

# Implantable cardioverter defibrillator: Frequently asked questions (FAQs)

The implantable cardioverter defibrillator (ICD) is an implanted arrhythmia management device that is used to treat patients with life-threatening ventricular arrhythmias. The ICD is currently implanted most frequently in patients who are survivors of cardiac arrest. Two completed and several ongoing clinical trials will clarify the emerging interest in use of ICDs in primary prevention of sudden death. The growing use of ICDs translates into increased exposure of physicians at all levels of expertise to these devices. The following is a far from inclusive list of frequently asked questions (FAQs) posed to a cardiologist with expertise in ICD management.

**1. Inappropriate shocks.** The ICD delivers appropriate therapy based on heart rate, but the physician wishes to suspend its function. This may occur with sinus tachycardia or atrial fibrillation. Applying a standard magnet (used to obtain ECGs in pacemaker patients) suspends detection of the device, allowing the device to be reprogrammed or the underlying rhythm to be treated. Occasionally the ICD will deliver inappropriate shocks because of an external sensed electromagnetic signal or internal lead problem. Removing the patient from the hazardous situation and applying a magnet to suspend detection will allow time to assess the patient and device and take appropriate action.

**2. Appropriate shocks.** The ICD delivers appropriate therapy, but the physician wishes to suspend its function. This may occur with well tolerated ventricular tachycardia (VT) or non-sustained VT. Applying a standard magnet suspends detection of the device, allowing the device to be reprogrammed or the underlying

rhythm to be treated. Incessant ventricular arrhythmias despite successful cardioversion or defibrillation (VT storm) may require suspension of ICD function with a magnet while the underlying cause is sought and antiarrhythmic drug therapy is administered.

**3. Cardioversion.** External pads should be applied at least 15 cm from the ICD generator. The optimal anteroposterior pad configuration is usually easy to obtain without interfering with the ICD. Most ICDs can be used for internal cardioversion.

**4. Patient death.** A coroner or mortician may call and ask for instructions regarding ICD handling after death. The ICD does not need to be removed unless cremation is planned. Cremation may result in device explosion. The person handling the device should wear rubber gloves and cut the lead(s) using wire cutters. If stored data is sought, ICD interrogation is necessary before cutting the leads. The manufacturer does not want the device returned.

**5. Surgery/electrocautery.** Cautery may be interpreted as a tachyarrhythmia by the ICD, leading to inappropriate shocks. Short bursts of bipolar cautery will minimize the problem. When in doubt, the ICD can be reprogrammed or a magnet can be applied to prevent inappropriate detection.

**6. Dental inquiries.** Normally functioning dental tools have no effect on the ICD, including ultrasonic cleaning devices, X-ray machines and drills. Prophylactic antibiotic therapy is not necessary.

**7. Cellular phones.** While the majority of ICDs and cell phones are well shielded, there is potential for interaction and inappropriate shocks. Digital phones are a greater risk than analog phones, particularly if held

within 15 cm of the device. Patients should be advised to talk in the opposite ear, and avoid carrying the phone in their breast pocket.

**8. Surveillance devices.** These devices emit a continuous high frequency signal that may result in false detection by the ICD. Patients are encouraged to walk briskly through any such detection device, or request a hand or wand check. Airport security will detect the ICD. Patients are advised to request a manual security check and carry their ICD identification card to present to security personnel.

**9. Diagnostic imaging.** ICDs are not affected by X-rays or ultrasound, but are incompatible with magnetic resonance imaging (MRI). Patients undergoing radiation therapy may need shielding if the device is within 5 cm of the radiation field, or relocation if the ICD is within the field.

**10. Sounds.** Some ICDs may emit a sound during magnet application, or when there is a device problem, such as device end-of-life, excess charge times detected, or the lead impedance is out of range. These sounds generally mean that the ICD requires prompt interrogation to determine the potential for malfunction.

## General rules

1. Keep a magnet handy – it suspends the ICD's ability to detect (quick shut off)
2. Keep external signals 15 cm from the ICD (cell phones, cautery, etc)
3. All manufacturers have a toll-free 24-hour support number to answer questions.

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