What is an arrhythmia?

Before explaining what an arrhythmia (also referred to as tachycardia) is, it is best to first quickly establish a few basic aspects of your heart. First, a heart is essentially an ingenious pump, that collects blood from all parts of the body and pushes it all back to nourish the body's tissues and organs. It is a workhorse of an organ, working non-stop your entire life. Second, similar to a water pump, the heart has an electrical system throughout its muscle tissue that initiates and controls the rhythm of the pumping action.

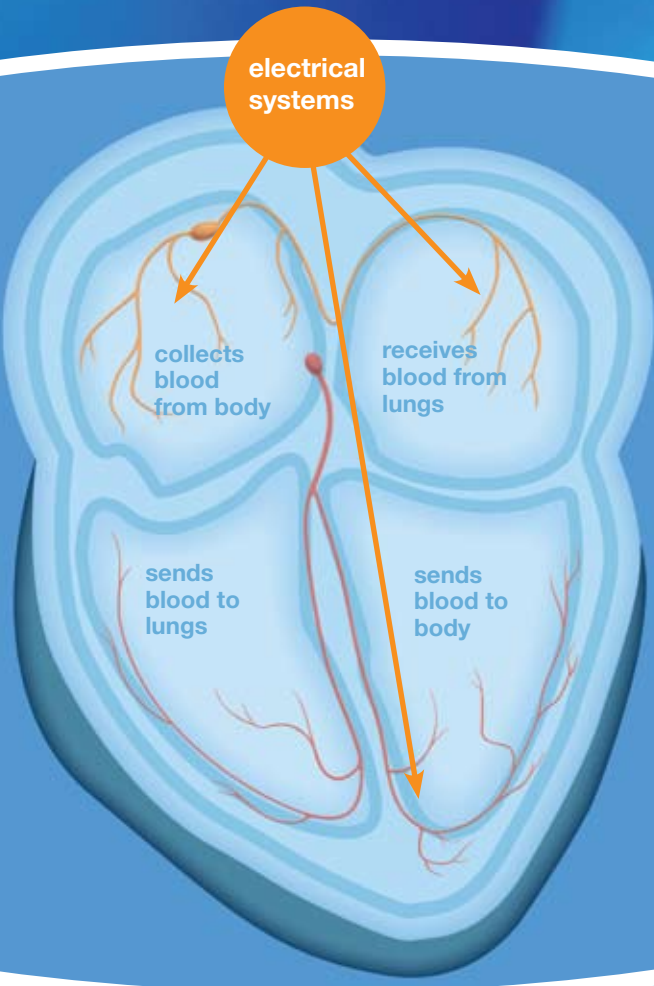
An arrhythmia is a problem that occurs in this electrical system, compromising the normal pumping action of the heart. Think of it as a short circuit in your heart's electrical system.

The short circuit may cause your heart to beat too fast, too slow, or to occasionally flutter in an irregular pattern.

There are different types of arrhythmias. Typically, they are classified based on where in the heart the short circuit is, and whether they cause your heart to beat too fast or too slow.

Symptoms include: palpitations, rapid heart rate, shortness of breath, dizziness, lightheadedness, fainting, and chest pain.

an ingenious pump ...



... controlled by a built-in electrical system

How are arrhythmias treated?

For patients whose arrhythmias cause only minor symptoms, living with the disease may be a reasonable option. Other people need more aggressive treatment, such as:

1. Medication

Often the first approach selected for the treatment of arrhythmias is the use of anti-arrhythmic medication. These may include digitalis, beta-blockers, calcium channel blockers, anticoagulants, and other drugs. In many cases, medications to treat arrhythmias have to be taken for life. Medications are carefully selected because they may cause side effects.

In some cases, drugs may provoke arrhythmias or make them worse. As a result, physicians will weigh the benefits of the drug against the risks of taking it. Your doctor will prescribe the dose or type of your medication suitable for treating your arrhythmia.

