

# The Ethics of Deactivating Implanted Cardioverter Defibrillators

Jeffrey T. Berger, MD

Implantable cardioverter defibrillators are life-saving devices for many patients with cardiac disease. Recipients of these devices, nevertheless, often suffer from progressive comorbid and cardiac conditions. Therefore, physicians should anticipate situations in which the defibrillator is no longer desired by the patient or no longer medically appropriate. Near the end of life, many of these patients may decline cardiopulmonary resuscitation. The management of do-not-resuscitate orders and implanted defibrillators can be confusing to patients and physicians alike since the former proscribe the use of electrical cardioversion while the latter pro-

vide this precise treatment. Although the use of implanted defibrillators has important ethical implications, few studies have examined these issues, and guidelines have not yet been developed to assist physicians in caring for patients who have received defibrillators. This paper discusses bioethical considerations in disabling implantable cardioverter defibrillators.

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For author affiliation, see end of text.

## CASE ILLUSTRATION

*An 80-year-old man with ischemic cardiomyopathy and inducible ventricular tachycardia had had a defibrillator implanted 4 years ago. Since then, he has suffered a series of strokes that resulted in dementia and dependence on gastrostomy feedings. He presents to the hospital with pneumonia. In accordance with the patient's living will, his wife asks his physician to enter a do-not-resuscitate order into his chart and requests that mechanical ventilation be withheld if the pneumonia worsens. The living will, however, does not address the defibrillator. The housestaff believe that disabling the device is appropriate, while the attending physician recommends its continued use. How should these physicians evaluate use of the defibrillator, and how should they counsel the patient's wife?*

## BACKGROUND

Implantable cardioverter defibrillators (ICDs) represent an important technological advance in the treatment of patients with impaired left ventricular ejection fraction, malignant arrhythmias, and other cardiac conditions. These devices electrically cardiovert an arrhythmic heart and confer a significant survival advantage on its recipients (1–6). However, many of these patients have serious comorbid diseases (for example, peripheral, renal, and cerebral vasculopathy), are experiencing progressive physiologic and functional decline, and have significant mortality rates irrespective of receiving an ICD (5, 7). Therefore, clinicians are likely to treat and counsel patients for whom ICDs are no longer useful, beneficial, or desired (8). Clinical guidelines, informed by bioethical discourse, can help physicians and patients assess the appropriateness of ICD use.

Generally, medical organizations are more attentive to developing indications for the use of new technologies than to assessing appropriate treatment withdrawal. It follows that guidelines are not yet available for disabling already implanted defibrillators (9, 10). Regardless, treatment decisions involving ICD use are unavoidable. Discussions about ICD deactivation may be initiated by patients, their

surrogate decision makers, or their physicians. These conversations may be stimulated by 1 of 3 categories of concerns: 1) Some patients will no longer value continued survival; 2) for other patients, the ICD no longer offers the prospect of increased survival; and 3) for others, the ICD impedes active dying. A concern superimposed on these categories is the authorization of do-not-resuscitate (DNR) orders for hospitalized patients with enabled ICDs. For these patients, do ICDs provide resuscitation and therefore should be disabled, or do they merely manage arrhythmias and should remain operational?

Disabling an ICD requires the patient to undergo a painless procedure involving a transdermally placed magnet, similar to disabling a permanent pacemaker (11). In fact, many implanted devices are combination pacemaker–defibrillators (12). Permanent pacemakers, akin to ICDs, may impede active dying or perhaps sustain a life the patient no longer values. The following discussion of the ethical considerations in decisions to deactivate ICDs may similarly apply to these permanent pacemakers.

## DO ICDs EFFECT RESUSCITATION OR ARRHYTHMIA MANAGEMENT?

Electrical cardioversion is perhaps best recognized when administered by external defibrillators in the setting of cardiopulmonary resuscitation (CPR), and is the treatment of choice for tachyarrhythmic causes of cardiac arrest. Although ICDs provide the same remedy for the same arrhythmias as do external defibrillators, ICDs are not necessarily resuscitative devices because not all ventricular tachyarrhythmias are cardiac arrest and not all cardioversion is resuscitation. For example, cardiac electrophysiology

