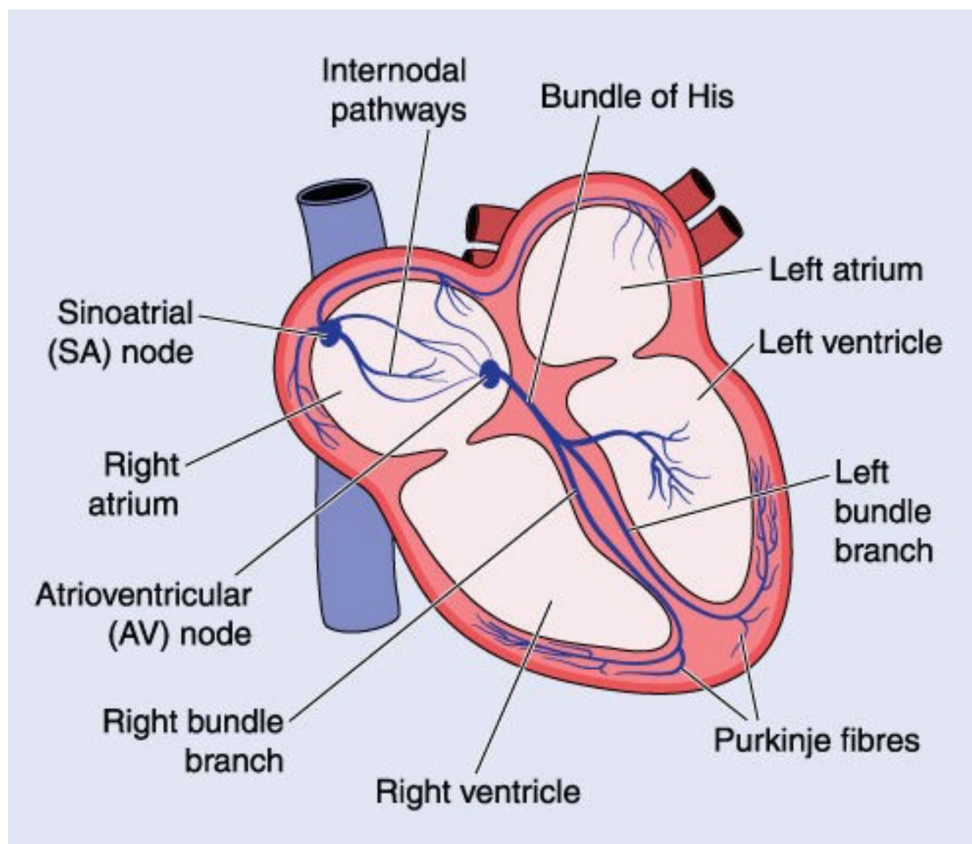


How does the electricity in my heart work?

To understand how an ICD works it is important to understand how the electrical system in your heart works. When your heart beats, it pumps blood to all parts of your body. It needs electricity in order to pump. When this electricity travels through the heart muscle it causes it to contract or beat.

A normal heartbeat is started by an electrical signal that comes from the heart's natural pacemaker, the sinoatrial (SA) node, located at the top of the right atrium. The electrical signal travels through the atria and reaches the atrioventricular (AV) node.

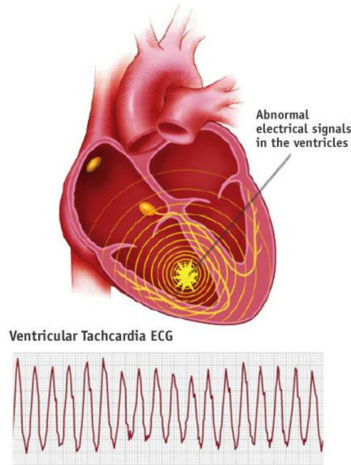


After crossing the AV node, the electrical signal passes through the bundle of His. This bundle then divides into branches that extend into the right and left ventricles. The electrical signal travels down the left and right bundle branches and eventually reach the muscle cells of the ventricles, causing them to contract and pump blood to the body.

Why would my doctor recommend an ICD?

