Deactivating Implantable Pacemakers and Defibrillators in Terminally-Ill Patients

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Introduction

Pacemakers and defibrillators are cardiac implantable electrical devices (CIEDs) used to treat electrical, or rhythm disturbances of the heart (i.e. hearts that beat slowly or dangerously fast). At the end of life, patients with CIEDs occasionally request to have their CIEDs deactivated, in order to allow themselves to die "naturally."[1] The goal of this article is to delineate the medical, legal and religious issues involved with deactivating CIEDs in terminally-ill patients.

Medical Aspects of CIED

Implantable pacemakers have been available since 1959. The pacemaker system is comprised of wires, called pacing leads, which are screwed into the heart muscle. The pacing leads are then connected to a battery, or generator, which resides underneath the skin in the upper chest or pectoral region. The generator delivers energy via the pacing leads to pace or beat

1. CIEDs are the sole property of the patient. Once implanted in a patient the CIED cannot be reused to implant in another patient. The hospital and CIED manufacturer do not need the CIED, so patients are buried with their CIED.

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for the heart. The energy delivered by the pacemaker to pace the heart is minimal and causes no pain.

Beginning in the late 1970's, settings on pacemakers could be adjusted without surgically explanting the device. Portable computers called programmers communicate with CIEDs so settings can be easily altered by physicians. Pacemakers cannot technically be shut off, but they can be programmed not to pace the heart. This will be referred to as deactivating the pacemaker.

Pacemaker patients can be classified into two groups. The first group consists of patients who are dependent on their pacemakers to live. These patients are referred to as "pacemaker dependent." Deactivating pacemaker function in these patients will cause the heart to stop beating and therefore lead to their death. The second group consists of patients who receive pacemakers to improve exercise capacity and physical energy but who will not die without their pacemaker. These patients are referred to as "non-pacemaker dependent." Deactivating pacemaker function in these patients may decrease quality of life but will not lead to their death.

There is a common misconception that pacemakers do not allow patients to expire because the pacemaker will pace and beat for the heart until the battery runs out. It is for this reason that many terminally-ill patients and their families request to have pacemakers deactivated. A proper understanding of pacemaker function can usually help alleviate patient and family concerns regarding this matter. A pacemaker does not actually beat for the heart but delivers energy to make the cells of the heart contract and beat. Once a patient stops breathing and the body is unable to obtain oxygen, the cardiac cells will die. Without oxygen, the cardiac cells are unable to contract and beat even with the energy delivered by pacemakers. Therefore, patients with a pacemaker can die from their terminal illness without deactivating the pacemaker.

Implantable defibrillators have been programmable since their inception in the late 1980's. Defibrillators are implanted in the heart similarly to pacemakers. They utilize defibrillator leads and generators that deliver high amounts of energy to electrically shock or defibrillate the heart. The energy required to defibrillate the heart is approximately ten million times the energy needed to pace the heart. Defibrillation shocks are painful and may cause significant physical and psychological harm to patients.[2]

Implantable defibrillators have three basic functions. Firstly, in a patient with a fatal fast heart rhythm called ventricular fibrillation, the defibrillator can electrically shock the heart back to a normal rhythm and revive the patient. Secondly, if a patient has a potentially dangerous fast heart rhythm called ventricular tachycardia, the defibrillator will attempt to terminate this rhythm.[3] Thirdly, defibrillators have the same pacing capabilities as pacemakers and can be used to treat slow heart rhythms. Therapy for fast heart rhythms can be completely shut off and pacemaker function for slow heart rhythms can be adjusted like pacemakers not to pace the heart.

There are several classes of patients who receive implantable defibrillators. Patients who have been resuscitated from ventricular fibrillation are at high risk of recurrent episodes and benefit from defibrillators.[4] Certain cardiac diseases are

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2. Ahmad M, Bloomstein L, Roelke M, Bernstein AD, Parsonnet V. Patients' attitudes toward implanted defibrillator shocks. Pacing Clin Electrophysiol 2000;23:934-938.

Bourke JP, Turkington D, Thomas G, McComb JM, Tynan M. Florid psychopathology in patients receiving shocks from implanted cardioverter-defibrillators. Heart 1997;78:581-583.

