

Cardiovascular Implantable Electronic Devices



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KEYWORDS

- Cardiovascular implantable electronic device • Pacemaker
- Implantable cardioverter defibrillator • Cardiac resynchronization therapy
- Cardiology • Arrhythmia

HOSPITAL MEDICINE CLINICS CHECKLIST

1. There are several types of cardiovascular implantable electronic devices (CIEDs), including pacemakers and implantable cardioverter defibrillators (ICDs).
2. The main indications for pacemakers are symptomatic sinus node dysfunction and high degree atrioventricular block. A biventricular pacemaker for cardiac resynchronization therapy is recommended in the setting of a low ejection fraction and anticipated need for pacing.
3. ICDs are used for primary and secondary prevention of ventricular tachycardia or ventricular fibrillation arrests.
4. The use of CIEDs has been steadily increasing.
5. There are several complications associated with CIED implantation, including infection, which can be a diagnostic and treatment challenge.
6. CIEDs require frequent monitoring, every 3 to 12 months; however, with the advent of remote monitoring, some of this can be accomplished without an office visit.
7. As CIEDs become more common, hospitalists will encounter unique dilemmas associated with CIEDs, such as use of MRI, preoperative and postoperative care, and device management at the end of life.

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DEFINITIONS

What is a CIED?

A cardiovascular implantable electronic device (CIED) is any device implanted with the main purpose of monitoring and/or managing the electrical activity of the heart. For the purpose of this article, pacemakers and implantable cardioverter defibrillators (ICDs) will be the focus; however, implantable loop recorders are also considered CIEDs (Fig. 1).

A pacemaker is a bradyarrhythmia device that monitors the underlying electrical activity of the heart and paces when needed. It is capable of pacing the right atrium, right ventricle, and/or left ventricle. Biventricular pacing, also referred to as cardiac resynchronization therapy (CRT), uses a left ventricular lead to mimic natural ventricular depolarization.

In contrast, an ICD is a tachyarrhythmia device, which monitors the electrical activity of the heart and delivers therapies to treat ventricular tachycardia (VT) or ventricular fibrillation (VF). Of note, contemporary ICDs are also capable of pacemaker functions.

What are the basic components of a CIED?

Pacemakers and ICDs consist of a pulse generator, which houses the battery and wiring, and 2 to 3 transvenous leads, which connect the generator to the cardiac endocardium or epicardium.¹ The lifespan of the battery can be from 5 to more than 10 years, depending on the model and generation of the CIED, as well as the frequency of use.²

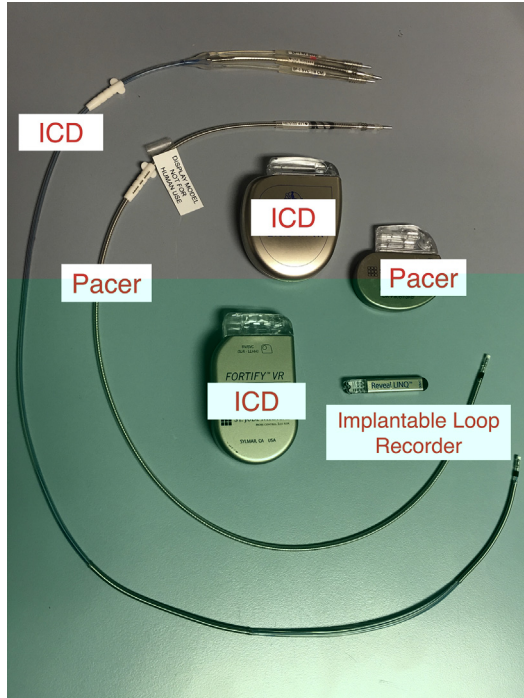


Fig. 1. Images of CIEDs. (Courtesy of St. Jude Medical, St. Paul, MN; and Medtronic, Minneapolis, MN; with permission.)

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