1. You may be at risk for having dangerous arrhythmias. This could be due to various factors. Your heart may have been damaged by a heart attack, virus or infection, birth defect or other problem. An ICD will protect you if you develop a dangerous arrhythmia.
2. There may be a problem with your heart's electrical system that puts you at risk. Again, the ICD will protect you if you develop a dangerous arrhythmia
3. You may have had a life-threatening arrhythmia before. If so, the ICD will protect you if this happens again

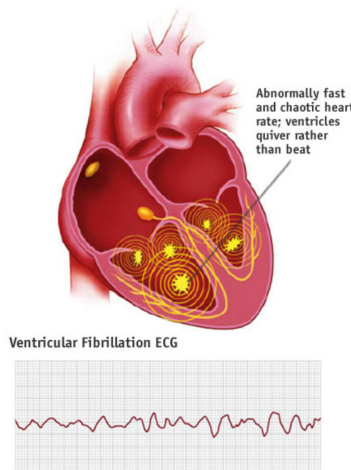
Dangerous arrhythmias



Ventricular Tachycardia (VT or V-Tach):

During VT, signals start to travel around inside the ventricles (lower chambers). The ventricles beat so fast that they don't have time to fill with blood.

The heart can't pump as much blood to the body as the body needs. Left untreated VT can be life threatening. It can also progress to a more serious arrhythmia Ventricular Fibrillation.



Ventricular Fibrillation (VF or V-Fib):

During VF, electrical signals in the ventricles are very fast and irregular. The heartbeat can be so fast and chaotic that the heart muscle quivers rather than pumps. If the abnormal heart rhythm is not treated right away, VF is almost always fatal.

Cardiac Arrest:

VT & VF can result in cardiac arrest if not treated, meaning no blood is being pumped out of the heart. A person in cardiac arrest will pass out. Emergency treatment is needed to get the heart pumping again or the person will die.

Treatment with an electrical shock to the heart is needed. This stops the heartbeat for a moment allowing it to return to a normal rhythm.

Symptoms of a fast heart rhythm

- Fluttering/palpitations
- Fainting/passing out
- A warm, flushed feeling
- Dizziness or lightheadedness
- Weakness
- Shortness of breath

What is an ICD?

An ICD (Implantable cardioverter defibrillator) is a pacemaker that has extra features that can stop a fast heart rhythm to save your life. As mentioned, fast heart rhythms in the ventricles can be dangerous, even deadly if not treated. An ICD can treat these rhythms.

The generator:

Contains a computer with memory, electrical circuits and a powerful battery. The battery is safety sealed within its casing.

It continuously monitors your heart rhythm and provides a small amount of energy to pace your heart if your heart rate becomes too slow. If an abnormal rhythm occurs, it sends out either electrical impulses (ATP) or a shock



Leads:

These are thin insulated wires that connect the ICD to your heart. You may have one, two or three wires depending on your individual needs.

The generator creates electrical impulses that are carried by the leads to the heart muscle, signaling it to pump. They also carry impulses or a shock to the heart when needed

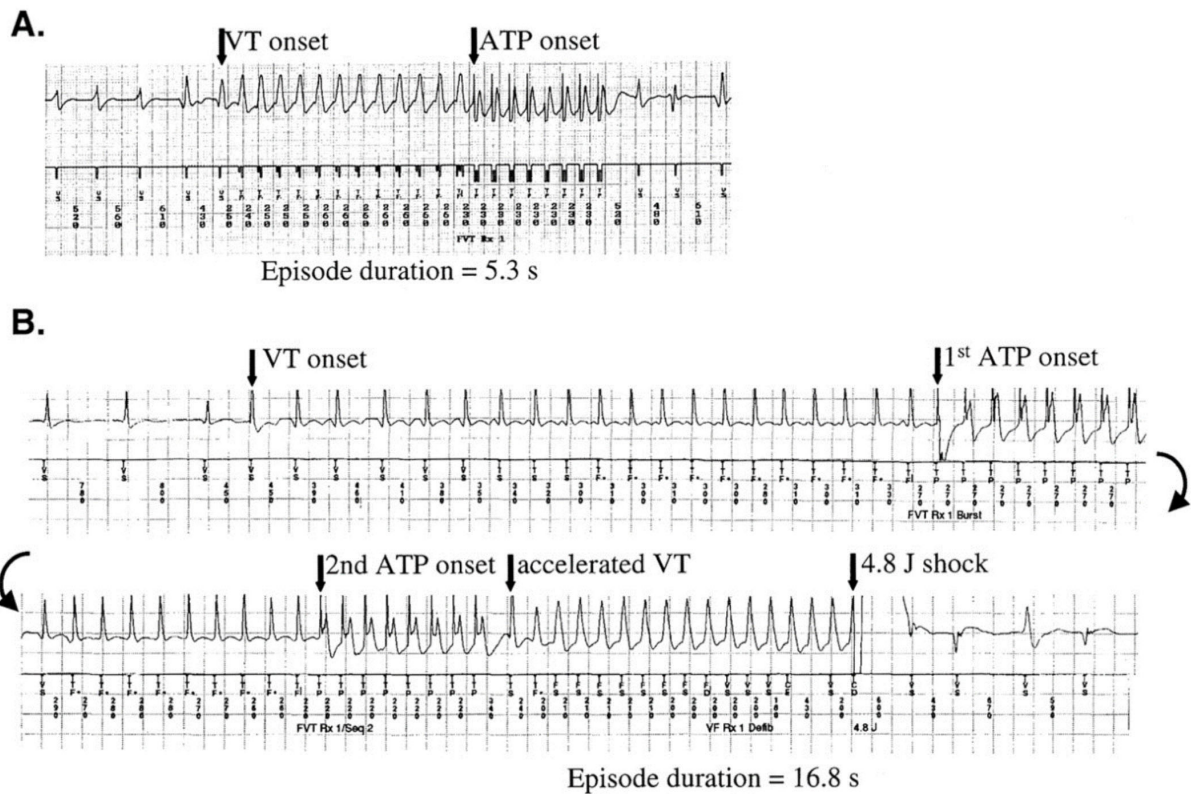
An ICD can do the following:

