



Understanding Arrhythmias and Your Electrophysiology Procedure



For Kaiser Permanente Patients

Your Information

Patient Name: _____

Date of procedure: _____

Procedure: _____

Your procedure will last approximately _____ hours.

Physician: _____

Check-in time: _____ a.m./p.m.

Please report to:

Scripps Memorial Hospital La Jolla

9888 Genesee Ave.

La Jolla, CA 92037

858-626-4123

Welcome to Kaiser Permanente

We are pleased that you have chosen Kaiser Permanente for your heart care needs. For more than 30 years, Kaiser Permanente in San Diego has partnered with Scripps Health for interventional cardiology, electrophysiology and heart surgery at Scripps Memorial Hospital La Jolla. We are committed to providing you with the highest-quality professional care, and look forward to making your stay with us as comfortable and safe as possible.

Caring for You

You are an essential member of your health care team, and we encourage you to take an active role in your care.

This includes:

- Providing accurate information
- Talking about your concerns
- Asking questions about anything you do not understand
- Participating in discussion and planning of your care

To help prepare you for your heart procedure, this brochure includes the following information:

- Description of a normal heart and how it functions
- Description of various heart arrhythmias
- Description of electrophysiology conditions
- Signs and symptoms
- Treatment options
- How to prepare for tests and procedures
- What happens during your procedure
- Care after your procedure

Please be sure to speak with a member of your health care team if you have any additional questions that aren't covered in this booklet. We want you to feel as prepared and comfortable as possible.

“The best and most beautiful things ... must be felt with the heart.”

— Helen Keller

Your Heart and Arrhythmia

Your doctor may have told you that you have a heart arrhythmia — an abnormal heart rhythm caused by a problem with the heart's electrical system. Abnormal heart rhythms may cause the heart to beat too fast, too slow or very erratically.

Your Heart

Understanding the anatomy and workings of the heart will help you understand arrhythmia. Your heart is a muscle that pumps blood throughout your body, every second of every day. Circulating blood delivers oxygen and nutrients to your body's organs and tissues and drops off waste products to be filtered out by the kidneys, liver and lungs.

The heart has three components:

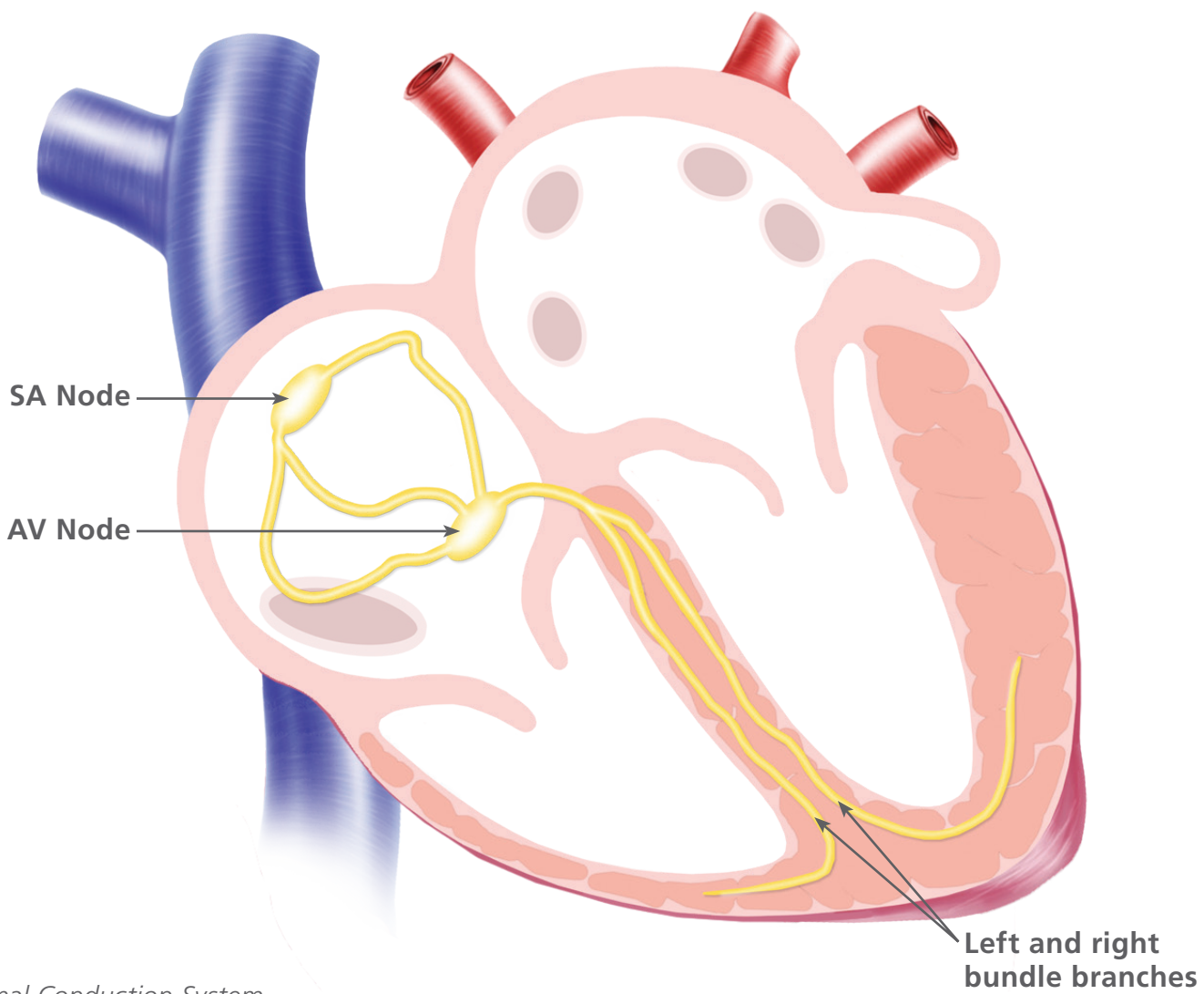
- The structural components (the muscle, chambers and valves)
- The electrical system (the signals that tell the heart to beat)
- The circulatory system (the blood pathways)

