Unlike Diamonds, Defibrillators Aren't Forever: Why It Is Sometimes Ethical to Deactivate Cardiac Implantable Electrical Devices

DANIEL P. SULMASY and MARIELE A. COURTOIS

I. Introduction

The distinction between "killing" and "allowing-to-die" (K/ATD) continues to be scrutinized by physicians and ethicists. Many reject the distinction.[1,2,3] Yet for those who accept it, as technology advances and therapeutic devices better mimic patient physiology, the question arises anew as to whether the physician who stops an implanted, sophisticated device is culpable for having stopped life itself.

This article addresses the ethics of deactivating life-sustaining cardiac implantable electrical devices (CIEDs). Thomas Huddle takes physician discomfort with deactivating CIEDs as a "clue"[4] and argues that the K/ATD distinction should be interpreted as a distinction between whether a therapy is completed or ongoing. Huddle claims that deactivation of CIEDs in all cases should be considered killing,[5] while refraining from adjustments to CIEDs should be considered ATD.[6] We will counter Huddle's analysis in favor of our own view that under appropriate conditions, CIEDs can be ethically deactivated as instances of ATD. First, we will present our points of agreement with Huddle. Second, we will show how Huddle's position is muddled: (A) he lacks a clear understanding of the role of intention in relation to moral acts, (B) he ignores Sulmasy's distinction between replacement and substitutive therapies, and (C) he misappropriates a hypothetical case described by Jeff McMahan. Third, we will point out a number of undesirable implications of following Huddle's proposal. These conclusions lead us to reject his position and reaffirm our own.

II. Points of Agreement with Huddle

We agree with Huddle that physicians ought not to kill patients. We also agree that there is moral significance to the K/ATD distinction and that it is complex. Two of the factors that make the K/ATD distinction complex are also points of concurrence with Huddle. We accept the fact/value distinction as he employs it, and we agree that the fact that a therapy has been "completed" carries some moral weight.

Regarding natural facts, we agree with Huddle that these alone do not determine ethical judgments. Instead, a physician should approach ethical questions by a strategy founded on a "normative framework."[7] According to our framework, understanding the K/ATD distinction requires evaluation not just of the facts but also of other factors, such as the nature of the act, its causal pathways, its anticipated

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outcomes, the circumstances under which it is performed, and the intention of the actor.[8]

We also agree that there is some validity to Huddle's idea that therapy completion is a factor in the K/ATD determination. According to Huddle, completed treatments are implanted material in which physician agency is no longer active and which place the patient at a physiological equilibrium. We agree that having implanted such a device does make the physician morally responsible for its effects and creates a *prima facie* duty to maintain the device. The implications Huddle draws from this, however, are overwrought. "Completed" treatments intended to secure physiological equilibrium in fact may be ineffective or cause unanticipated complications, so it does not seem unreasonable to allow them to be stopped in these circumstances. For example, it does not seem unreasonable to us to discontinue a left ventricular assist device that was implanted as destination therapy when the postoperative course includes hypotension requiring inotropic support, kidney failure requiring hemodialysis, and respiratory failure requiring mechanical ventilation with no hope of recovery.[9] As we will argue below, for the termination of a treatment to count as killing, the fact that the therapy is completed may be a necessary, but not a sufficient, condition of the ethical judgment.

III. Points of Disagreement with Huddle

Although Huddle accurately quotes and reports definitions from Sulmasy, he does not do justice to the robust role that intention plays in Sulmasy's account and ignores Sulmasy's distinction between "replacement" and "substitutive" therapies. Additionally, he draws an inappropriate analogy between Jeff McMahan's *Burning Building II* case and the distinction between K/ATD as it arises in medical practice. These problems undermine his argument.

