A Patient's Guide to Understanding Cardiac Resynchronization Therapy Defibrillators (CRT-Ds)

ST. JUDE MEDICAL

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St. Jude Medical thanks James G. Porterfield, M.D., and Linda M. Porterfield, Ph.D., Arrhythmia Consultants, Methodist Central Hospital and University of Tennessee, Memphis, for their contribution to this booklet, parts of which are based on their interactive computer-disk program, *Know Your Defibrillator.*

Your Contact and Device Information

Have your doctor or nurse complete the information on these pages before you go home from the hospital.

Physician Name _____

Phone Number _____

Address _____

_____

Hospital Name _____

Phone Number _____

Address _____

_____

Device Model Number _____

Serial Number _____

Date Implanted _____

Description _____

_____

_____

_____

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Physician Instructions

Living With Your Device

Many people suffer from heart disease. Often it takes the form of a rapid heartbeat that can result in a stopping of the normal pumping action of the heart (cardiac arrest). This kind of heartbeat is called an arrhythmia (a RITH me uh).

There are also some patients who have congestive heart failure or heart failure. Heart failure is a medical condition in which the heart muscle is weakened and can no longer pump blood as efficiently as a healthy heart.

Your doctor has explained that you have an arrhythmia and heart failure.

There are several ways to treat arrhythmias and heart failure. This booklet is about one of the treatments, implantation of a device called a cardiac resynchronization therapy defibrillator (CRT-D).

Implantable cardioverter-defibrillators (ICDs) look a lot like pacemakers. As you may already know, pacemakers can speed up a slow heartbeat. ICDs do just the opposite. They slow down a

too-rapid heartbeat. Some ICDs can do both. A CRT-D is an ICD that includes a pacing feature to help resynchronize (coordinate) the lower heart chambers, enabling your heart to beat efficiently.

When you have a CRT-D, there are certain things you need to know about.

Caution: Electromagnetic interference (EMI) may interfere with the function of your CRT-D. Avoid sources of electromagnetic fields. (Page 28)

Caution: Metal detectors and Electronic Article Surveillance (EAS) systems will not harm your CRT-D if you pass through the archway at a normal pace. Avoid lingering in the immediate area. If a search with a hand held wand is performed you should stress to security personnel that the search should be performed quickly and that they should avoid holding the wand over your CRT-D for a prolonged period. (Page 30)

Caution: Medical equipment, such as diathermy, TENs units, and MRI may affect the function of your device. Always tell the doctor or nurse that you

have a CRT-D before undergoing any medical procedure. (Page 31)

Caution: Keep a hand-held personal cellular phone at least 6 inches (15 cm) from your CRT-D. A cellular phone may affect the function of your device. (Page 34)

Detailed information is provided in *Cautions and Warnings* beginning on page 27 of this booklet.

CRT-Ds protect the lives of many people worldwide. You and your doctor may decide to use a CRT-D in your treatment. We at St. Jude Medical want you to feel comfortable about your decision, so we have provided you with this guide. It will help you understand how CRT-Ds work and how they will affect your life.

You will probably have questions that this booklet does not answer. We encourage you to discuss them with your doctor and your nurse. They are your partners in health care and your best source of information.

If you come across a word you do not understand, you can find its definition in the Glossary on page 51.

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The Healthy Heart

Why is the heart sometimes called a "pump"?

The heart's job is to move blood around the body. Blood contains the oxygen that the organs and tissues need to do their work. The blood cells pick up oxygen in the lungs and the pumping action of the heart moves this oxygen-rich blood to the rest of the body.

What does the heart look like?

As shown in Figure 1, the heart has four chambers. When it is at rest, the chambers fill with blood. With each heartbeat, the heart squeezes blood out into the body.

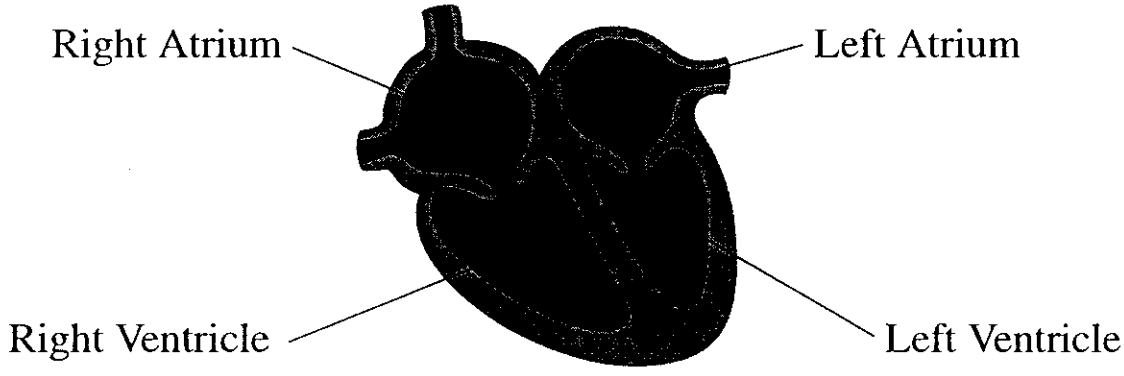


Figure 1. A typical heart.

How often does the heart beat?

A normal heart beats 60 to 100 times each minute.

When you exercise, get excited, or experience stress, your body needs more oxygen. Your heart beats faster to keep up with the demand. How fast it beats is controlled by a small area in the upper chamber of your heart. This area is called the sinoatrial (SA) node. It sends out an electrical signal that causes your heart to beat. Figure 2 shows the location of the SA node.

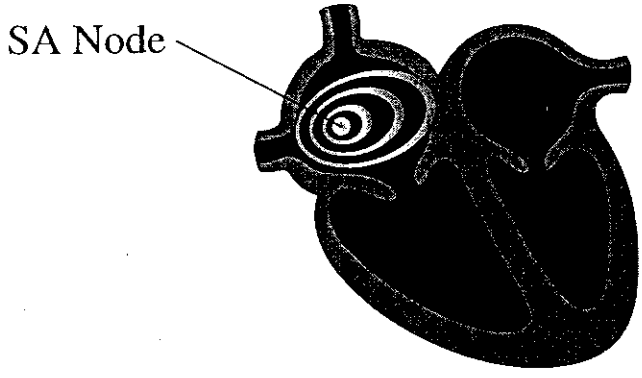


Figure 2. The sinoatrial (SA) node sends out an electrical signal that causes your heart to beat.

