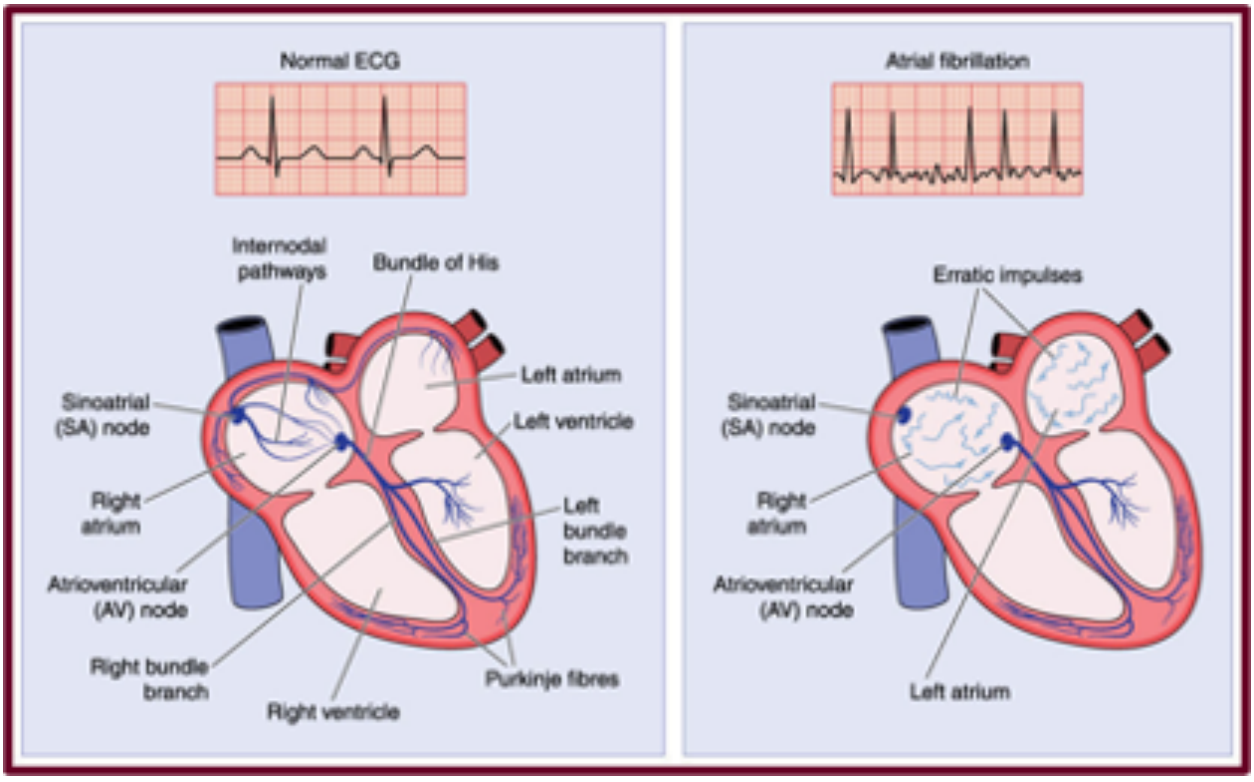
What is Sinus rhythm (normal rhythm)?

