presents itself. At the last level remains the question of how death can be assessed with the greatest accuracy, involving the technical or operational task of determining the most suitable tests for ascertaining death (Bernat et al. 1981; Khushf 2010). Thus, if death is defined as “the irreversible cessation of the integrated functioning of an organism as a whole,” the more essential ontological question of “what *is* death” would remain open permanently (Khushf 2010). At the level of policy-making, committees in the United States as

well as Israeli law chose not to tackle the fundamental, metaphysical aspects of defining death and instead focused on more practical aspects of the definition of death, hoping thereby to create broader grounds for consensus by leaving aside deeper and more complex philosophical considerations.

### *Death and Judaism*

Regarding the abstract level of defining what is death, there is no clear statement of the metaphysical nature of death in ancient Judaic texts. Yet, at the level of how death presents itself, there are Jewish sources stipulating that a person may be presumed dead or “soulless,” not having a *neshama*, upon the loss of breath, or *neshima*. Over the years, a cardiac criterion has been grafted onto this traditional definition. Not surprisingly, given the historical changes in the understanding of physiology, later rabbinical sources generally viewed breath and heartbeat as interchangeable signs of life. Centuries later, scientific and technological developments, most notably Harvey’s discovery of blood circulation and subsequent successes in cardiopulmonary resuscitations, effectively demonstrated the distinction between the pulmonary and the cardiac systems. Jewish religious authorities either referred to a straightforward cardiac criterion or to a combination of both pulmonary and cardiac elements to determine the presence of death.

As already mentioned, Jewish law or halakha has some difficulties in accommodating the modern criteria of brain death, not just in principle, but in relation to its own manner of reasoning as well (Hacking 1992). Essentially, halakhic judgments are given based on specific cases that are brought to a particular rabbi. This rabbi consults any of the sources applicable to the case at hand, and if no primary source directly solves the problem, the rabbi can rephrase or redefine the case and then apply already settled or even still unsettled controversies and common law in order to provide a suitable casuistic analysis. Reaching a decision would involve processes of interpretation and exegesis of the Torah, the Talmud, religious codes, and responsa,<sup>1</sup> in this order of importance (Grodin 1994). There is no necessity for unanimous accord among rabbis, and individual Jews are encouraged to follow the teaching and dictates of the rabbi of their choice. Some rabbis, who are considered important *poskim*, or leading authorities on matters of Jewish law, enjoy widespread followings. Prominent *poskim* often join the ICR in Israel, but others remain fiercely independent of it. Rabbi Yosef Shalom Elyashiv was one such independent authority who remained adamantly opposed to the idea of brain death throughout his life.

Other rabbinic authorities associated with the ICR have, however, interpreted halakha in such a way as to accept the modern concept of brain death. They have done so by relying on the idea of breathing, rather than heartbeat, as the *sine qua non* sign of life. Brain death may thus be accepted under the premise that brain stem functioning serves as a proxy for breathing (Barilan 2014; Grodin 1994). To this interpretation was added an additional line of reasoning, according to which a brain death patient, having had lost all blood flow to the brain, should be considered “physiologically decapitated.” In Jewish law, decapitation is considered an unmistakable sign of death even if the individual appears to retain signs of life, with any motion after the decapitation meaning as little as “the wiggling tail of a lizard,” to which no commonsensical individual would assign any attributes of life. According to this reasoning, brain death could be considered “true” death (Kunin 2004; Steinberg and Hersch 1995).

To address the problem of decapitated individuals still being able to procreate, as procreation is a clear sign of life, in 1995, one prominent rabbinical authority, Rabbi Auerbach, agreed to witness a staged operation known as the “sheep experiment.” In this unusual procedure, conducted in a prominent Jerusalem hospital, a live lamb was delivered from a wholly decapitated but artificially sustained sheep. While this was not an actual experiment in the scientifically understood sense, and the issue could have been considered using a more philosophical and less visceral conceptualization, there seemed to be a need to actually demonstrate or enact the clinical procedure. The mere design and arrangement of this procedure attests to the complexity involved in the complicated network of technological, scientific, and religious authorities in addressing the idea of brain death. In the sheep demonstration, technology was employed to graphically demonstrate to the lay eye that brain death is indeed death, and not simply a scientific construct resulting from technological progress.