A. A Fuller Account of Intention

At one level, Huddle is correct in suggesting that Sulmasy's account of the distinction between K/ATD is descriptive. He fails, however, to fully appreciate how Sulmasy's account incorporates intention into the determinations of killing and ATD. Sulmasy's definition of killing is "an act in which an agent creates a new, lethal pathophysiological state with the specific intention in acting of thereby causing a person's death," and his definition of ATD is "an act in which an agent either performs an action to remove an intervention that forestalls or ameliorates a preexisting fatal condition or refrains from action that would forestall or ameliorate a preexisting fatal condition, either with the specific intention of acting that this person should die by way of that act or not so intending."[10] Sulmasy notes that the traditional understanding of the distinction can be rendered as the following: all medical killing is wrong, but some allowing-to-die is morally permissible. Thus the ethical judgment has a complicated and quantified logic, superimposed on definitions that combine intention and description. The ethical judgment is that it is wrong for a physician to act with the direct intention in acting of making a patient dead, which is true in all cases of killing and in some cases of allowing-to-die. The justification for this judgment is based on ethical views about the value of human life and the social role of the physician. This is not, therefore, a merely descriptive account.

Moreover, Sulmasy's account of intention is helpful for understanding the

psychological complexity of deactivating a CIED, which can explain some of the discomfort physicians might feel about deactivating CIEDs. Intentions can be complicated to determine. They are not the same as motives, desires, beliefs, or foresight.[11] Death for the suffering patient may be *desired* by the patient for the sake of ending pain, the physician may *believe* the patient will die as a result of CIED deactivation, and death may be *foreseen*,[12] but these propositional attitudes are distinct from having the death of the patient as the object of one's *intention*.[13] For those who (like Huddle and like us) think it is wrong to kill patients, in morally permissible cases of ATD the intention should be "to remove a treatment that is perceived by the patient as non-beneficial or burdensome, not termination of the patient's life."[14] Intending to make the patient dead by means of CIED deactivation counts among instances of ATD that are ethically wrong.[15] On the other hand, an act that may be contrary to patient survival may not be contrary to patient well-being, and such is the case with ethically permissible cases of CIED deactivation, in which commitment to the patient takes precedence over the physician's fidelity to the prescribed technology.

Physicians express discomfort with CIED deactivation because they question whether interfering with such a device violates their obligation to do no harm. Sulmasy's more refined understanding of intention shows how CIED deactivation can be consonant with *primum non nocere*. Physicians must avoid *aiming* at harm by their own hands, but they must also avoid prolonging the harms inflicted by their medical technologies. Sulmasy's approach, focused on intention, connects physicians' inner attitudes with rightful action.

B. Establishing More Precise Treatment Categories

As stated, we agree with Huddle's assertion that completion is an important factor in determining whether the withdrawal of a given life-sustaining therapy is an instance of ATD.[16] We disagree, however, that it is a sufficient factor for determining whether withdrawal can be morally permitted, as in the case of CIED deactivation.

One difficulty with Huddle's categorization is the fact there are many examples in which a physician's therapeutic act has been "completed," yet the intervention can still be undone at the request of the patient. Some examples include vasectomy reversal,[17,18,19] the removal of hernia mesh,[20,21] removal or deactivation of deep brain stimulation,[22,23,24,25] and the removal of a ventriculoperitoneal (VP) shunt.[26,27] Some of these, like the VP shunt or (arguably) a deep brain stimulator, are life-sustaining. Does Huddle want to suggest they cannot be removed even if they function imperfectly?

Huddle's categorizations are imprecise and broad. Now, perhaps what he wants to say is that if a therapy is "completed," and it is life-sustaining, and there is no plan to replace it, then to withdraw it is killing and ought not to be permitted. But what if a patient's Parkinson's disease has improved with deep brain stimulation, but he doesn't like the personality changes that accompany the treatment as side-effects?[28,29] If he goes on to die of accelerated Parkinson's disease once the deep brain stimulator has been removed, have we then killed the patient? Or what if a VP shunt works but just keeps getting infected?[30,31,32] If the patient is tired of being treated with IV antibiotics, is already dying of lung cancer with cerebral metastases, asks that the shunt be removed, and later dies of increased

intracranial pressure, have we then killed that patient? To conclude that the patient has been killed seems far removed from basic clinical intuitions and the common use of language.

