

Medtronic

A patient's guide

Understanding your electrophysiology
study and catheter ablation



Table of contents

Introduction

The normal heart

Normal structure	1
Normal rhythm	1

Abnormal heart rhythms

Slow heart rhythms	2
Fast heart rhythms	2
Supraventricular tachycardia (SVT)	2
Atrial flutter	3
Atrial fibrillation (AFib)	3
Ventricular tachycardia (VT)	3
Ventricular fibrillation (VF)	3

The electrophysiology study

Patient preparation	4
Food and fluid intake	5
Medication	5
Intravenous line insertion	5
Preparation of the catheter insertion sites	5
Other	5
The procedure	5
Catheter insertion	6
Sensations during the study	7
Potential complications	7
Patient recovery and follow-up	7

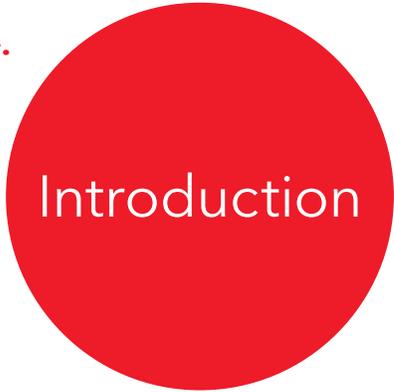
Treatment options8

The catheter ablation procedure

Patient preparation	9
Catheter insertion	9
Cardiac ablation	10
Potential complications	10
Patient recovery and follow-up	10

Illustration of the heart11

Notes12



Introduction

Your doctor and nurse have asked you to read this patient's guide to help you understand one or both of the following procedures that have been recommended for you: **electrophysiology (EP) study and/or catheter ablation**. This booklet is intended to answer many of the questions you may have about what to expect before, during, and after the procedure, and why the procedure will be helpful for you. If you have questions after reading this booklet, your doctor or nurse will be able to help you. This booklet contains general information only. Your doctor will provide you with specific instructions concerning your procedure.



The normal heart

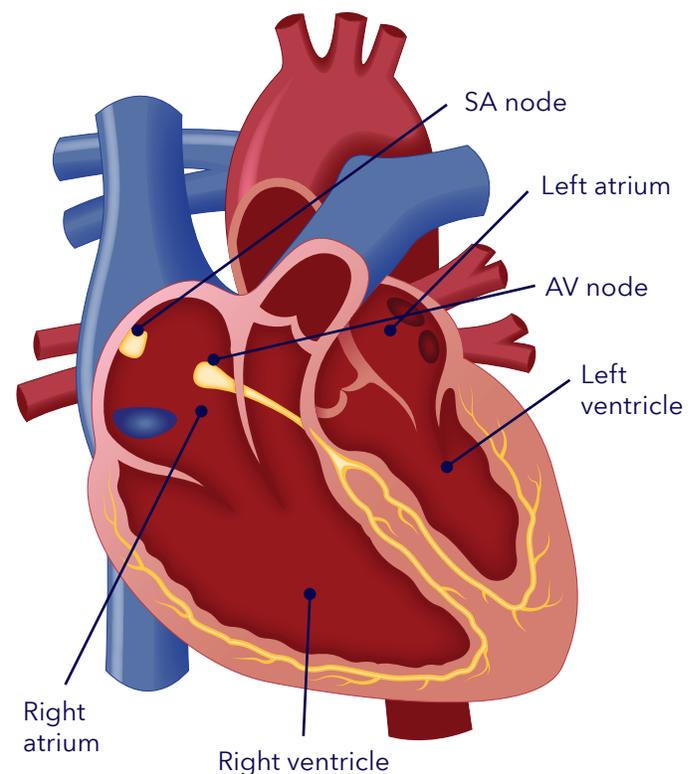
Normal structure

The heart is roughly the shape and size of a closed fist. It is a muscle that continuously sends oxygen-rich blood throughout the body. It has four chambers: two smaller, upper chambers (the right and left atria) and two larger, lower pumping chambers (the right and left ventricles). The right upper chamber gathers blood from the body, and the right lower chamber sends that blood to the lungs to pick up fresh oxygen. At the same time, the left upper chamber gathers oxygenated blood from the lungs, and the left lower chamber sends that blood to the rest of the body.