As this article demonstrates, while many of the cultural, political, and conceptual contexts appear unique to the issue of brain death, religious resistance to brain death bears uncanny parallels with arguments arising from nonreligious philosophical concerns (e.g., Shewmon 1998, 2001). For those accepting the definition of brain death as tantamount to decapitation, with decapitation necessarily indicating death, coherence demands the rejection of the idea that gestation and birth are ultimate signs of life. For others, who do not consider decapitation certain or clear sign of death or equivalent to brain death, there must then be some sort of integrative biological mechanism or metaphysical presence keeping these bodies “alive” (Miller and Truog 2010). In such cases, the heartbeat may again be used

either as a sign or as a proxy of this critical “integrating element.” Nonetheless, no clear philosophical or theological ontology has emerged about the issue of brain death. As a result, rather than probing deeper or more fundamentally into the philosophical grounding of the notion of death, the argument around brain death continues to hover at the level of lawmaking or of specifying particular practices and instruments. In some sense, coherence and cohesion in practice and law have superseded adherence to or reverence for an agreed upon ontology. The inner logic and tensions of these practical and semiotic entanglements currently revolve around instruments, with a minimum of metaphysical grounding.

## **Experiments in Accommodation**

While the elusiveness of metaphysical grounding may allow for legal adjustments to be made, it may also be the reason for the volatile nature of the Israeli political debate on brain death. In 1986, following a plea from the IMoH, the ICR agreed publicly to support the life-saving practice of organ donation and concurred that, in principle, Jewish law looked favorably upon brain death. However, twenty-two years passed before the ICR agreed to support organ donation, and even then, it quickly reneged on its promise to openly endorse the change (Boas 2009; Boas and Lavi 2017). Based on interviews with key actors, it seems that the fact that the policy change was closely associated with and expressed respect for dissident rabbis may have played a role in the delay and in the subsequent difficulties in finalizing the law and ensuring effective collaboration. This resistance was evident in a dispute that had less to do with the general spirit of the law and much more with its details. With the acceptance of brain death presumably resolved in principle, two bitter points of dispute remained. The first was the ICR’s insistence on adding a mandatory “objective device” to the already existing clinical examination for determining brain death. The second was the ICR’s demand for rabbinical supervision of physicians determining brain death. Both these demands encountered intense resistance from the medical establishment.

Regarding the instrumental testing, the orthodox rabbinical position can be understood in terms of accepted medical directives. The medical consensus is that brain death is a clinical diagnosis and that instruments should be used solely in specific cases. These cases include (a) when a clinical examination cannot be fully executed, (b) when a reduction in the required waiting time for the determination of death is sought, and/or (c) when any of the preliminary conditions cannot be ascertained with full confidence (Lessaard and Brochu 2010; Link, Schaefer, and Lang 1994). In 2002, still only

35 percent of the eighty countries reviewed by Wijdicks (2002) made instrumental confirmatory testing obligatory, and even these requirements were purportedly devised to reduce the waiting time until the final determination of death. In contrast, clinical testing is mandatory in all guidelines, as found in seventy of the eighty countries. In general, the consensus in the medical literature is that tests should be used at the discretion of the clinician, and not as part of any state legislative directive (Lessard and Brochu 2010; Link et al. 1994). In addition, where proper guidelines are used, clinical tests should confirm diagnosis in 100 percent of all cases (Jørgensen and Malchow-Møller, 1981). While clinical examinations may more accurately indicate the lack of responsiveness characteristic of the absence of significant and relevant brain function, some mechanical tests may show traces of neuronal activity that have little to do with the “integrative function of the brain” (Kellehear 2008; Khushf 2010). Thus, with many having agreed that brain death is functional rather than anatomic, including the ICR, it seems that clinical examinations are more suited to determining brain death (Arnold and Youngner 1993; Bernat 2006). Therefore, it is curious why the ICR continues to insist upon the perceived authoritative-ness of the objective tests, especially in light of the expectation that the ethos of objectivity would be strongly embedded within a respect for science and technology (e.g., Daston and Galison 1992, 2007; Foucault 1964; Knorr-cetina and Amann 1990). Namely, if clinical tests are almost universally accepted for determining brain death, why were mechanical tests added to the heart of the definition of brain death in Israel?