Therapy completion does not seem to be a sufficient condition for denying a patient's request for CIED removal.[33] We share Huddle's sense, however, that there are treatments that have become so physiologically integrated with the patient that they seem to become part of the patient's "self" and that deactivating such treatments would be morally wrong.[34] It seems to us that *this* quality of the treatment, more so than completion, marks the moral distinction between deactivatings that are killings and deactivatings that are ATD.[35] Sulmasy has argued that a judgment needs to be made whether a treatment has become so integrated—physiologically as well as physically—with the patient that it has "replaced" the diseased or inoperable part or function.[36] Stopping a therapy that had become a part of the person would then count as creating a "new" lethal pathophysiological state (new to the patient as an integrated whole) and would then constitute killing. An example would be administering a high-dose potassium chloride IV to "deactivate" a transplanted human heart. Sulmasy's approach to categorizing therapies as either replacements or substitutions does not engender the sorts of counter-examples we noted were one to take mere "completion" to mark the moral difference between killing and ATD. Sulmasy's approach reflects both common-sense insights from clinical experience and consistent philosophical ethical theory.

i. Characterization of a Replacement Therapy. A "replacement" therapy is one that "is a technological intervention that participates in the organic unity of the patient as an organism."[37] Removal or deactivation of a replacement therapy would be impermissible because it would introduce a new lethal pathophysiology.[38] Some of the examples that Huddle[39] provides of completed therapies also fit under the category of replacement therapies (i.e. prosthetic aortic valves and organ transplants). "Replacement" is a better moral descriptor for these treatments than "completed." For example, prosthetic aortic valves are different from other types of cardiac devices because they do not require an external power supply, do not need frequent inspection to confirm functionality, and tend to last a long time without renewal. They require almost no physician work, maintenance, or monitoring, and they are integrated into the patient. If one were to remove a prosthetic aortic valve that was functioning well, or to remove it for no other good reason, with no plan to replace it, then one would be killing the patient.

Yet even replacements may not last forever—and in this sense, they are not "completed." When we say that a replacement therapy is always a completed therapy, we are using the word "completed" in a somewhat looser sense than Huddle, merely implying that the therapy does not need further intervention for a very long time, *ceteris paribus*. If prosthetic aortic valves malfunction, then they can be removed, but typically only if there is a plan to replace or substitute for the lost vital function or part. One could also allow a patient to die with a malfunctioning prosthetic aortic valve or failing transplanted kidney by not replacing or substituting for the defective vital function. Under proper circumstances, this is justified. For example, one might elect not to replace a defective prosthetic aortic valve in a patient dying of cancer. Yet, one ought not to intend to bring about

a quicker death for the patient by removing the prosthetic valve with no intention of replacing it—that would be killing.

ii. Characterization of a Substitutive Therapy. By contrast, "substitutive" therapies are "distinct from the organism and extrinsic to its function, whether administered inside or outside the body. They function by attempting to regulate bodily functions, coaxing them back toward homeostasis."[40] They require external energy sources, are not responsive to physiological changes, and require monitoring or maintenance. Examples Sulmasy provides for substitutive therapies include an implantable cardioverter defibrillator (ICD) and a peritoneal dialysis.[41]

It is important to note that the distinction between replacement and substitutive therapies does not have a bright line. The criteria Sulmasy suggests are rules of thumb rather than a list of necessary and sufficient conditions. The point is that the more criteria for a replacement therapy an intervention satisfies, and the more *clearly* each of these criteria is satisfied, the more accurate it is to consider the deactivation of the intervention an instance of killing.

CIEDs satisfy criteria for a substitutive therapy because they require maintenance checks and intervention (even if infrequent) by a physician in order to maintain proper function. They also require external energy sources (i.e., batteries). Even according to Huddle's own criteria, the status of CIEDs is ambiguous: they "straddle the divide between ongoing and completed treatments,"[42] buttressing the claim that the difference between replacement and substitutive (R/S) therapies is a more effective indicator of the ethical status of CIED deactivation. According to the R/S classifications, it would not be permissible to remove[43] a well-functioning heart valve, but it could be permissible to deactivate a CIED in a situation such as that of a patient dying of another lethal condition.