What is the AV Node?

The atrioventricular (AV) node is another specialized area in the heart, located between the upper and lower chambers of your heart. It holds the electrical signal from the SA node for a fraction of a second before releasing it into the ventricle. The result is that the atrium beats first, pushing blood into the ventricle, and then the ventricle beats after it has been filled with the blood from the atrium. Figure 3 shows the location of the AV node.

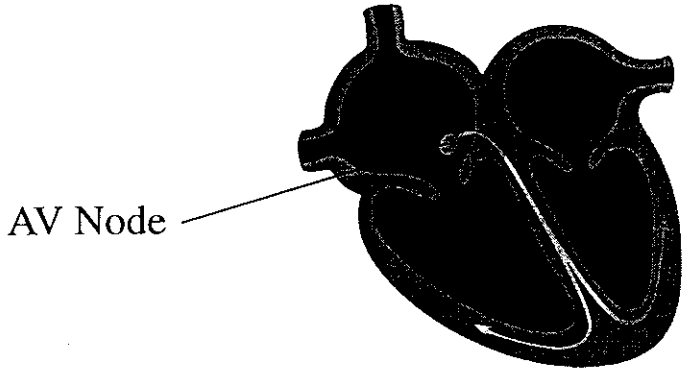


Figure 3. The atrioventricular (AV) node holds the electrical signal from the SA node for a fraction of a second before releasing it into the ventricle.

Arrhythmias

What is an arrhythmia?

An arrhythmia is any heart rhythm that is "abnormal." It may be considered abnormal if it is too fast, too slow or starts somewhere in the heart other than the SA node.

What are some of the different kinds of arrhythmias?

Some common arrhythmias are described below.

Bradycardia

Damage to the SA node or blockage of its electrical signal can cause the heart to beat too slowly. This is called bradycardia. A person with bradycardia may feel very tired because their body is not getting enough oxygen. They may also feel light-headed or dizzy. Pacemakers correct bradycardia by speeding up the heartbeat to a more normal rate.

Ventricular Tachycardia

Sometimes the heart beats much too fast. This is a serious condition called ventricular tachycardia (VT). As shown in Figure 4, VT is caused by signals that come from the heart's lower chamber instead of from the SA node. During VT, the heart beats so fast that its chambers can not completely fill with blood between beats. Therefore, less blood and oxygen are pumped through the body, causing dizziness, fainting, or loss of consciousness.

Doctors and paramedics can stop VT with medication or with an electrical shock. Sometimes the heart's normal rate returns without treatment.

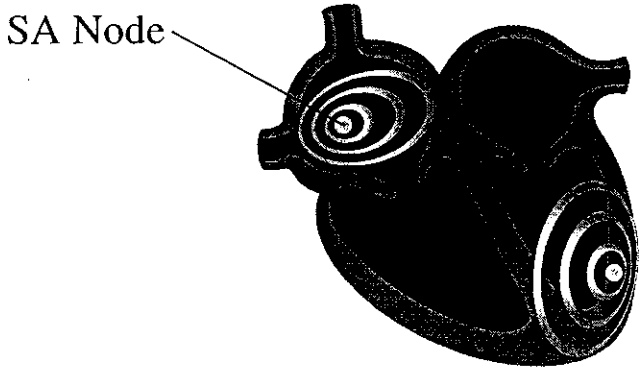


Figure 4. Ventricular tachycardia (VT) is caused by signals that come from the heart's lower chamber instead of from the SA node.

Ventricular Fibrillation

The most serious kind of arrhythmia is ventricular fibrillation (VF). As Figure 5 illustrates, during VF many, many electrical signals come from the heart's lower chambers. These signals cause the heart to "quiver" rather than beat normally. Because of the quivering, very little blood is pumped out to the body. A person suffering from VF loses consciousness very quickly. An electrical shock must be given at once to restore normal heart rhythm. This can be done by a CRT-D or an external defibrillator. Untreated ventricular fibrillation can be fatal.

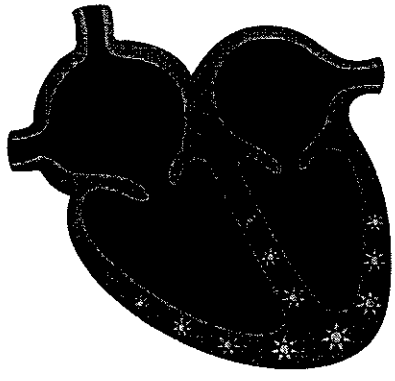


Figure 5. Ventricular fibrillation (VF) is caused by many electrical signals that come from the heart's lower chambers and cause the heart to quiver.

Atrial Fibrillation

Atrial fibrillation is the most common arrhythmia in older people. As Figure 6 illustrates, many electrical signals are sent from the upper chambers to the lower chambers in an irregular fashion. This causes the heart to "quiver". Some people may not feel any effects of atrial fibrillation. But in many people, this arrhythmia causes a feeling of pounding or fluttering in the chest. It may make people feel tired, sluggish, dizzy, or short of breath.

More serious is the fact that atrial fibrillation can cause a blood clot inside the heart that can flow to any part of the body, where it can cause a stroke or an embolism.

Atrial fibrillation is normally treated with medications and/or electrical cardioversion at a hospital. If these options do not adequately control the atrial fibrillation, then surgery or AV node ablation with the implantation of a CRT-D or pacemaker may be used to assist in the control of symptoms.

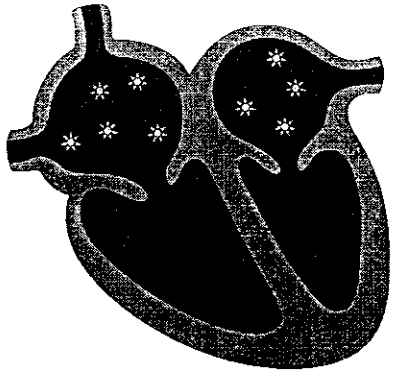


Figure 6. Atrial fibrillation is caused by many electrical signals that come from the heart's upper chambers.

Heart Failure

What is heart failure?

Besides beating too fast or too slow, the heart can also beat irregularly. In some patients, one side of the heart may contract sooner than the other side. When this happens, the pumping mechanism begins to fail. Blood and oxygen are not delivered fast enough to the body. This condition is called heart failure.

What is congestive heart failure?