Normal rhythm

The heart's pumping is controlled by the heart's electrical system. Each beat is started automatically by the heart's natural pacemaker, the sinus (SA) node. The signal or impulse travels through the atrium, causing the atria to contract and push blood into the ventricles. The impulse continues to a place in the middle of the heart, called the atrioventricular (AV) node. The AV node is like a relay station that delays each impulse before it passes through to the ventricles. The function of the AV node is to prevent the heart from beating too fast. The impulse then continues throughout the ventricles, causing the bottom chambers to contract, pumping blood to the lungs and body. The contracting of the upper and lower chambers produces the "da-dum" of our heartbeats. The heart then rests until the next impulse begins the cycle over again.

The normal heart beats at a steady, regular pace, usually from 60 to 80 times per minute. The rate will vary depending on your level of activity and other factors. It may be slower if you are resting or sleeping, and may be faster if you are exercising.



Abnormal heart rhythms

Slow heart rhythms

When the heart's electrical system is not functioning properly, abnormal heart rhythms may occur. Another word for an abnormal heart rhythm is arrhythmia.

If the heartbeat is too slow, bradycardia is said to exist. If the rate is too slow to meet the body's demands, symptoms such as dizziness, extreme fatigue, shortness of breath, or fainting spells may be present. With bradycardia, the sinus node may send out electrical impulses too slowly, or irregularly. You may hear this condition referred to as sick sinus syndrome.

The impulses may also be blocked after leaving the sinus node, resulting in a slowed or irregular heart rate. This form of bradycardia is called heart block. Catheter ablation is not used to treat bradycardias.

