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Pacemaker deactivation: withdrawal of support or active ending of life?

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Abstract In spite of ethical analyses assimilating the palliative deactivation of pacemakers to commonly accepted withdrawings of life sustaining therapy, many clinicians remain ethically uncomfortable with pacemaker deactivation at the end of life. Various reasons have been posited for this discomfort. Some cardiologists have suggested that reluctance to deactivate pacemakers may stem from a sense that the pacemaker has become part of the patient's "self." The authors suggest that Daniel Sulmasy is correct to contend that any such identification of the pacemaker is misguided. The authors argue that clinicians uncomfortable with pacemaker deactivation are nevertheless correct to see it as incompatible with the traditional medical ethics of withdrawal of support. Traditional medical ethics is presently taken by many to sanction pacemaker deactivation when such deactivation honors the patient's right to refuse treatment. The authors suggest that the right to refuse treatment applies to treatments involving ongoing physician agency. This right cannot underwrite patient demands that physicians reverse the effects of treatments previously administered, in which ongoing physician agency is no longer implicated. The permanently indwelling pacemaker is best seen as such a treatment. As such, its deactivation in the pacemaker-dependent patient is best seen not as withdrawal of support but as active ending of life. That being the case, clinicians adhering to the usual ethical analysis of withdrawal of support are correct to be uncomfortable with pacemaker deactivation at the end of life.

Keywords Pacemaker deactivation · Withdrawal of support · End of life care · Medical ethics · Physician assisted suicide

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While physicians have become accustomed to withholding and withdrawing life-sustaining therapies, withdrawing is more difficult with some therapies than with others. Deactivating implantable cardiac defibrillators (ICDs) and pacemakers has been especially problematic for many physicians.[1] Accepted ethical analyses of withdrawal of these devices have assimilated them to other life sustaining treatments that physicians readily withdraw, such as hemodialysis or mechanical ventilators [1]. According to such analyses, withdrawal of these medical interventions is justified by the patient's right to refuse treatment. And refusal of treatment in the form of an ICD or pacemaker ought to be no different than refusal of mechanical ventilation. In the past 10 years, this analysis has, perhaps, persuaded most clinicians that ICDs can legitimately be withdrawn at the end of life. ICDs can clearly be burdensome as death approaches, and the analogy to other forms of life sustaining therapy which can also be burdensome and which clinicians readily withdraw has, by and large, been accepted. This has not been the case with pacemakers, which many clinicians remain reluctant to withdraw (when they are life-sustaining), even in the face of patient or family requests. Although response rates to surveys exploring this issue have been low, several have found a significant proportion of physicians to be uncomfortable with deactivating pacemakers [2, 3]. Almost one-third of physicians responding to a 2008 survey equated pacemaker deactivation in a pacemaker-dependent patient with physician-assisted suicide [3].

Many possible reasons have been posited as to why physicians find the withdrawal of pacemakers to be especially problematic. It has been suggested that their small size, their location within the body, and their lack of interference with patient quality of life (in most circumstances) are all potentially important in distinguishing these devices from modes of therapy physicians are more comfortable withdrawing [4]. While the Heart Rhythm Society has issued guidelines suggesting that both pacemakers and ICDs can be legitimately deactivated in the right circumstances [5], some cardiologists have not been persuaded that the act of pacemaker deactivation, in particular, can avoid equivalence to active euthanasia if the patient involved is pacemaker-dependent [6].

Clinician reluctance to deactivate pacemakers has seemed mysterious to those familiar with the conventions of clinical ethics, according to which any patient has a right to refuse treatment and hence an unequivocal right to device deactivation. Daniel Sulmasy has recently analyzed objections to pacemaker deactivation. He argues that a potent source of such objections may be a sense that the pacemaker has become a part of the patient and, hence, is no longer properly subject to requests for deactivation or removal [7]. Patients can legitimately demand withdrawal of a ventilator but not of a heart transplant. Perhaps clinicians see pacemakers as analogous to heart transplants rather than to ventilators. Sulmasy considers the character of medical interventions that have become "part of the patient." He suggests that such interventions replace

[1] ICDs are implanted devices that terminate lethal cardiac rhythm disturbances by automatically detecting them and administering an electric shock. Pacemakers are implanted devices that sense the electrical function of the heart and provide pacing impulses if those provided by the native cardiac electrical system are insufficient for normal cardiac function. Many pacemakers are not life-sustaining or are only so intermittently. Our argument in this paper is in regard to pacemakers that serve a life-sustaining function, such that a patient's death might be reasonably anticipated after deactivation.