2. Ablation

Because drugs may not be an ideal answer to treating arrhythmias, many physicians along with their patients prefer a routine medical procedure called catheter ablation.
The most effective treatment for an arrhythmia is to permanently deactivate the tissue cells that are causing the problem. To do this, a thin tube (catheter) is placed into the heart on or near the area that is causing the arrhythmia. An energy source, either hot or cold, is delivered through the catheter tip to destroy (ablate) a very small part of heart tissue, thereby stopping the aberrant electrical pathway and allowing the normal rhythm to return.

3. Implantable Devices

An electronic device, such as a pacemaker, can be implanted in the patient's chest to help remedy some types of arrhythmia. These devices are battery-powered and send electrical pulses into the heart to regulate the rate at which it beats.

Why choose cryoablation?

With over 250,000 procedures performed each year, ablation is one of the most common treatments for arrhythmias. While the majority of patients that are treated with heat-based (RF) ablation have successful outcomes, there are risks associated with RF ablation like irreversible damage to critical heart structures, blood clots and pain. More serious side effects can include stroke, and, in extreme cases, death. Cryoablation uses cold energy to produce the same effect as heat-based ablation — it destroys the tiny heart cells that are causing the arrhythmia. While cryoablation is effective, it has certain advantages that differentiate it from RF ablation:

1. Less discomfort

Cold is one of nature's anesthetics; accordingly, cryoablation results in little or no discomfort or pain during the procedure.

2. Greater stability

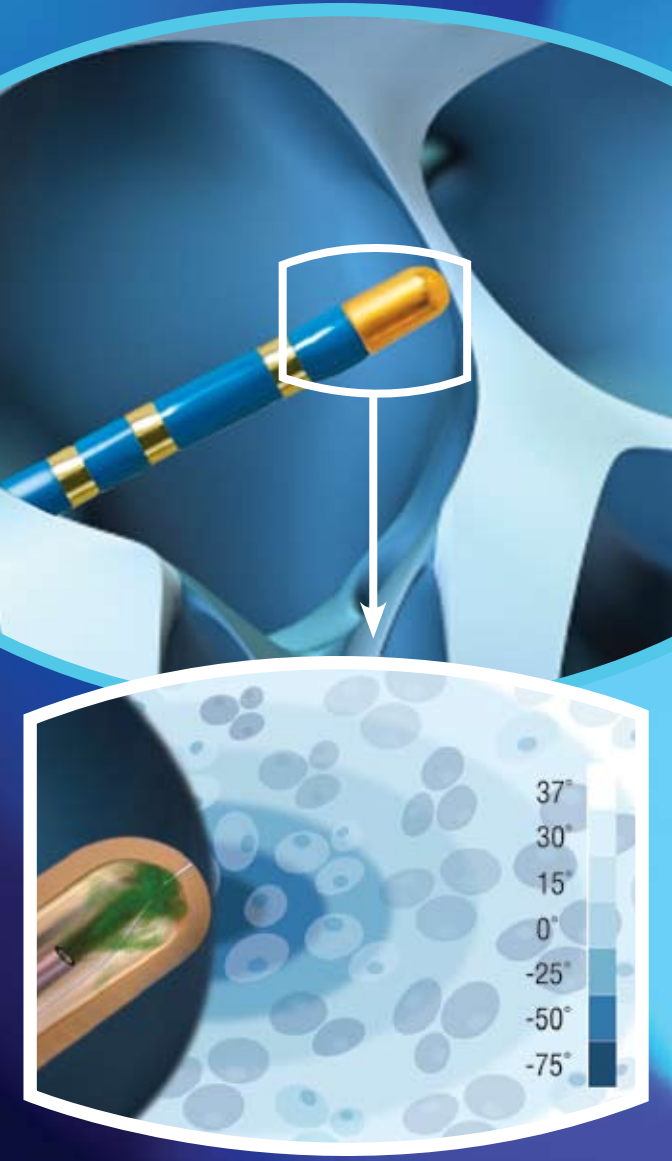
When cold temperatures are applied, cryocatheters stick to the tissue they touch, much like a tongue on cold metal. This is an advantage because ablation is performed in a beating heart where there is constant movement. By sticking to the exact spot to be ablated, the electrophysiologist can avoid any accidental slips of the catheter tip, thereby preventing accidental damage to critical structures nearby.