Fluid can also back up in the lungs and elsewhere in the body, causing congestion similar to a traffic jam. This fluid back up can lead to a serious condition called congestive heart failure.

These conditions are usually treated with drugs, but in some cases, a CRT-D can be used to help in the treatment. CRT-Ds can help the left and right ventricles beat at the same time (resynchronize the heartbeat).

Some Basic Facts About CRT-Ds

What is a CRT-D?

CRT-D stands for cardiac resynchronization therapy defibrillator. It is a special type of implantable cardioverter-defibrillator (ICD) that includes a pacing feature to help resynchronize (coordinate) the lower heart chambers, enabling your heart to beat efficiently.

Through the use of electronic circuitry, the battery-powered CRT-D senses the heart's rhythm and delivers treatment when necessary. This treatment is in the form of electrical pulses delivered to the heart. Wires, or "leads," connect the CRT-D to the heart. An illustration of a CRT-D and leads is shown in Figure 7.

A CRT-D is different from other ICDs. Typically, an ICD has either one or two leads in the right side of the heart. A CRT-D can have up to three leads: one in the right atrium, one in the right ventricle and one for the left ventricle.

A CRT-D can be used with your prescribed heart medications as part of your treatment plan.

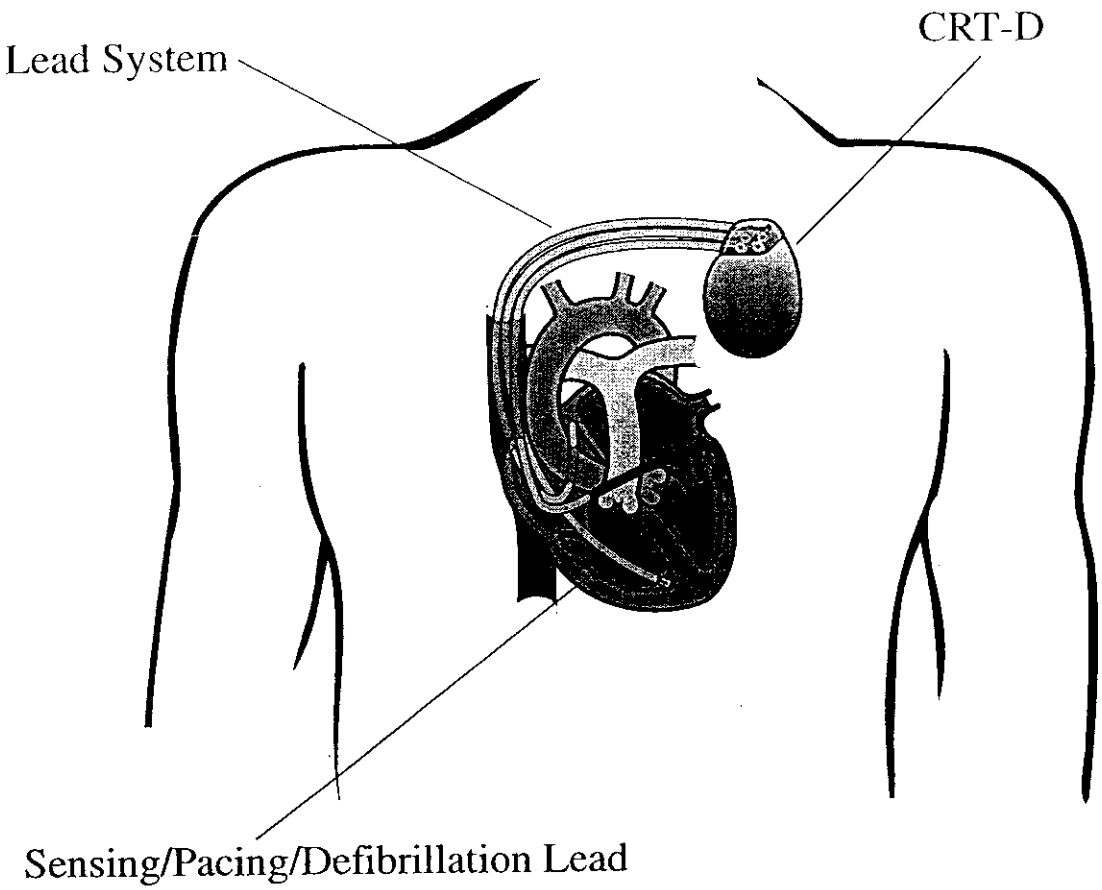


Figure 7. A CRT-D system.

What does a CRT-D do?

A CRT-D corrects rapid, abnormal heart rhythms. It constantly watches the heart and delivers treatment to stop an abnormally fast rate—such as VT and VF described on the previous pages. CRT-Ds can treat slow rhythms as well. They do this by sending tiny electrical impulses to the ventricle, the atrium, or both.

Your doctor sets the CRT-D to watch for heart rates that could be harmful to you. When the CRT-D senses that you are having an arrhythmia, it sends electrical pulses to the heart muscle through the leads. The electrical pulses slow the heart, therefore restoring a more normal rate.

To treat heart failure, the CRT-D monitors your heart signals and sends electrical pulses to the lower chambers of your heart and enables them to contract more efficiently.

Why do I need a CRT-D?

CRT-Ds are for people who are at risk of sudden cardiac death due to an abnormal ventricular arrhythmia. Your doctor has determined that despite taking medication for heart failure, you still have heart failure symptoms.

Implantation of a St. Jude Medical CRT-D is intended to provide an automated treatment for life-threatening ventricular arrhythmias. The CRT-D is also intended:

- to reduce the symptoms of heart failure in people who still have symptoms despite taking medication for heart failure.

- to maintain organized beating of the left and right ventricles in people who have undergone an AV nodal ablation for chronic (long-standing) atrial fibrillation and have heart failure.

Who does not need a CRT-D?

If your conditions are reversible, temporary, or can be controlled solely by drugs or other methods, you do not need a CRT-D. If you are not taking medication for heart failure you should not receive a CRT-D. There is more about medication in a later section of this booklet.

What is the therapy like?

The electrical pulses that are delivered to your heart for heart failure and some arrhythmias are very small. You probably won't notice this kind of therapy.

Stopping other, very fast arrhythmias may require a larger pulse of energy (a shock). A shock has been described by some CRT-D patients as a swift thump or blow to the chest. How strong the thump feels depends on how strong the shock is. Lower energy shocks may produce a less intense thump. Any

discomfort associated with shock therapy lasts for only a short time.