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physiological functions as part of the organic unity of the organism. Having scrutinized pacemakers in light of his tentative criteria for replacement therapies that become "self," he concludes that pacemakers do not actually become "self" and hence ought not to be considered "part of the patient." As they are thus conventional medical treatments, they can and should be withdrawn, that is, deactivated, when patients ask for withdrawal or deactivation.

We believe that Sulmasy is correct to suggest that if replacement therapies become part of the person, physicians ought not to be obligated to accede to requests for deactivation or withdrawal. But we shall argue that this is too high a bar to set for the class of interventions that physicians might legitimately regard as active ending of life. Patients have the right to refuse ongoing medical treatment; but we shall argue that they do not have the right to demand that physicians undo treatments previously completed. What sets apart medical interventions that physicians may refuse to withdraw or deactivate is the absence of ongoing physician agency. Organ transplants and other treatments that have become part of the patient are, of course, among such treatments. But so are others, including, as we shall suggest, pacemakers.

Withholding and withdrawing treatment

Conventional doctrine in medical ethics on withholding and withdrawing treatment has developed from the core notion of the patient's right to refuse treatment [8]. That right clearly justifies a patient's demand to deactivate a pacemaker if the pacemaker is "treatment"—ongoing intervention by a physician or physicians aimed at sustaining or improving health. We shall return to that issue. But it is important to establish whether other generally accepted reasons for recommending withdrawal of life sustaining therapy apply to the withdrawal of pacemakers or whether patient refusal is the sole acceptable justification for pacemaker withdrawal in conventional medical ethics. To answer this question, we begin with an account of the usual physician perspective on the ethics of withholding and withdrawing treatment.

Physicians seek to act in the interests of the patient. The determination of medical interest is generally made by the physician, in part, independently of the patient's wishes. The legitimacy of such a mode of proceeding would, of course, be hotly disputed by many ethicists, who would likely argue that a patient's medical interests ought not to be construed as independent of the wishes of the patient. Many physicians would reply that while a patient's wishes must always be taken into account, they do not necessarily determine what would be good for that patient, medically speaking—that is, good for the patient from the standpoint of that patient's life and health.

Physicians approach the issue of withholding and withdrawal, at least initially, from the latter standpoint. They consider the likely benefits and burdens of a given life-sustaining intervention in deciding whether to offer and recommend that treatment to a patient. If a patient is receiving such a treatment, the decision to recommend withdrawal would also turn upon a calculation of burdens and benefits. Recommendations based upon such calculations are subject to a further traditional

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imperative: physicians generally hold themselves obliged to act without intending the patient's death. If death can be foreseen to likely follow the withdrawal of life sustaining treatment, the physician invokes the principle of double effect, according to which acts causing bad outcomes may sometimes be permissible if such outcomes are a side effect, rather than the intended effect, of the act [9]. In the case of withdrawal of life-sustaining therapy, the intended effect is relief of the burden of a no-longer-beneficial treatment. The physician, in so relieving the patient of the burden of, say, mechanical ventilation, does not kill him; she allows him to die of his underlying disease.

This traditional view of how a physician's obligation not to kill might be compatible with the withdrawal of life sustaining treatment is, of course, deeply controversial. One of the most important arguments in favor of physician-assisted suicide or active euthanasia is the contention that withdrawal of life-sustaining therapy is, in fact, a life-ending act that is not in principle different from active euthanasia, presuming the patient's complicity and the physician's beneficent intent. On this view, there is no morally significant difference between doing and allowing in cases such as physician killing and so-called allowing-to-die; and the doctrine of double effect fails to identify a meaningful distinction between intended and foreseen outcomes. Physicians actively end the lives of patients when they withdraw life-sustaining treatment and they should face up to the fact [10].