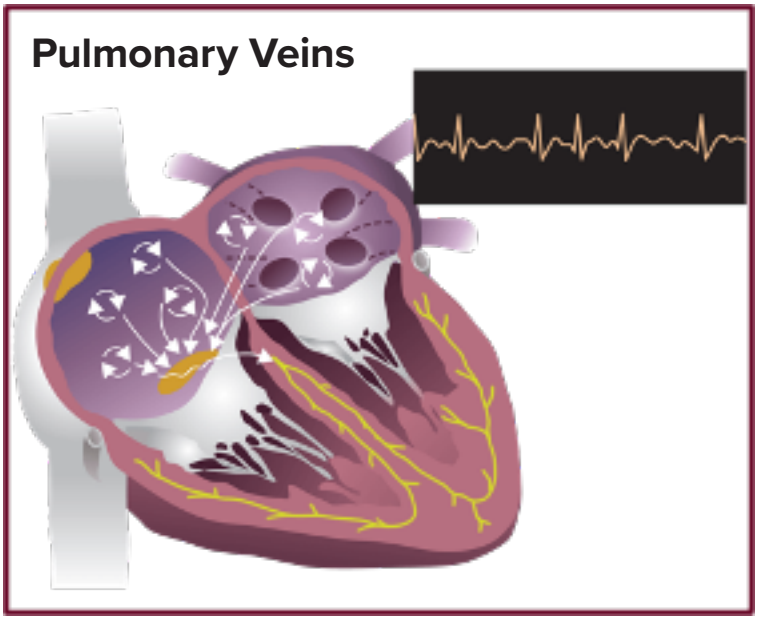
When your heart is in a normal, regular rhythm it is called sinus rhythm. A normal heartbeat starts with your sinoatrial (SA) node in the right atrium. Electricity spreads, starting with top chambers (atria) in a wave that spreads down toward the bottom chambers (ventricles). The first thing that happens is the atria squeeze downward, like milking a cow. This same signal, then goes through the Atrioventricular (AV) node between the atria and ventricles. This is the only electrical connection from the atria and ventricles, like an insulated wire. Overall, the atria collect blood, and the ventricles pump blood. This pattern of contraction of the atria and ventricles from top to bottom again and again, with the rate being set by the SA node, is known as sinus rhythm. (left image below).



What is Atrial fibrillation (Afib)?

Afib is the most common abnormal rhythm a person can experience. What starts Afib about 90% of the time are extra electrical signals generated from the pulmonary veins. These bring blood back from the lungs to the left atrium. Instead of having a normal, organized signal that fires, like when in sinus rhythm, imagine having four angry hornets inside a pint-sized jar buzzing around. When you are in Afib there are approximately 300-400 signals a minute bouncing around. It is uncontrolled and unorganized so that the atria can no longer squeeze or contract (Right image above).

Afib is a disease that is progressive and chronic. Afib worsens with time. Episodes typically become more frequent, last longer and eventually become permanent. When untreated, Afib can lead to heart failure or cause a stroke. It is important to see a doctor if you have symptoms of Afib, because it becomes harder to treat once episodes become persistent. Afib, typically starts paroxysmal (intermittent) then becomes persistent or permanent.



Types of Afib

Paroxysmal Afib: Episodes start and stop suddenly and resolve on their own within less than 7 days, usually without intervention or treatment.

Persistent Afib: Episodes that last > 7 days as long as 1 year; These episodes do not usually resolve spontaneously and nearly always require medical treatment either to resolve.

Longstanding persistent Afib: Episodes that last 1 year without stopping

Permanent Afib: This is when Afib is chronic, ongoing and resistant to treatment attempts

What are the symptoms of Afib?

Some patients have no symptoms at all. Others may experience:

- Feeling overtired or having little to no energy
- Shortness of breath, especially with activity or exertion
- Heart palpitations/fluttering
- A faster than normal or irregular heart rate
- Dizziness/lightheadedness
- Trouble with everyday exercises/activities
- Pain, pressure, tightness, or discomfort in your chest

Causes of Afib

Aging is by far the biggest cause of Atrial fibrillation

Fifty percent of the time, Afib is caused by lifestyle factors including:

- Obstructive Sleep Apnea
- Obesity/being overweight
- Drinking too much alcohol
- Smoking

Health conditions and situations that increase your risk are:

- High blood pressure
- Diabetes
- Lung disease
- Thyroid disorders
- Heart surgery
- Heart valve surgery/Valve disease
- Coronary Artery Disease

Some people also experience Afib as a result of a serious stressor like an illness

A sedentary lifestyle significantly contributes to other risk factors such as being overweight, uncontrolled high blood pressure, and diabetes.

Genetics is also a factor, one that you don't have any control over unfortunately.

How does the doctor diagnose my Afib?

Your doctor will evaluate your heart rhythm to identify if you have Afib. This can be done in a few different ways.

1. Electrocardiogram (ECG):

The first way to look at your heart rhythm, is an ECG. This is a test performed in your doctor's office that records the electrical activity of your heart. This is usually done by placing adhesive pads on your chest, arms, and legs. Altogether, these pads detect the heart's electrical activity. Wires are attached to the pads, and a brief recording of your heart rhythm is obtained.