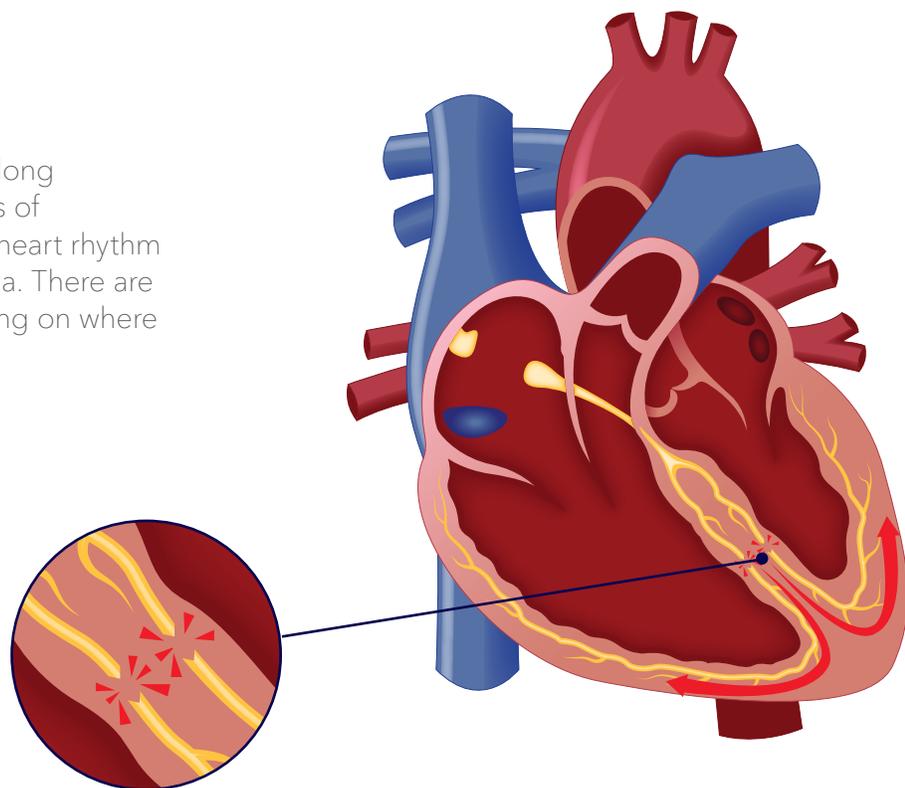
Fast heart rhythms

If the heart beats too quickly, or along abnormal pathways, specific types of arrhythmias can occur. This rapid heart rhythm may be referred to as a tachycardia. There are a variety of tachycardias, depending on where the impulses start.

Supraventricular tachycardia (SVT)

If the impulses are fast and start from the top chambers, the arrhythmia is called a supraventricular tachycardia (SVT). There are several types of SVTs.

The symptoms associated with SVT will vary from patient to patient. Some patients may have SVTs for years without realizing it. Most patients with SVTs experience one or more of the following symptoms: heart pounding, fluttering, or racing; lack of energy, tired feeling, shortness of breath, and/or pressure or discomfort in the chest. It is important to be aware of these symptoms and discuss them with your doctor.



Abnormal heart rhythms, *cont'd.*

Atrial flutter

With atrial flutter, the atria (upper chambers) are beating regularly between 250 and 400 times per minute. The AV node limits the number of impulses traveling to the ventricles (lower chambers) so they do not beat as fast as the atria. However, the ventricular rate (felt as your pulse) may be fast.

Atrial fibrillation (AFib)

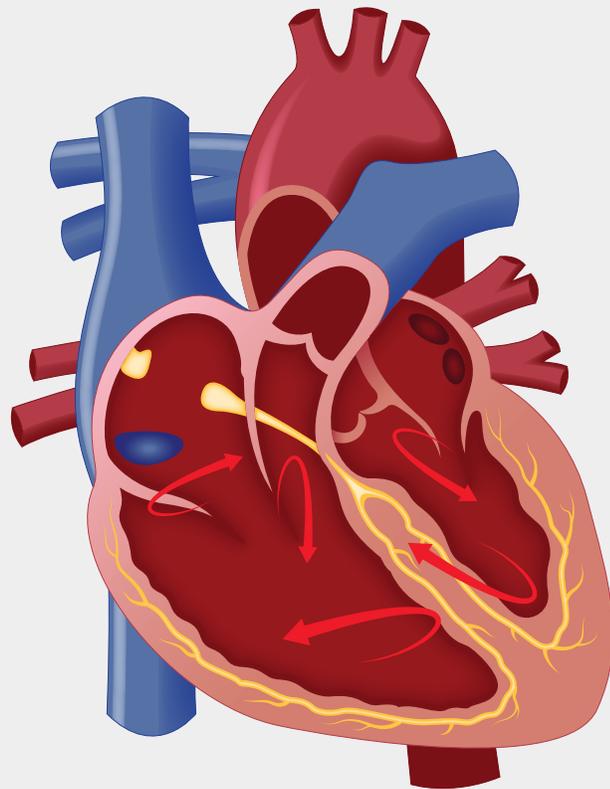
With atrial fibrillation, the heart's electrical impulses start irregularly from several sites in the upper chambers of the heart, and travel in a disorderly fashion through these chambers. This causes the upper chambers to quiver rapidly instead of pumping in regular rhythm. The atrial rate can range from 300 to 600 beats per minute. As in atrial flutter, the AV node limits the number of impulses that pass to the ventricles, so they will beat more slowly. Your pulse will be irregular and can be fast.

Ventricular tachycardia (VT)

Ventricular tachycardia is present when your heart beats too quickly and the impulses start in the lower chambers of the heart (ventricles). Should you experience VT, your heart may not pump blood as efficiently as it does during a normal rhythm. These abnormal and rapid contractions prevent the heart from filling adequately with blood between beats. Less blood may reach your brain. During VT, you may feel your heart pound or feel faint or dizzy. You may even pass out. VT can be dangerous, even life-threatening, if not properly treated.