While this attack on traditional medical ethics is important in the ethics literature and likely also among physicians who practice physician-assisted suicide in states such as Washington and Oregon, it has not yet prevailed in the medical mainstream. That being so, it is fair (we believe) to contend that the medical practice of withholding or withdrawing life sustaining treatment generally follows guidelines according to which the withdrawal of such therapy may be recommended (and undertaken) if one of the following holds:

1. It is judged by physician and patient that the burden of such treatment exceeds any benefit conveyed by the treatment to the patient, and the physician in withdrawing the treatment intends relief of the burden and not the death of the patient (although the death of the patient following withdrawal may be foreseen).
2. The patient demands withdrawal; irrespective of the physician's judgment of burden and benefit, life-sustaining treatment may and must be withdrawn if the patient demands withdrawal. The patient always has the right to refuse treatment even if such treatment is judged by the physician to be medically beneficial (or essential).

Deactivating ICDs and pacemakers

ICDs and pacemakers fare somewhat differently when their withdrawal is considered in light of the above analysis of traditional medical thinking about withdrawal. ICDs can clearly be burdensome to patients in some circumstances; in end-stage congestive heart failure, it might be judged likely that a patient would

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suffer repeated shocks from an ICD without any fundamental improvement in the heart's function or in its propensity to fatal arrhythmias. In such a case, the burden of an ICD might easily be judged by both physician and patient to exceed any benefit gained from the device. Cardiologists are generally willing to deactivate ICDs in such circumstances.

The withdrawal of pacemakers is not so straightforward; patients are generally insensible to pacemakers and it is difficult to conceive of circumstances in which burdens undergone by patients are attributable to a pacemaker (rather than to underlying disease). In such cases, it is difficult to argue that deactivating a pacemaker is not aimed at the patient's death if the patient is pacemaker-dependent. Any attempt to invoke the doctrine of double effect in exculpating the physician from a charge of intending the patient's death in such a case would be vulnerable to a traditional charge of abuse of that doctrine: that the actor can justify any act that causes ill effects simply by manipulating her intentions. The terror bomber might say that in bombing the innocent he intends not their deaths but a quicker end to the war. The legatee might say that in killing his father he intends not his father's death but simply to enjoy his inheritance the sooner [11]. Similarly, the physician in deactivating the pacemaker might claim to intend something other than the patient's death—but if there is no burden borne by the patient on account of the pacemaker, what might that be? According to double effect reasoning, a given outcome can be a side effect only if it is neither itself a bad outcome or (exclusively) the means to such an outcome. In the absence of any burden conveyed to the pacemaker-dependent patient by the pacemaker, the only outcome from its deactivation available as an end to the deactivator is the patient's death. And the pacemaker's deactivation can then only be a means to that end, whatever the deactivator might claim to otherwise intend.

The physician adhering to traditional medical ethics might, therefore, demur from recommending pacemaker deactivation in a pacemaker-dependent patient because in performing such an act, she would be implicated in active euthanasia. In the absence of a pacemaker-induced burden to be relieved, pacemaker deactivation can be the means only to the patient's death and thus must be impermissible. The only exception to such impermissibility would be cases in which the patient himself demands deactivation. In such cases, the patient's right to refuse treatment would allow the deactivating physician to intend an end other than the patient's death, i.e., honoring the patient's refusal of a treatment. And the doctrine of double effect would then justify the physician's act as an act primarily of withdrawing an undesired treatment, of which the patient's death (from the physician's standpoint) would be an unfortunate side effect.

A possible source of clinician resistance to considering pacemaker deactivation to be withdrawal of a treatment: the pacemaker as "replacement therapy"

The above analysis of pacemaker deactivation in the case of a patient who demands such deactivation would be standard for many physicians that accept traditional medical ethics (that is, a medical ethics that rejects active euthanasia and parses

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physician actions that hasten death, such as withdrawal of life-sustaining therapy, in terms of double effect). While patient refusal of continued treatment is a relatively narrow ground for justifying pacemaker withdrawal, it is clearly one of the reasons for the withdrawal of life-sustaining therapy that are traditionally regarded as acceptable. Perhaps this analysis has not been sufficiently considered by the many physicians who continue to regard pacemaker deactivation in pacemaker-dependent patients to be active euthanasia, even in cases when patients or families request such deactivation. While it is likely true that clinicians do not, in general, concern themselves with the niceties of medical ethics, clinical practice in regard to the withdrawal of other forms of life-sustaining therapy certainly conforms to this standard analysis. By the early 1990s, professional organizations in the United States had produced statements asserting the propriety of withdrawing life-sustaining therapy if it is judged to be futile (or if patients demand such withdrawal). These statements took care to deny that such withdrawals have to constitute active euthanasia [12, 13]. And by this time, most clinicians did not regard most withdrawals of life-sustaining treatment to be active euthanasia [14]. The importance of distinguishing active euthanasia from the withdrawal of life-sustaining treatment (allowing-to-die) has been reiterated in more recent professional statements [15]. Clinicians readily withdraw life-sustaining therapy in dying patients (or in patients who request such withdrawal) and construe such acts as allowing-to-die. Why would the same clinicians not assimilate pacemaker deactivation to their other practices of withdrawing treatments when patients refuse them?