Another reason to prefer the R/S distinction to Huddle's distinction is that use of the terms "completed" vs. "ongoing" can shape expectations and subliminally affect the physician's sense of duty toward the patient.[44] "Replacement" and "substitution" simply specify a treatment's relationship between the treatment and the patient's own physiology without implying that the physician's work is finished. This is important because, while some CIEDs may return the patient to homeostasis,[45] the reality is that the patient may experience relief from one or more cardiac symptoms only to be left with unresolved effects of aging, comorbidity, treatment complications, etc. "Completed" might be taken to mean that the physician's work is done, but the fact that the treatment is "completed" does not release the physician from the duty to continue to evaluate the burdens and the benefits of the treatment. The best medical judgment may be to withdraw a completed but substitutive intervention that relieves only one occasion of suffering while prolonging several other experiences of suffering.[46,47]

C. The Irrelevance of McMahan's Burning Building II

Huddle references McMahan's *Burning Building II* [48] case to attempt to demonstrate how role responsibilities inform one's duty toward another's fatal trajectory. Yet this example is irrelevant to deactivating CIEDs.

In McMahan's *Burning Building II* case, a fireman with only one net removes it from under one jumper in order to rescue two other jumpers.

Huddle claims that "In this example the causal relations between the fireman, the net and the first jumper exactly parallel that of a physician having set in motion a treatment obstructing a patient's fatal trajectory."[49] We agree with McMahan and Huddle that the fireman "allows" the one jumper to die. But Huddle then claims that removing a life-sustaining treatment is analogous to taking the net away from the one jumper when there are no others to be saved. He says removing the net in this instance would be killing and concludes that withdrawing ongoing life-sustaining treatments is therefore killing.

There are profound problems with this analysis. First, because the net is not yet in use until the jumper makes contact with it, Huddle's analogizing the case to an ongoing medical treatment is strained. The analogy with *Burning Building II* is best made to medical treatments that are potentially life-saving, scarce, but not yet deployed, as in triage situations. Imagine, for example, that a physician had a single oxygen tank and that there were two people trapped in rubble next to each other, both needing oxygen, and that the two would be able to share the single oxygen tank. Imagine further that the physician saw these two while running to administer the oxygen to a single person trapped in a pile of rubble 10 yards away. In this triage case, more precisely analogous to the *Burning Building II* case, it seems that the physician would be justified in diverting his course and rescuing the two instead of the one. And most observers would say that the physician allowed the one to die in order that the other two might live.

Yet Huddle wants the case to do something different. He wants to analogize the *Burning Building II* case to the withdrawal of ongoing, life-sustaining treatment—a physician's reversal of course after "having set in motion a treatment obstructing a patient's fatal trajectory."[50] He deems all such cases "killing." Yet, if this is his argument, whether the treatment is completed or not, whether it is internal to the patient or external to the patient, will not matter. The withdrawal of any and all life-sustaining treatments becomes killing because the physician is taking away the safety net. If that is the case, and if killing is wrong, then one would never be permitted to discontinue a ventilator or a pacemaker or an infusion of dopamine, let alone deactivate a CIED. That would be a troubling consequence of Huddle's thinking. On our view, by contrast, these are all instances of ATD, and these acts can often be justified in the proper circumstances.

A second important disanalogy with the *Burning Building II* case is that the jumper presumably wants to be rescued, and everyone would agree that the burdens of his hitting the net are more than met by the benefits of having his life saved. Under these circumstances, if one took away the net for no good reason, then the act would be wrong—it would be an unjustified instance of allowing-to-die. Yet in what we would consider the justifiable set of cases of withdrawing life-sustaining treatments, precisely the opposite is true. The patient has judged that the burdens of the intervention outweigh the benefits and no longer wants to be saved. One has not killed; one has not acted with the intention of making the patient dead but rather with the intention of removing the barrier to his inevitable death. One is justified in allowing the patient to die. Using the terms killing and ATD in this way makes the best sense of common clinical intuitions and sound ethical reasoning.