Ventricular fibrillation (VF)

When ventricular fibrillation occurs, your heart beats in a disorganized manner. It quivers. No blood is pumped, and your body is quickly depleted of oxygen. If your heart goes into VF, you usually pass out within a few seconds. This situation is lethal and is referred to as a cardiac arrest.



The electrophysiology study

There are a number of tests that are used in diagnosing abnormal heart rhythms. The electrocardiogram (ECG) may be used. The ECG is a noninvasive recording of the electrical activity of the heart on paper. You may be asked to wear a portable monitor, called a Holter monitor or event recorder, to record your heart rhythm continuously or when you feel symptoms. There are additional diagnostic devices your doctor may prescribe, including insertable cardiac monitors (e.g., Reveal LINQ™ or LINQ II™). Other tests may also be used to diagnose abnormal heart rhythms. If these tests do not provide enough information about the abnormal heart rhythm, an electrophysiology (EP) study may be performed to diagnose a heart arrhythmia.

An EP study is a minimally invasive diagnostic study and is the most comprehensive and thorough way to look at your heart rhythm. The study evaluates the heart's electrical system and can help determine the appropriate treatment for specific abnormal heart rhythms.

Patient preparation

Prior to the study, your doctor and nurse will review your medical history. They will describe the EP study procedure, the reason you are having it, and the possible side effects of the EP study.

The procedure is typically done in a hospital. You may be asked to arrive several hours before the test is scheduled. You may have blood work drawn prior to the study. The room where the study is performed is often referred to as an electrophysiology (EP) or catheterization (cath) lab. These rooms are specialized for EP studies and contain all the necessary supplies and equipment. You may see overhead X-ray equipment and monitors that are used to direct and observe the progress of the study. There may be several staff members (technicians and nurses) assisting your doctor. One staff member is in close contact with you during the entire procedure. An electrophysiologist (a doctor specializing in heart rhythms) generally performs the procedure. The procedure will be done in a clean, sterile environment. Usually, friends or family may accompany you to an area near the lab. Generally, there is a waiting room where they can stay until your procedure is finished.



The electrophysiology study, *cont'd.*

Food and fluid intake

Your doctor will give you specific instructions regarding eating and drinking restrictions prior to the study. Don't be surprised if you are told not to eat or drink anything for 6 to 8 hours or more before your procedure.

Medication

Your doctor will give you specific instructions regarding heart rhythm medications or blood thinners that you may already be taking. You may be asked to stop taking these medications a few days before the test. Be sure the doctor knows every medication that you are taking, even over-the-counter medications, such as aspirin.

Your doctor may order a relaxing medication for you before the procedure begins. Be sure to tell the doctor and staff if you are allergic to any medications.

Intravenous line insertion

An intravenous (IV) line is usually started before the procedure begins. Mild sedatives, pain medication, and heart medications may be given through this line before, during, or after the procedure.

Preparation of the catheter insertion sites

The areas on the groin, arm, or neck (where the catheters are to be inserted) will be shaved and cleansed thoroughly. Tell the staff if you are allergic to any soap or tape. The areas are covered with sterile towels, so it is important not to touch them. Ask a staff member for assistance if you need to change positions or move.

Other

ECG patches will be attached to you so your heart rhythm can be monitored. The heart monitor and other equipment may make a variety of sounds. A staff member will be watching the monitor at all times, so try to relax as much as possible. A blood pressure cuff may be placed on your arm, which will automatically check your blood pressure. You will feel the cuff inflate and deflate during the EP study. Other patches or monitors may also be used. All of the steps done to prepare you for the test are routine and are done for your safety.

The procedure

Once preparation is complete, the actual EP study will begin. The preparation may take approximately half an hour to complete. You may be given medication to relax you. You may even fall asleep. These steps are also routine for the catheter ablation procedure.