How often does the CRT-D deliver therapy?

To treat arrhythmias, therapy varies widely from patient to patient, depending on each patient's heart condition.

For heart failure, the purpose of the CRT-D is to deliver therapy when the lower chambers of the heart are not beating in synchrony. For the most part, this therapy is constant.

What should I do if I receive a shock?

Your doctor will tell you what to do if you receive a shock. Doctors usually want to know right away if you receive two or more shocks within 24 hours.

Important: Follow your doctor's instructions about what to do if you receive a shock.

When you receive a shock:

What happens after the CRT-D is implanted?

Your doctor will give you a special schedule to follow for your regular checkup visits. Checkups don't hurt and take only a few minutes. They tell the doctor if your CRT-D is working properly and how much energy is left in the battery. Checkups also tell how often your CRT-D has delivered electrical pulses to your heart.

After your CRT-D is implanted, you will be given an identification card with information about your CRT-D. Put the card in your wallet or carry it with you at all times. Show your card if you are ever in an emergency, are admitted to a hospital, see a new doctor or need to prove that you have a CRT-D.

You can obtain an application for a Medic Alert® identification emblem. The Medic Alert Foundation provides an ID emblem for people with medical problems. If you become ill and need emergency aid, the emblem alerts medical professionals that you have a CRT-D. For more information, contact the Medic Alert Foundation at (209) 668-3333 (888-633-4298 in the USA).

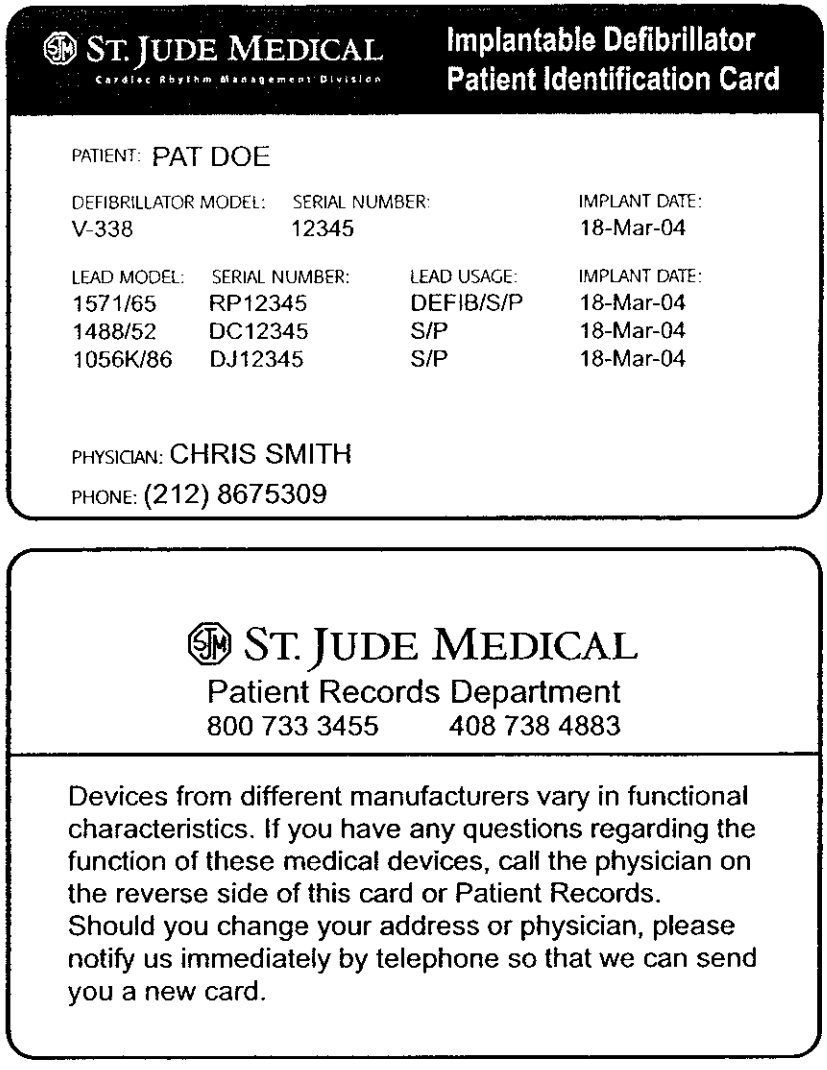


Figure 8. Example of a typical St. Jude Medical Patient Identification Card.

What happens when the battery runs down?

CRT-Ds can be expected to last anywhere from three to seven years. The life of the CRT-D depends on how often it delivers therapy. When the battery gets low, the entire CRT needs to be replaced. An incision is made where your current CRT-D is located, and your current CRT-D will be replaced with a new one. This is generally a very quick procedure and you will probably stay in the hospital for only a short time. Your CRT-D can be replaced as many times as needed. During the CRT-D exchange, the lead wires are not usually changed, but they are tested to make sure they are still working properly.

What happens if a lead needs to be replaced?

If a lead needs to be replaced, surgery is required to replace it.

Risks and Benefits

What are the benefits of having a CRT-D?

The major benefit of a CRT-D is that it constantly senses the heart's rhythm and automatically treats an arrhythmia. If your arrhythmia is very dangerous, this treatment can save your life. Also, many patients find that symptoms such as light-headedness, dizziness, and fainting decrease after they get a CRT-D. Some patients no longer need anti-arrhythmia drugs, and others need less anti-arrhythmia drugs.

A CRT-D gives many patients more "peace of mind." They feel safer because the CRT-D will automatically treat their arrhythmia. A CRT-D may also help alleviate your heart failure symptoms, such as fatigue or shortness of breath. You may experience other benefits from a CRT-D. Your doctor is the best person to help you understand them.

What are the risks of having a CRT-D?

Your doctor is the best source of information about the risks of getting a CRT-D. Be sure to talk about all your questions and concerns. Some possible risks of CRT-D treatment are discussed below.

A small percentage of CRT-D patients will develop a complication because of the implant surgery. They may include infection, a reaction to a drug used during surgery, blood loss, or damage to a blood vessel, the heart wall, or other organ. After the surgery, you will feel some discomfort, and you will be tired. As you recover, you will feel better. However, some patients continue to feel some discomfort where the CRT-D is implanted.