How Your Heart Functions

Your heart muscle is divided into four chambers — the left and right atria (the upper chambers), and the left and right ventricles (the lower chambers). Usually, the four chambers beat in a steady, rhythmic pattern. With each heartbeat, the atria draw blood into the heart and sends it to the ventricles. The ventricles push blood out of the heart to the brain and body.

Between these upper and lower chambers are valves that open and close, like doors, to direct the flow of blood. The left ventricle performs most of the work and is the strongest of the four chambers. It ejects blood into the main pipeline, or artery, that comes out of the heart. This artery is known as the aorta and supplies oxygenated blood to the entire body.





Normal Conduction System

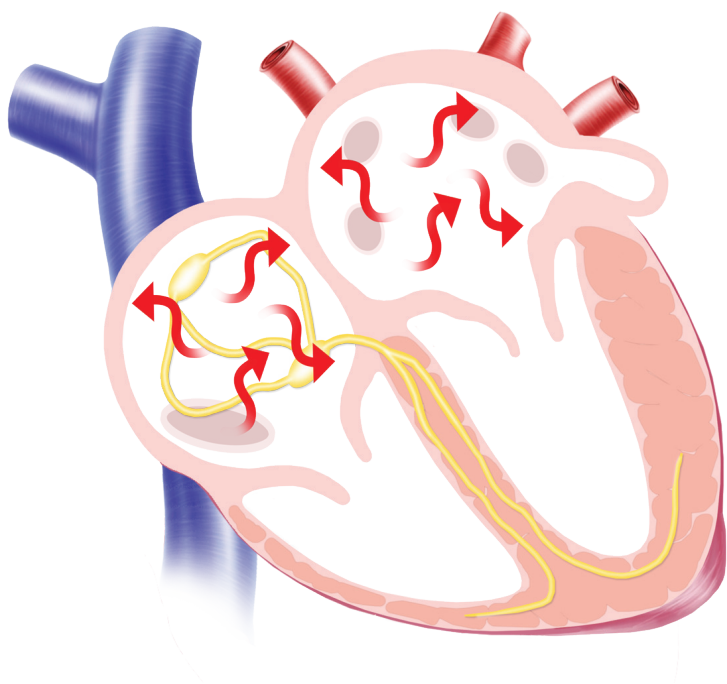
Electrical System of the Heart

The electrical system of your heart initiates each heartbeat. The electrical system also sets the heart rate and coordinates the pumping action of the heart. Electrical impulses travel through the heart muscle. There are specialized electrical pathways that allow for efficient spread of electricity through the heart.

A normal heartbeat has a specific pattern of electrical flow. The electrical impulse starts in the right upper chamber in the sinoatrial node (SA node). This electrical impulse generator is often called the heart's natural electrical pacemaker. The electrical signal, or wave, first spreads through the upper chamber. This causes the upper chambers to contract and pump blood to the lower chambers. The electrical impulse then arrives in

the atrioventricular node (AV node). This is an electrical relay station between the upper and lower chambers. From the AV node the electrical impulse travels through a specialized conduction system to the ventricles. These specialized conduction pathways are called the His Bundle and Bundle Branches.

There are many different types of arrhythmias, and problems may occur anywhere along the electrical conduction system. Your heart may beat too fast, too slow or irregularly. Some start in the heart's upper chambers, the atria, and others originate in the lower chambers, the ventricles. When the heart beats too fast, it is called tachycardia. When the heart beats too slow, it is called bradycardia. When the heart beats erratically, this may be referred to as fibrillation.



Atrial Fibrillation

Atrial Fibrillation

You are not alone if you have been diagnosed with atrial fibrillation (AF) — it is the most common type of arrhythmia. More than two million people in the United States have this condition. If left untreated, the side effects of AF can be potentially life-threatening.

During AF, the top chambers (atria) of the heart quiver, or fibrillate, in a rapid, irregular pattern. This arrhythmia is usually driven by abnormal heart muscle in the left upper chamber. The electrical signal of the upper chambers becomes very rapid and disorganized. This impairs the pumping function of the upper chambers and decreases hearts output. This usually causes symptoms of fatigue, palpitations, lightheadedness and shortness of breath. Some people can be asymptomatic.

Blood can pool in the upper chambers causing blood clots to form. Most blood clots form in a structure in the left upper chamber called the left atrial appendage. If these blood clots leave the heart they can travel to the brain and cause a stroke.