Catheter insertion

A number of specially designed catheters will be used for the study. The catheters are small flexible tubes. Before the catheters are inserted, your skin will be numbed. Similar to an experience at your dentist's office, the medicine used may sting or slightly burn initially. Once the area is numb, you may feel pressure as the doctor works, but it should not be painful. If you experience pain, be sure to tell the doctor or nurse.

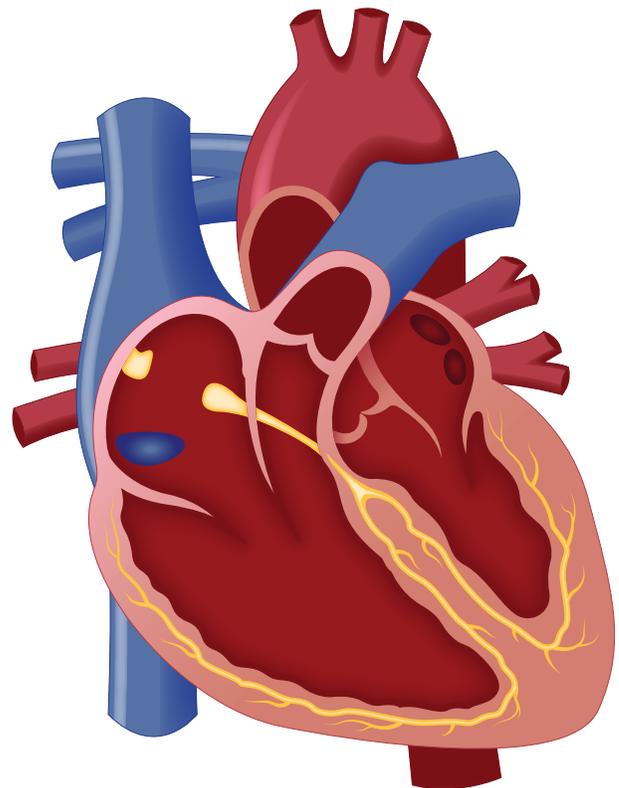
A small incision will be made in your skin to make it easy to pass the catheters into your blood vessels. The catheters will be advanced to your heart under fluoroscopic control. Because there are no nerves in the heart's inner lining, you should not feel the catheters themselves. You may, however, feel like your heart skips a beat as the catheters are positioned. This is normal.

The catheters are positioned inside the heart. When they are in place, the EP study is performed by doing two things: recording the heart's electrical signals and pacing the heart through a catheter. During the recording phase of the study, important information about your heart's conduction system is gathered. This process records ECGs from inside the heart and compares them to an ECG from the body surface.

The doctor will also pace or stimulate your heart during the study. This process may enable the doctor to reproduce the arrhythmia that has caused your symptoms. The combination of recording and stimulation may help identify sites in the heart causing the arrhythmia. You may feel your heart beat quickly or experience skipped beats during pacing.

This again is normal, and you should not be alarmed. You may also be asked questions about how you are feeling during the study. It is important that you tell the staff as much as you can about how you feel. The doctor may ask, "Do you feel lightheaded or dizzy?" or "Is this feeling similar to one you have had before?" Your answers are important and will help the medical staff make the best possible diagnosis.

You may be given medications during the study to elicit symptoms or evaluate the effect on your arrhythmia.



The electrophysiology study, *cont'd.*

Sensations during the study

The procedure is relatively painless. You may feel a slight pressure when the catheters are introduced. At various times in the procedure, you may feel that your heart is skipping beats. You may feel symptoms like the ones that caused you to seek treatment: e.g., heart pounding, fluttering, lightheadedness, dizziness, faintness, shortness of breath, and/or pressure or discomfort in the chest. Medications used during the procedure may cause specific symptoms. Occasionally, a shock is given to the heart to stop a fast heart rate.

