

FAST FACTS AND CONCEPTS #112
IMPLANTABLE CARDIOVERTER-DEFIBRILLATORS AT END-OF-LIFE
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Background Recent clinical trials and advances in device technology have expanded the indications for implantable cardioverter-defibrillators (ICDs). At least 12,000 ICDs are implanted per month in the US and over 3 million patients in North America are eligible for an ICD. Near the end of life, however, ICD decision-making can be the source of anguish for patients, families and palliative care/hospice staff.

Current Devices ICDs are somewhat larger than pacemakers and are usually implanted in the upper chest under the clavicle. They monitor cardiac rhythm and can either cardiovert or defibrillate (electrically 'shock' a heart) when certain rapid abnormal cardiac rhythms are identified. These shocks can be painful and are inconsistent with comfort care in a dying patient. ICDs can also deliver pacing therapy. Pacing increases heart rate when slow heart rhythms are detected and can promote comfort as slow heart rhythms can cause heart failure symptoms. Finally, certain pacemakers or cardiac resynchronization therapy devices may include an ICD function all in one device. For these devices, the shocking functions of an ICD can be independently turned off and a decision to discontinue a device's ICD function should be considered separately from a decision to discontinue its pacing functions (see *Fast Fact #111*).

Indications for deactivation of ICD therapy

- Continued use of an ICD is inconsistent with patient goals.
- Withdrawal of anti-arrhythmic medications: if anti-arrhythmic medications are withdrawn consider turning off the ICD to avoid frequent shocks.
- When a patient's condition is worsening and death is anticipated.
- The patient has a DNR order. The functioning of an ICD is generally inconsistent with a 'Do-Not-Resuscitate' order since ICDs attempt to resuscitate the patient by shocking their hearts back into a life-sustaining rhythm.

Discussing deactivation of the ICD

1. Consult the clinician who manages the ICD (usually a cardiologist or associated clinician); that individual is often the person to assume responsibility for deactivation. Patients are usually followed in a device clinic and probably have an established relationship with the physician and staff. The involvement of these professionals can provide a sense of comfort and closure for the patient and family. Note: The device manufacturers will not send representatives to patient's homes for deactivation by simple reprogramming of the device.
2. Discuss expectations of "turning off" the ICD. The following should be made clear:
 - a. Turning off the ICD means that the device will no longer provide life-saving therapy in the event of a ventricular tachyarrhythmia.
 - b. Turning off the ICD will not cause death.
 - c. Turning off the ICD will not be painful, nor will its failure to function cause pain.
3. Establish a plan of care that will ensure availability for addressing new questions or concerns that might arise (patient/family should not feel abandoned once the device is turned off).
4. If there are conflicts among providers or family members, consultation with a palliative care expert or ethics team can be helpful.

Emergency ICD Deactivation When patients are imminently dying, there may not be enough time for a cardiac physiologist to prevent painful shocks via ICD reprogramming. Any health care professional can temporarily deactivate the device by placing a special magnet, which are usually available at electrophysiology clinics, directly over the implant site. This stops the defibrillation function of the device, but would not disable the pacing functionality. Of note, once the magnet is removed, the ICD will resume functionality. Hence, reprogramming of the device by a cardiac physiologist would still be required.

Ethical/Legal issues A patient's right to request withdrawal of life sustaining medical interventions, including ICDs, is both legal and ethical. Withdrawal of a life sustaining medical intervention with the informed consent of a patient or legal surrogate is not physician-assisted suicide or euthanasia.

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