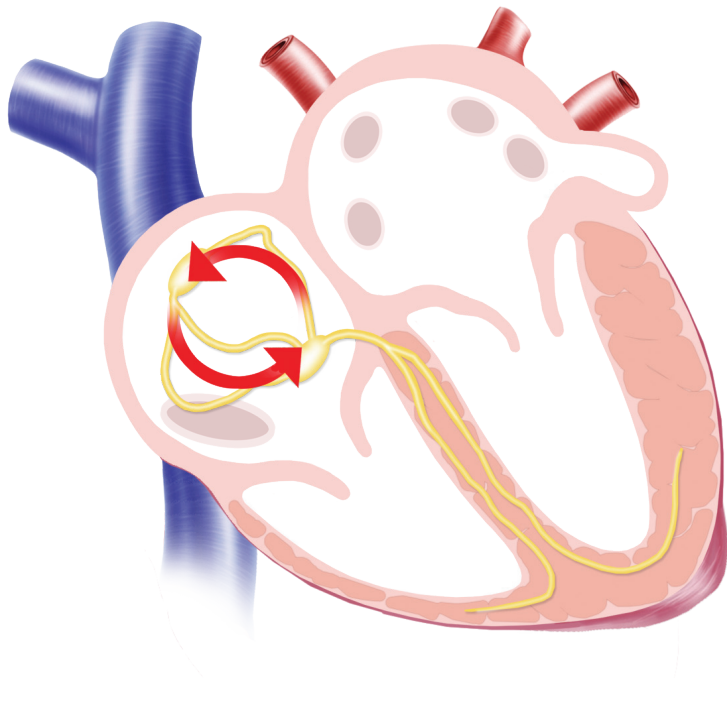
AF can also cause the ventricles (the lower chambers of the heart) to beat too fast and irregularly. This can

weaken the heart muscle over time and lead to heart failure. The rapid and irregular electrical signals travel to the lower chambers through the AV node.

There are three types of AF:

- Paroxysmal AF refers to an AF that comes and goes on its own. AF can last for seconds, minutes, hours or days before the heart returns to its normal rhythm. No specific treatment is required to make the heart return to a normal rhythm.
- Persistent AF refers to when an AF continues for 7 days or more and does not stop by itself. The AF stops only when you receive treatment.
- Longstanding Persistent AF (chronic or permanent) refers to AF that has been present continuously for more than one year.

There are two primary goals when treating atrial fibrillation: improving symptoms and preventing stroke. Symptoms are controlled by keeping the heart in a normal rhythm or slowing the heart rate down and making it more regular. Stroke is prevented by blood-thinning medications or by procedures to close a structure in the heart called the left atrial appendage (LAA).



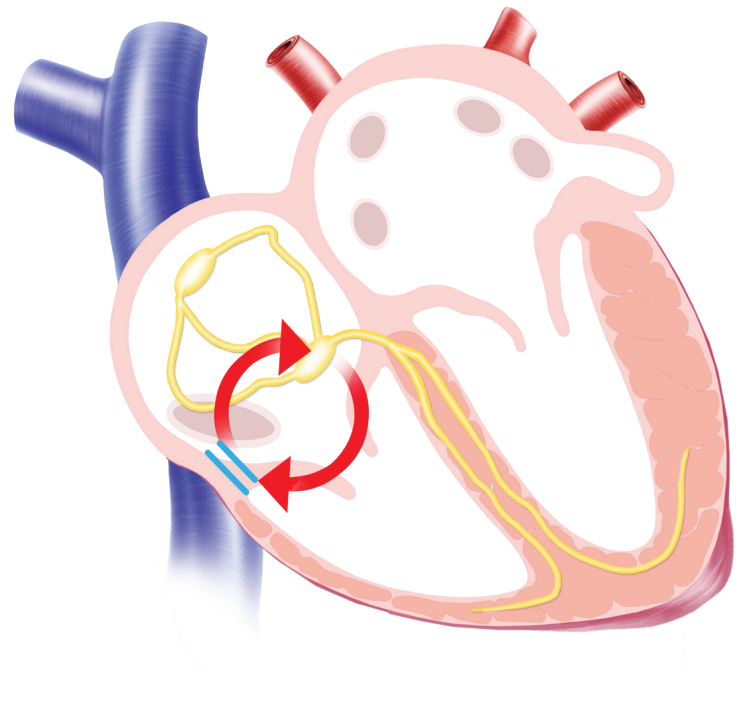
Atrial Flutter

Atrial Flutter

Atrial flutter (AFL) often occurs in people that also have atrial fibrillation. AFL originates in the right upper chamber and is characterized by a rapid, regular rhythm. Atrial flutter is caused by a single electrical wave that circulates very rapidly around the right upper chamber at about 300 times a minute. This impairs the pumping function of the heart and causes symptoms that can be similar to atrial fibrillation.

Inappropriate Sinus Tachycardia

This condition occurs when the heart beats faster than it normally should without a clear underlying cause. The heart rate may respond inappropriately to such things as exercise and accelerate too fast. This condition rarely requires treatment.