1. Pacing:

If your heart rate is too slow, the ICD will send out a signal to ensure your heart rate does not drop below a set rate. This is called pacing. Not all patients that get an ICD need to use the pacing function, but it is available if needed.

2. Antitachycardia Pacing (ATP):

When VT occurs, the ICD will send out a series of impulses. These may make the rhythm return to normal. ATP may feel like fluttering in your chest or may not be felt at all.



Getting an ICD implant— what to expect:

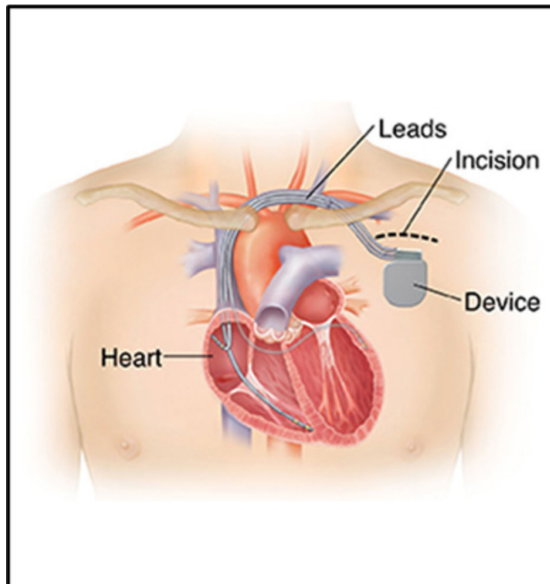
- Prior to your procedure, your nurse will review pre-procedure instructions that your doctor wants you to follow by one of three ways. She will either call you, send you written instruction via MyChart or will send you a letter in the mail.
- You will be given an antiseptic soap called Hibiclens to shower with the evening prior to and the morning of your procedure
- You will be asked to fast after midnight the night before the procedure
- Follow all the instructions that you were given, especially regarding medications

What to expect on the day of procedure

- You will need a driver to and from procedure
- You usually do not have to stay the night but be prepared to stay if your doctor decides to keep you overnight to monitor you.
- You will be asked to check in 2 hours prior to your procedure so that the nurse can prepare you
- You will be given an IV to provide fluids and medication & have labs drawn
- The doctor will have you sign a consent form if you haven't already
- The skin where your ICD will be implanted will be washed and hair in that area may be removed

During the procedure:

- ICDs can be placed on either side but are usually implanted on the left side of the chest just under the collar bone. The procedure usually takes 1-2 hours
- You will be taken to the operating room or cardiac catheterization lab for the procedure. Once there, the staff will connect you to equipment to monitor your vital signs. The implant area will be draped in sterile drapes.
- You are usually given sedation and/or pain medication throughout the procedure so that you don't feel any discomfort.
- The sedation nurse will be up by your head the entire duration of the procedure if you have any questions or discomforts throughout the procedure.



ICD implant procedure:

- Your doctor will first cleanse the site with antiseptic and then inject it with local anesthetic. An incision is made just under your collar bone. A small “pocket” for the generator is created. The incision lets your doctor access a vein that leads to your heart
 - The leads are guided through a vein into your heart. They are secured in your heart using small anchors on the tips of the leads. Electrical measurements are done to find the best area for lead placement.
 - Once the leads are secure, they are attached to the generator. The generator is then placed in the pocket beneath your skin.
- Your doctor will then close the incision with internal sutures and surgical glue or steri-strips on the outside of the incision. You will then be taken to the Cardiovascular Admit Recovery Unit (CVAR) to recover.