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gists routinely induce and electrically reverse ventricular tachycardia. In addition, cardioversion is used for ventricular arrhythmic states (for example, stable ventricular tachycardia) that are not cardiac arrest. Therefore, the mere fact that an ICD shocks an arrhythmic ventricle does not clarify whether its use constitutes resuscitation or simply arrhythmia management. In fact, the clear distinctions often drawn between cardiac arrest and other life-threatening cardiac conditions are clinically artificial and ethically immaterial (13). Cardiopulmonary instability and cardiopulmonary arrest often sit along a continuum of physiologic derangement. For example, a patient with stable ventricular tachycardia is not considered to have cardiac arrest, but at some point, as decreasing blood pressure manifests in clinically evident organ hypoperfusion, cardiac arrest is diagnosed. At what point is treatment considered resuscitation? Does this determination alter physicians' medical-ethical obligations?

Resuscitation, arrhythmia management, and treatment of other life-threatening conditions are all similar in terms of professional responsibilities and medical decision making. The 2 major considerations underlying each of these decisions are the likelihood that the treatment will produce a defined outcome and whether the patient values this outcome. Therefore, striving to define ICD function as resuscitation or arrhythmia management is less important than efforts to clarify each patient's goal of care and objectively assess whether the ICD serves that goal.

### PATIENTS' PREFERENCES AND CATEGORIES OF ICD USE

Patients who consent to the implantation of a defibrillator generally have in mind 1 of 3 treatment objectives: 1) to maintain life at the quality patients currently enjoy; 2) to maintain life as long as its quality does not fall below some specified threshold; and 3) to remain alive regardless of impairment. Quality-of-life assessments are highly subjective and are best made by the patient; physicians poorly predict their patients' assessments of quality of life. Physicians' assessments tend to more closely reflect preferences for their own treatment and personally held values rather than those of their patients (14–16).

Patients' determinations of adequate quality of life are often predicated on levels of cognitive or physical function, such as the ability to speak to or recognize loved ones or to independently transfer from bed to wheelchair. Patients, sometimes idiosyncratically, determine what elements, or combinations of elements, define a valued quality of life, and what medical intrusions (for example, thrice-weekly hemodialysis) would diminish it sufficiently to render it no longer valued. These and other considerations make decisions about ICDs, and life-sustaining medical interventions in general, exquisitely personal.

Conversations with patients to clarify device-specific goals are most useful and best accomplished when embedded in a broader discussion of the patient's general medical

condition and overall goals for care (13, 17). Physicians should encourage their patients to critically measure the use of an ICD against their treatment objectives. These discussions, if held before defibrillator implantation, are likely to improve the quality of patients' informed consent. Physicians should record these preferences in their patients' record, recommend that patients communicate these preferences to their surrogates and in their advance directives, and ask ICD recipients to revisit their preferences periodically, particularly when their health status significantly changes.

### ICDs AND DNR ORDERS

Do-not-resuscitate orders disallow the use of efforts to reverse a cardiac or pulmonary arrest (18, 19). These orders have little direct bearing on the appropriate use of ICDs. Rather, the reasons underlying consent to a DNR order are more relevant. Tomlinson and Brody have identified 3 categories of reasons (20): 1) Some patients may simply accept that attempts at CPR would be medically inappropriate; 2) patients who are medically appropriate candidates for CPR may, nevertheless, consent to a DNR order on the basis of their determination that their present quality of life is inadequate; and 3) other candidates for CPR may decline resuscitation to avoid a postarrest quality of life that they anticipate will be inadequate.

Do-not-resuscitate orders are appropriate when the likelihood of successful resuscitation is remote (for example, arrest in the setting of malignancy, active sepsis, or acute renal failure) (18, 21). Patients with an ICD who have DNR orders for this reason may still benefit from continued ICD use if the arrhythmias are due to the primary cardiac condition rather than to a secondary systemic illness, if rapid cardioversion for episodic arrhythmias confers added survival, and if the patient judges the relative burden and benefits favorably. If the patient is expected to die in a short period, even with repeated discharge of the device, the ICD, now an obstacle to timely death and causing disproportionate burdens, should be disabled (22).

For patients whose unsatisfactory present quality of life forms the basis of DNR orders, nonuse of other life-extending, nonpalliative treatments is generally consistent with the withholding of CPR. Since ICDs are intended to increase survival, deactivation should be strongly considered.