It is important to follow certain precautions after you get a CRT-D. Your doctor will discuss them with you. Also, read this booklet completely, and pay close attention to sentences that are labeled with the word "warning" or "important." Those sentences contain important safety information. For more information about precautions and warnings, see page 27.

When an arrhythmia occurs, CRT-D treatment may not end it, or treatment may make the arrhythmia worse. In either case, the CRT-D then delivers stronger treatment to try to end the arrhythmia. The CRT-D may not always eliminate all symptoms of the arrhythmia. You still may feel lightheaded or dizzy, or you may faint.

Implanting the CRT-D System

What will the operation be like?

You will be under anesthesia during the operation. Once you are asleep, the doctor makes two incisions. The first incision is to implant the leads. One end of a lead goes in or on your heart. The other end will be plugged into the CRT-D.

The second incision makes a "pocket" or pouch just under your skin. Next, the doctor connects the leads to the CRT-D. They put the CRT-D in the pocket to hold it firmly in place.

Once the leads are connected, the system is checked to make sure it works properly. After the testing, your incisions are closed and you are taken to the recovery room.

Figure 9 shows some of the incisions commonly used for implanting leads and CRT-Ds.

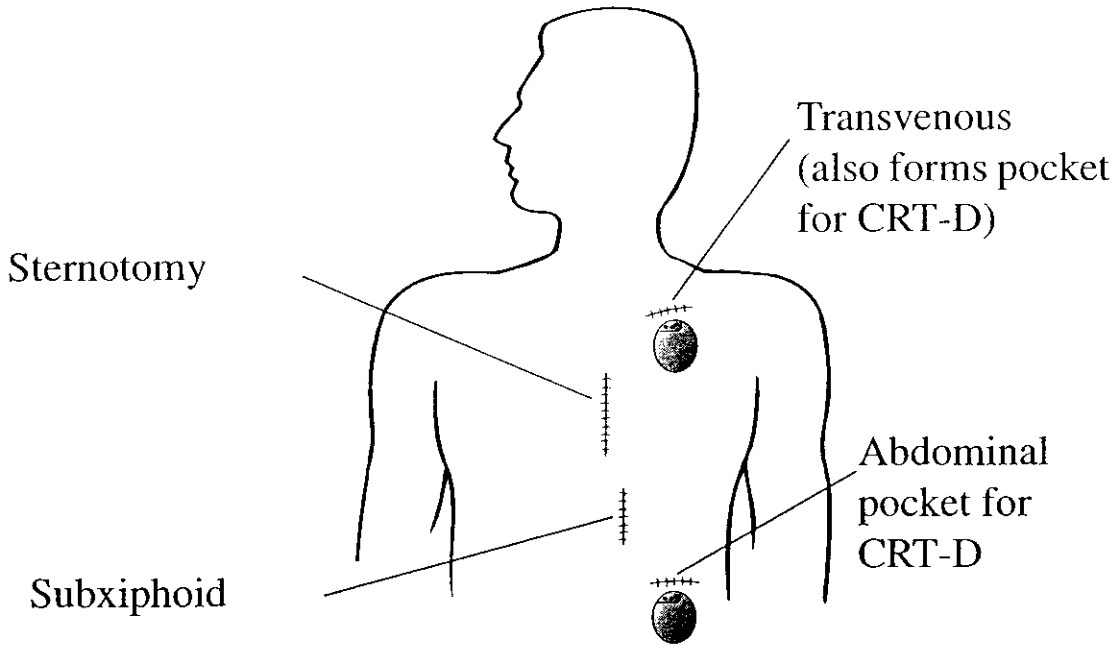


Figure 9. Incisions commonly used for implanting the CRT-D system.

What are the most common types of surgery used to implant the leads?

Transvenous: Transvenous means "through the vein." This type of operation is used for leads that are placed inside your heart. The doctor makes a small incision near your collarbone and threads the leads through a vein into your heart.

Thoracotomy: This is a general term used to describe several types of chest operations. A thoracotomy is used to place "patch" leads on the outside of your heart. These leads are thin oval patches made of rubber and wire mesh.

The operations described below are similar operations. The difference between them is where the incision is made.

Sternotomy: During this operation the incision is made over your breastbone, or sternum. This is the type of operation that is commonly used in coronary bypass and heart-valve surgery.

Subxiphoid: During this operation the incision is made slightly to the left of your breastbone.

The choice of operation depends on your heart condition, any previous chest surgery you may have had, your anatomy, and other factors.

What is recovery like?

When you wake up from the anesthesia, you will probably be drowsy and feel some discomfort. You will be connected to an electrocardiogram (ECG) to watch your heart and its activity. In fact, your heart will be watched closely during the entire time you are in the hospital.

By the following day, you will probably be up and walking about. Every patient's recovery from the operation is

different, so ask your doctor how long you can expect to be in the hospital.

Before you leave the hospital, your doctor may test the CRT-D again. To make sure your CRT-D works properly, the doctor will make the CRT-D deliver therapy, usually a shock. During this testing you may be mildly sedated; however, you should be able to feel the shock.

After your CRT-D is implanted, you should return to your normal activity as soon as you feel up to it. You may feel a little tired or sore at first, so build slowly up to your normal routine. Before long you'll feel more like yourself.

You will need regular checkups after you are released from the hospital. Your doctor will let you know how often these checkups should be. Once you're at home you should pick up your life where you left off before your operation. You will feel stronger with each day and can resume your normal activities.

Home From the Hospital

Listed below are a few important things to remember.

1. **You should follow your doctor's instructions for returning to your normal activities and for rehabilitating your heart.**
2. **Feel free to talk with your doctor if you or your family find it hard to adjust to the CRT-D once you get home.**
3. **If you need medications, take them as directed.**
4. **Follow the doctor's instructions about receiving a shock** **(see page 14).** If the doctors instructions are to phone them after receiving a shock, place the phone number in a convenient place.
5. **See your doctor for regular checkups.** The doctor will discuss a specific schedule for you to follow. If you are planning to travel or if you are moving, ask your doctor for the name of a doctor in the new

location who can treat you and your CRT-D.

6. **Avoid any rough contact with your CRT-D.** Avoid contact sports such as wrestling and football. Report any signs of soreness, swelling, or redness near your incisions to your doctor.
7. **Always carry your ID card.** You will receive an identification card after your CRT-D implant. It will contain information about your CRT-D. Place the card in your wallet or carry it with you at all times. Show your card if you are ever in an emergency, are admitted to a hospital, see a new doctor or need to prove that you have a CRT-D.
8. **Have your family members learn CPR.** This is a wonderful lifesaving skill for an emergency.
9. **Call your doctor immediately if** the CRT-D pocket becomes painful, swollen or red (whether or not you also have a fever) or if you experience palpitations, dizziness, or fainting.