2. Heart Monitors:

A heart monitor is a device that records your heart rhythm during the time you are wearing the device. There are 2 types of monitors:

Holter Monitors:
These can be worn for either 24 or 48 hours. Patches are placed on your chest with wires that are connected to a small portable device that you carry with you for the duration you wear the device. When you are finished wearing it, you mail it in, and the data is retrieved from it for your doctor to interpret.

Cardiac Event Monitors:
These are worn for 7-30 days. These will be a patch that is placed on your chest. These do not have wires, or a device attached to it. These are used when your doctor wants to monitor your heart rhythm for a longer period, or your symptoms are not as frequent. When you are finished wearing it, you mail it in, and the data is retrieved from it for your doctor to interpret.

Apple Watch:
These can take a 30 second reading of your heart rhythm that you can send to your doctor for review. The Apple Watch can also notify you of an irregular heart rhythm or when it suspects Afib, with 97% accuracy studies have shown. If you would like more information, please ask for a brochure on how to obtain an ECG with an Apple Watch.

Risk Factor Modification

It isn't enough to just take medication, to only be treated with a procedure, or combine procedure with medication. Without addressing risk factor modification, Atrial fibrillation cannot be treated successfully.

Obstructive Sleep Apnea
Obstructive Sleep Apnea (OSA) is a sleep disorder in which a person stops breathing for short periods while sleeping. There is a high prevalence of OSA in patients with Afib and a recurrence of Afib in more severe or untreated OSA. If you have not been tested for sleep apnea, please discuss with your doctor about getting tested.

If you have already been diagnosed with Obstructive Sleep Apnea, it is important to use your CPAP equipment diligently. As noted, untreated OSA has been shown to be linked to a high prevalence and recurrence of Afib. If you have equipment that does not work well for you, it is important to talk to your doctor about assessing you for different equipment that might be more comfortable/appropriate for you

Obesity
Obesity is defined as a body mass index (BMI) of >30. Obesity is one of the most significant factors associated with Afib. It can contribute to Atrial fibrillation in several ways. Studies have shown that obesity has been associated with changes in the electrical activity in the atria (upper chambers of the heart) as well as structural changes seen in the atria. Studies have also shown that as a person gains weight, fat is deposited in the heart which can trigger arrhythmias, most commonly Afib.

Another way that obesity can contribute to the development of Afib is by causing other problems that lead to Afib. Obesity can lead to or worsen hypertension and can also lead to obstructive sleep apnea, both of which can increase the risk of Afib. What is reassuring for people who are obese or overweight, even a 10% reduction in weight can improve your Afib symptoms.

Physical Activity
Studies have shown that regular exercise can reduce the amount of Afib you have. Exercising regularly also can reduce other risk factors by helping with maintaining a healthy weight, controlling blood pressure and blood sugar and overall health.

Diabetes
For patients already diagnosed with Afib, diabetes has been shown to increase symptoms of Afib as well as hospitalizations. Higher blood sugar levels have been linked to an even higher risk of this. Because of this, it is important to keep your blood sugar well controlled. If you are having difficulty with your blood sugar control, please ask your primary doctor for help.

High blood pressure
If you have high blood pressure (BP), keeping it well controlled is essential. Studies have shown that high BP nearly doubles your risk of developing atrial fibrillation. If you have high BP, you should check your BP and record it, once or twice a week.

Ensure you sit down and relax for at least 5 minutes prior to measuring your BP and make sure you calibrate your cuff at the doctor's office to ensure it is accurate. When you see your doctor, you can bring these measurements to your appointment. Taking home readings of your BP helps your doctor manage your high BP.

Smoking
Studies have shown that smoking was associated with a 15% increased risk of Afib. Nicotine is a heart stimulant and can make Afib worse in patients who have already been diagnosed with Afib. Another way smoking can contribute to Afib, is that nicotine contributes to high blood pressure, also a risk factor for Afib. If you want help with smoking cessation, please ask your doctor.

Alcohol
Alcohol has been shown in studies to be a risk factor for Afib and other studies have shown that drinking little to no alcohol can help reduce the amount of Afib you have. If you have Afib, you can try cutting back on alcohol, or even not consuming alcohol at all.

This is a lifestyle change that many with Afib may find helpful at reducing the amount of Afib they experience. Talk to your doctor if you are having trouble reducing your alcohol consumption or would like help in reducing your alcohol consumption.

