FAST FACTS AND CONCEPTS #111
CARDIAC PACEMAKERS AT END-OF-LIFE

Background
Worldwide more than 3 million people have cardiac pacemakers. Over 600,000 new pacemakers are implanted each year, with most of these devices in patients over the age of 60. Although pacemakers were once primarily used to treat bradyarrhythmias (e.g., heart block), more recently, patients with subvalvular stenosis, and atrial fibrillation may qualify for pacemakers. Additionally, patients with congestive heart failure may receive biventricular pacemakers or cardiac resynchronization therapy devices (CRT) to improve symptoms. This Fast Fact discusses management of cardiac pacemakers at life’s end. Fast Fact #112 discusses implantable cardioverter-defibrillators.

Pacemaker Function at Time of Death
Patients and their families often make assumptions that pacemakers prolong the dying process and thus prolong suffering. However, a pacemaker is not a resuscitative device. In general, pacemakers do not keep dying patients alive, as terminal events are often due to sepsis, hemorrhage, pulmonary emboli, or arrhythmias from metabolic abnormalities associated with end-stage cancer, liver, or renal failure. At the time of death, the myocardium is usually too sick to respond to the pacemaker generated signals.

When is Pacemaker Deactivation Indicated?
In patients with irreversible cognitive failure, where continued pacemaker activity is not meeting the goals of care, it may be appropriate to discuss the option of deactivation. In most other situations, deactivation is not indicated since the result is likely to be a symptomatic bradycardia, producing signs and symptoms of worsening heart failure (fatigue, dizziness, dyspnea). In contrast to popular belief, it is rare that disabling the pacemaker will result in a swift and painless death as few patients are 100% pacemaker dependant, particularly during the period of imminent death (Fast Fact #3), where tachycardia is the most common rhythm. When questions arise concerning dependency on the pacemaker, consult the cardiology/pacemaker service.

CRT Devices
These devices are used most often for patients with heart failure and, more rarely, in select patients with atrial fibrillation. CRT devices deliver biventricular pacing to improve the efficiency and functionality of the right and left heart ventricles. There are two main types: a) CRTs without capability for defibrillation (CRT-P) or b) CRTs with added capability for defibrillation (CRT-D). Most in the United States are of the CRT-D type. Below are relevant considerations:

• A CRT-P cannot be upgraded to CRT-D without lead replacement; however, a CRT-D may be downgraded to CRT-P in one of three ways: simple reprogramming; generator replacement; or placing a magnet over the generator (similar to an ICD).
• Indications for downgrade of CRT-D to CRT-P are evolving but often depend upon goals of care and prognosis. Downgrading does not affect the symptomatic benefits of pacing.
• While a trained radiologist or cardiologist may be able to discern the thicker RV lead and the visible coil of a CRT-D device on a chest x-ray, clinical distinction between CRT-D and CRT-P is best achieved by interrogating the device. This is usually performed by a technician from the manufacturing company or an electrophysiology clinician. Reference #7 provides an algorithm for identification of cardiac rhythm devices, which can facilitate this practical process.

Ethical/Legal issues
A patient’s/surrogate’s right to request withdrawal of life sustaining medical interventions, including pacemakers, 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. While there may be more agreement about the deactivation of implantable cardioverter-defibrillators than of pacemakers amongst practicing clinicians, the Heart Rhythm Society issued a consensus statement in collaboration with many professional groups (including the American College of Cardiology, the American Academy of Hospice and Palliative Medicine, and the American Heart Association) which effectively erased any ethical distinction between types of implanted devices being deactivated and endorsed a patient’s right to have one’s pacemaker deactivated.

Summary
Initiate a discussion about pacemaker deactivation only if there is potential for patient benefit; consider the potential negative effects of deactivation before disabling the pacemaker. For patients who
wish to deactivate the ICD function of a CRT-D devices, this can often be done via simple reprogramming of the CRT device.

References


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