TREATING ATRIAL FIBRILLATION WITH CATHETER ABLATION
WHAT IS ATRIAL FIBRILLATION?

Atrial fibrillation, also known as AF, is an irregular heart rhythm that affects the upper chambers (atria) of the heart. In AF, the atria quiver instead of beating normally. AF can also lead to rapid heart rhythm, where the heart can beat as much as 300 times a minute or more in the atria, and up to 150 times a minute or more in the lower chambers (ventricles).

The importance of treating atrial fibrillation

As a result of the quivering rhythm in the atria during AF, blood is not completely pumped out of the upper chambers of the heart, which may cause it to pool and clot. Treating AF is important because it may negatively impact your quality of life or cause a stroke. During AF, the blood clot may form because blood is not completely

NORMAL HEARTBEAT

Flow of electrical signals in a normal heartbeat.
pumped out of atria. This clot can travel to the brain causing a stroke. In fact, people with AF are five times more likely to form blood clots and suffer a stroke.\textsuperscript{1} Atrial fibrillation is also associated with fatigue and heart failure.\textsuperscript{1,2} The rapid and irregular heartbeats associated with atrial fibrillation can make your heart larger and weaker over time. A larger and weaker heart which does not pump blood to all the areas of your body very efficiently is called heart failure.

Fortunately, these risks can be reduced dramatically if they are monitored and treated. By working closely together, patients and doctors can choose the most appropriate course of care for the treatment of atrial fibrillation.

\textbf{Why does atrial fibrillation occur?}

AF is commonly associated with structural heart disease but can also be associated with diabetes, heart failure, obesity, coronary artery disease, high blood pressure, ageing, and can have a genetic predisposition.
HOW DO I KNOW IF I MIGHT HAVE AF?

Some people experience these symptoms of atrial fibrillation:

- A feeling that the heart is racing
- Fatigue, shortness of breath, or weakness
- Heart sensations, sometimes called palpitations, which may include irregular, thumping, or pounding heartbeats
- Chest discomfort or pain
- Fainting or lightheadedness

Others have no symptoms and discover that they have AF at a doctor’s appointment. Even without symptoms, atrial fibrillation is a serious medical condition. Make an appointment with your doctor if you have symptoms such as those above. Your doctor can help determine if those symptoms are related to AF or another health concern.
ARE THERE DIFFERENT TYPES OF AF?

There are four main types of AF:

**Paroxysmal AF**
Paroxysmal AF refers to AF that can last up to seven days. Paroxysmal AF may last for seconds, minutes, hours and ends spontaneously or requires a cardioversion (a type of electrical shock) to return to normal rhythm. As the heart goes in and out of AF, the pulse rate can change from slow to fast and back again in short periods of time, which often causes more symptoms.

**Persistent AF**
Persistent AF lasts longer than seven days. Persistent AF includes those episodes that require a cardioversion (either electrically or with drugs) to return the heart back to normal rhythm, after seven days.

**Long-standing Persistent AF**
This is continuous AF lasting longer than one year.

**Permanent AF**
Permanent AF occurs when the AF cannot be fixed and it is accepted by patient and doctor not to use rhythm control strategies.
WHAT ARE MY TREATMENT OPTIONS IF I HAVE AF?

The European Society of Cardiology recommends proactive treatment for AF whether you can feel symptoms or not. You and your doctor can discuss which treatment would be best for you and your heart condition.

The major goals in treating atrial fibrillation are to:

- Relieve AF symptoms and improve a patient’s quality of life
- Prevent blood clots to decrease the risk of stroke
- Control the heart rate to allow the ventricles (lower heart chambers) enough time to fill with blood
- Reset the heart rhythm to allow the atria (upper chambers of the heart) and ventricles to work together more efficiently
The following treatments may be prescribed to treat atrial fibrillation:

- Anticoagulation or “blood thinning” therapy to prevent clots from forming
- Medication to control the heart rate or rhythm
- Restoration of normal heart rhythm either through an electrical cardioversion or medication. Electrical cardioversion itself does not generally have lasting effects
- Catheter ablation to create lines of scar tissue to block abnormal electrical circuits causing AF
- Pacemakers and defibrillators, although not used as stand-alone treatment, may be used in conjunction with medication or catheter ablation. Some pacemakers and defibrillators have features that detect AF early and help suppress episodes
- Open-heart surgery to create lines of scar tissue to block abnormal electrical circuits causing AF

The remainder of this guide will focus on the treatment of atrial fibrillation using catheter ablation.
WHAT IS CATHETER ABLATION?

Catheter ablation is a minimally invasive procedure that can be used before or when medication fails to control the heart rhythm. Catheter ablation is performed in an electrophysiology lab in the hospital by a team of highly skilled nurses and technicians who work alongside the electrophysiologist (a doctor who specializes in treating heart rhythm conditions).

The goal of catheter ablation is to prevent electrical pathways from traveling from the pulmonary veins to the atrium. The pulmonary veins are large blood vessels that carry blood from the lungs to the left atrium. The pulmonary veins are the primary source of the electrical triggers causing AF.

The recommended ablation technique for accomplishing this goal is called pulmonary vein isolation. During the procedure, catheters are used to terminate (ablate) these abnormal electrical pathways and stop them from continuing to cause AF.