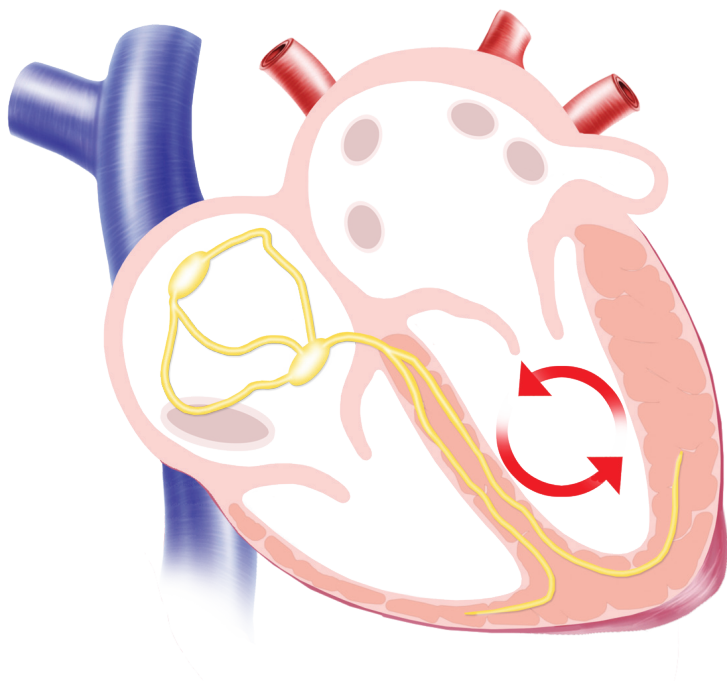
Supraventricular Tachycardia (SVT)

Supraventricular Tachycardia (SVT)

This term describes several different types of fast heart rhythms that are caused by abnormalities in the upper chambers of the heart. Atrioventricular nodal reentrant tachycardia (AVNRT), atrioventricular reentrant tachycardia (AVRT) and atrial tachycardia (AT) are the most common types. These can cause symptoms of palpitations, fatigue or shortness of breath. They typically start and stop suddenly and may last for minutes or hours. These arrhythmias cause a rapid, but steady, pulse during the episode. Medicine may be needed in the emergency room to terminate these abnormal heart rhythms.

Wolff-Parkinson-White (WPW) Syndrome

Wolff-Parkinson-White syndrome is a heart condition in which there is an extra electrical pathway or circuit in the heart. The condition can lead to episodes of rapid heart rate or SVT. There is a small chance that this condition may lead to dangerous, abnormal heart rhythms.



Ventricular Tachycardia (VT)

Ventricular Tachycardia (VT)

Ventricular tachycardia is a fast heart rhythm that originates in the lower heart chambers. When this occurs, it does not allow the ventricle to pump blood effectively. This may cause symptoms of palpitations, lightheadedness or passing out. It is often associated with other forms of heart disease and may be life threatening. If it does not stop on its own, VT usually requires prompt treatment with either medication or an electrical shock to the heart (electrical cardioversion). Further treatment of VT may involve anti-arrhythmic medications, a catheter ablation procedure or an implantable cardiac defibrillator (ICD). Often, people with VT and heart disease are protected by the ICD. VT may degenerate into ventricular fibrillation (VF).

Ventricular Fibrillation (VF)

This condition results in a rapid, chaotic beating of the ventricles causing them to quiver. The heart is unable to pump blood to the brain and body. If prompt treatment is not provided, VF may be fatal. Ventricular fibrillation may cause cardiac arrest and may need to be treated emergently with cardiopulmonary resuscitation (CPR) and defibrillation, which is sometimes referred to as “shocking the heart” back to a normal rhythm. Patients who are at risk for this condition or have survived this condition may be treated with an ICD.

Premature Atrial Contractions (PACs or APCs)

These are early, extra beats from the upper chambers of the heart. They may happen one at a time or in small clusters. These extra beats may produce symptoms of palpitations or a skipping sensation, and may also produce a pause by resetting the heart’s electrical system. These extra beats may trigger more sustained abnormal heart rhythms in susceptible individuals.

Premature Ventricular Contractions (PVCs)

These are early, extra beats that originate in the lower chambers. These extra beats may produce symptoms of pounding, chest pain, palpitations and lightheadedness. These extra beats also may produce a pause in the hearts rhythm as the electrical system is reset. These extra beats may trigger more sustained abnormal heart rhythms in some individuals.

Bradycardia

This conditions means that your heart beats very slowly. A normal, resting heart rate is 60 to 100 beats a minute. If your heart beats less than 60 times a minute, it is considered slower than normal. This can be a sign that the heart's natural pacemaker isn't working right or that the electrical pathways of the heart are disrupted. In some cases, the heart beats so slowly that it doesn't pump enough blood to meet the body's needs.

Reducing Your Risk Factors For Arrhythmia

Arrhythmias can affect anyone — even people who are otherwise healthy and free of heart disease. Arrhythmias are caused by abnormal heart muscle and abnormal electrical cells within the heart muscle.

The key to reducing your risk is to take the best possible care of your heart. You can do this by managing your existing health conditions, following a healthy lifestyle and avoiding substances that can trigger arrhythmias. At Scripps, we are here to help you achieve these goals.