Cautions and Warnings

Most electrical and mechanical devices have no effect on your CRT-D. Its built-in features protect it from the kinds of interference you are likely to encounter in your normal daily activities.

General Information

Any electrical equipment, appliance, or machine that you use should be in good working order. If the power plug is the three-prong type, make sure that the grounding plug is intact. Do not use three-wire to two-wire "cheater" plugs. An evaluation of wiring by an electrician, particularly in older homes, would identify any improper grounding.

Caution: Do not carry magnets or products containing magnets close to your CRT-D.

Avoid holding motor-driven appliances and machine-shop tools closer than necessary to your implant site.

When working with tools or appliances, be careful in situations where you could be injured if you become dizzy or receive a therapeutic shock from your CRT-D.

EMI

There are some things that produce very strong magnetic fields or electromagnetic interference (EMI) and may affect your CRT-D's function. Certain types of electrical or magnetic energy can interfere with your pulse generator's operation. You should do your best to avoid sources of EMI.

Use the following information as a guideline and discuss it with your doctor. If you have concerns about a specific type of equipment or appliance not listed within this booklet, check with your doctor. If you still have questions, contact St. Jude Medical at (408) 738-4883 (800-733-3455 in the USA).

Home Appliances

Assuming they are in good condition and the plugs have not been damaged or altered, the following items are safe to operate:

- kitchen appliances, including microwave ovens, can openers, blenders, toasters, electric knives
- televisions, VCRs, personal computers, AM/FM radios, remote controls, garage door openers

- major appliances, including washers and dryers, electric stoves, refrigerators, etc.
- electric blankets, heating pads

Avoid holding the following items closer than necessary to your implant site:

- hand-held appliances with motors, such as hair dryers and shavers
- light shop equipment, such as drills, table saws, etc.
- transmitters for radio-controlled equipment or toys

It's generally safe to work around spark-ignited internal combustion engines, such as lawn mowers, leaf blowers, automobiles, etc., but limit your exposure to ignition-system parts when they are in operation. If you're fixing your car, remember that your car's electrical system (alternators, high-tension ignition wires, spark plugs, and coil wires) can be a source of EMI.

Office Equipment

Most office equipment is safe to operate as long as it is in good working order and the plugs have not been damaged or altered. This includes computers, electric typewriters, fax machines, pagers and copiers.

Security Systems

Metal detectors and anti-theft systems used in airports, stores and other locations create electromagnetic fields than can interfere with your CRT-D.

Anti-theft systems or Electronic Article Surveillance (EAS) systems such as those used at the entrances/exits or checkout counters of stores, libraries, banks, etc. emit signals that may interact with CRT-Ds. It is very unlikely that these systems will interact with your device. To minimize the possibility of interaction, just walk through the entrances/exits of these establishments at a normal pace and do not linger in these areas.

Metal Detectors: Walking through the metal detector archway will not harm your CRT-D. Be sure to pass through the archway at a normal pace and avoid lingering in the immediate area. Your CRT-D system has metal inside that

may set off the airport security system alarm. If the alarm does sound, be sure to present security personnel with your CRT-D identification card. If a search with a hand held wand is performed you should stress to security personnel that the search should be performed quickly and that they should avoid holding the wand over your CRT-D for a prolonged period.

Industrial Equipment

Large industrial equipment, such as generators and electric motors, often generate strong electromagnetic fields that can interfere with your CRT-D. Avoid standing near large motors or other electromechanical equipment. Make sure that the equipment is properly grounded before working near it.

Medical Equipment

Although most medical equipment will have no effect on your CRT-D, some may affect its function. Always tell the doctor or nurse that you have a CRT-D.

You can safely undergo diagnostic X-rays including fluoroscopy, dental and chest X-rays, computed tomography (CT) scans, and mammographies.

Ultrasonic dental cleaners should not affect your CRT-D.

Caution: Do not undergo any diathermy procedure, even if your CRT-D has been turned off. It could cause damage to the tissue around the implanted leads, or permanent damage to the CRT-D.

Caution: Try to avoid electrical nerve and muscle stimulators (TENS units). They may interfere with the function of your CRT-D.

Caution: Magnetic resonance imaging (MRI) scans can severely damage your CRT-D. When you are in or near an MRI room, your CRT-D might be affected.

Recreation

Amusement park rides should not affect your CRT-D, but be cautious of rides that have large sparks, such as bumper cars. It's also best to avoid activities that involve severe shaking, like horseback riding or bumper cars. Depending on the programming of your device, this type of activity may inappropriately cause a temporary increase in the rate of pacing.

Most tanning beds will not affect your CRT-D.

Caution: Don't touch the antenna of an operating CB or ham radio. It may cause interference with the function of your CRT-D.

Arc Welding

Caution: Arc welding can affect your CRT-D because of the strong electromagnetic fields produced. Here are some recommendations to help minimize interference:

- Wear non-conductive gloves, such as leather (must be dry), fireproof cloth, or rubber. Keep your shoes dry, and don't weld in a wet or damp area.
- Use acetylene or other non-electric welding when the application is suitable.
- Don't use higher current settings than necessary.
- Keep the cables close together by twisting them around each other. Place the welding machine and excess cable away from you.
- Don't weld using repeated short bursts; wait about ten seconds between each weld. If you have difficulty starting a weld on a dirty

surface, don't strike the rod rapidly, and wait about 10 seconds between each start.

- If you feel dizzy, light-headed or faint, stop welding immediately. Lay down the rod and move away from the welding machine. Arrange your work so that if you drop the handle and the rod because of a dizzy spell, they will not drop into the metal being welded. For similar reasons, don't work on a ladder or in a cramped, confined location.
- Don't work alone. Have someone else around when you're welding.

Cellular phone

Recent studies have suggested that if a cellular phone is held close to a CRT-D (within 6 inches), the phone may affect the operation of the defibrillator. This may be either because of radio signals produced by the phone or because the phone contains a magnet. It is possible that a cellular phone might stop your CRT-D from delivering therapy or cause it to deliver therapy that is not needed. The effects produced by a cellular phone are temporary. If you move the phone away from the CRT-D, the CRT-D works normally again.