Potential complications

As with any procedure that requires incising the skin and inserting a catheter, there is a small risk of complications. Your doctor will discuss these with you, but they may include bleeding at the insertion site or, less frequently, damage to blood vessels, formation of blood clots, or infection. Although the vast majority of EP study patients do not experience complications, you should be aware of possible risks.

Patient recovery and follow-up

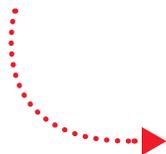
When the EP study is complete, the catheters are removed. To prevent bleeding, pressure is applied to the insertion site(s) for 10 to 20 minutes. The recovery routine will depend on what type of blood vessel your doctor used for the procedure. Your nurse will explain what is necessary for your healing, such as the amount of time it will be necessary to stay in bed, and other guidelines.

- You will be monitored closely after the procedure. Your vital signs and insertion site will be checked frequently.
- After the procedure, you may feel tired from the sedative or uncomfortable from lying still for a period of time. Be sure to let the nurses know if you feel any discomfort, wetness, or swelling at the site, or if you have other needs.
- Your doctor or nurse will give you specific discharge instructions and review your medications before you are dismissed.





Treatment options



Your doctor will discuss the results of the EP study with you and describe the treatment options. These may include medication, an implantable device, catheter ablation, or surgery. Whatever the recommended treatment, your doctor and medical staff will explain it in detail. Follow their instructions, take medications as directed, and report any signs of side effects. **You are in partnership with your doctor and medical staff, and everyone has the same goal: to keep you as healthy as possible.**

The catheter ablation procedure[†]

Patient preparation

Prior to the procedure, your doctor and nurse will review your medical history. You may have already had an electrophysiology (EP) study to diagnose your abnormal heart rhythm. The catheter ablation procedure is very similar to the EP study. Your doctor will describe the catheter ablation, the reason you are having it performed, and the possible side effects of the procedure. You will be asked to sign a consent form.

Catheter ablation is typically done in a hospital. You may be asked to arrive several hours before the procedure is scheduled. You may have blood work drawn prior to the ablation. The room where the ablation is performed is often referred to as an electrophysiology (EP) or catheterization (cath) lab. These rooms are specialized for these procedures and contain all the necessary supplies and equipment that allow the doctor to direct and observe the progress of the procedure. An electrophysiologist (a doctor specializing in heart rhythms) will generally perform the procedure.

Catheter insertion

As discussed earlier, a number of specially designed catheters will be used for the procedure. They will be inserted through a small incision in your skin and passed into your blood vessels. The catheters will be advanced to your heart to record information and perform the ablation procedure.



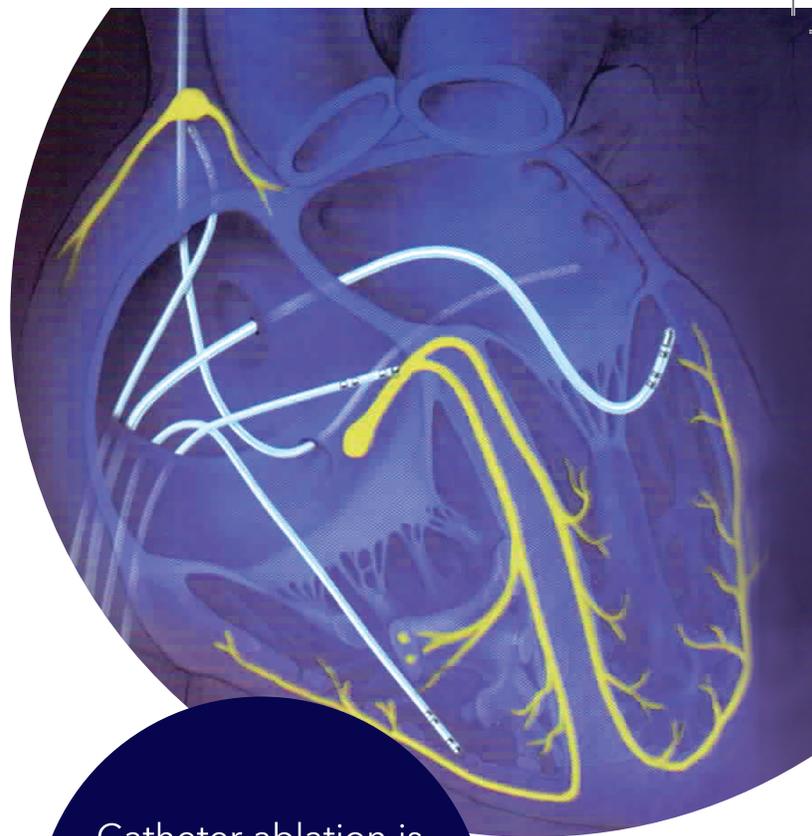
[†] Not every person will receive the same results. Talk to your doctor about the right treatment option for you.