3. Ability to confirm target ablation site

Cryoablation allows the electrophysiologist to slightly freeze tissue to test whether it is responsible for conducting an arrhythmia. Heat-based therapies don't allow that — once the tissue is burned, it stays

Extremely cold temperatures cause tissue to adhere to the tip of the catheter (much like a tongue on cold metal) at the exact spot to be ablated, preventing accidental damage to nearby structures

Temperatures at the tip of the catheter quickly reach as low as -85 degrees Celsius.



Cryoablation destroys targeted cells only, leaving the intracellular matrix surrounding them intact and providing additional safety benefits.

burned. By contrast, cryoablation allows the electrophysiologist to re-warm frozen tissue (that is not responsible for the arrhythmia) and restore its normal electrical function.

4. Minimizes the risk of damaging critical structures

Treating arrhythmias with ablation involves working very close to critical structures, for example, the heart's natural pacemakers, the esophagus or coronary arteries. Damage to critical structures can result in the permanent interruption of normal electrical conduction in the heart and require the placement of an artificial pacemaker in the patient — an outcome everyone absolutely wants to avoid. With cryoablation — which freezes tissue instead of burning it — the risk of damage to these critical structures is minimized.

5. Minimizes the risk of perforation

Perforation — for example, to the atrial wall — is a dangerous risk that can lead to serious complications. Thanks to its ability to preserve tissue integrity, there is minimal risk of perforation with cryoablation.

6. Minimizes the risk of clot formation

Heat burns and chars the ablated tissue. This tissue disruption can result in clot formation called thrombus in medical terms. The thrombus can dislodge and migrate into a blood vessel which can lead to stroke. With cryoablation, this risk is minimized.


A typical cryocatheter
is not bigger than this

What can you expect?

Before the ablation procedure

Preparing for ablation is like preparing for any other type of elective procedure. Typical instructions include: not drinking or eating after midnight the night before the procedure. Certain medications may need to be stopped; your doctor will advise you accordingly. As well, you will need to tell your doctor immediately of any health changes before the scheduled procedure as infections can increase the risk of the procedure.