Risk Factors and Arrhythmia Triggers

Each of the following risk factors can increase your chances of developing a heart problem that can lead to an arrhythmia:

- Coronary artery disease
- High blood pressure
- Diabetes
- Smoking
- High cholesterol
- Obesity
- Excessive caffeine/alcohol
- Drug abuse
- Stress
- Family history of heart disease
- Advancing age
- Certain medications, dietary supplements and herbal remedies
- Sleep apnea
- Anemia

Understanding Your Symptoms

Symptoms of arrhythmias can vary. Some of the most common signs and symptoms are:

Palpitation or Skipped Beat

This is a sensation of pounding, skipping or fluttering in the chest.

Rapid Heartbeat (Tachycardia)

Tachycardia means “fast heart rate.” The normal heart rate is 60-100 beats per minute.

Fainting (Syncope)

Fainting is a sudden loss of consciousness. It most often occurs when the blood pressure is too low (hypotension) and the heart does not pump a normal supply of oxygen to the brain. Lightheadedness is a related condition that may occur, as blood flow to the brain is interrupted to a lesser degree.

Slow Heartbeat (Bradycardia)

A diagnosis of bradycardia means that your heart rate is slower than 60 beats per minute, either occasionally or all the time. Symptoms include fatigue, dizziness, lightheadedness and fainting.

Shortness of Breath (Dyspnea)

Several types of arrhythmia will make it difficult to breathe. This is caused by a drop in the heart's output, causing blood and pressure to back up into the lungs.

Effort Intolerance

Arrhythmias can make it harder to exert yourself by causing fatigue or shortness of breath. This results from a decrease in cardiac output.

Your Diagnosis

Your doctor may order diagnostic tests if you are having signs or symptoms of a fast or irregular heartbeat.

These tests can include:

Cardiac Computed Tomography (CT)

Cardiac computed tomography, or cardiac CT, uses an X-ray machine and a computer to take clear, detailed pictures of the heart in 3-D.

Cardiac Magnetic Resonance Imaging (MRI)

A cardiac MRI, uses radio waves, magnets and a computer to create images of your heart as it is beating, which can then become pictures or videos. Doctors use cardiac MRI to see the beating heart, the parts of the heart and how the heart is working.

Transthoracic Echocardiogram (TTE)

An echocardiogram uses sound waves to produce images of your heart using a doppler. A computer creates a video of your heart and shows the size of your heart and how well your heart is working. This test gives your doctor information about the valves of the heart and chamber sizes.

Transesophageal Echocardiogram (TEE)

A transesophageal echocardiogram, or a TEE, is often done when the doctor needs a good picture of your heart and to check for blood clots. The patient is given conscious sedation. An echo probe is then placed in the mouth and down the esophagus to visualize the heart.

Electrocardiogram (ECG or EKG)

An electrocardiogram (ECG) is a snapshot of your heart's electrical activity. An ECG often is performed in your doctor's office, using a machine that prints out a graph showing electrical activity of different parts of the heart.

Event Recorder or Event Monitor

An event monitor is a portable ECG that is used for patients who have an irregular heart rhythm every once in a while. You will carry this small device with you at all times and attach it to your chest when you feel symptoms in order to make a one-to two-minute recording of your heart rhythm when you are actually experiencing symptoms. This is useful if you have

relatively infrequent and brief symptoms, and lets your doctor check heart rhythms at the time of symptoms. This test may not be useful if you do not have symptoms with your arrhythmia.

Holter Monitor

A holter monitor is a small portable device that you wear on your chest with electronic memory to record a series of ECGs over time. A holter monitor runs continuously, and is usually worn for 24 to 48 hours. It records the electrical activity of your heart for your doctor to review later.

Mobile Cardiac Monitoring

A mobile cardiac monitor is worn between seven and 30 days. It monitors your heartbeat when it is normal and will trigger a recording when it senses an abnormal rhythm. This transmits the rhythm automatically and sends it directly to your physician when it occurs. Your physician uses this information to evaluate and treat the arrhythmia. This type of monitor is helpful to diagnose atrial fibrillation if you are asymptomatic because it will automatically detect abnormal heartbeats. This monitor may resemble a cell phone with wires that attach to the chest. Another version of this technology resembles a patch or a large Band-Aid.

Implantable Loop Recorder (ILR)

This is a very small monitoring device that is placed under the skin, typically on the left side of your chest. This device can monitor your heart rhythm for up to three years. A minor, sterile surgical procedure and local anesthetic are necessary to place the device. This type of EKG monitoring device is capable of storing heart rhythm data that can be transmitted automatically to your physician's office via a wireless bedside monitor.



Choosing Treatment and Therapies

There are a variety of treatments and therapies that will help you manage your abnormal heart rhythm. We will partner with you to decide on the best plan, taking into account your needs, symptoms, type of arrhythmia and the cause.

Lifestyle Changes

Making positive lifestyle changes, such as eating healthy foods and exercising, can help alleviate your symptoms.

Medications

You may need to take one or more medications. Since everyone reacts differently to medication, we will find what works best for you and has the fewest side effects.