Risks of the procedure

Possible risks/complications of implanting a pacemaker include:

- Discomfort/pain to incision
- Bleeding
- Infection
- Bruising or swelling at implant site
- Puncture of the lung (pneumothorax)
- Damage to the heart (perforation or tissue damage)
- Puncturing of the heart or a vein on the outside of heart (tamponade)
- Clotting in the vein
- Heart attack/stroke/death (very rare)

Activity restrictions:

After you go home you will be asked to restrict the arm movement on the side the pacemaker was implanted. This is because until scar tissue forms around the lead, your leads are vulnerable to being dislodged. The following arm-movement restrictions help prevent lead dislodgement—**For 6 weeks:**

- Do not raise arm on affected side above shoulder
- Do not lift more than 10 lbs. with affected side
- No aggressive/repetitive arm movements such as sweeping, raking, vacuuming, golfing, chopping wood, tennis, or similar type movements

You can otherwise resume your usual activities. If you work, ask your doctor when it is ok to return to work or start driving again.

Caring for your incision:

It is normal to have some pain and stiffness around your incision in the first few days after you have your implant. Over-the-counter pain medication may be helpful. Use the following tips to care for your incision:

- If you have any dressing other than steri strips or skin glue, it can be removed in 24 hours; do not pick or peel off steri strips or skin glue.
- Do not shower until 24 hours after your procedure; when you do avoid rubbing incision, but you may get it wet during shower. Gently pat dry after.
- Do not apply any creams, lotions, ointments or powder to implant site
- Look at your incision every day watching for any signs of infection
- It is normal to have some bruising around your incision, to your chest or even under your arm on the side the pacemaker is implanted. This gradually fades away
- It is also common to experience some minor swelling in the first couple of days

Report any of the following to your doctor:

- redness to incision/surrounding area
- new or worsening swelling
- new or sudden onset bruising
- increased warmth to touch
- incision opens/drainage from incision
- presence of suture
- non-stop hiccups
- fever >100F

The standard follow up after having a ICD:

- ***1-week post-implant:*** This is a visit with a Nurse Navigator to check your ICD function and that your incision is healing properly.
- ***3-month follow-up:*** This is an appointment with an ARNP or PA-C with another ICD check (done by device tech or device nurse)
- ***Follow up with physician:*** Your physician will choose whether you are to be seen annually or every 6 months, depending on your individual needs.
- ***In-office device checks:*** When you have an ICD, you will need your ICD checked in the clinic every 6 months. In between these visits, remote checks from home are done. If you don't have a home monitor sending reports to the clinic every 3 months, you will need to have your ICD checked in the clinic every 3 months.

How is a ICD evaluated?

To ensure your ICD is working properly, your ICD will be evaluated in the clinic by a device nurse or device tech when you come in for follow up. You will initially have a one-week follow up after your ICD is first implanted. This is a visit with a Nurse Navigator to check your ICD and your incision.

When your ICD is evaluated, the ICD's function and battery is evaluated and if needed, settings may be adjusted. This fine-tunes the ICD to ensure it is working the best it can for your heart.

Each time your device is evaluated in the clinic, the need for adjustments will be assessed. Your doctor wants your ICD doing the best job it can for you. The nurse or device tech will ask about your activities and if you have any fatigue with activities to see if any adjustments are necessary.

Checking your ICD from home

You will receive a home monitor that will be paired with your ICD. This monitor will automatically be able to send your clinic an update on your ICD every three months.

It is also very important to keep your monitor plugged in every day. Each day your monitor will check to see if there are any problems with your ICD. Your ICD has alerts programmed into it, mainly related to lead integrity and if any alerts are triggered within the ICD, your monitor will send your clinic a message notifying them of the alert.

The third function of your monitor is the ability to manually send a report to your clinic. If you are not feeling well and call your clinic, your nurse may prompt you to send a report from your home monitor. You can remotely transmit an ICD report from home with your home monitor.

Home Monitors



Medtronic ICDs offer two options—either a cell phone APP or a stand-alone monitor



This is the monitor for **Abbott** ICDs



This is the monitor for **Boston Scientific** ICDs

What do I do if I receive ATP or shock from my ICD?

Antitachycardia pacing (ATP) can feel like small flutters/palpitations, brief dizziness or you may not feel anything at all. A shock may feel as strong as a kick to the chest but is usually brief. You may also pass out and receive a shock while passed out and not realize you were shocked.

