Fast Fact and Concept #112: IMPLANTABLE CARDIOVERTER DEFIBRILLATOR (ICD) AT END OF LIFE

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Recent clinical trials and advances in device technology have expanded the indications for implantation of cardiac devices. In 2002 alone, 96,000 ICDs were implanted in North America. It is estimated that over 3 million patients in North America could now be eligible for an ICD, with over 400,000 additional patients meeting the criteria every year. However, near the end of life, decisions as to how best to use these devices can be the source of much anguish for patients, families and palliative care/hospice staff.

Current Devices
The devices in question are implantable cardioverter defibrillator devices. These devices, somewhat larger than pacemakers, are usually implanted in the upper chest under the clavicle. They monitor cardiac rhythm and deliver shocks when rapid abnormal cardiac rhythms are identified. These shocks can be painful and thus are inconsistent with comfort care. These devices can also deliver pacing therapy. Pacing therapy increases heart rate when slow heart rhythms are detected. Pacing therapy can promote comfort as slow heart rhythms may cause heart failure symptoms. The shocking and pacing therapies of an ICD can be independently turned off. Discontinuation of pacing is discussed in Fast Fact #111. The remainder of this Fast Fact will discuss withdrawal of the shocking function of ICDs.

Indications for Withdrawal of ICD (turning off)

- Continued use of an ICD inconsistent with patient goals
- Withdrawal of anti-arrhythmic medications. If anti-arrhythmic medications are withdrawn consider turning off the ICD to avoid frequent shocks.
- Imminent Death (see Fast Fact #3)
- DNR order. The functioning of an ICD is 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 ICD physician; that individual will be the person to assume responsibility for deactivation. Patients are usually followed in a device clinic and probably have an established relationship with the ICD physician and staff. The involvement of these professionals will 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.
2. Discuss expectations of "turning off" the ICD. The following should be made clear:
   o Turning off the ICD means that the device will no longer provide life-saving therapy in the event of a ventricular tachyarrhythmia
   o Turning off the ICD will not cause death
   o 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.

**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.

**References**


Mueller PS, Ethical Analysis of Withdrawal of Pacemaker or Implantable Cardioverter-Defibrillator Support at the End of Life, Mayo Clinic Proceedings, 2003; 78 (8): 959-963.


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**Purpose**: Instructional Aid, Self-Study Guide, Teaching
**Audience(s)**

**Training:** Fellows, 3rd/4th Year Medical Students, PGY1 (Interns), PGY2-6, Physicians in Practice

**Specialty:** Anesthesiology, Emergency Medicine, Family Medicine, General Internal Medicine, Geriatrics, Hematology/Oncology, Neurology, OB/GYN, Ophthalmology, Pulmonary/Critical Care, Pediatrics, Psychiatry, Surgery

**Non-Physician:** Nurses

**ACGME Competencies:** Medical Knowledge, Patient Care

**Keyword(s):** Antibiotics, Blood products, Clinical interventions, Communications skills, Death pronouncement, Discussing hospice care, Family conference, Giving bad news, Hydration, Interventional procedures, Negotiating treatment goals, Non-oral feeding, Personal reflection, Prognosis, Radiation or chemotherapy, Rehabilitation, Surgery