- Anti-arrhythmic medications treat, prevent or lessen the frequency or severity of abnormal heart rhythms. The primary role of these drugs is to keep your heart in a normal rhythm. Examples include Sotalol, Multaq, Amiodarone, Norpace, Rythmol and Flecainide.
- Anti-clotting agents, or anti-coagulants, prevent blood clots that can cause heart attack and stroke. Anti-coagulants are commonly used for patients with atrial fibrillation or mechanical heart valves. Although vital, these medicines may increase the risk of bleeding.
- Rate-controlling agents, such as calcium channel blockers or beta blockers, help to keep the heart rate slow during arrhythmia. They are not necessarily trying to keep the heart in a normal rhythm like anti-arrhythmic drugs. They are often used with anti-arrhythmic medications.

There are also other options available that may be used in conjunction with medication or when medication is not working to control the heart rhythm.

Cardioversion

Cardioversion is a brief, outpatient procedure that converts you from atrial fibrillation/atrial fibrillation back to normal rhythm. An electrical shock is delivered to the heart to convert an abnormal heart rhythm back to a normal rhythm. In some cases, your doctor may suggest cardioversion using only medications to restore your heart's rhythm. The

medicines are taken by mouth or given through an intravenous line. The heart can go back into an abnormal rhythm after cardioversion unless something is done to maintain the normal rhythm.

Cardioversion is usually a scheduled procedure performed in a hospital, and you should be able to go home the same day as your procedure.

Catheter Ablation

Catheter ablation is a minimally invasive procedure performed by our highly skilled, multidisciplinary team of medical experts. The abnormal heart muscle that causes abnormal heart rhythms is destroyed by one of several methods. The abnormal heart muscle is most commonly cauterized but can also be treated by freezing (cryoablation) or laser.

One or more flexible, thin wires (called catheters) are guided, via sophisticated mapping equipment or X-ray, through a blood vessel in the groin and into the heart. The electrodes at the tips of the catheters are able to detect electrical signals from the heart, and your team is able to determine the site of the abnormal signals.

Once the area is located, a special catheter (called an ablation catheter) sends out a burst of radiofrequency energy to treat the tissue that gave rise to abnormal

electrical signals. The tissue is then electrically inactive and incapable of causing arrhythmia. Once the ablation is completed, the catheter is removed, and the heartbeat returns to normal. Several different arrhythmias can be treated in this manner.

Surgery

Although surgery is sometimes used to treat abnormal heart rhythms, it is more commonly used to treat other cardiac problems, such as coronary artery disease and heart failure. Correcting these conditions may reduce the likelihood of arrhythmias.

Left Atrial Appendage Closure (LAAC)

Left atrial appendage closure (LAAC) is a treatment to reduce the risk of strokes without using blood thinners in patients with atrial fibrillation by sealing off the left atrial appendage (LAA). The left atrial appendage is a small structure that protrudes off of the left upper chamber of the heart. Blood clots may form in this structure and travel to the brain, causing a stroke. It has no important function in adults. By closing this structure, blood can no longer get into it and therefore, blood clots will not form. Because blood clots are less likely to form in the heart, the risk of stroke is reduced without the need for blood-thinning medications. There are several types of devices now being used. Scripps is one of the first sites in the United States to place these devices in patients.



Choosing Ablation

Your cardiologist may recommend cardiac ablation and refer you to an electrophysiologist, a specialist in treating and correcting abnormal heart rhythms. With recent advances, heart ablations are now often the first line of treatment for irregular heart rhythms. Ablations can be performed to cure or control supraventricular tachycardia, atrial fibrillation and flutter, and ventricular tachycardia.

Your Ablation Procedure

Cardiac ablation is performed in a Scripps hospital laboratory by your electrophysiologist with a team of specially trained experts, including technicians and nurses. You will be given a sedative and, in some circumstances, general anesthesia. The type of sedation will depend upon your doctor or anesthesiologist and your overall health. A topical anesthetic may be also used to numb your skin before the catheters are inserted. During the ablation, you may be given a blood thinner to prevent clots from forming in your heart during the procedure.

The procedure involves inserting catheters — narrow, flexible tubes — into a blood vessel. Using advanced mapping equipment and X-ray images, your physician carefully threads the catheters through the vein until they reach your heart. The electrodes at the tips of the catheters are able to detect electrical signals from the heart, and your team is able to determine the site of the abnormal signals.

Advanced mapping technology, also known as electroanatomical mapping, creates a 3-D picture of your heart that helps your doctor see exactly where the abnormality is located. Once the precise location is identified, the abnormal heart muscle is treated — curing or controlling the arrhythmia. This is done by sending energy through the catheters to destroy a small amount of tissue at the site. Catheters may use heat, cold or laser to treat the abnormal heart tissue.

Catheter ablation usually takes two to six hours. After the procedure, pressure or a closure device will be used to prevent bleeding on the area where catheters were inserted. You will need to lie still for a period of time afterward to make sure your catheter entry points heal

properly. You may need to stay overnight for observation or you may go home the same day.

Ablation is generally a safe procedure. Your doctor will talk to you about rare complications that may arise.

Supraventricular Tachycardia (SVT) Ablation

This is generally an outpatient procedure. Abnormal heart muscle in the upper chambers is treated in order to cure supraventricular tachycardia (SVT). This procedure is very effective and is often used as first-line treatment for SVT.

Atrial Fibrillation (AF) Ablation

This generally requires an overnight stay in the hospital or observation unit. The abnormal heart muscle that causes atrial fibrillation is treated with catheters that are passed to the heart through small puncture sites in the groin. After this procedure, patients are often able to withdraw several medicines that were previously used to control the arrhythmia.

