

Pacemakers and Defibrillators

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Outline

1) What is a pacemaker/defibrillator?

- Parts of the pacemaker/defibrillator

2) How does it work?

- Pacemaker – pacing for slow heart rate
- Defibrillator – pacing; anti-tachycardia pacing; cardioversion, and defibrillation



3) What are the risks and benefits of a pacemaker/defibrillator?

4) How will my lifestyle change after the procedure?

- Returning to normal activities
- Lifestyle changes
- Emotional adjustment
- Things to avoid
- Follow up visits and patient responsibilities



What is a Pacemaker/Defibrillator

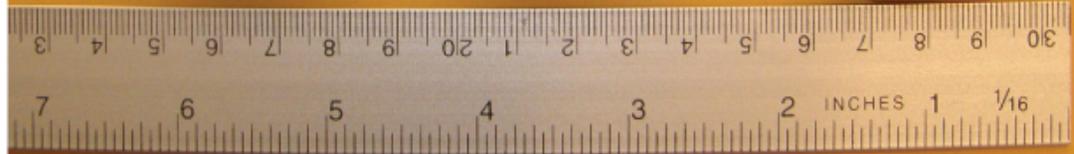


- A pacemaker is a device that helps the heart muscle beat and contract properly. It is placed permanently under the skin (chest or abdomen) and is connected to wires (leads) that are placed in your heart.
- A defibrillator is very similar to a pacemaker, the difference is that a defibrillator can out-pace or give a shock to terminate an arrhythmia where a pacemaker cannot.

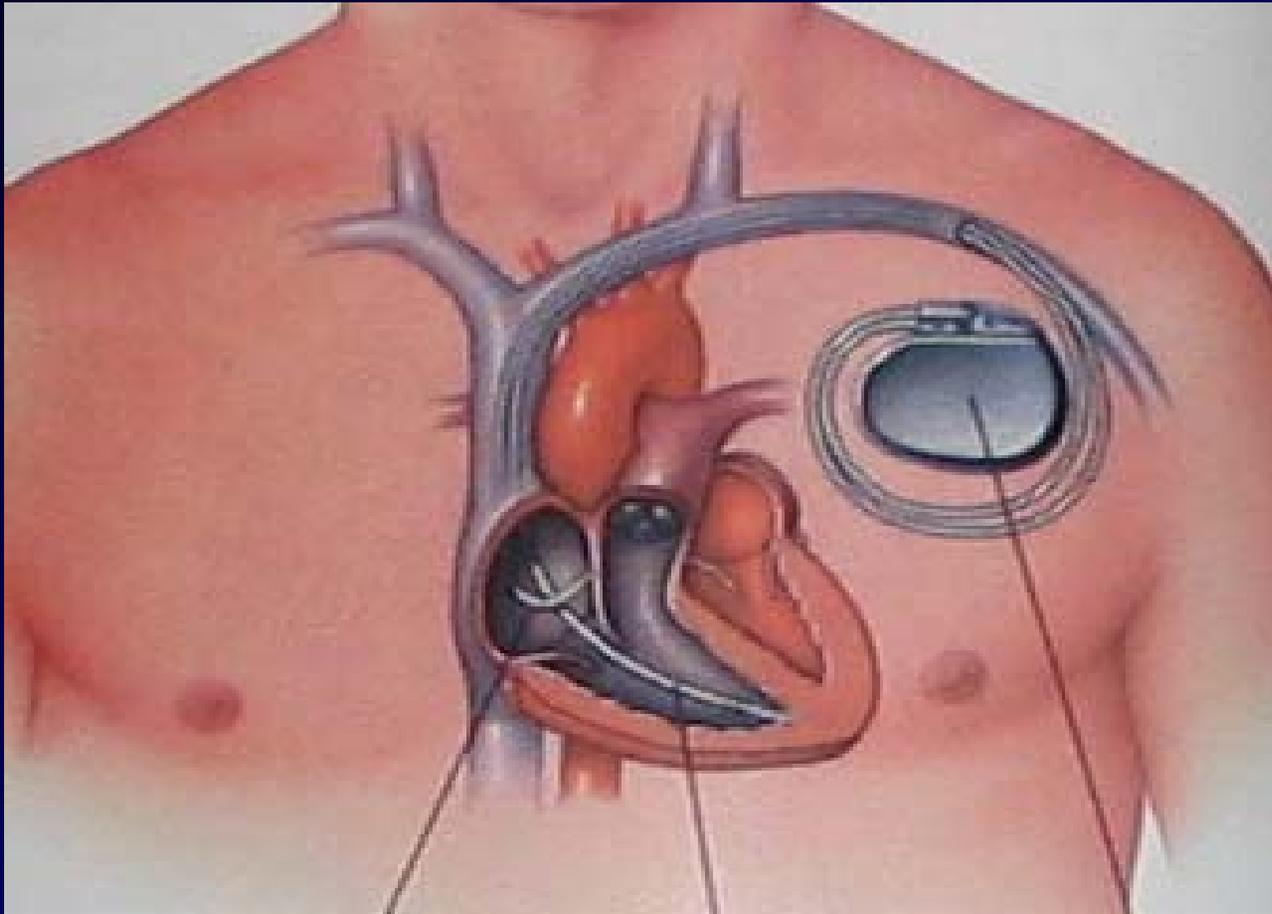


- Both a pacemaker and defibrillator are like small computers that run on a battery.
- The lead is a wire from the pacemaker/defibrillator to the inside of your heart
- The lead takes signals from your heart to the device and then takes an electrical current from the device back to your heart.