Clinicians who equate pacemaker deactivation to active euthanasia do not necessarily offer clear or cogent reasons for their position. As mentioned above, Goldstein's qualitative research points to the small size and location within the body of the pacemaker as features that may generate clinicians' reluctance to deactivate [4]. The best articulated instance of a position opposing pacemaker deactivation, of which we are aware, is that of G. Neal Kay and Gregory Bittner [6]. Kay and Bittner invoke the distinction between ordinary and extraordinary care and suggest that a pacemaker in place is ordinary care, implying that it ought not to be withdrawn or deactivated. For their equation of pacemaker deactivation to active euthanasia, however, they appear to rely more on a different kind of argument. They draw upon Sulmasy's distinction between medical treatments that become part of the patient's "self" and treatments that remain separate from the patient [7]. Sulmasy took note of clinician objections to deactivating ICDs and pacemakers and sought to consider whether there were medical therapies that required a re-drawing of the line between killing and allowing-to-die, which the medical profession had drawn in the case of treatments like mechanical ventilation and hemodialysis.

Sulmasy begins by distinguishing between regulative and constitutive therapies; the latter do not merely adjust natural corrective mechanisms (regulative therapies) but replace physiological functions. Antipyretics are regulative; therapies such as pacemakers or insulin are constitutive. Constitutive therapies may be further divided into those that are "substitute" and those that are "replacement." The latter are not only substitutive but also part of the patient's organic unity. A ventilator is a substitute therapy; an organ transplant is an archetypal replacement therapy.

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Sulmasy plausibly argues that the more a treatment can be seen as a replacement therapy, the less it may seem morally appropriate to withdraw. He offers criteria for deciding whether a therapy is replacement, including responsiveness to the environment, growth and self-repair, independence from external control or supply, immunologic compatibility, and physical integration into the body.

Kay and Bittner contend that a pacemaker meets these criteria sufficiently to be considered replacement therapy. If they are correct, deactivating a pacemaker would be an act that is analogous to injecting potassium chloride into a transplanted heart to stop it. Clearly such an act would be a killing rather than an allowing-to-die and would thus be unacceptable in any ethics that forbade active euthanasia. It seems doubtful, however, that Kay and Bittner are correct in contending that pacemakers are replacement therapies in Sulmasy's sense. Even if it is granted that pacemakers are constitutive therapies, replacing rather than merely regulating an aspect of the heart's function (in this case its generation of electrical impulses that stimulate heart muscle contraction), it is not at all clear that they become part of the organic unity of the patient.

While pacemakers exhibit some responsiveness to the environment and limited independence from external energy sources and control, they clearly do not grow or repair themselves. They are immunologically compatible with the body but this is not because they are immunologically self; rather, they are immunologically inert. And in spite of their implantation within the body, they are not physically integrated with it. Pacemakers, in spite of their small size and intra-body location, seem clearly to be "other" rather than "self"; as such, they seem more similar to constitutive therapies such as ventilators than to organ transplants. If that is correct, they are substitutive rather than replacement therapies, in Sulmasy's terminology, and the special character of replacement therapies offers no grounds for distinguishing pacemakers from other substitutive therapies such as ventilators.

Some have suggested grounds other than organic integration for considering that an implanted device might be "part of" the patient (and thus ineligible for compulsory removal or deactivation by physicians on the ground of a patient's right to refuse treatment). Jeremy Simon suggests that if an implanted device not only restores organ function but allows independent living, it has become analogous to a transplanted organ and cannot be the object of a withdrawal or deactivation request that physicians must honor. He offers the hypothetical example of an artificial heart completely independent of external support, which, as he says, is a very conceivable if not yet realized example of artificial organ technology [16]. Simon plausibly proposes that a physician might legitimately refuse a patient's request that such an artificial heart be explanted or deactivated. Simon extends his analysis beyond implanted devices, arguing that hypothetical backpack ventilators might have a similar status. For Simon, the aspects of such devices that make them part of the patient they support are (1) replacement of physiological function and (2) functional independence of the person supported by the device or treatment [17].