Atrioventricular (AV) Node Ablation

This is a simple ablation procedure that is used to control the heart rate for people with atrial fibrillation. It provides very effective rate control of the atrial fibrillation and often allows for the discontinuation of rate-controlling medications. People that have this procedure must also have a pacemaker. Your doctor may place a pacemaker at the time of the AV node ablation or you may already have a pacemaker. It is important to recognize that this procedure does not stop the atrial fibrillation, but it does make the heart beat slower and more regularly.

Ventricular Tachycardia (VT) Ablation

During this procedure, abnormal heart muscle in the lower chambers is targeted in order to control or cure ventricular tachycardia. This procedure may reduce the need for medications, and is often done for patients who have implantable defibrillators and are receiving shocks.

Results

Cardiac ablation is an effective treatment for many types of arrhythmias. Success rates for cardiac ablation vary depending on type of arrhythmia and patient history. In some cases, repeat ablation may be needed. Your physician will discuss success rates.

Preparing for Your Ablation Procedure

From the moment you reach out to us, you will receive compassionate and experienced care. Members of your team will be there every step of the way to answer questions and guide you through your diagnosis, procedure and recovery.

Your nurse coordinator will provide instructions and answer any questions regarding the procedure. To prepare for your procedure, be sure to do the following:

- Pack a small bag with personal toiletries if you are being admitted to the hospital.
- If your physician requests, do not eat or drink for eight hours before the procedure to prevent nausea and vomiting.
- Arrange for a friend or family member to drive you to and from the hospital.
- Provide a list of your current medications, including blood thinners and doses, and any allergies you may have to medications. You may be asked to stop taking certain medications several days before the procedure to ensure accurate results.
- Get plenty of rest and fluids the day before your procedure.
- Weigh yourself on your home scale the morning of your procedure.

Care After Your Ablation Procedure

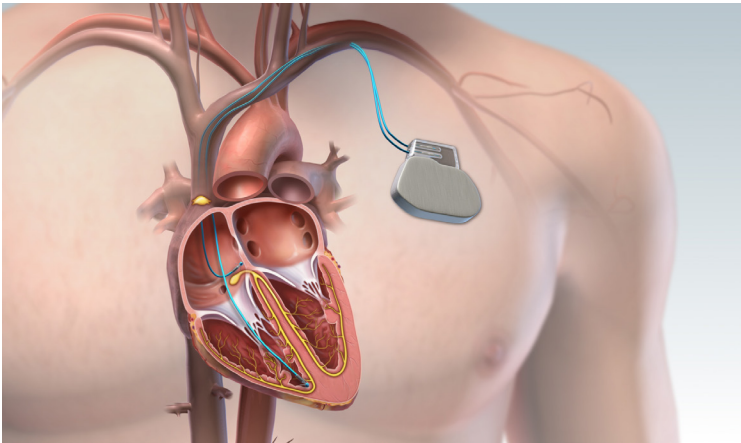
Please keep the following points in mind.

- You may feel fatigue or minor discomfort during the first 48 hours after your procedure. Talk with your doctor if these symptoms persist or become severe.
- Generally your care team will recommend no heavy lifting or strenuous activity for five days after the procedure. During this period do not take baths, including Jacuzzi baths. The puncture sites should not be submerged underwater for five days.
- Keep the procedure sites clean and dry.
- Most patients are able to return to work within three to seven days, depending on the type of ablation and work activity. People can generally ease back into normal activities after about five days.
- No excessive consumption of alcohol for two weeks.
- Follow-up appointments will vary by type of procedure and patient condition.



Implanted Devices

You may be referred for implantation of a device to help treat your heart rhythm disorder (arrhythmia). Cardiac implanted electrical devices are permanently implanted heart rhythm management tools that your cardiac electrophysiology specialist will tailor to your individual needs. There are three main categories of implantable devices: pacemaker, defibrillator and cardiac resynchronization therapy (CRT) device.



Pacemaker

A pacemaker is used to treat patients with slow heart rhythms. It is a small device that is implanted under the skin, and works by simulating the normal heart electrical action to help your heart pump blood to your body effectively. Pacemakers generate an electrical pulse that causes the heart to beat with regular rhythm and prevent it from going too slow. Some of today's pacemakers have features to pace your heart at faster rates when needed, such as when you exercise.

A pacemaker has wires, known as leads, which attach to the heart through blood vessels. Standard pacemakers and defibrillators usually have one wire that attaches to the right lower chamber and one wire that attaches to the right upper chamber. Occasionally only one wire will be needed in either the upper or lower chamber.

Pacemakers may be used in conjunction with other therapies to treat arrhythmias.

Implantable Cardiac Defibrillator (ICD)

All defibrillators are also pacemakers. An implanted defibrillator, more commonly known as an ICD or AICD, provides treatment for fast heart rhythms. An ICD has a more complex computer and electrical system than a regular pacemaker, and it is programmed to treat rapid, life-threatening arrhythmias that originate in the lower heart. When an abnormal rhythm is detected, the ICD "shocks" the heart back to a normal state.

This is a lifesaving therapy used for patients with rhythm disorders, such as ventricular tachycardia or ventricular fibrillation.