Cardiac ablation

Cardiac ablation is performed using a variety of energy sources. Radiofrequency (RF) and cryo energies are the most widely used. One of the main differences between these two energy sources is that during RF ablation, energy is applied to heat the cardiac tissue, whereas in cryoablation, heat is removed from the cardiac tissue by introducing cold temperatures.

However, pulsed field ablation is an energy source now approved for cardiac ablation that does not require thermal energy like heat or cold. Since pulsed field ablation is a nonthermal energy source, pulsed field ablation allows for specific areas within the heart to be treated where the unwanted electrical signals are coming from while reducing damage to other parts of the body.

Regardless of which ablation device is used, the goal of the procedure is to create scar tissue to prevent irregular electrical signals from conducting, which cause the irregular heart rhythm. Before the procedure, your physician should discuss the ablation options available and select the appropriate therapy based on your individual need.



Catheter ablation is a minimally invasive procedure that can be used to control the heart rhythm.

Potential complications

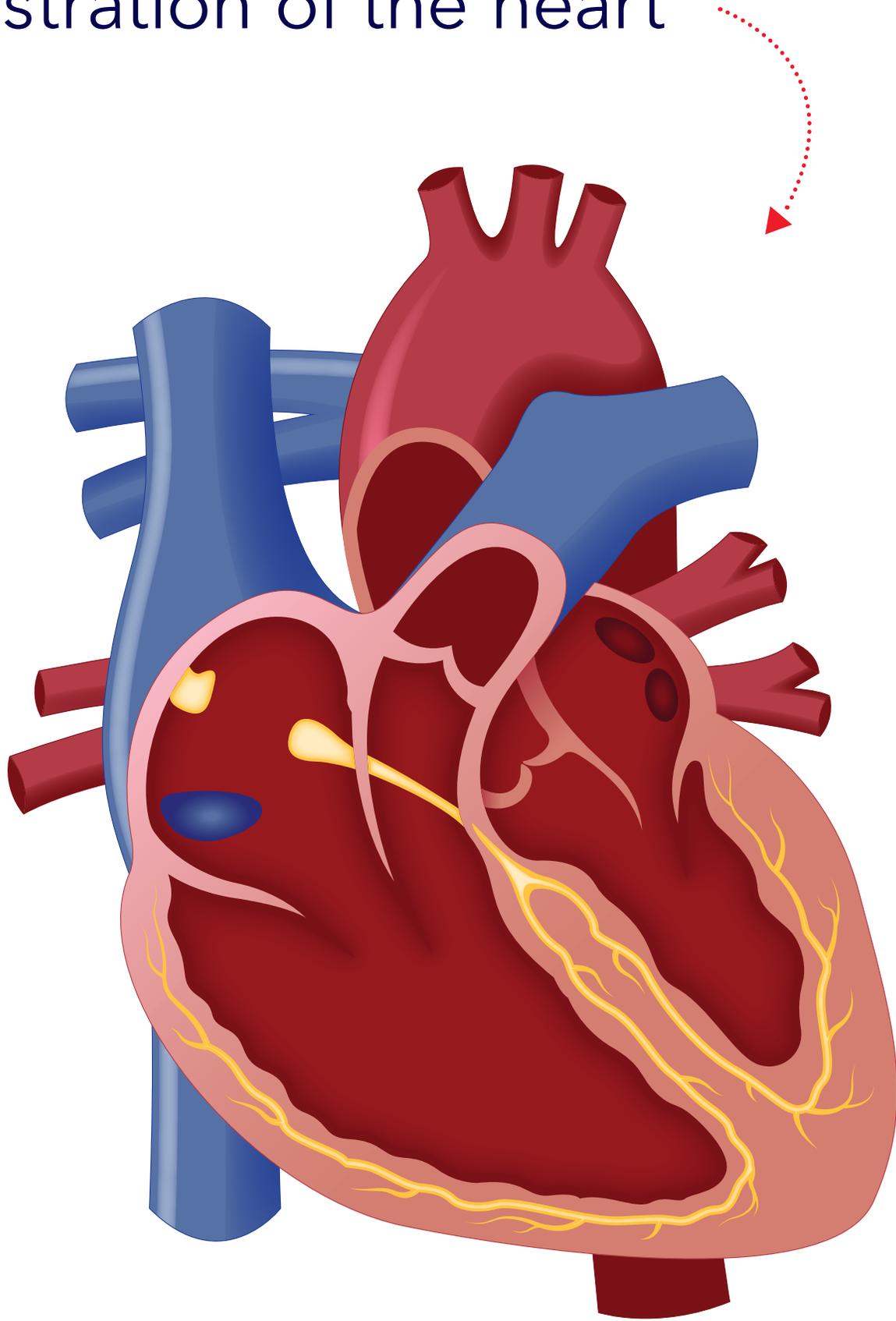
Catheter ablation is a procedure that is considered relatively safe. Complications, while infrequent, can occur during catheter ablation. Some of the risks include bleeding and bruising where the catheter was inserted, cough, shortness of breath, infection, temporary or permanent stroke, severe complications leading to hospitalization or potentially death. Your physician can further explain these complications as a part of a comprehensive risk/benefit evaluation, as you consider catheter ablation for your condition. This treatment is prescribed by your physician. This treatment is not for everyone. Please