Atrial fibrillation (AF) also known as A-fib is the most common heart rhythm abnormality (arrhythmia) in the United States affecting approximately 2.5 million people. AF can occur at any age but is more common as we get older.

Some people with atrial fibrillation have few or no symptoms while others have symptoms that can be debilitating. Regardless of the presence of symptoms, without proper treatment, AF can cause a weakening of the heart muscle and may cause blood clots to form in the heart. This can lead to a stroke.

There are a number of treatment options for people living with atrial fibrillation aimed at reducing the symptoms of the arrhythmia and reducing the risk of serious complications. These options can be discussed with any of the physicians at the Al-Sabah Arrhythmia Institute.

How does the heart normally work

To better understand A-fib, it is useful to understand the normal electrical and mechanical functions of the heart

The heart has four chambers; two are on the right side and two are on the left side. The right side of the heart receives blood from the body into the right atrium (upper chamber). The right atrium then contracts and pushes the blood into the right ventricle (lower chamber), which in turn pumps blood to the lungs. This is where the blood picks up oxygen. The left side of the heart then collects the oxygen-rich blood through four pulmonary (lung) veins into the left atrium. When the left atrium contracts, blood is pushed into the left ventricle.

The ventricle in turn, pumps the blood to all parts of the body. For this complex pump to operate efficiently, it needs an electrical wiring system that keeps all four chambers properly synchronized.

Under normal circumstances an electrical impulse is generated in the sino-atrial node (or sinus node). This area is the heart’s natural pacemaker and it responds appropriately to your physical or emotional state by increasing or decreasing the rate at which the electrical impulses are generated. The electrical signal leaves the sinus node and disseminates through both atria (upper chambers) resulting in a coordinated contraction pushing the blood into the lower chambers. Following this, the signal is received by another node called the atrio-ventricular (AV) node. The AV node passes the signal to the ventricles which then contracts soon after the atria contracts. These sets of coordinated contractions are known as Normal Sinus Rhythm. In sinus rhythm there is efficient movement of blood through the heart and out to the lungs and the rest of your body. It also produces the familiar “lub-dub” of a normal heart beat.
Unlike normal sinus rhythm, atrial fibrillation is characterized by disorganized, nearly continuous, and widespread electrical activity throughout the upper chambers of the heart. As a result, the upper chambers (atria) do not contract in an organized fashion as described above. Furthermore, the lower chambers (ventricles) are bombarded with rapid, irregular impulses from the atria. This causes the ventricles to beat quickly and erratically. This may result in a variety of symptoms including:

- Uncomfortable fluttering sensation inside the chest, or chest pain
- Shortness of breath
- Fatigue
- Sweating
- Chest pressure
- Dizziness (fainting, rarely)
- Decrease in the ability to exercise
- Sudden unexplained anxiety

If the heart is forced to beat too fast for long periods of time, the heart muscle can begin to weaken leading to heart failure. Also, because the atria are no longer activated in an organized fashion, there is stagnation of blood within these chambers resulting in blood clots. These blood clots can then travel from the heart to the brain resulting in a stroke.

For many people with AF, the arrhythmia comes and goes. This is known as paroxysmal atrial fibrillation. Generally episodes last less than 24 hours; however, sometimes they can last for a few days before spontaneously converting to a normal rhythm. When an episode lasts more than 7 days, this is known as persistent atrial fibrillation. Atrial fibrillation is called longstanding persistent when it lasts for longer than a year. While some patients with paroxysmal A-fib continue to have the arrhythmia only intermittently, many patients progress to persistent and long-standing persistent AF. Patients with all types of atrial fibrillation including paroxysmal may be highly symptomatic and are still at risk for stroke.
Management of atrial fibrillation

As mentioned before, patients with A-fib have an increased risk of stroke. This risk can be lowered by the use of blood thinners. However, blood thinners may increase the risk of bleeding. Therefore, these two risks (bleeding versus stroke) must be weighed and balanced for each patient.

Factors that increase the risk of stroke in atrial fibrillation include, among others, congestive heart failure, high blood pressure, advanced age, diabetes, and a prior history of stroke. In some patients who have few or no risk factors for stroke, only aspirin is needed to thin the blood. In others who are at a higher risk, blood thinners such as Coumadin (warfarin), rivaroxaban (Xarelto), dabigatran (Pradaxa), or apixaban (Eliquis) may be used.

In addition to thinning the blood, other medications may be used to control the heart rate while in A-fib and prevent the development of heart failure. The goal is to lower the average heart rate to below 110 beats per minute. This is called “rate control.” Some patients remain symptomatic despite adequate control of the heart rate. In these patients, the goal is to restore normal sinus rhythm and eliminate symptoms.

Restoring sinus rhythm can be achieved initially with medications and/or a procedure called cardioversion. Cardioversion is an electrical shock delivered under anesthesia that “resets” the heart and frequently converts AF to sinus rhythm. Most patients will require medical therapy in order to maintain sinus rhythm after a cardioversion. For patients who are intolerant of medications, in whom the medications do not work, or for those who develop heart failure from atrial fibrillation, catheter ablation may be useful to achieve control of the arrhythmia.
More than a decade ago it was observed that rapid electrical impulses originating in cardiac muscle of the pulmonary veins (which drain into the left atrium) could trigger atrial fibrillation. Catheter ablation aims to alter the tissue of the heart in order to eliminate those triggers. This is done by delivering radiofrequency energy to tiny areas within the heart muscle using very thin catheters which come in direct contact with the tissue. The energy denatures the tissue which eventually forms a scar and does not conduct electrical activity. This is called radiofrequency ablation.