Cardiac Resynchronization Therapy (CRT)

Some pacemakers or defibrillators have an extra (third) lead or wire that attach to both lower chambers of the heart. Using this three-lead system, your heart is synchronized to beat in the atria first, followed by both the right and left ventricles simultaneously. This relatively simple electrical resynchronization can dramatically increase your heart's pumping function and your energy level. This technology is usually used to treat or prevent heart failure by "resynchronizing" the contractions of the lower chambers of the heart and may improve the heart's pumping function and reduce symptoms.

Preparing for Your Procedure

Device implantation, whether a pacemaker, ICD or CRT, is performed in a sterile operating room environment in the electrophysiology lab by an experienced, well-trained team who provides for your care, as well as your comfort. An anesthesiologist physician or nurse will make sure you are comfortable and well-sedated. To have the best possible experience, please follow these guidelines to prepare for your procedure:

- Do not eat or drink for eight hours prior to minimize any possibility of nausea.
- Take daily medications as usual with a small sip of water.
- Check with your physician or team - in advance - about medications, such as insulin or blood thinners.
- Shower in advance, cautiously cleaning the area where surgery is planned.
- Arrive at the hospital on time, typically two hours prior to your procedure, to allow for proper registration and preparation.
- Arrange for a friend or family member to drive you to and from the hospital.
- Bring a list of contact phone numbers so your team can notify your family or loved ones after surgery is completed.
- Bring any documents requested, such as a living will and your medication list of all your home medicines.

Your Device Implantation Procedure

In the preoperative area, a trained nurse will start an IV to administer fluids and any medications to ensure your comfort. The IV will also be used for anesthesia. You are allowed to have a family member or friend present to keep you company during this time. Next, you will be transported to the electrophysiology lab where your procedure takes place. A board-certified anesthesiologist will administer general anesthesia for sleep and pain control, while monitoring and supporting your vital signs.

Prior to your procedure, your physician will provide you with information about your procedure and answer any questions you may have.

Implantation of a cardiac device is commonly performed through a small incision (one to two inches in length) on the upper chest with the leads threading through a nearby vein and positioned in the heart chambers as previously explained.

Once the device implantation surgery is complete, you will slowly awake in the post-anesthesia care unit (PACU) where specially-trained nurses will monitor you as you recover. After approximately two hours, you will be transported to a hospital room or recovery area in preparation for discharge. Most device surgery patients go home the day of surgery or the next morning.





- Call your physician if:
 - Your surgical area swells dramatically, such as growing to the size of an orange.
 - You have a fever 102 degrees or higher.
 - You have excessive pain, swelling, light-headedness or other unfamiliar physical sensations.
- Schedule an appointment for a wound check-in within one to two weeks following surgery.
- Keep appointments with all your other physicians as scheduled.
- Many cardiac implanted devices include a home monitoring system that allows your physician to supervise heart function via the Internet. This unit will arrive in the mail within a few weeks of surgery with instructions for set-up and use.
- Follow up with your physician for periodic monitoring of your device to evaluate the battery and other features of the device.

Following surgery do not attempt any heavy lifting and limit movement of your arm nearest the surgical site, as the leads can take several weeks to settle in place. This includes sporting activities such as golf and tennis or lifting of weights greater than 10 pounds for the first four weeks. During the first month, it is fine to raise your arm, such as to shampoo your hair, but refrain from any action that is abrupt or forceful.

Travel after device surgery is encouraged. One of the reasons patients undergo surgery is to resume a normal life. However, you should not drive a car until approved by your physician. This commonly occurs within a week of surgery.

Air travel is usually allowed within a few weeks surgery. Modern airport metal detectors will reveal your implanted device. To assist airport screening personnel in understanding your device, you will receive a card in the mail to present when traveling. Most devices are safe for evaluation with a metal detector, however, check with your physician regarding your individual circumstance. If you are still within four weeks of surgery, do not lift heavy luggage with the arm closest to your surgical site.

After Device Surgery

After surgery, you will have a clear plastic dressing on your wound that looks like kitchen wrap. This dressing keeps the incision clean and sterile as it heals. You may shower with the dressing in place. Follow these guidelines for optimal wound care and accelerated healing:

- Do not peel the edges off of the dressing; it will be removed at a wound-check visit with your electrophysiology team in one to two weeks.
- Do not be concerned if you see a slight amount of discoloration or blood on the incision.
- Do not touch your dressing or new device. It can be damaged if you manipulate the device and attached leads.
- Resume all of your medications as prescribed on the discharge instruction sheet.
- Post-operative pain should be minimal and can be controlled with over-the-counter medications such as acetaminophen or ibuprofen (check your discharge instructions).

Health and Healing at Scripps

When you choose Scripps, you choose excellence, experience and compassion. At the forefront of cardiovascular care, Scripps is nationally recognized as a heart care leader. We are honored to be consistently named as one of America's Best Hospitals for cardiology and heart surgery by U.S. News & World Report.

In heart care, experience counts. Scripps treats more heart patients than any other health care system in San Diego. Our experts perform more cardiovascular procedures than any other heart care program in California. Call us at **1-800-SCRIPPS (727-4777)** for a referral and consultation with an electrophysiologist. Our goal is to help you get back to your daily life and family as quickly as possible.



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