Thus, Huddle's use of this case seems either confused or irrelevant and does nothing to detract from Sulmasy's

account of the distinction between killing and ATD.

IV. The Implications of Huddle's View

As biotechnology advances, medical interventions will better replicate natural physiology. The number of therapies under the category of replacement will likely increase, and substitutive therapies may be relied upon less frequently. The refinement and application of the R/S distinction will be important for future bioethical deliberation. Restricting the category of permissible ATD to deactivation of treatments that are not "complete" limits the freedom of the patient to try out a treatment in order to determine its effectiveness[51] and runs the risk of condemning patients to discomfort and suffering that could otherwise have been avoided. If forced to live with burdensome life-sustaining interventions, a patient might even be led to seek physician-assisted suicide (PAS), which we suspect Huddle would not welcome. Other implications for Huddle's view may include physician reluctance to attempt potentially helpful interventions that they know they could not stop and aversion to prescribing or improving upon state-of-the-art therapies. Applying the K/ATD distinction to advancing medical technology will require new conceptual work, so it is important to begin now to build a framework through which to anticipate care decisions involving innovations yet to come. Inconsistencies in Huddle's position seem to bolster the case for adopting Sulmasy's framework as the most promising one for evaluating new developments in care at the end of life.

Notes

1. Brock DW. Taking human life. *Ethics* 1985; 95(4):851–65.
2. Arguments for and against a distinction between assisted suicide and treatment withdrawal are discussed in Miller FG, Fins JJ, Snyder L. Assisted suicide compared with refusal of treatment: a valid distinction? University of Pennsylvania Center for Bioethics Assisted Suicide Consensus Panel. *Annals of Internal Medicine* 2000;132(6): 470–5.
3. Rachels J. Active and passive Euthanasia. *New England Journal of Medicine* 1975;292: 78–80.
4. Huddle TS. A moral argument against turning off an implantable cardiac device: Why deactivation is a form of killing, not simply allowing a patient to die. *Cambridge Quarterly of Healthcare Ethics* 2019;28(2): 329–337, at 332.
5. See note 4, Huddle 2019, at 330, 333.
6. See note 4, Huddle 2019, at 334–5.
7. See note 4, Huddle 2019, at 334–5.
8. Sulmasy DP. Killing and Allowing to Die: Taking Another Look. *Journal of Law, Medicine & Ethics* 1998;26(1):55–64.
9. Mueller PS, Swetz KM, Freeman MR, Carter KA, Crowley ME, Severson CJA, et al. Ethical Analysis of Withdrawing Ventricular Assist Device Support. *Mayo Clinic Proceedings* 2010.
10. See note 8, Sulmasy 1998.
11. See note 8, Sulmasy 1998.
12. See note 9, Mueller et al. 2010.
13. See note 8, Sulmasy 1998.
14. See note 9, Mueller et al. 2010.
15. See note 8, Sulmasy 1998.
16. According to Huddle, a physician should not interfere with a completed therapy that is disengaged from physician agency and puts the patient at a physiological equilibrium; an "ongoing" therapy, which continually requires maintenance or intervention by a physician in order to properly and beneficially function, may be deactivated as desired by the patient because it is not independently sustained. See note 4, Huddle 2019, at 334–5.
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22. Wong SH, Eldridge PR, Duffy A, Fox SH, Varma TRK, Fletcher NA. Two cases of unexpected long-term improvement of Parkinson's disease after subthalamic nucleus deep brain stimulation removal. *British Journal of Neurosurgery* 2011;25(2):281–3.
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24. Bulluss KJ, Pereira EA, Joint C, Aziz TZ. Pallidotomy after chronic deep brain stimulation. *Neurosurgical Focus* 2013;35(5):E5.