In ablation for atrial fibrillation, electrophysiologists perform the procedure to electrically isolate the pulmonary veins and any other areas that may be triggering AF from the rest of the heart.

The procedure is performed under general anesthesia in a specialized area of the hospital called the electrophysiology lab. During the procedure catheters are inserted into the large veins of the leg and/or the neck. From there, they are placed in the heart. One catheter has an ultrasound at its tip allowing for continuous ultrasound images throughout the procedure helping your doctor see the other catheters and the detailed structures of the heart. The other catheters record detailed electrical activity in different areas of the heart. Two catheters are advanced through a thin portion of the muscle separating the right and left atrium (the septum) in order to access the left atrium and pulmonary veins. These catheters are used to map the arrhythmia and perform the ablation. The catheters are maneuvered systematically within the left atrium and elsewhere until all the pulmonary veins are electrically isolated and all the triggers for atrial fibrillation are identified and ablated. No tissue is cut or removed during the procedure. Electrophysiologists use a number of tools to guide the movement of the catheters within the heart.

These include:

- **Fluoroscopy** helps localize the catheters within the heart using X-rays.
- **Intracardiac echocardiography (ICE)** allows visualization of detailed structures and catheters within the heart.
- **Intracardiac electrograms** are recordings of the heart's electrical activity made by catheters from within the heart. These are used to guide the ablation procedure and to verify complete isolation of the pulmonary veins and other structures.

**3-D mapping system**: A number of mapping technologies may be employed that allow for visualization of the catheters within the heart. These systems work as a GPS to localize the catheter position and are accurate to within millimeters. Using these systems, detailed maps of the heart can be created to guide and catalog areas of ablation. These images may also be integrated with a CT scan or MRI of the heart performed prior to the procedure.
To determine if a catheter ablation is appropriate for you, a thorough evaluation will be performed by members of our team at the Al-Sabah Arrhythmia Institute. This may include:

- A review of your medical history and a physical examination
- Electrocardiograms (EKGs)
- Echocardiogram or other cardiac imaging such as an MRI or CT scan
- Ambulatory EKG monitoring (Holter or event recorder)
- Evaluation for coronary artery disease

If it is determined that you are a candidate for catheter ablation, and you wish to proceed with the procedure, members of our team will assist you in scheduling any tests needed prior to the procedure.

During the first few months following your procedure you will be given a device to send recordings of your heart rhythm to our office. This will allow us to monitor you and make any adjustments to your medications. Depending on your response to the procedure, it is common to require repeat EKGs in our office, ambulatory EKGs at home, echocardiograms and blood work following the procedure.

Our staff at the Arrhythmia Institute will closely follow and assess the outcome of your procedure. During the first 3 months after the procedure, you may experience recurrent atrial fibrillation. This may be due to inflammation in the heart from the ablation and does not necessarily mean the procedure did not work. If after 3 months, you are still experiencing atrial fibrillation or a related rhythm called atrial flutter, a repeat ablation may be required.

Our team is dedicated to providing you with the best possible care before, during, and after your procedure. We are always a phone call away for any questions, concerns or suggestions you may have.

Al-Sabah Arrhythmia Institute:
212-523-2400
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<td><strong>What are the risks of the procedure?</strong></td>
<td>Catheter ablation for atrial fibrillation is generally very safe. As with any invasive procedure there are some risks. We take every precaution to minimize these risks during the procedure, and all risks will be discussed with you in detail by your doctor prior to the procedure.</td>
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### Frequently asked questions

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<td><strong>When can I return to my normal activities?</strong></td>
<td>You can walk around and return to work after 48 hours so long as you can avoid heavy lifting for 5-7 days.</td>
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<td><strong>What symptoms should I expect after the procedure?</strong></td>
<td>You may experience skipped heartbeats or short episodes of AF during the first three months after the procedure. These symptoms are common and due to inflammation of the heart tissue. After the heart has healed, these should subside.</td>
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<td><strong>What symptoms should I report?</strong></td>
<td>Please call us immediately if you have a fever of higher than 101 degrees; bleeding, redness, swelling or drainage at the site of the procedure. Also let us know if you have any symptoms of AF and use the heart monitor to record your rhythm during these periods.</td>
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<td><strong>Can I stop taking a blood thinner following the procedure?</strong></td>
<td>For at least a few months following the procedure, you will need to continue taking a blood thinner. Following this, you and your doctor will determine if and when it is safe to discontinue a blood thinner.</td>
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<td><strong>When should I resume other medications?</strong></td>
<td>Upon discharge from the hospital, all the medications that you should be taking will be reviewed. Most patients will resume previous medications that were used to control AF. Often, these medications will be stopped or tapered about 5-4 months after the ablation.</td>
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