Thyroid Disorders:
Hyperthyroidism (an overactive thyroid) can lead to Afib. Treatment of hyperthyroidism can reduce the risk of Afib and should be actively pursued. If you have an overactive thyroid, it is important to follow up regularly with your primary doctor to make sure it is well managed to prevent occurrence, recurrence or worsening of Afib.

Treatment

ANTICOAGULATION

Afib puts you at a higher risk of stroke because when you are in Afib, your upper chambers, or atria, are not pumping properly. There is a pouch off the left atrium called the left atrial appendage, approximately the size of your thumb. In normal rhythm, blood moves in and out but in Afib, blood sits there and shakes. That's where a blood clot can form. From there the blood clot goes out into the left atrium, downstream to the left ventricle. It then gets pumped out of the heart, up through the aorta towards the right or left arm and up into the carotid artery and to the brain causing a stroke. Even a small clot in the carotid artery can cause a catastrophic stroke

Other factors also increase your risk your risk of stroke. Your risk is calculated by a score called a CHADS2VASc score. The more risk factors you have, the higher your risk of stroke. You are given points based on age, sex and health conditions including congestive heart failure, high blood pressure, diabetes, a history of vascular disease/ previous heart attack, previous blood clot, and a previous stroke. The recommendation is that for men who have risk of CHADS2VASc score of 2 or greater, be put on lifelong anticoagulation. For women the recommendation is with a score of 3 or greater.

To prevent a stroke, your doctor may prescribe anticoagulation medication. Anticoagulation medication affects the clotting mechanisms in your system to prevent a blood clot from forming. You may have heard these medications referred to as "blood thinners" but they do not actually thin your blood. Examples of some of the medications used include:

DIRECT ORAL ANTIOCOAGULANTS (DOACs):

- *Eliquis* (Apixaban)
- *Xarelto* (Rivaroxaban)
- *Pradaxa* (Dabigatran)
- No blood testing is required for these medications
- Diet does not affect how DOACs work
- DOACs are newer and can be expensive.
- Please call your insurance company to find out which of these medications will be covered and what your out-of-pocket cost will be. Relay this information to your nurse if you need assistance with the cost of the medication.

OTHER ANTICOAGULANT MEDICATION:

- *Warfarin:* This medication requires regular lab testing and eating a consistent diet.
- If your cardiologist prescribes this medication, he will refer you to an anticoagulation clinic to do your regular lab testing and assist with dose adjustments based on your lab results

Rate Control

If you are in Afib and your heart is beating on average more than 100 beats per minute (bpm), all the time, then you are at risk for developing tachycardia mediated cardiomyopathy. This essentially means that if your heart beats too fast (tachycardia), for too long, measured usually in months, your heart can weaken and dilate. This is something that is more likely to develop in patients that do not experience symptoms with their Afib.

Your doctor may prescribe medications that will slow down your heart rate, allowing the ventricles to pump more blood to the rest of the body and keeping your heart from weakening. This can help relieve symptoms.

Up to one third of the people that have Afib, do not experience any symptoms of Afib. They do not know when they experience Afib or fast heart rates. If patients are asymptomatic, we base rate control treatment by reviewing heart rate trends on your heart monitor.

Medications used are:

- **Beta blockers:** metoprolol, atenolol, carvedilol, nadolol, bisoprolol
- **Calcium channel blockers:** diltiazem, verapamil

Rhythm Control

This aims to restore and maintain normal (sinus) rhythm. By doing this your heart pumps more efficiently alleviating symptoms. This can be done by three different ways:

CARDIOVERSION:

This is a procedure done to restore your heart rhythm to a normal or “sinus rhythm.” This may be done in the hospital or in an outpatient surgery center. This is not a cure, just a temporary measure.

- You will have an IV started and blood tests drawn before your cardioversion.
- Pads are applied to your chest. These monitor your heart rhythm and are also used by the physician to deliver the shock that will convert your heart to a normal rhythm.

- The cardioversion is done under anesthesia, so you will be given medication in your IV before the start of the procedure to help you go to sleep.
- After the cardioversion is completed, you will be monitored until you are awake and alert.
- Once you can eat, drink, sit up and walk independently, you should be able to go home.