25. Vergani F, Landi A, Pirillo D, Cilia R, Antonini A, Sganzerla EP. Surgical, medical, and hardware adverse events in a series of 141 patients undergoing subthalamic deep brain stimulation for Parkinson disease. *World Neurosurgery* 2010;73(4):338–44.
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30. See note 26, Nigim et al. 2015.
31. Schreffler RT, Schreffler AJ, Wittler RR. Treatment of cerebrospinal fluid shunt infections: a decision analysis. *Pediatric Infectious Disease Journal* 2002;21(7):632–6.
32. Vajramani GV, Jones G, Bayston R, Gray WP. Persistent and intractable ventriculitis due to retained ventricular catheters. *British Journal of Neurosurgery* 2005;19(6):496–501.
33. It is also important to note that there are no legal reasons for continuing treatments. See note 9, Mueller et al. 2010.
34. Sulmasy DP. Within You / Without You: Biotechnology, ontology, and ethics. *Journal of General Internal Medicine*. 2008;23(Suppl. 1):69–72.
35. Huddle seems to acknowledge this feature of CIEDs, but fails to capture all of its implications within the small scope that is attached to a "completed therapy" category. He writes, "…the pacemaker itself is acting less like a finger in the hold of the dike (analogous to a ventilator arresting lethal respiratory pathophysiology) and more like a repair of the dike." See note 4, Huddle 2019, at 332.
36. See note 34, Sulmasy 2008.
37. See note 34, Sulmasy 2008, at 71.
38. This addresses the concern raised by Huddle (note 1, Huddle 2019, at 332), that "Sulmasy's analysis seems powerless to resolve this disagreement because whether a new pathophysiology has been introduced, the distinguishing criterion of killing in Sulmasy's scheme, is what is at issue in the disagreement—a disagreement not over natural facts but over the appropriate description of those facts." This is because Huddle founds his critique solely upon Sulmasy's basic analysis of the K/ATD distinction (note 8, Sulmasy 1998) and ignores Sulmasy's application of this basic analysis to emerging technologies. See note 34 2008.
39. See note 4, Huddle 2019, at 333.
40. See note 34, Sulmasy 2008.
41. See note 34, Sulmasy 2008.
42. See note 4, Huddle 2019, at 334.
43. Though this is not to say that all instances of removal (as opposed to deactivation) are illicit. Under appropriate circumstances, a substitutive therapy can also be removed from the body just as licitly as another (or the same) substitutive therapy can be turned off.
44. It is true that the degree to which a physician is involved as an agent in the care of the patient can imply the severity of the patient's case, as indicated by Huddle: "That is, if physician agency in a treatment is ongoing, as in hemodialysis or mechanical ventilation, the physician is judging the patient to be in an arrested downward trajectory, and it is sometimes permissible for physicians to withdraw their agency and allow the patient to die. If a treatment is independent of physician agency (or to the degree that it is), the patient is judged to be

in equilibrium." But the term "completed" may conflate agency status with treatment status, as it intrinsically is a descriptor of the physician's relationship to the treatment, not of the natural facts of the treatment itself. Quote from: See note 4, Huddle 2019, at 333.

45. See note 4, Huddle 2019, at 333.
46. See note 9, Mueller et al. 2010.
47. Bramstedt KA. Destination nowhere: a potential dilemma with ventricular assist devices. *American Society for Artificial Internal Organs Journal* 2008;54(1):1–2.
48. McMahan J. Killing, Letting Die, and Withdrawing Aid. *Ethics* 1993;103:250–79. Referenced in: See note 4, Huddle 2019, at 333–4.
49. See note 4, Huddle 2019, at 334.
50. See note 4, Huddle 2019, at 334.
51. "…some ethicists argue that withdrawing is often morally preferable to withholding in cases where one needs time to determine whether or not the therapy is effective." Sulmasy DP, Sugarman J. Are withholding and withdrawing therapy always morally equivalent? *Journal of Medical Ethics* 1994;20:218–22.