This line of argument is resisted by Ruth Fischbach and Katrina Bramstedt, who suggest that devices such as LVADs or artificial hearts are more analogous to mechanical ventilators than to organ transplants and, thus, ought to be considered ongoing treatments subject to withdrawal upon request rather than "part of the

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patient" and, thus, improper objects for such requests. If such devices are deactivated, Bramstedt and Fischbach argue, the patient dies of the underlying disease, not from device deactivation. Such a death is, then, passive rather than active euthanasia [17, 18].

In suggesting that physicians would hesitate to deactivate an implanted artificial heart that allowed a patient to live independently, Simon is likely correct; such physician reluctance would mirror well-documented physician reluctance to deactivate pacemakers in pacemaker-dependent patients. It seems a stretch, however, to base this reluctance upon an alleged status of the artificial heart as "part of" the patient. And considering a hypothetical backpack ventilator to be part of the patient seems even less plausible than considering an artificial heart to be so. Felicitas Kraemer has pointed out some of the difficulties in deciding when internal, external, or hybrid devices might be part of the patient or not [19].[2] At least insofar as the notion of being "part of" an organism implies organic integration, as typically it does, arguments that implanted devices become part of the patients in whom they are implanted face an uphill climb. For Simon, Kay, and Bittner, such arguments appear to serve the purpose of rationalizing the reluctance that many clinicians feel when asked to deactivate certain of these devices, but as far as we can see, such arguments have not successfully achieved such rationalization.

A different ground for rejecting a right to pacemaker deactivation: as an instance of the right to refuse treatment

We shall suggest that clinician assessments that some device deactivations are active rather than passive euthanasia do have validity, but we shall offer grounds for this assessment that do not construe the devices in question as part of the patients in whom they are implanted. Sulmasy's distinction certainly does identify a class of medical interventions that patients cannot demand to reverse based on their right to refuse treatment. Pacemakers and LVADs are not clearly replacement therapies (in Sulmasy's terminology); but we contend that therapies organically integrated into the body may not be the only medical treatments to which a right of refusal does not apply.

It is instructive to consider Katrina Bramstedt's analysis of the total artificial heart as a therapy that falls under a patient's right of refusal (which physicians would be, therefore, obligated to deactivate upon the patient's request) [18]. Bramstedt considers the total artificial heart (TAH) as a replacement of function therapy (meaning not organic integration, as per Sulmasy, but merely replacement of physiological function) and is led to ask whether one should view deactivation of the TAH differently from that of other replacement of function therapies such as ventilators. She answers in the negative, suggesting that in each case the important factor to consider is the therapy's replacement of function. Life sustaining therapies

[2] Kraemer's suggested solution to the problem, which we shall not address here, is to posit that the patient's perception of the device can guide our thinking as to whether the device is part of him/her or not and, hence, as to whether device deactivation is active or passive euthanasia in a given case. We suspect that this approach to the problem is too subjective to be satisfactory.

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such as ventilators, extra-corporeal membrane oxygenation (ECMO), and TAHs are all on a par in that their withdrawal allows an underlying disease to take its course. This analysis would also extend, presumably, to pacemakers in pacemaker-dependent patients, although Bramstedt does not explicitly mention pacemakers. In all such cases, the patient's death after withdrawal is rightly attributed to the underlying disease rather than to the deactivation of the life sustaining therapy; and the physician's action in deactivating the therapy is thus passive rather than active euthanasia. Fischbach takes a similar line on LVADs, suggesting that deactivating an LVAD leads to the patient's death from heart failure. Fischbach also invokes the partially external character of the LVAD in support of this position, suggesting that for her not only the replacement of function but also the character of an intervention as internal or external are material to whether death induced by its withdrawal is active or passive euthanasia [17].