In addition to the unusual nature of the rabbis’ insistence on using specific instruments in confirming brain death, they also insist on supervising the implementation of brain death determination. According to Israel’s 2008 “Brain-Respiratory Death Law,” religious authorities would be allowed to consider the validity of brain death determinations only retrospectively during the proceedings of an annual or semiannual committee meeting, presumably including official state rabbis employed by the ICR. Nevertheless, still unsatisfied, some in the ICR introduced two interrelated initiatives: *Arevim* (literally, trustees), a group of on-call rabbis to be sent if a family requested rabbinical reassurance; and “*Bilvavi*” (in my heart), a donor card for specific sectors, such as the ultrareligious, that conditions organ donation upon the approval of the *Arevim*. The ICR insisted that representatives from *Arevim* be accorded a unique status in the process of determining brain death, thus creating an association between medical knowledge and religious authority. An *Arevim* representative located in the hospital’s intensive care unit, arguably the heart of the biomedical world, would have real-time access to both

clinical and instrumental reports and thus be able to translate the ascertained “truth” to the family as well as reassure any rabbinical authority that no foul play was involved. While the medical establishment did not find the presence of a rabbi as a counselor to the family problematic, they were unable to accept a rabbi’s role as an expert supervisor. A “supervisor” is theoretically endowed with the vision and knowledge enabling him or her to impose authority on the arguably weaker party. (Boas 2009).

## Testing for Brain Death

Prior to 2008, brain death was determined in accordance with specific directives issued by the IMoH; the first in 1987; the second in 1996. In both these directives, the use of instruments was recommended only if and when other tests could not be fully administered, or the results remained inconclusive. Some changes were implemented in 2009, with the introduction of the 2008 Brain-Respiratory Death Law, and later in a 2011 amendment enacted following deliberations with rabbinical authorities. The list of tests in the 2011 version is quite extensive, including five tests for blood flow and two for electrical activity, and the level of details to be entered in the forms is staggering: no less than twenty-one pages, in comparison to four pages in 2009, and none prior to this. The 2011 amendment included another significant change. While the two first actions to be taken in determining brain death—identifying the cause and asserting preliminary conditions, including the absence of confounding factors—retained their positions as clause one and two, respectively, the two last clauses were reversed, with instrumental testing now placed before and not after the clinical examination, including the apnea test and brainstem functions. This may reflect a growing trust in the more advanced instruments added to the list, or an acquiescence to further pressure by the ICR. Regardless of the precise cause, the importance of instruments in determining brain death is growing, with overt and more latent effects on both the technological practices and epistemological issues involved in the process. In Israel, the authority for determining brain death seems to have been largely delegated to the instruments (Latour 1994).

While the determination of brain death is different in different jurisdictions, all the definitions of brain death share the criterion of the cessation of spontaneous respiration, which is actually the crucial issue in Jewish law. Although some activity in the brain may persist after brain stem death, this criterion is not anatomical, that is, the complete destruction of every living cell in the brain, but rather functional, that is, the loss of spontaneous breathing (Reichman 2004). Thus, loss of blood circulation to the brain is a central