3. The defibrillator will first try to terminate ventricular tachycardia without electrically shocking the heart. A pacing algorithm is used to overdrive and terminate the ventricular tachycardia. This is usually sufficient but if it is unsuccessful, the defibrillator will electrically shock the heart back to a normal rhythm.

4. The Antiarrhythmics versus Implantable Defibrillators (AVID)

associated with a high risk of dying from a fatal heart rhythm, and defibrillators are recommended to prevent sudden cardiac death.[5] Patients with poor heart pumping function, referred to as systolic heart failure, are at a higher risk of dying suddenly from a fatal heart rhythm. Studies done over the last 15 years have shown that implantable defibrillators prolong lives in this last group of patients.[6] The vast majority of patients in the United States with implantable defibrillators fall into this last group.

By reducing the incidence of sudden death from a fatal heart rhythm, defibrillator patients are now dying from other causes. Over the last few years there has been a significant increase in terminally-ill patients who are living with implantable defibrillators. Terminally-ill patients often have discussions with their primary care doctors regarding end of life issues. Deactivating defibrillators is often encouraged to prevent unwanted painful shocks.

Legal aspects of deactivating pacemakers

According to United States law, people have autonomy over their own body. Suicide is not a criminal offense and the US courts have upheld the rights of patients to refuse life-saving

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Investigators. A comparison of antiarrhythmic-drug therapy with implantable defibrillators in patients resuscitated from near-fatal ventricular arrhythmias. N Engl J Med 1997;337:1576-1583.

5. Zipes DP, Camm AJ, Borggrefe M, et al. ACC/AHA/ESC 2006 Guidelines for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death-Executive Summary A Report of the American College of Cardiology/American Heart Association Task Force and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Develop Guidelines for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death). J Am Coll Cardiol 2006; 48:1064-1108.

6. Bardy GH, Lee KL, Mark DB, et al. Amiodarone or an implantable cardioverter-defibrillator for congestive heart failure. N Engl J Med 2005; 352:225-237.

treatments and to withdraw life-sustaining treatments.[7] However, physician-assisted suicide (except in Oregon and Washington) and euthanasia (in all states) are illegal.

Pacemakers are considered life-sustaining therapy.[8] Pacemakers perform the electrical duties of the heart but do not cure the hearts' electrical problems. Other examples of life-sustaining therapies are hemodialysis in patients with kidney disease and insulin in patients with insulin dependent diabetes mellitus. Hemodialysis performs the function of the kidneys but does not treat the kidney disease and exogenous insulin replaces the insufficient endogenous human insulin but does not reverse the underlying disease process.

Removing life-sustaining therapy will cause the patient to die from their medical illness. However, it is not the removal of therapy that kills the patient but the patient's underlying disease. This is in contrast to physician-assisted suicide and euthanasia where the intervention itself kills the patient.[9] The US Supreme Court has made a clear distinction between withdrawing life-sustaining treatment, and physician-assisted suicide, or euthanasia. In Vacco versus Quill[10] the court ruled on this difference.

> The distinction comports with fundamental legal principles of causation and intent. First, when a patient refuses life-sustaining medical treatment, he dies from an

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7. Cruzan v. Director, Missouri Department of Health, 497 U.S. 261 (1990). 497 U.S. 261 88-1503. 1990. Supreme Court of the United States. Also see medicolegal discussion regarding Terri Schiavo case in Annas GJ. "Culture of Life" politics at the bedside- the case of Terri Schiavo. N Engl J Med 1997; 337:1710-1715.

8. Lampert R, Hayes D, Annas G. HRS expert consensus statement on the management of cardiovascular implantable electronic devices (CIEDs) in patients nearing end of life or requesting withdrawal of therapy. Heart Rhythm 2010; 7:1008-1026.

9. Ibid.

10. Vacco vs Quill, 521 U.S. 793, 117S.Ct. 2293 (1997) Supreme Court of the United States.

> underlying fatal disease or pathology; but if a patient ingests lethal medication prescribed by a physician, he is killed by that medication.

The act of deactivating a pacemaker does not kill the patient, but allows the patient to die from the heart's electrical problem. This is not considered euthanasia and is legally permissible.