The Bramstedt/Fischbach analysis, we think, proves both too little and too much. It proves too much because it is unclear that this view would exclude organ transplants from patient requests for explantation or deactivation (perhaps through intracardiac KCL, in the case of a heart). If the replacement of function (referring to physiological replacement) of a therapy confers inclusion in the group of therapies whose removal or deactivation physicians must honor on request, heart transplants would appear to fall within that group. Bramstedt would likely resist this conclusion; she offers an example of a patient who sustained a massive stroke after coronary artery bypass grafting. She asks whether one might consider his bypass grafts to be "life support" and thus amenable to requests for the removal of life-sustaining therapy after the stroke. She answers in the negative because "graft explant would actively cause the patient's death, irrespective of his disease state" [18]. Bramstedt would likely view explantation of a transplanted heart in a similar light. But this seems inconsistent. Why, on Bramstedt's view, ought we to consider a transplanted heart (or bypass grafts) differently from an artificial heart in regard to the character of the physician's action in deactivating or removing them? All three replace an impaired physiological function the absence of which would result in the patient's death. Her view implies that removing the physician-inserted therapy in any of these cases is simply to allow an underlying disease to take its course. In the case of organ transplants, bypass grafts, prosthetic valves, and other such interventions, such a view is implausible.

The analysis proves too little because it is simply not clear that withdrawals or deactivations of LVADs or pacemakers or artificial hearts simply "allow [the] disease to take its course." The thrust of the Bramstedt analysis is to suggest that medical treatments such as ventilators or artificial hearts do not fundamentally alter the fatal processes against which they are directed, such that removing such treatments simply allows the disease to take its course. Simon's riposte is to suggest that in fact some treatments, such as artificial hearts, do not merely obstruct a fatal process but instead bring about a new homeostasis. Given that an organism is in ongoing physiological equilibrium, even if in an equilibrium inferior to that of its natural healthy state, an interference that upsets this equilibrium must be "doing" rather than merely "allowing." And an interference that hastens death is then active killing rather than allowing to die.

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We do not believe that there is an obvious right choice between the Bramstedt and Simon construals of an organism subjected to a life-sustaining medical treatment such as a hypothetical self-contained artificial heart. Whether one construes such an organism as being on an arrested trajectory toward death or as in a new (albeit inferior) equilibrium seems more a function of one's own interests than of any feature of the treated organism itself. If this is correct, Bramstedt and Simon are at an impasse.

We wish to suggest a different approach to characterizing withdrawals of support in medicine—as "doing" or "allowing." It is important initially to be clear about the concepts to which these terms refer. Neither merely characterizes acts or omissions within a causal chain or web. Consider, for example, Dan Brock's pair of cases involving a terminally-ill woman on a ventilator [20]. In one case, her greedy nephew, anticipating an inheritance, sneaks into her hospital room and disconnects the ventilator. In the other case, her physician, carrying out her wishes to withdraw support, disconnects the ventilator. Both nephew and physician perform the same act qua intervention in a causal sequence. But we label one as a doing (an active killing) and the other as an allowing-to-die. Labeling acts such as these as "doing" or "allowing" is characterizing the actor's agency, as expressed in the act, as positive or negative. And the character of agency expressed in an act (or omission) is determined not only by the fit of the act into a causal structure but by the identity of the actor and by the contextual norms and obligations that bear upon said actor. In Brock's pair of cases, the nephew's agency is positive because the nephew has no proper role in the management of the aunt's ventilator. Any interference with it by the nephew is positive agency. The physician's agency is negative because he is positively implicated in the ventilator's ongoing presence and efficacy (properly so)—so that removing it in the face of terminal illness in accordance with the aunt's wishes is an allowing.

This analysis, we believe, offers the clue to the proper labeling of withdrawal or deactivation of medical therapies as doing or allowing. The important considerations for proper labeling is not the treatments' degree of organic integration, their role in the patient's physiology, their internal or external character, or the degree of independence they allow the patient to assume. It is the role of ongoing physician agency in the treatment's presence and efficacy. This is what distinguishes heart transplants, prosthetic valves, permanent indwelling sutures, and bypass grafts from ventilators for purposes of characterizing withdrawal or deactivation. If tissue or a device inserted by a physician is playing a critical role in maintaining a patient's physiological equilibrium (and, hence, his/her life), the removal of said tissue or device may be a doing (killing) or an allowing-to-die in so far as the physician is not or is actively involved in the tissue/device's presence and activity.