Caution: Because there are so many different cellular phones and because people and their CRT-Ds will each react differently, St. Jude Medical cannot make recommendations that cover all patients and all cellular phones.

Here are some general guidelines for cellular phone use:

- Keep a hand-held personal cellular phone at least 6 inches (15 cm) from your defibrillator. Portable and mobile cellular phones generally use more power than hand-held models. For phones transmitting above three watts, keep the phone at least 12 inches (30 cm) from your CRT-D. Hold the phone to the ear opposite the side of the implanted device.
- Some phones send out signals when they are turned ON but are not being used (for example, in the listen or standby mode). Therefore, do not carry the phone in a breast pocket or on a belt within 6 inches of your CRT-D. Store it on the side of your body opposite the CRT-D.

Caution: Do not hold a cellular phone too close to your CRT-D. It may affect CRT-D function.

Contact St. Jude Medical for more information about using a cellular phone.

Learning to Live with Heart Disease

My illness has changed my life. How do I cope with it?

Serious heart disease is a blow that can affect your emotions as well as your body. At times you may feel anxious, afraid, depressed, even angry. There are many ways to cope:

- Talk to other people. It will help you work through your feelings. Talk to your doctor, a nurse, a counselor, a friend or family member, or a member of the clergy.
- Talk to your doctor about joining a support group. Sharing experiences with other CRT-D patients lets you know that you are not alone.
- Exercise regularly. It's a great way to reduce stress, build strength and gain confidence. Remember to ask your doctor before starting an exercise program. There is more about exercise later in this guide.
- Learn more about relaxation. Too much stress can wear you down and

increase your chance of getting other illnesses. It also disturbs your sleep and makes you cranky.

One good way to relax is to sit quietly with your eyes closed for 20 to 30 minutes twice a day. A short nap each day or a slow walk every morning can also be calming.

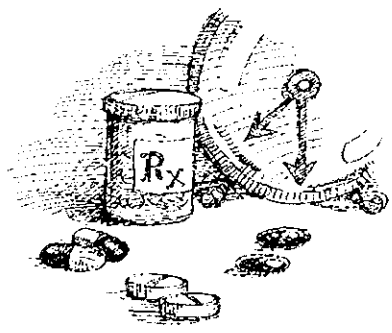
- Take care of yourself. Avoid alcohol and caffeine. And quit smoking. These habits can make anxiety and depression worse.

My spouse/family member is the patient. How can I help?

If a family member or friend is the patient, it is natural for you to have the same fears and worries. There are several things that can help both of you cope with their condition. For example, listen when they want to talk. Your loved one needs reassurance that they have your support. However, you should not deny that their illness is serious.

Drugs

Why do I need medication if I have a CRT-D?



Anti-arrhythmia drugs and the CRT-D can work together to make your abnormally fast heart rate easier to stop or occur less frequently.

In addition to your CRT-D, you will also need to take medication as part of your heart failure treatment plan.

Warning: Do not stop taking your drug(s) without the advice of your doctor!

I'm told that my drugs may need periodic adjustments. How will that be done?

Your doctor may find it necessary to increase or decrease your drug dosage. They may also add a new drug. Your heart must be watched closely while your doctor makes these changes. This means that you may need to stay in the hospital. The length of the hospital stay varies from patient to patient.

Is it OK to take my anti-arrhythmia and heart failure drugs with other drugs?

Make sure your doctor knows about all of the drugs you are currently taking. Tell your doctor whenever another doctor prescribes a new drug.

Food and Nutrition

I already have heart disease. Will changing my diet benefit me?

It is never too late to improve your diet. The American Heart Association recommends a diet high in fiber and low in fat, cholesterol and sodium (salt). High-fat, high-cholesterol foods (such as whole milk dairy products, red meats and junk foods) contribute to hardening of the arteries—a major cause of heart attacks and strokes. High-fiber foods are rich in vitamins and minerals and make you feel full and satisfied for fewer calories.

What are good sources of fiber?

Oatmeal, fresh vegetables, and fruit are good sources of fiber. Fiber helps lower blood cholesterol and prevents constipation.

How much fat can I have?

Generally, you should keep saturated fat to less than one third of your daily fat intake—10% of daily calories. A fat-rich diet raises blood cholesterol and can lead to weight gain, both of which contribute to heart disease. Most packaged foods list fat, cholesterol and fiber content on their labels. Talk with your doctor about your specific dietary requirements and changes you may need to make in your eating habits. A registered dietitian is a wonderful resource to help you learn more about eating to be "heart healthy."

What is the best way to control my fat intake?

Let balance, variety and moderation guide you. There is no need to give up meats and dairy products. Eat lean cuts of meat and low-fat dairy items. Save high-fat foods such as potato chips and cheesecake for special occasions.

Avoid saturated fats. These are found mostly in red meats, whole milk products, and foods made with palm and coconut oil. In general, saturated fats come from animals.

Sometimes it is not obvious that a food is high in fat. For example, one ounce of

trail mix with peanuts and raisins has as much fat as one chocolate chip cookie.

What foods are high in sodium?

Salty foods and those foods with preservatives generally have a high sodium content. For example, broth, soy sauce, cold cuts, hot dogs, chips, nuts and pretzels are high in sodium. Sodium may encourage high blood pressure and water retention. Reducing the sodium in your diet is simple if you take note of the food products labeled as "low sodium." Ask your doctor how much sodium is OK for you.

Besides diet, what affects heart health?

Many factors contribute to heart disease. Some things you can't change, like your sex, race, age, high blood pressure and family. You can change other things that affect your heart, like smoking, a poor diet and lack of exercise. If you have high blood pressure, have it checked regularly and follow your doctor's instructions to keep it under control.

Why is being overweight dangerous for a person with heart disease?

When you're overweight, the extra pounds make your heart work harder. They can also lead to high blood pressure and diabetes, which are bad for the heart. Losing excess weight eases the strain on your heart.

If you diet, you should lose weight slowly, ideally one-half to one pound a week. You will be more likely to keep the weight off. Your doctor can help you set up a weight-loss program.

Exercise

What kind of exercise can I do after surgery?

After surgery you should resume your normal activity as soon as you feel up to it. You may feel a little tired or sore at first, so build slowly up to your normal routine. Before long, you'll feel more like yourself. Your doctor may give you special exercise instructions or suggest that you start a cardiac rehabilitation program.