A recent consensus statement was published by the Heart Rhythm Society to address the medicolegal issues involved in deactivating pacemakers.[11]

> A patient with decision-making capacity has the legal right to refuse or request the withdrawal of any medical treatment or intervention, regardless of whether the treatment prolongs life and its withdrawal results in death….Ethically and legally, there are no differences between refusing cardiovascular implantable electronic device (CIED) therapy and requesting the withdrawal of CIED therapy… Ethically, CIED deactivation is neither physician-assisted suicide nor euthanasia…. The clinician's intent is to discontinue the unwanted treatment and allow the patient to die naturally of the underlying disease – not to terminate the patient's life.

Legally, patients have the right to withdraw pacemaker therapy even if it will immediately lead to their death.[12] Physicians have a legal right to honor a patient's request and deactivate pacemaker therapy.[13]

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11. Lampert et al. ibid.

12. Meisel A, Snyder L, Quill T. Seven legal barriers to end-of-life care:myths, realities, and grains of truth. JAMA 2000; 284:2495-2501.

13. While the physician has the right to deactivate a pacemaker he/she is not obligated to do it. If the physician does not wish to deactivate the pacemaker they should refer the patient to someone who will deactivate the pacemaker.

Jewish aspects of deactivating pacemakers

The major principle which differentiates Judaic law from United States law is ownership of one's body. Judaism believes that our bodies and souls belong to God. In Ezekiel, God says that "all souls are mine." [14] We have no ownership rights over our own person and are not afforded the ability to decide what can be done to our bodies.[15]

In the beginning of Deuteronomy Moses exhorts the Jewish people to obey the laws of the Torah and states that "you shall greatly beware for your souls."[16] We are mandated to protect ourselves from any harm. At the end of Deuteronomy God states that "I put to death and I bring life, I strike down and I will heal, and there is no rescuer from my hand."[17] God is the only one who determines life and death. The Torah mentions the prohibition against killing numerous times and states in Leviticus that one should "not stand idly by while your neighbor's blood is shed."[18] We are instructed not only to protect ourselves but our fellow Jews as well.

The Gemara in *Shabbat* states that "He who closes the eyes of a dying person while the soul is departing, he sheds blood."[19] Rashi explains there that closing of the eyes may hasten death and is thus forbidden. The Rambam explains that one who is dying is regarded as a living person in all respects.[20] Therefore, anything that may hasten death is akin to murder. The *Shulchan Aruch* rules that even a *gosses*, a person whose death is imminent (estimated to be less than 3 days), is considered a

14. Ezekiel 18:4.
15. Rambam *Chovel Umazik* 5:1.
16. Deuteronomy 4:15.
17. Ibid 32:39.
18. Leviticus 19:16.
19. *Shabbat* 151b.
20. Rambam *Avel* 4:5.

living person in all respects.[21] The *Shulchan Aruch* rules that it is prohibited to perform certain activities with a *gosses* because it is tantamount to murder. Rabbi Moshe Iserles (Ramo) explains that in accordance with the Gemara in *Shabbat* these actions may hasten death and are thus prohibited. [22]

Rabbi Yehuda HeChasid writes that if a person is actively dying (a *gosses*) one should not prevent him/her from dying.[23] He writes that one should not place salt on the tongue of a *gosses* in an effort to delay his imminent death. In addition, he states that if someone near the house of the *gosses* is chopping wood and the noise is preventing the soul's departure, the wood chopper should be removed. However, he prohibits moving a *gosses* if the *gosses* states that his/her soul cannot depart until the body is moved to another location. Since the wood chopping is remote from the body and is not providing any mode of therapy, such an impediment may be removed even if the soul will depart faster.