Some patients may value their present quality of life and accept treatments that preserve it, but decline CPR to avoid cognitive or functional disabilities after resuscitation. Some of these patients may in fact be willing to receive CPR under conditions associated with a high likelihood of rapidly successful resuscitation (for example, cardioversion for ventricular tachycardia in the setting of an acute myocardial infarction). Where the ICD serves the patient's goals of maintaining a valued quality of life and of avoiding

postarrest disabilities, continued use of the ICD may be highly appropriate.

## REQUESTS TO DISABLE AN ICD

### Patients

There is a medical, bioethical, and legal consensus that a cognitively intact patient may decline any and all treatment, even if the patient is not terminally ill (23). This right is grounded in notions of bodily integrity; each of us is entitled to be free of unwanted intrusions of our person. Treatment refusal, whether withholding or withdrawing, is not generally construed as equivalent to suicide or euthanasia because nontreatment allows a randomly assigned disease to progress whereas suicide and euthanasia cause death irrespective of disease (24–27). Moreover, in cases of treatment withdrawal, if not for the treatment the patient would already be dead. Notwithstanding these established professional-ethical positions on life-sustaining interventions, many physicians are uncomfortable with discontinuing life-sustaining treatments (28, 29). Physicians who morally object to terminating life-sustaining interventions should not be compelled by patients to do so, and, reciprocally, physicians should not impose their personal values on their patients (18).

Physicians should respond to a patient's request for disabling an ICD by assessing the patient's understanding of his or her condition; clarifying the patient's goals for care; and discussing the patient's medical, emotional, and social concerns. Although major depression is common among patients with serious illnesses, most of these patients retain decision-making capacity (30).

A patient's decision to disable an ICD should be respected as long as the patient understands the facts of the medical condition, can deliberate using deeply held values and beliefs, is able to appreciate the likely consequences of their decisions, and is free of controlling influences (31).

### Family Members

Family members are widely accepted as surrogate decision makers for cognitively incapacitated relatives (32). Surrogates are expected to advocate for the expressed wishes of the patient; if these are not known, surrogates are encouraged to replicate the patient's likely choice. Each of the 50 states makes some provision for advance planning via designation of agents for health care, also known as health care proxies, or execution of living wills to guide surrogates (33). No specific data address whether patients wish their proxies to have authority over ICD use, and few data are available on whether living wills include preferences regarding ICDs (8). However, since patients imbue family members with moral authority over a great range of decisions affecting health and welfare and proxies have legal purview over the array of well-established life-sustaining interventions, it is only consistent to include ICDs among these interventions (33–35). The seriousness of consequence of deactivating an ICD is no different from that of

discontinuing hemodialysis for a patient with chronic renal failure.

## ICDs AND MEDICAL FUTILITY

Physicians of patients with limited physical or cognitive function may assess continued use of ICDs as "futile." Physicians must be extremely cautious in making futility assessments for patients because quality-of-life judgments vary widely among physicians and are often influenced by their personal values, such as religious and cultural beliefs (14, 16, 36). Determinations of futility are often complex and vexing, and medical and ethics bodies continue to wrestle with the clinical role of the concept of futility (37–39). In the narrowest sense (physiologic futility), an ICD is futile when it can no longer restore a stable cardiac rhythm. As long as the ICD achieves this purpose, its continued use ought to be measured against medical appropriateness and the patients' goals for care. This statement prompts a question the medical community has not yet answered: How ought already implanted defibrillators be used in patients with limited life expectancies? Professional organizations should address this clinical concern in their clinical guidelines.

## CONCLUSION

Implanted cardioverter defibrillators represent another new life-extending technology for which examination of its ethical implications lags behind its use. Looking to established medical and bioethical analyses of similarly life-extending interventions is useful. However, to promote good patient care, it is important to examine patients' understanding of and preferences for ICD use, to study physicians' clinical concerns and beliefs regarding ICDs, and to encourage greater ethical discourse about this technology. Furthermore, since clinicians will undoubtedly encounter increasing numbers of ICD recipients, particularly as health care coverage changes (40), it is prudent to develop clinical guidelines specifically to address the disabling of implanted defibrillators.

From State University of New York Stony Brook School of Medicine, Stony Brook, New York, and Winthrop University Hospital, Mineola, New York.

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**Requests for Single Reprints:** Jeffrey T. Berger, MD, Clinical Ethics, Department of Medicine, Winthrop University Hospital, 222 Station Plaza North, Suite 518, Mineola, NY 11501; e-mail, jberger@winthrop.org.

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