entry point for determining death. A transcranial Doppler ultrasound utilizes ultrasound waves to reveal the extent to which and at what speed blood flows into the upper brain and does not require moving the patient to MRI or CT machines, as it can be administered at the patient's bedside. Because of its ease of use, it has been adopted as the test of choice in Israel. Brainstem auditory evoked response and somatosensory evoked potentials tests, which do not serve as standalone tests, but require clinical testing, have also been approved in Israel. These tests are not used universally because, unlike the Electroencephalogram (EEG) test, they are capable of testing the activity of the brain stem and are therefore relevant for the physiological decapitation prescription and the spontaneous breathing criteria. The results of these tests, some in the form of images, are provided to the rabbi for consideration and thereby serve as boundary objects between the frontiers of lay perception of the nature of death and the technical, nonintuitive biomedical reality of brain death. Indeed, the interpretative flexibility associated with boundary objects allows them to be translated in ways that serve the needs of different groups, without necessarily creating a complete or deep consensus (Bijker 1995; Star 2010; Star and Griesemer 1989). Such objects often provide a way to moderate or control the need for a specific expertise in order to communicate between different social groups (Bijker, Hughes, and Pinch 1987; Sismondo 2008). Images may be used to support different arguments, to make things "truer," or to provide discipline to realities by defining their parameters of representation. The movement of images between and at the boundaries of different social worlds enables them to create a conceptual space where cosmologies are reduced to the visual cue and seem to be shared (Burri and Dumit 2008; Prasad 2005).

## **The Perpetual Making of Brain Death**

ICR rabbis have strongly justified the creation of *Arevim* by emphasizing the aim of raising organ donation rates where public trust is missing. The name *Arevim* suited this purpose well, as the "trustees" can attest that all was done in compliance with the ethical obligation shared by the family and the religious institution. This reflects, once again, a broader problematic surrounding brain death involving the clash between utilitarian considerations of the provision of organs to many, and the intrinsic value of each particular life, including the potential donor's. Prominent scholars have referred to brain death as a form of "conceptual gerrymandering" or a sort of "legal fiction" (Taylor 1997) designed to solve the economic and/or social problems associated with futile care of irreversibly comatose patients

and the shortage of organs for transplant (Giacomini 1997; Pernick 1999; Wijdicks and Pfeifer 2008). Even in the United States, the public seems to have real concerns that the need to procure organs may result in suboptimal medical treatment. Concerns about premature declarations of death and undertreatment appear as the outstanding reasons for refusals to sign donor cards in both Israel and the United States (Robbins 1990; Youngner and Arnold 2001). In Israel, a mixture of different solutions, reflecting the well-known importance Judaism places on saving each life, have been devised to address this problem (Flannelly et al. 2006; Rosner 2002).

### *Enacting Social Death*

The issue of determining death has important social and interactional bases (Cassell 1974; Lock 1996). In this context, a brain death patient may still remain within a family's world, and any attempts to remove the individual from this interaction within the family may result in cries of "murder." Mixed messages from professional caretakers only add to the uncertainty (Kaufman and Morgan 2005; Lock 2001). Often, health-care workers may have fluid ways by which they consider whether a patient is dead or alive (Day 2001; Kellehear 2008; Rassin, Lowenthal, and Silner 2005). Even if health-care workers say nothing, through "work practices" (Casper 1994) they may exchange meanings and attach them to specific "things," thereby leading others to sense ambiguities. The news may be presented in a confusing manner, introducing tropes of hope, as if discussing a bad prognosis rather than a declaration of death (Kesselring, Kainz, and Kiss 2007).

At a basic intuitive phenomenological level, brain death patients may appear to be soundly, peacefully asleep, rather than dead. They do not resemble corpses, as their skin has a pinkish hue, their chests go up and down, and they may even become "sick" and develop bedsores (Kellehear 2008; Sundin-Huard and Fahy 2004). In fact, there may even be some movement, known as the Lazarus reflex (Ropper 1984). On the superficial visual level, the person seems alive and may often lack any exterior sign of injury or disease (Kesselring, Kainz, and Kiss 2007; Siminoff et al. 2001). Even the Electrocardiogram (ECG) monitor, a technological proxy *par excellence*, may at times show signs of life, the graph seldom completely flattening (Rassin, Lowenthal, and Silner 2005).