How do they work



Pacemaker

- The pacemaker and the pacing lead, work together to perform two main functions: pacing and sensing.
- Pacing is when a pacemaker sends tiny electrical signals to the heart through a pacing lead.
- Each tiny electrical signal is called a pacing pulse (pacing impulse, pace) and it is this pacing pulse that starts a heartbeat.
- The pacemaker paces (sends a pacing pulse to) the heart when the heart's own rhythm is interrupted, irregular, or too slow (i.e. heart block, bradycardia)



- A pacemaker may also sense (monitor) the heart's natural electrical activity. If a pacemaker senses a natural heartbeat, it will not deliver a pacing pulse to the heart.



Defibrillator

- It is very similar to a pacemaker, in that it can prevent a slow heart rate.....but it can do more:
 - 1) Sense and detect a rapid heart rhythm (tachyarrhythmia).
 - 2) Deliver one or more therapies until a more normal heart rhythm is restored. (Mild therapies are often used first followed by stronger therapies.)



Defibrillator System Therapies:

1) Antitachycardia Pacing

- Small, rapid pacing signals are delivered when the defibrillator detects the atrial or ventricular tachyarrhythmia.
- Usually these cannot be felt.
- If a normal rhythm is restored, no further treatment is delivered. If not, next step may be cardioversion.



2) Cardioversion

- The defibrillator can be programmed to deliver stronger impulses.
- These cardioversion shocks may be programmed from low to high energy shock, as needed.
- These shocks are timed to be delivered at a specific time in the heart rhythm.
- Cardioversion shocks feel like a "thump on the chest." You may feel lightheaded because of the tachyarrhythmia.



3) Defibrillation

- Detects ventricular fibrillation (VF – very fast, irregular heart beat), it will send a high-energy shock to the heart. This defibrillation shock interrupts the rapid heart rhythm so a more normal rhythm can be restored.
- During VF, many people lose consciousness. People who are conscious often describe the shock as a "kick in the chest."
- The shock is over quickly.



4) Bradycardia (slow heart rate) pacing

- The defibrillator has a built-in pacemaker: it sends signals that increase the heart rate to a normal rate.
- The defibrillator paces the heart until the heart begins beating at a normal rate.



Risks and Benefits of a Pacemaker/Defibrillator



Pacemaker

- Your heart will beat in a healthy rhythm, allowing you to have a normal lifestyle.
- Pacemaker may fail to pace or sense your normal heart beat (usually seen at time of implant).

Defibrillator

- Biggest problem is that you get a shock when you don't need one.
- Defibrillator does not fix heart problems, it lowers the risk of dying from an abnormal heart rhythm.
- Biggest benefit.....saves your life !!



How will a Pacemaker/Defibrillator affect my lifestyle?



- Return to normal activities gradually
- Depending on your condition your doctor will tell you if it's safe for you to drive.
- In general, you can expect to return back to normal after a month.
- Always follow your physician's instructions regarding medications.
- Discuss with your doctor regarding your participation in contact sports



Things to Avoid

Following activities are dangerous if you should lose consciousness:

- Swimming or boating alone
- Climbing a ladder
- Scuba diving
- Operative heavy equipment



Electromagnetic Interference

- Strong electrical and magnetic fields can interfere with pacemaker/defibrillator function.
- Most, everyday appliances are not an issue.
 - microwave, TV, radio computer



➤ Avoid:

- Airport security wands
- Touching the spark plug of a running motor or mower
- Areas need TV or radio transmitter tower
- Arc and resistance welding
- MRI, electrocautery



Things to discuss with your doctor

- Touch football
- Soccer
- Hockey
- Baseball, softball
- Water Skiing



Emotional Adjustment

- Emotional adjustment varies with each patient
- Normal reactions include:
 - Depression
 - Anxiety
 - Anger
 - Fear



➤ Patients often worry about:

- Loss of independence
- Uncertainty about the future
- Change in body image
- Employment status
- Participation in recreation activities
- Freedom to travel
- Reaction of family and friends



➤ Patients sometimes fear:

- Defibrillator failure
- Premature battery depletion
- Being alone
- Triggering a shock
- Sensation during shock
- Lack of warning before a shock is delivered
- Social isolation



➤ To ease the adjustment:

- 1) Know how your ICD or pacemaker works
- 2) Learn about lifestyle changes
- 3) Read available literature
- 4) Ask questions
- 5) Plan for emergencies
- 6) Talk about your concerns



Follow-up Visits



Purpose:

- Assess your medical condition
- Evaluate the pacemaker/defibrillator function and stored data
- Evaluate your medication and defibrillator therapy
- Reprogramming of device if needed
- Battery voltage is checked
- Follow up visits do not require surgery





Patient Responsibilities

- Resume daily activities gradually and healthy lifestyle
- Inform other healthcare providers of the pacemaker/defibrillator
- Call your doctor as instructed
- Schedule and keep all follow-up appointments
- Plan for emergencies (e.g. shocks)



- Carry your ID card with you at all times
- Take your medications as instructed
- Follow precautions for avoiding electromagnetic interference



Questions?