There are only a few exercise restrictions to keep in mind. For example, avoid contact sports like wrestling or football, since they may damage the CRT-D or the leads. Consult your doctor before doing strenuous or repetitive upper-body exercise like weight lifting or softball.

Warning: Avoid contact sports after you get your CRT-D. Also, get your doctor's approval before starting an exercise program, especially if it involves upper-body activity.

What is cardiac rehabilitation?

It is an exercise and education program to help you regain your strength and improve your heart. A typical program consists of regular exercise monitored by medical professionals. Walking and bicycling are the most common exercises. You will also attend classes to learn more about your heart, the reasons for your heart disease, and how to live a healthier life.

Ask your doctor if this kind of program would be good for you. They will develop one specifically for you.

Do I need to go to a special facility for cardiac rehabilitation?

Not always. You may begin your cardiac rehabilitation program in a monitored setting but continue at home. An example of exercise you might do at home is a twenty-minute walk three times a week. Monitor yourself. If you begin to feel weak or short of breath, slow down or stop until you feel stronger or catch your breath. Over time, you will build up your strength and endurance.

No matter where you exercise, be sure to wear loose clothing and comfortable walking shoes. Feeling comfortable will help you get the most benefit and enjoyment from exercising.

What if my CRT-D delivers therapy when I exercise?

This does not happen very often. But remember, the CRT-D is watching how fast your heart is beating and during exercise your heart rate will increase. Generally your doctor makes allowances for this increase when they program your CRT-D. In the isolated case, your CRT-D may need to be adjusted or "fine tuned" to avoid unnecessary therapy.

If you do receive a shock while exercising, stop. If you are in the hospital or office, tell the person attending you. If you are at home, notify your doctor.

What about sex?

How will having a CRT-D affect my sex life?

Your sex life should not be affected by having a CRT-D. Once your incisions heal and your doctor gives the okay, you and your partner can resume relations when you want to. Healing is usually complete within 12 weeks but it varies from one patient to another.

Is there any chance the CRT-D will deliver therapy during sex?

Physical activity (of any kind) is not likely to cause the CRT-D to deliver therapy. But if it does happen during intercourse, stop and notify your doctor just as you would if it happened during exercise.

Will I have problems with my sexual performance?

CRT-Ds rarely affect sexual performance. Impotence may occur for a short time. It may be due to worry about receiving therapy or medications you are taking. If the problem doesn't get better, discuss it with your doctor.

You may fear that your partner will be hurt if the CRT-D delivers a shock. They may feel a tingle, but nothing more.

In short, you can pick up where you left off. The key lies in becoming comfortable with the CRT-D.

Is it possible to dislodge the CRT-D? Will pressure affect its operation?

The CRT-D is firmly fixed in the pocket under your skin and the leads are well secured to the CRT-D. Pressing on the CRT-D does not affect how it functions. However, avoid rubbing your CRT-D or the area surrounding it. Avoid rough contact that could impact your implant site.

Glossary of Terms

Ablation	The elimination of tissue that is generating or conducting inappropriate electricity, causing an arrhythmia.
Arrhythmia	An abnormal rhythm of the heart.
Atrioventricular (AV) Node	The small mass of special muscle tissue that delays the energy pulse traveling from the SA node to the lower chambers (ventricles) of the heart.
Atrial Fibrillation	A very fast heart rhythm that occurs when many electrical signals are sent from the upper chambers of the heart to the lower chambers of the heart in an irregular fashion. This causes the heart to quiver.
Atrium	One of the two upper chambers of the heart. These chambers receive blood from the body and pump it to the ventricles, the lower chambers of the heart.

Bradycardia An abnormally slow heart rate, less than 60 beats per minute. However, if a person is in very good physical condition, it is natural for their heart rate to be below 60 beats per minute.

Cardioversion The use of electric shock to stop rapid heartbeats, usually ventricular tachycardia.

Contraction A squeezing of the heart muscle that forces blood out of the heart. This contraction is the heartbeat.

CRT-D A cardiac resynchronization therapy defibrillator. It is an implantable cardioverter defibrillator that includes a pacing feature to help resynchronize (coordinate) the lower heart chambers. Also known as an ICD-CRT, ICD with biventricular pacing, or heart failure ICD.

Defibrillation The use of electric shock to stop rapid heartbeats, usually ventricular fibrillation. Defibrillators use paddles on the outside of the chest or internal electrodes placed directly on the heart.

Electro-cardiogram	Often called an EKG or ECG, it is a "picture" showing the electrical activity of the heart.
Electrode	The portion of the lead that transmits and records electrical signals to and from the heart.
Electromagnetic Interference	Also known as EMI, this is magnetic or electrical interference from machines or devices which can interrupt the normal operation of a pulse generator.
Electro-physiologist	A doctor who specializes in diseases of the electrical system of the heart.
Electro-physiology (EP) Test	A test in which your electrophysiologist evaluates the electrical system of your heart. During this evaluation, the electrophysiologist may also cause your arrhythmia to occur. This is how CRT-Ds and antiarrhythmic drugs are tested.
EMI	See "Electromagnetic Interference."

Heart Failure	Heart failure (HF) is a complex clinical syndrome that results when the heart muscle is weakened and can no longer pump blood as efficiently as a healthy heart.
Incision	A cut produced by a surgical instrument in order to perform surgery.
Lead	A special wire connected to the pulse generator and placed in or on the heart.
Pulse Generator	The part of the CRT-D system made up of the electronic circuitry and the batteries, which are packed and sealed in a metal container.
Sinoatrial (SA) Node	The small mass of special muscle tissue that generates a heart beat. It is located in the upper right chamber of the heart.
Thoracotomy	An incision made in the chest when performing heart or lung surgery.
Transvenous	To place something through a vein or the venous system.

Ventricles	The two lower chambers of the heart. These chambers pump the blood out of the heart into the body.
Ventricular Fibrillation	A quivering of the ventricles during which essentially no blood is pumped to the body. It can lead to death if an electrical shock is not quickly delivered to the heart to restore a normal heart beat.
Ventricular Tachycardia	A rapid beating of the ventricles. This rapid beating reduces the heart's pumping efficiency and can therefore lead to fainting, dizziness, weakness, blind spots, and unconsciousness. If this rhythm is not treated with medications or an electrical shock, it can lead to the more serious problem of ventricular fibrillation.

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Notes

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