Carrying out death in a technological setting must then include technology. Indeed, dying "naturally" in the Intensive Care Unit (ICU) means dying through the instruments (Seymour 1999). In cases of pending hospital death, family members tend to gather around the screen and learn to "read" the vital

signs on the monitor to such an extent that they may focus more on the screen than on the patients (Mol 2002). The technological apparatus translates the inner condition of their loved one, to whom they have no access, into a clear picture portraying the absence of a particular biological activity (Hadders 2009). The flat line on the monitor, just like the output from the instrumental testing for brain death, shifts the role of the “herald” of death from the body to the technology (Glaser and Strauss 1968; Sudnow 1967). In this technology-in-practice (Timmermans and Berg 2003), the instruments and the human actors work within a complex network (Latour 2005; Mol and Law 2004). It is here where *Arevim* can play a key role in reducing ambivalence on the part of family members, thus removing an important obstacle to permitting organ retrieval (Rassin, Lowenthal, and Silner 2005). This role of the *Arevim* conforms with the ICR’s position on the determination of death and to its own need to resolve the ambiguities and uncertainties involved in the ontology, epistemology, and halakhic status of brain death.

### “Do-ability” and Human Mediation

The introduction of medical technology affects how scientific and lay concepts are constructed, deconstructed, and reconstructed. This is obvious where the technology actually creates new phenomena, as is the case with the mechanical ventilator and brain death patients, but it also occurs when a phenomenon already existing becomes associated with specific tools. In Israel, forty years after the Harvard Committee’s findings, the instruments have been given the new role of making the determination of brain death “do-able.” They stabilize and routinize the newly founded fact that brain death can be ascertained beyond reasonable, perhaps unreasonable, doubt, reflecting its acceptance or kosherness. In the Israeli protocol for determining brain death, transcranial Doppler and angiography are used, inter alia, as the technology of choice in confirming the clinical tests. The choice of visualizing instruments for providing an objective endorsement of the clinical test is of special interest from the general perspective of technological objectivity in medicine as well as from the perspective of granting legitimacy to the definition of brain death in Israel. In effect, it is the do-ability or the ability to create a believable object that reinforces and justifies a religious acceptance of brain death.

This do-ability, however, is achieved through a significant amount of human mediation. First, making the images readable demands considerable manipulation. Second, actually reading the images correctly often requires a high level of expertise and specialization, including both formal education and experience. Decisions made about the contrast, colors, sensitivity,

interface with the reader, and other properties are all preprogrammed, often deliberately, in a way that may seem transparent (Burri and Dumit 2008). However, what may seem to the noninitiated as a mere reflection of reality is in fact mediated by complex technological constructions and mathematization through which rough data are organized, operationalized, and transformed. Mediation may hide or reveal certain aspects of the phenomenon simply based on an abstract, opaque formula, which mimics unmediated sensual faculties (Cartwright, 1995; Foucault 1964). Of these faculties, vision is unquestionably the most noteworthy. Instruments easily produce images of “entities” that are naturally beyond human experience. False colors may be created, contrast may be added, and Gestalt filling of gaps of data is common. Images clean out the fuzziness of reality. In this respect, images are hyperreal and may seem more like nature than nature itself (Burri and Dumit 2008; Dumit 2004; Ihde 2009; Joyce 2006). Thus, although images are far from neutral revelations of reality, the modern tendency to regard sight as evidence, with seeing being almost inseparable from “knowing” seems almost insurmountable (Draper, 2002; Lynch and Woolgar 1990) and is likely to be shared, at least superficially, by the ICR.

The source of confusion could be expressed in Goffmanian terms (Goffman, 1959), that is, in the backstage engineering of the frontstage. In the backstage, the choices for the forms of representations take into account the frontstage enactment in the ways in which the user interfaces are designed. While *Arevim* rabbis seek to become part of the backstage, their attitude toward the instruments is one that disregards the elaborate scriptwriting that may have turned them into artifacts that have the power to suspend disbeliefs. Another possibility is that some of these *Arevim* actors adopt a willing suspension of disbelief in the instruments, with the more medically savvy rabbis aware of the hermeneutic mediation involved, yet viewing the frontstage as the place where truth is not only displayed but also created. The abstract philosophical manner in which this material from the instruments becomes evidence would then be much less relevant than the fact that it is, simply, an accepted form of evidence in the eyes of the public the *Arevim* seek to serve and the ICR authority they need to persuade and reassure. The role these materials play in this process constitutes a crucial component in the perceived authoritativeness of instruments and the reason why *Arevim* rabbis will insist on their importance. That being said, it can also be assumed that the addition of more layers of instruments and tests for confirming brain death, and the involvement of representatives of the religious camp in the “backstage” of the brain death, definition is aimed at preventing false positives in determining brain death and reducing or eliminating the

risk of killing a person who, according to the orthodox understanding of Jewish law, is still alive.