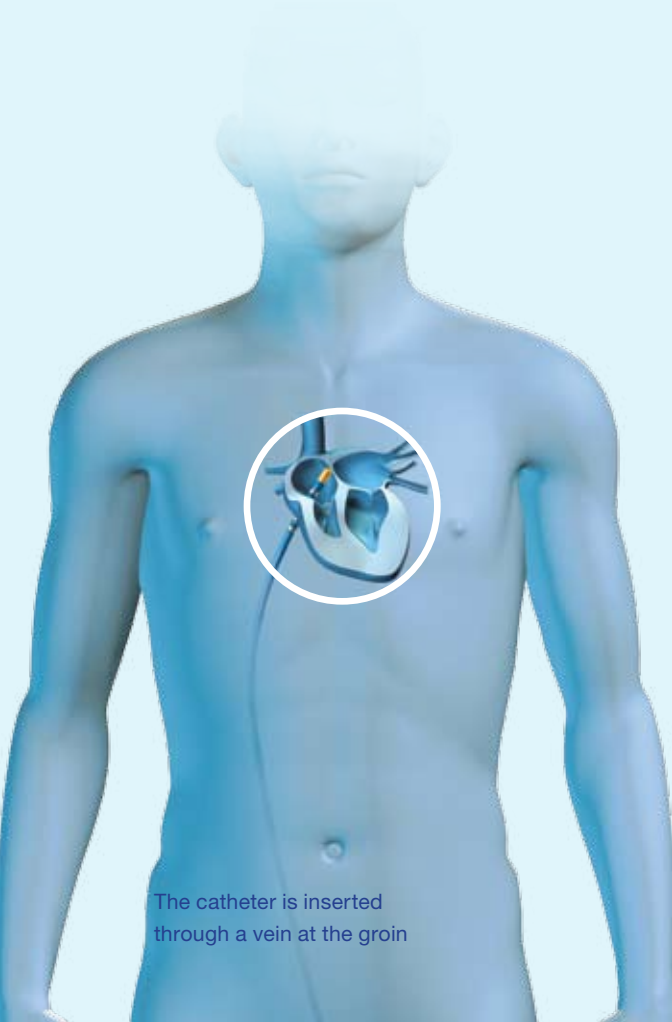
During the ablation procedure

A nurse will shave and cleanse the area where the ablation catheters will be inserted into your body. This is usually done in the groin, but can also be in the arm, shoulders or neck. A local anesthetic will be given to numb the area. The catheters will then be inserted into a blood vessel through a small incision in the skin and guided to your heart. If you have not already had one done, the doctor will perform an electrophysiology (EP) study. This assesses your heart's electrical system and helps the doctor to determine all possible heart rhythm problems.

An intracardiac mapping procedure comes next. By moving a steerable ablation catheter inside the heart, your doctor will be able to find the specific area causing your arrhythmia. The actual ablation procedure involves delivering energy through the ablation catheter to the targeted heart tissue.

The energy, whether you choose heat or cooling, kills that tissue, creating a lesion. While only the size of a kernel of corn, the typical lesion will stop any further incidence of arrhythmia. After the procedure is done, the doctor will test your heart. If the abnormal rhythm cannot be restarted, then the procedure was a success. If the arrhythmia is still there, further ablation may be needed.

What happens after the procedure?
Immediately after the procedure has been completed, the catheters will be removed and pressure will be applied to the insertion site to reduce any bleeding. You will likely stay overnight in the hospital for observation but able to return home the next day. While activities will need to be limited for a couple of days, most patients return to normal routine within a few days. While you may experience some minor soreness in your chest, you should not have severe chest pain or shortness of breath; call your doctor if this occurs.



The catheter is inserted through a vein at the groin

I chose cryo

Michael Curtin
CryoAblation successfully treated this pilot's tachycardia — enabling him to fly again.

Four years ago, before I had cryoablation to treat my tachycardia, I had a lot of doubts about my future. I hadn't felt well for years and my quality of life had really suffered. Even though I tried hard to stay active, I began to feel less and less aerobically fit. After years of playing golf and tennis on a fairly regular basis, I could no longer do either without feeling completely drained.

Even though I'd been told by several doctors that nothing was wrong with my heart, I woke up one night with a sustained 230 beats per minute tachycardia. It lasted three and half hours; the only way the attending emergency room physician could bring it back to normal was with a drug called Adenosine.

As a result of this episode, I was grounded from flying. The fact that my life-long career as a pilot was in danger only served to compound the stress that I was already feeling. Even though I'd

had my pilot's license since I was 18, and had been flying for a private corporation for nearly 20 years, it was all now in jeopardy. Not only was I worried about my deteriorating health, but also how I was going to support myself financially.

My options didn't look good. If I got a pacemaker, I'd never be able to fly again. If I took drugs to treat my condition, I faced an expensive medical re-certification process every year. As for drugs, I didn't feel like they were the best option. My research showed they were often associated with a number of negative side effects. Some became less effective over time too. For those reasons, drugs were the wrong choice for me.

I needed a solution that would put my life back on track, with me in the pilot's seat. I spent a lot of time on the Internet exploring the options that were available to me. Even though I knew about the risks involved, I chose to have RF ablation.

Then, just four days before my procedure was scheduled to occur, I learned about cryoablation. It had recently been approved, and unlike RF, there were no reported cases of heart block. Even though I felt badly about cancelling my RF procedure, I knew I had to do what was best for me. That was cryoablation.

Soon after the cryoablation procedure, I received a clean bill of health and was able to return to work. Since then, I've even received a promotion. Now, I'm Manager, Chief Pilot of my department. I also got back to living my life the way I want to. Before, I kept away from aerobic activities because I was worried they would bring on an episode or tire me out. In the last two years, I've completed at least a half-dozen high altitude hiking trips in the Sierra Nevada Mountains. That's something I would not have even dreamt about before cryoablation. I'm also back to playing tennis and golf.

There's nothing I can't do. And without any recurrences, I can look forward to fully living life healthy.

CRYOCATH®

Stop arrhythmias cold

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