The Ramo states that it is prohibited to move the body of a *gosses*. Even to remove feathers from the pillow of a *gosses* is not allowed since such movements may hasten death.[24] However, if there is something preventing a *gosses* from dying, such as salt on the tongue or an external noise, that impediment to death may be removed. While Rabbi Yehuda HeChasid does not obligate one to place salt on the tongue of the *gosses*, the Ramo allows for the removal of salt even though it may hasten death. The Ramo states that removal of salt is not considered a *maaseh,* or positive action. Rather, it is simply removing an inhibitor to death and is therefore permitted. Commentators on the *Shulchan Aruch* find this particular statement of the Ramo difficult to understand since the salt

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21. *Shulchan Aruch Yoreh Deah* 339:1.
22. Ibid.
23. *Sefer Chasidim*: 723.
24. Ramo *Yoreh Deah* 339:1.

removal requires moving the mouth of the *gosses*.[25] Rabbi Shabbatai ha-Kohen, author of the *Siftei Kohen*, explains that moving the lips of the *gosses* is an insignificant movement and is therefore permitted by the Ramo.[26]

Modern-day *poskim* discuss this ruling of the Ramo. Rabbi Immanual Jakobovits reiterates that the Ramo is only referring to a *gosses* but not to terminally-ill patients who may have more than 3 days left to live.[27] Secondly, the impediments mentioned (noise and salt) do not play any role in the medical management of the patient. Removing life-sustaining therapy that is critical to the medical management of the patient would likely not be included under the Ramo's ruling. Rabbi Waldenberg similarly explains that the Ramo only allowed the removal of impediments that had no medicinal purpose but would not allow for the removal of any medical therapy even for a *gosses*.[28]

Modern-day *poskim* discuss the halachic issues involved with removing medical therapy from terminally-ill patients. Rabbi Moshe Feinstein rules that there is no obligation to prolong life in terminally-ill patients but under no circumstances can anything be done that will hasten death by even a moment.[29] Rabbi Shlomo Zalman Auerbach rules that one must never do anything to hasten the death of a terminally-ill patient.[30] Even a *gosses* must be given basic human requirements and once medical treatments have been initiated they cannot be discontinued if it will hasten death. Rabbi Waldenberg similarly rules that a patient with any spontaneous life, even a *gosses*, must be given blood, antibiotics, oxygen and food.[31]

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25. *Turei Zahav* and *Ba'er Haitev Yoreh Deah* 339:1.
26. *Yoreh Deah* 339:1.
27. Jewish Medical Ethics. NY, NY 1959 119-125.
28. *Tzitz Eliezer* 14:80,81.
29. *Iggerot Moshe Choshen Mishpat* 83:1.
30. See *Nishmat Avraham Yoreh Deah* 2:324.
31. *Tzitz Eliezer,* ibid.

The consensus from modern-day *poskim* is that it is prohibited to remove any medical therapy from patients if it will hasten death.

The removal of pacemaker function in "pacemaker dependent" patients will directly cause death. The heart will stop beating and the patient will die from the cessation of the heart's pacemaker function. Even one who may argue[32] that the Ramo would permit removing medical therapy in the case of a *gosses*, would likely not allow deactivating a pacemaker. In the Ramo's case of removing the impediment to death, the patient will die from their terminal illness. However, when deactivating a pacemaker in a terminally-ill patient, the patient will die from the loss of pacemaker function and not from the terminal illness.

The removal of pacemaker function in "non-pacemaker dependent" patients will not lead to the death and may be permitted. However, since these patients had pacemakers placed for slow heart beats to improve quality of life, deactivating pacemaker function may increase suffering. In patients who are dying from end stage heart failure, a slow heart beat may actually worsen heart failure and indirectly hasten death. These cases are complex and each patient is different, so a discussion between the physician and rabbi is needed before deactivating a pacemaker.

Legal aspects of deactivating defibrillators

As opposed to pacemaker function which is life-sustaining, defibrillator function would be considered *life saving*. Defibrillators (not including its pacemaker capabilities) are referred to as life insurance policies. If a patient has a lethal fast heart rhythm the defibrillator can convert the rhythm back to normal and save a patient's life. On an ongoing basis the

32. I am unaware of any ruling that explains the Ramo to include the removal of medical therapy.

defibrillator monitors the heart but doesn't actively do anything to prolong life or improve a patient's quality of life.