### *The Medium and the Message*

The uses of instruments in medical practice and in the production of “truth” in scientific studies have been well examined (Gross 2009; Joyce 2006; Prasad 2005). Their functions are produced within a context of available techniques, professional knowledge, and the cultural and aesthetics preferences of the reader. Machines and instruments draw their authoritativeness precisely from the process of blackboxing, which hides both the internal processes dividing the input and output and the involvement of human actants in these processes. Thus, the images are assigned a central epistemological virtue: objectivity (Cambrioso, Jacobi, and Keating 1993; Daston and Galison 1992). Another, no less consequential purpose served by the instruments has less to do with the rhetorical power of the medium and more to do with the suitability of the message it is meant to convey. Images often support metaphors and stories about the world that correspond to particular cognitive and cultural inclinations (Martin 1987). A Doppler study, for example, does not automatically provide any “readable” material. The output, however, may be made to look like a familiar wave of activity. In cases deemed appropriate, images of status, or nouns, can be transformed into images of process, or verbs, and vice versa.

The issue of status versus process is critical in the position one takes on brain death. Indeed, at every stage of life (and, arguably, death, right until full decomposition), both live and dead cells coexist within the organism. This makes any attempt to define biological life and death as mutually exclusive artificial and logically problematic (Botkin and Post 1992; Emanuel 1995; Halevy and Brody 1993). However, if, according to another system of thought, such as that reflected in Jewish and state law, life and death must be viewed as binary categories, some artifacts may provide a clearer binary answer. If any doubt remains, tests can be repeated. Epistemologies of risk, where certainty is replaced with statistical near-certainties, do not appear to be relevant in making brain death acceptable according to Jewish law (Gross and Shuval 2008), but they are critical in medicine where certainty may be more elusive than in any other field in which science is implemented. Yet again, in Israel, a bridge between the lay and the medical epistemologies of death has been constructed by representatives of orthodox religion who, while less than likely actors and participants in the debate, have control over the power of technology. This modern attitude toward

technology is, perhaps, more remarkable in a body like the ICR, which is entrenched in tradition and would be expected to have less reverence for or awe of technology. Yet, rabbis and the family members with whom they are in contact use this modernist approach to satisfy their need for certainty, evidence, and authority in a realm where ambiguity reigns.

## Conclusion

If death has a history, then the history of brain death is the history of dispute, controversy, and contention. Since the introduction of brain death fifty years ago, the concept of death has undergone a rapid process of entropy. The mere fact of death has been charged with multiple meanings to the point where the controversial epistemology of death has become a public issue. This article has examined the various ways in which different social actors negotiated, enacted, and disputed the validity of brain death. The adoption of brain death as a bona fide form of death demands a reconsideration of the ontological, the epistemological, and the ethical, all entangled in one network. In the case at hand, religious tradition and modern technology, each with its own aesthetic, discursive qualities and assigned authorities, played critical roles in the complex history of brain death in Israel. The construction of a definition of death acceptable to orthodox Jews entailed a sophisticated use of science and technology by all parties. Rabbis affiliated with the ICR have used technology in order to find a meeting point between the halakhic, aerobic, definition of death, and the neurological definition, while the dissident camp of ultra-orthodox rabbis has used technology in order to reject this compromise. Even today, ten years after the enactment of the respiratory brain death law, brain death is still unacceptable within large circles of the public.

Although this article discussed the evolution of brain death in Israel, this discussion can be generalized to a growing number of cases where technological advances introduce hybrids that do not conform to lay conceptions of life and death. Brain-dead fetuses, frozen embryos, egg freezing, and gene editing are contemporary challenges that may raise similar concerns. A comprehensive understanding of the mechanism at work with these contested realities is one of the pressing tasks of bioethics today.

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1. A body of knowledge based on answers given by esteemed rabbis to particular problems.

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