MEDICATIONS:

Your doctor may prescribe antiarrhythmic medication to prevent Afib or to convert your rhythm from Afib to a normal or sinus rhythm

Tikosyn

Tikosyn (also called dofetilide), is an antiarrhythmic mediation designed to keep people in sinus (or normal) rhythm or more specifically, out of Afib. It works for approximately 60% of the people who are started on it and is successful for a period of 5-10 years. There are two reasons that it does not work for the remaining population. The first is, that they cannot tolerate the medication.

The medication requires a 3-day hospital stay to initiate it because it changes how the electricity in your heart conducts. If it changes the electrical pattern in your heart too much, then you are at risk for life-threatening arrhythmias. The second reason it does not work for some, is that it is unsuccessful at keeping you out of Afib.

Other Antiarrhythmic Medications:

Other medications your doctor may prescribe to keep you out of Afib include:

- Amiodarone
- Propafenone
- Sotalol
- Mexiletine
- Flecainide
- Dronedarone

ABLATION:

Your doctor may recommend an ablation for your Afib

Ablation for atrial fibrillation attempts to electrically isolate the pulmonary veins from the body of the left atrium. Electrical signals that originate within the pulmonary veins have been shown to trigger atrial fibrillation.

During an Afib ablation procedure, your cardiologist will advance catheters from the femoral vein in the groin up to the heart. Then he will cross over from the right to left side of the heart. He will perform the ablation by using heat or cold energy, isolating the pulmonary veins by creating a circular line of scar around each vein.

This has been shown to reduce the frequency of atrial fibrillation and symptoms of atrial fibrillation. Single procedure success rate of an Afib ablation is 50%. This means that half of the people that have an ablation never have Afib symptoms again. The other half come back for repeat ablations for which the success rates are 87-88%.

Risks & Complications:

- Bleeding
- Infection
- Stroke
- Damage to heart muscle
- Damage to esophagus
- Damage to pulmonary veins

Recovery:

- On the day of procedure: you will have to rest and lay flat strictly for 1 hour and continue resting for an additional two hours during which you may have the head of the bed raised before you can get up and walk around. This is to allow the access site at the femoral vein to clot sufficiently and prevent bleeding.
- When you go home: minimize your activity in the first three days following your procedure
- Avoid lifting anything heavy >10 lbs or bending over. You can then gradually begin returning to your usual activity level as tolerated.

When to call your doctor:

- Fever >100.4F
- Persistent cough
- Trouble swallowing
- Shortness of breath
- Coughing up blood
- Severe chest pain

Complications of Afib?

Afib is a progressive and chronic condition, meaning that if it is not treated, it will worsen. Episodes will become more frequent, will last longer and eventually become permanent. When untreated, Afib can lead to heart failure or cause a stroke.

Heart failure

is when your heart becomes weak and is unable to pump blood effectively. Some of the symptoms may include shortness of breath, dry cough, swelling to feet and/or legs, fatigue, weakness, weight gain and loss of appetite. If you note any of these symptoms, talk to your doctor about them immediately.

Tachycardia Mediated Cardiomyopathy:

As noted previously if your average heart rate is greater than 100bpm for a long period of time (months), your heart can weaken and dilate. If you have no symptoms with your Afib, your doctor will assess your heart rate with a heart monitor. If you do have symptoms, monitor your heart rate when you are in Afib and let you nurse or doctor know if your heart rate is consistently above 100bpm.

Stroke

As noted previously, Afibs put you at a higher risk of stroke. A stroke is a medical emergency.

Always call 911/the ambulance immediately if you suspect a stroke!!

What are the warning signs of Stroke?

Below are the signs of a stroke so that you know how to recognize if a stroke were to occur. You may have some or all the signs below

Note the time when symptoms start and call 911 immediately!

- Sudden numbness/weakness of face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden severe headache with no known cause

RESOURCES for PATIENTS:

For multiple resources, articles, videos, discussion forums and much more, go to:
www.stopafib.org


SPOT A STROKE
- FAST -
F
FACE
Ask the person to smile.
Does one side of the face droop?
A
ARMS
Ask the person to raise both arms.
Does one arm drift downward?
S
SPEECH
Ask the person to repeat a simple phrase.
Is their speech slurred or strange?
T
TIME
If you observe any of these signs,
call 9-1-1 immediately!