There are two main techniques used to perform pulmonary vein isolation: Cryoablation (Cryo) and Radiofrequency (RF) ablation. One of the main differences between these techniques is the energy source used during the procedure. In RF ablation, heat is applied to the tissue, and during Cryoablation, heat is removed from the tissue by introducing cold temperatures. Both types of ablation result in the formation of scar tissue around the pulmonary veins.
Cryoablation using the Arctic Front Advance™ catheter is an established standard in the treatment of atrial fibrillation. The Cryoballoon delivers refrigerant through an inflatable balloon to freeze tissue and disable unwanted electrical circuits that contribute to AF.

Since European approval in 2005 Cryoballoon technology has been used to treat over 220,000 patients in 1000 centers worldwide. The Cryoballoon allows physicians to reach and treat pulmonary veins quickly and efficiently because of its anatomically-designed shape.

In addition, this balloon design gives physicians an advantage by enabling creation of circumferential and continuous scar tissue line around the pulmonary veins in a single shot.

In comparison, RF ablation systems require multiple applications to create a contiguous lesion of scar tissue.
WHAT CAN I EXPECT TO EXPERIENCE WITH A CRYOABLATION PROCEDURE?

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
During the procedure, you will receive fluids and any necessary medication through an intravenous (IV) line inserted in your arm. You may be anesthetized (‘put to sleep’) or sedated for the procedure.
A local anesthetic will be applied to the site where the ablation catheters will be inserted. In most cases, the blood vessels in your groin are used for catheterization.
In the procedure, the physician makes a needlestick or a small cut in the groin area through which to insert the catheter. The physician threads the catheter to the right atrium of the heart. Then he or she crosses the wall that separates the right and left sides of the heart. This provides access to the left atrium. You will receive anticoagulants (blood thinners) to help prevent blood clots during the procedure.
The Cryoballoon catheter enters the left atrium.

The physician inflates the balloon and moves it to the opening of the pulmonary vein.

The goal is to close off the opening of the pulmonary vein completely, which stops the flow of blood between the vein and the atrium (this is called occlusion).

Once occlusion is confirmed, the physician introduces liquid refrigerant into the balloon. The refrigerant evaporates in the balloon and removes heat from the heart tissue at the opening of the pulmonary vein. As a result, the tissue is scarred and may no longer spread the electrical currents that cause atrial fibrillation.
What happens after the procedure?

Soon after the procedure is completed, the catheter 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. While activities will need to be limited for a couple of days, most patients return to their normal routine within a few days. You may feel some minor soreness in your chest, or bruising or soreness at the insertion site. Your doctor will talk to you about any activities you may have to stop while you are healing. In most cases, you will be able to return home the day following the procedure. But some patients may be in the hospital a little longer. Some patients may experience a slight cough following the procedure. Let your physician know any time you have symptoms causing you discomfort.

Follow-up visits

Your doctor will likely want to see you to check on your healing and monitor your heart rhythms. One catheter ablation is usually enough to treat atrial fibrillation. In some cases, individuals need a repeat procedure to achieve full success. It’s important to have check-ups as recommended by your physician. In addition, many patients may continue anticoagulation medication following an ablation procedure. Monitoring for this therapy may be required.
WHAT ARE THE BENEFITS AND RISKS OF CATHETER ABLATION?\textsuperscript{6,7,8}

Benefits

Catheter ablation may successfully treat atrial fibrillation.

Catheter ablation may improve your quality of life and eliminate or reduce the unpleasant symptoms of atrial fibrillation like shortness of breath, fatigue, or weakness.

Some patients may require more than one catheter ablation procedure. In some cases, patients may not require further drug treatment after receiving a catheter ablation procedure. Remember to talk to your doctor about all benefits and risks that are specific to your condition, and address any of your concerns. Although many patients benefit from catheter ablation, results may vary.

Risks

As with any medical procedure, there are risks with catheter ablation. Some of the risks include stroke, pericardial tamponade, narrowing of pulmonary veins, damage to the phrenic nerve, damage to the blood vessels in your groin area, and a serious but extremely low risk of atrio-esophageal fistula. Other risks include irritation, infection, or bleeding occurring where the catheter was inserted. In rare cases death may occur.
WHAT TO ASK YOUR DOCTOR

If you have been diagnosed with atrial fibrillation, or suspect that you may have the condition, here are some questions that you may want to ask your physician:

- What is the cause of my AF?
- How can I be sure I have AF and not a more serious heart rhythm problem?
- Will my condition go away on its own?
- What are the risks that it will become worse (more symptomatic)?
- Am I at increased risk of having a stroke?
- What are my treatment options?
- What are the risks and side effects of medications to control my condition or to reduce the risk of stroke?
- What are the risks and benefits of other treatment options?
- Should I see an electrophysiologist (a specialist in heart rhythm disorders)?
WHERE CAN I GET MORE INFORMATION?

For more information about atrial fibrillation or to read more stories of people who have had a cryoablation procedure, visit:

afsolutions.eu
medtronic.com
afibmatters.org
References


7 Arbelo E et al. ESC-EUObservational research programme: the atrial fibrillation ablation pilot study, conducted by the European Heart Rhythm Association. Europace 2012;14:1094–1103


Brief Statement

Please consult your physician for detailed information regarding the procedure, indications, contraindications, warnings, precautions, and potential adverse events. The information contained in this brochure is designed to help you learn more about the therapy. It is intended to provide you with helpful information but is for information purposes only, is not medical advice and should not be used as an alternative to speaking with your doctor. Be sure to discuss questions specific to your health and treatments with a healthcare professional.