talk to your doctor to see if it is right for you. Your physician should discuss all potential benefits and risks with you. Although many patients benefit from the use of this treatment, results may vary. Information on this site should not be used as a substitute for talking with your doctor. Always talk with your doctor about diagnosis and treatment information.

Patient recovery and follow-up

Similar to the electrophysiology study, when the catheter ablation is complete, the catheters are removed and pressure is applied to the insertion site(s) for 10 to 20 minutes. Your vital signs and insertion site will be checked frequently. Be sure to let the nurses know if you feel any discomfort, wetness, or swelling at the site, or if you have other needs.

Your doctor or nurse will give you specific discharge instructions before you are dismissed. Your heart rhythm medications will also be reviewed, as they may be adjusted, changed, or stopped following the ablation procedure.

Illustration of the heart



Notes

Doctor: _____ Phone #: _____

Nurse: _____ Phone #: _____

Emergency medical service: _____ Phone #: **911** _____

Date and place of EP study:

Date: _____

Location: _____ Phone #: _____

Special medication instructions before EP study: _____

Food and fluid restrictions: _____

Follow-up appointment:

Date: _____ Time: _____

Location: _____ Phone #: _____

Date and place of ablation study:

Date: _____

Location: _____ Phone #: _____

Special medication instructions before ablation study: _____

Special medication instructions after ablation study: _____

Questions/notes: _____

Medtronic
710 Medtronic Parkway
Minneapolis, MN 55432-5604
USA
Toll-free in USA: 800.633.8766
Worldwide: +1.763.514.4000

[medtronic.com](https://www.medtronic.com)

UC200200147f EN ©2024 Medtronic.
Minneapolis, MN. All Rights Reserved.
Printed in USA. 06/2024

Medtronic