ECG Challenges: Indications for Implantation of Cardiac Pacemakers

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The prevalence of implantable cardioverter-defibrillators (ICDs) is increasing. In 2003, 150,000 ICDs were implanted in the United States, double the 75,000 implanted in 2001.1 This is because "new guidelines dramatically increase the number of patients for whom prophylactic implantation of an ICD would be covered under Medicare."1(2542) Under current Medicare guidelines, patients with a left ventricular ejection fraction of less than 30% and nonischemic cardiomyopathy now qualify for these devices.1 The number of eligible patients is estimated to be around 600,000 annually, a figure that will likely increase as the population ages.1 The ICDs monitor the patient's heart rhythm and deliver electrical shocks (shock therapy) for any detected life-threatening arrhythmia2; they are not designed to maintain existing heart function. However, although shock therapy can be life saving, it can also be physically and emotionally painful. Patients describe the physical sensation of shock therapy as similar to that of being kicked in the chest by a horse or struck by lightning.3 The fear of getting a shock can also cause anxiety and psychological harm to patients and families.2

ICD Deactivation
Although ICDs can save people's lives, there are situations in which deactivating them may be appropriate. When the risk of shock therapy causes unbearable anxiety, competent patients may determine that they no longer wish to continue the use of ICDs. In addition, there are certain medical situations, such as certain critical or terminal illnesses, in which their use can be counterproductive. Sepsis, hypoxia, and electrolyte...
or metabolic imbalances can cause ventricular and supraventricular arrhythmias, which could prompt repetitive shocks. Similarly, when antiarrhythmic or vasopressor medications or other life-sustaining therapies are discontinued or decisions to forgo resuscitation are made, discussions about deactivation are warranted. Shock therapy may therefore be inappropriate for patients whose goals are focused on palliation or comfort. Avoiding shocks in such cases means preventing unnecessary suffering. In a retrospective study of patients with ICDs who received shock therapy before they died, 30% were in their last minutes of life. The family members of these patients "found it distressing to witness the patient being shocked at the end of life." On the other hand, ventricular tachycardia, a possible arrhythmia in the last minutes of life, is not considered uncomfortable.

Several recent studies have focused on aspects of deactivating ICDs. Some show that both patients and clinicians have misconceptions about these devices. One study explored attitudes among 15 patients with ICDs and found that these patients did not understand how the devices worked or why they had them and that they could not conceive of circumstances where it might be appropriate to deactivate them. Patients also could not recall anyone ever discussing deactivation with them and were interested in receiving more information about the devices. Studies of physicians show that many are unaware that shock treatment can be painful and are unclear of the legal and ethical aspects of ICD deactivation. Among the noncardiologists in one study, 46% "either thought it was illegal or were unsure if it was legal to withdraw ICD therapy in terminally ill patients." Such misconceptions contribute to confusion over whether or when to consider ICD deactivation. As a result, deactivation is often addressed only as a patient's condition deteriorates or when the patient is very near death when the potential for nonbeneficial shock therapy increases. In fact, many physicians were willing to discuss deactivation if death was more imminent. In one study, 27% of discussions took place in the last hours of patients' lives and 4% in the last minutes. Because 20% of deaths occur during or after an intensive care unit admission, decision making about ICD deactivation is often a critical care issue. When considering ICD deactivation, it is helpful to recognize the following relevant ethical principles.