We stipulate "may be" because scenarios are conceivable that complicate the analysis. What if a physician becomes homicidal and surreptitiously disconnects a ventilator from a ventilator-dependent patient who is expected to recover (or who is terminally ill)? Such an act is clearly a doing rather than an allowing. It is so, once again, because of the norms that bear on the physician's action in such a case. Only in the case of physicians acting properly in the interests of their patients is a withdrawing of life-sustaining treatment involving ongoing physician agency an

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allowing-to-die. As we have suggested, in the traditional analysis, these would be limited to cases in which the burden of treatment is judged to exceed the benefit or to cases in which treatment is refused.

This traditional analysis does not bear on treatments in which ongoing physician agency is absent, such as heart transplants, orthopedic hardware, permanent sutures, and prosthetic valves. Once such medical interventions are in place, the physician's agency is no longer involved in their continuing efficacy. The physician has become a bystander rather than an agent in regard to the function of such interventions. Such interventions were put into place to arrest a harmful sequence of events—mechanical forces interfering with healing in the case of orthopedic hardware and sutures or disordered cardiac physiology in the case of prosthetic valves. The functions of these interventions are analogous to those of interventions involving ongoing physician agency, such as mechanical ventilation or hemodialysis, which also obstruct harmful physiological processes. Interventions in place, however, become different from ongoing interventions (in regard to the meaning of physician interference) when physician agency ceases to be involved in their continuing action.

The right to refuse treatment is an instance of a broader right not to be interfered with. In the case of patients and physicians, it is the right of the patient to demand an allowing, perhaps an allowing-to-die. Patients may demand that physicians stop doing something—generally that they stop interposing an obstacle to a harmful or fatal sequence of bodily events. While patients have a right to refuse ongoing or future physician interventions, a negative right against interference does not confer a right to demand that physicians undo the effects of treatments previously administered, in the present effects of which the physician's ongoing agency plays no part (presuming, of course, that the previously administered treatments were performed in accord with the patient's wishes).

How does this point bear on LVADs, ICDs, and pacemakers? These devices are not, of course, quite as independent of continuing physician agency as are prosthetic heart valves. We would suggest that a patient right of refusal would apply to those aspects of these treatments that involve ongoing physician agency. Patients may rightly refuse a renewal of the power supply for these devices or physician monitoring and adjustment of them. If we are correct, patient demands to remove or deactivate them, if they are sustaining life and do not of themselves confer a disproportionate burden on the patient (such as an ICD often might), are demands for a physician to actively hasten death rather than to allow disease to take its course. They are not refusals of treatment but demands for undoing previous treatment. As such, they do not fit into the traditional analysis of legitimate physician withdrawal of support.

Conclusion

Clinician reluctance to deactivate pacemakers in pacemaker-dependent patients has seemed anomalous in the context of the same clinicians readily withdrawing other forms of life sustaining therapy when such therapy is deemed futile or when patients

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request withdrawal. A persuasive rationale for such clinician reluctance in the case of pacemakers has seldom been articulated. Kay and Bittner's effort in this regard is not wholly convincing. Our argument, if it is successful, shows that clinician misgivings about pacemaker deactivation are in fact well-founded. On our reading, the traditional ethical analysis of the withdrawal of life sustaining therapy does not permit the withdrawal of a pacemaker (or of other completed treatments) on the grounds of a right to refuse treatment. As we have argued, the physician is a bystander in regard to the pacemaker, which is (in large part) a treatment completed rather than ongoing; and a patient right to refuse treatment cannot apply to completed treatments.

Clinician discomfort or even "moral distress" associated with particular forms of caregiving may often be unwarranted [21]. It may, however, point to real ethical difficulties even when the clinicians involved have difficulty articulating just where the ethical difficulty lies. We believe that clinician discomfort with pacemaker deactivation is such a case. Contrary to previous ethical analyses, pacemaker deactivation (in pacemaker-dependent patients) is better seen as doing than allowing, as active ending-of-life rather than as the withdrawal of an ongoing treatment that patients have a right to refuse. Clinicians persuaded by the usual ethical analyses of withholding and withdrawing therapy and who accept a prohibition on active euthanasia ought not to advise patients to consider pacemaker deactivation or accede to patient requests for it. Compassionate and effective end-of-life care need not involve hastening death through means the end of which can only be such hastening rather than the relief of burdens or the honoring of patient rights.

Conflict of interest None.

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