Defibrillator shocks prolong patient survival but do so by causing significant pain. Patients who are terminally ill are sicker and more prone to receive both appropriate and inappropriate shocks. One study evaluating terminally-ill patients with defibrillators noted that approximately 20% received a shock within a month of their eventual death and almost 30% within 3 months of their death.[33] By electrically shocking patients, defibrillators prevent patients from dying suddenly of a lethal heart rhythm. In patients who are suffering from a terminal illness (i.e. cancer), this *life saving* shock therapy is often viewed as unnecessarily causing additional pain and prolonging existing suffering. For this reason, patients with terminal diseases who have defibrillators often request to have their devices deactivated. Legally, patients may request to have their defibrillator deactivated and physicians may honor this request.[34]

Jewish aspects of deactivating defibrillators

Deactivating an implantable defibrillator has no immediate effect on the patient. The defibrillator does nothing active but passively watches for a potentially fatal heart rhythm. If a patient develops a dangerous heart rhythm the defibrillator when programmed off will not electrically shock the patient. The defibrillator doesn't hasten death but allows the patient to die without saving or reviving them. This is most comparable to a Do Not Resuscitate (DNR) order.

As mentioned above, it is our personal duty to protect ourselves and our fellow Jews from bodily harm. It would

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33. Lewis WR, Luebke DL, Johnson NJ, Harrington MD, Costantini O, Aulisio MP. Withdrawing implantable defibrillator shock therapy in terminally-ill patients. Am J Med 2006;119:892-896.

34. Zipes et al. ibid p. 1065.

seem from the Torah that we are obligated to do everything in our power to preserve our own and our fellow Jew's life.[35] However, there may be cases where halacha would consider it medically futile to treat or resuscitate a patient and would permit doing nothing while our fellow Jew was dying.

Rav Moshe Feinstein discusses issues regarding a patient who is suffering from an underlying disease that has no curative therapy.[36] He writes that while you can't perform an act to curtail life, you need not administer medicine that can only temporarily prolong an existing life of suffering. Rav Moshe reiterates that you should do nothing but maintain the patient in their present condition. Rav Moshe writes specifically regarding cancers with no known cure, that there is no obligation to administer or receive medication that will prolong life, even for a few months, if it is a life of pain and suffering. Rav Moshe writes that if the intervention itself causes suffering, that therapy should not be administered.[37]

Rav Elyashiv is more stringent and requires one to do everything possible to prolong the life of a terminally-ill patient even if he/she is suffering.[38] However, if the treatment itself brings additional suffering, Rav Elyashiv agrees that there is no obligation to receive or administer that treatment. Rav Shlomo Zalman Auerbach similarly rules that it is permissible to withhold therapy from a terminally-ill patient if the treatment itself will cause additional pain.[39]

Halachically, defibrillator therapy in terminally-ill patients can be categorized as a painful therapy that is not directed at treating the underlying medical illness. It is often viewed as

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35. Leviticus 19:16, that one should "not stand idly by while your neighbor's blood is being spilled."

36. *Iggerot Moshe Choshen Mishpat* 83-85.

37. *Iggerot Moshe Yoreh Deah* 174:3.

38. See *Nishmat Avraham Yoreh Deah* volume 2: 339.

39. *Minchat Sholmo* 91:24.

prolonging the inevitable death process. According to the aforementioned *poskim*, it would be permitted to deactivate defibrillators in patients who are suffering from their terminal illness.

Conclusion

CIEDs are implanted to prolong lives. Patients who are suffering from a terminal illness may no longer desire CIED therapy. According to United States law, it is always permissible for a patient to request CIED deactivation. It is also permissible for a physician to deactivate CIED therapy if requested by a patient. According to Jewish halacha, one does not have ownership rights over their body. Therefore, removing pacemaker therapy which is life-sustaining in a "pacemaker dependent" patient is prohibited since this will hasten death from loss of pacemaker function. Removing pacemaker therapy in most "non-pacer dependent patients" would be permitted since it will not hasten death.[40] Removing defibrillator therapy which is *life saving* is permitted in patients suffering from a terminal illness since it will not hasten death and the therapy itself causes additional suffering. A discussion between the treating physician and rabbi is critical to determine the appropriate halachic ruling for each individual case.

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40. In patients with poor heart pumping function, removal of pacemaker function even in "non-pacemaker dependent" patients may hasten death and would thus be prohibited.

This article was written in memory of Chanah bat Avraham. The author wishes to acknowledge Rabbi Joshua Flug for his helpful suggestions.