- If you are shocked by your ICD, feel better after, and it is within clinic hours M-F 8am-4pm call your doctor immediately at 509-755-5500. We will usually have you do labs and come in for an urgent follow up appointment
- If you have not been shocked but feel rapid palpitations, sudden dizziness or feel like passing out, sit or lay down immediately and call your doctor's office immediately

CALL 911 immediately & go to Emergency department for evaluation:

- If you are shocked and it is outside of our office hours
- If you are NOT feeling better a shock
- If you receive 2 or more shocks
- If you ever pass out

Important things to remember

Some people are nervous about getting a shock. You may never experience a dangerous heart rhythm, but if you do, the ICD will treat the rhythm much quicker than paramedics could, and most likely will save your life.

If you are worried about getting a shock, keep the following in mind:

- If you received a shock, it's because your life was in danger. The ICD did it's job and saved your life
- The ICD settings allow it to distinguish between an increased heart rate due to exercise and a life-threatening rhythm. Having an ICD won't prevent you from exercise or most other physical activities
- If your ICD ever goes off during physical activity, tell your doctor. If the shock was accidental, the ICD's settings can usually be adjusted to prevent this from happening again.
- You can wear a medical ID bracelet that says you have an ICD (you must purchase this independently). This may help you feel secure that if you have an event and need help from others, you'll get it.

Living with an ICD

It may take time to get used to having a pacemaker, but most people are able to lead normal lives. It is safe for you to do almost any activity you like but there are things to consider when you have a pacemaker.

ICD ID Card

You will receive an ID card that contains important information about your ICD. A temporary one is given to you at the hospital until a permanent one comes in the mail 6-8 weeks after you have had your ICD. Always carry this with you and show it to any healthcare provider you go to so that they are aware that you have an ICD. You will also need to show your card to security staff in airports so that they know to follow special procedures that prevent the security wand from interfering with your ICD.

Does an ICD affect driving privileges?

Whether or not you are able to drive once you have an ICD will depend on your specific symptoms and the driving laws where you live. In general, an ICD does not prevent you from being able to drive, although your doctor may ask you to wait until you recover from the initial recovery stage of the ICD implant procedure. Ask your doctor about any restrictions that you may have.

Your ICD and outside signals

Most household appliances and items do NOT interfere with your ICD. For example, it is safe to use microwave ovens, computers, radios, televisions, hair dryers, electric blankets, heating pads, razors, remote controls, vacuums, and many other household appliances. People with ICDs do need to be aware that ICDs can be affected by electromagnetic interference (EMI). EMI is caused by strong electrical or magnetic fields.

A few things can create signals that may interfere with your ICD:

- *Cellular phones:* should not be kept in a pocket over your ICD; should be 6 inches away. As you talk, talk on the opposite side of the ICD.
- *Electromagnetic anti-theft systems:* are often located near store entrances and exits. Walking through one is okay but avoid standing or leaning up against one.
- *Very strong magnets:* Do not place a magnet over your ICD
- *Strong electrical fields* can be created by heavy duty power equipment such as an arc welder. Stay 6 feet away from large industrial power sources. If you use welding equipment, ask your physician for more information
- *Chainsaws:* avoid use of a chainsaw when you have a ICD, it can cause your ICD to shock you when a shock is not needed.
- *TENS units or massagers:* avoid use of these on the upper body. Use of these on the upper body can cause interference with your ICD, it can also cause a shock when a shock is not needed

Am I able to have an MRI scan?

Some patients need an MRI (Magnetic Resonance Imaging) scan to diagnose different health conditions. MRI is a diagnostic tool that uses different types of magnetics and electromagnetic fields to image soft tissue of the body. Many pacing systems are not appropriate for use during an MRI; however, you may be eligible to have an MRI if you are implanted with an MRI conditional pacing system. This means that the leads and the generator must be designed to work in an MRI environment and meet the conditions of use. Your cardiologist will be able to work with you to determine if your ICD system can undergo an MRI scan.

Can I travel with my ICD?

Once you have recovered from your implant procedure, you can feel confident to resume your normal activities including any travel. Make sure you carry your ID card with you at all times to alert medical and security personal that you have an implanted device.

It is important to carry your ID card with you because it tells airport security that the device may contain metal components that may set off metal detectors. Walking through a metal detector will not harm your ICD. Airport security wands could temporarily affect the device. If security personnel use a wand, ask them to do the search quickly and to not hold the wand directly over the device. You can also request a hand search if you prefer.

Exercise Regularly

Having an ICD does not mean that you can't be active. Regular exercise is good for your overall health and is encouraged. You can do most activities with your ICD but if you play any contact sports or do weightlifting, please discuss these with your doctor. If you need help knowing how to start an exercise program, ask your doctor for advice.

