Placement, Management, & Extraction of Cardiac Implantable Devices

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Mike and Lisa have indicated that they have no relationship which, in the context of their presentation, could be perceived as a potential conflict of interest.
Objectives

• List three differences between single, dual, and biventricular devices

• Describe two differences between non-traditional and traditional cardiac devices

• Describe two possible complications of cardiac device extraction
Pacemakers are most commonly used for the treatment of bradyarrhythmias from blocked conduction or disease through the heart’s electrical pathway from the SA node to the AV node and through the HIS-Purkinje system.
Pacemakers

Symptomatic bradycardia
Fainting or syncope

Congestive heart failure
AV Block following valve surgery

Fatigue and / or exercise intolerance
History of cardiac involved sarcoidosis
Hypertrophic cardiomyopathy (HOCM)
Implantable Cardiac Monitors
Defibrillators

ICD’s or Implantable cardiac defibrillators are used to detect tachyarrhythmia's by delivering electrical energy to the heart muscle.
Defibrillators

- Ischemic heart disease
- Nonischemic cardiomyopathies such as HOCM
- Wolfe Parkinson White (WPW)
- Sarcoidosis
- Sudden Cardiac Death
- Long QT Syndrome
Traditional Cardiac Devices

Cardiac devices are made up of two parts:

- A pulse generator, which includes the battery and several electronic circuits
- Leads, which are attached to the heart wall
Non-Traditional Cardiac Devices

- Epicardial lead
- Subcutaneous lead
- Leadless
- MRI Conditional
A single-chamber device has a single lead placed in the ventricle or rarely in the atrium.
Dual chamber devices have two leads: one in the right atria and one in the right ventricle.
Cardiac resynchronization therapy (CRT) is a device-based therapy for patients with damaged heart muscles, electrical timing abnormalities, and symptomatic heart failure.
Elderly Patients are the Primary Users of MRI Conditional Pacemakers

Ophthalmology
Otolaryngology
Cardiothoracic Surgery
Surgical Oncology
Nephrology
Gynecologic Oncology
Urology
Rheumatology
Neurosurgery
Neurology
Oncology
Radiation Oncology
Interventional Radiology
Gastrointestinal Surgery
Orthopedic Surgery
Vascular Surgery
MRI Conditional Device

Lead tips can heat up
Strong magnetic field
Medicare reimbursement
Preserves venous access
Eliminates potential for vascular injury
Reduces potential for systemic infection
Avoids potential complications associated with endovascular lead implantation or extraction
Implanting the S-ICD® System
Leadless Pacemaker
NANOSTIM™ LEADLESS PACEMAKER

Implant

video
Cardiac Device Extractions

- Infection
- Damage
- Blockage
Infection

When a patient develops an infection, a cardiac device system may be completely removed to cure the infection.
Infection
Sometimes the lead(s) no longer provide reliable connections to the heart.

This necessitates the removal of the damaged lead(s).
Damage
A damaged lead(s) that have not been previously removed sometimes block venous flow to the heart.

In such cases, the damaged lead(s) must be removed in order to restore venous flow.
Blockage
Hybrid OR
**Tools Needed**

- Needle Eye Snare
- Femoral Work Station
- Locking Liberator
- Stylet Wire
- Evolution
- Laser
References

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