

ATRIAL FIBRILLATION

What is Atrial Fibrillation?

Atrial fibrillation (also called AFib or AF) is a quivering or irregular heartbeat (arrhythmia) that can lead to blood clots, stroke, heart failure and other heart-related complications. Some people refer to AF as a quivering heart. An estimated 2.7 million Americans are living with AF.

What happens during AF?

Normally, your heart contracts and relaxes to a regular beat. In atrial fibrillation, the upper chambers of the heart (the atria) beat irregularly (quiver) instead of beating effectively to move blood into the ventricles. About 15–20 percent of people who have strokes have this heart arrhythmia.

“Anything that allows blood to slow down or pool increases the risk of clotting, and so increases the risk of stroke,” says Dr. Steve Roach, Professor of Neurology and Director of the Comprehensive Epilepsy Program at Wake Forest University Medical School. If a clot breaks off, enters the bloodstream and lodges in an artery leading to the brain, a stroke results.“ This clot risk is why patients with this condition are put on blood thinners. People with atrial fibrillation have an increased stroke risk of about five percent per year.”

It's the most common "serious" heart rhythm abnormality in people over the age of 65 years. Even though untreated atrial fibrillation doubles the risk of heart-related deaths and causes a 4–5-fold increased risk for stroke, many patients are unaware that AF is a serious condition.

According to the 2009 “Out of Sync” survey:

- Only 33% of AF patients think atrial fibrillation is a serious condition
- Less than half of AF patients believe they have an increased risk for stroke or heart-related hospitalizations or death

Why Atrial Fibrillation Matters

What are the consequences of atrial fibrillation (AF)?

Although atrial fibrillation can feel weird and frightening, an “attack of AF” usually doesn’t have harmful consequences by itself. The real danger is the increased risk for stroke. Even when symptoms are not noticeable, AF can increase a person’s risks for stroke and related heart problems.

What causes atrial fibrillation?

Sometimes the cause of AF is unknown. Other times, it is the result of damage to the heart's electrical system from other conditions, such as longstanding, uncontrolled high blood pressure or artery disease. AF is also the most common complication after heart surgery.

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Usually, the most serious risk from AF is that it can lead to other medical problems, including:

- Stroke
- Heart Failure
- Chronic fatigue
- Additional heart rhythm problems
- Inconsistent blood supply

How does AF lead to stroke?

The heart quivers. The upper chambers (the atria) of the heart do not produce an effective, regular contraction.

- The contraction fails. Imagine wringing out a sponge. Without a good squeeze, water will still be left in the sponge. In the same way, when a heart contraction is either too fast or too uneven, it doesn't completely squeeze the blood from the atria into the next chamber.
- Blood pools in the atria. Left over blood remains in the atria and may pool there.
- Risks of clotting go up. When blood has the opportunity to pool, it also has the opportunity to clot.
- Clots can travel and cause blockages. If a blood clot forms in the atria, it can be pumped out of the heart to the brain, blocking off the blood supply to an artery in the brain, causing a stroke. This type of stroke is called an embolic stroke or some doctors call it a cardioembolic stroke.

How does AF lead to heart failure?

Heart failure means the heart isn't pumping enough blood to meet the body's needs. AF can lead to heart failure because the heart is beating so fast that it never properly fills up with blood to pump out to the body.

As a result, when the heart can't pump the blood forward, symptoms develop because

- Blood can "back up" in the pulmonary veins (the vessels that return oxygen-rich blood from the lungs to the heart.) which can cause fluid to back up into the lungs.
- When AF causes heart failure, fluid in the lungs can cause fatigue and shortness of breath. Oxygen-rich blood is not being delivered to the body and brain, causing physical and mental fatigue and reduced stamina.
- Fluid also can build up in the feet, ankles, and legs, causing heart-failure related weight gain.

How does AF lead to additional heart rhythm problems?

Basic answer: The heart's electrical system stops working properly, and fails to keep the heart chambers in rhythm.

Thorough answer: Every heartbeat is controlled by the heart's electrical system. To understand why atrial fibrillation is a problem, it is helpful to understand the normal patterns of the heart's electrical system.

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The heart's normal electrical pattern:

- The current travels from top to bottom. The heartbeat starts at the top of the heart and – like an electrical wave – the current travels to the lower parts of the heart, signaling the tissue to contract.
- The sinoatrial (SA) node starts the contraction in the top of the heart. The right atrium (top section of the heart) houses a group of cells called the sino-atrial node. In healthy adults, the SA node fires off between 60-100 heartbeats per minute. The electrical wave moves through the atria to “gatekeeper node.”
- The atrioventricular (AV) node regulates the timing for the lower portion of the heart. The AV node serves as a “gatekeeper” for all of the electrical pulses going through the atria (top sections) to the ventricles (bottom sections). The electrical pulses are delayed at the AV node before they are allowed to move into the ventricles. The delay gives the ventricles extra time to finish filling with blood before contracting.
- The ventricles contract and pump blood out to the lungs and the body.

Electrical problems in atrial fibrillation:

- In AF, the SA node may not start the contraction. Instead, the contraction might start randomly in other areas of the atria or even in the pulmonary veins.
- In AF, the electrical current doesn't flow in an organized top-to-bottom fashion. Instead, contractions are rapid and disorganized.
- In AF, the AV node often can't regulate the chaotic current. It does its best to protect the ventricle from extra electrical impulses, but it can't stop all of them. As a consequence, the ventricle beats more often than it should – giving rise to the noticeable symptoms of breathlessness and fatigue.
- When the beat is off, the blood supply can be unpredictable. So, even though the ventricles may be beating faster than normal, they aren't beating as fast as the atria. Thus, the atria and ventricles no longer beat in a coordinated way. This creates a fast and irregular heart rhythm. In AF, the ventricles may beat 100 to 175 times a minute, in contrast to the normal rate of 60 to 100 beats a minute.

The amount of blood pumped out of the ventricles to the body is based on the randomness of the atrial beats.

The body may get rapid, small amounts of blood and occasional larger amounts of blood. The amount will depend on how much blood has flowed from the atria to the ventricles with each beat.

Can AF simply go away?

Yes, rarely “spontaneous remission” does happen; it simply goes away. However, it is still something you and your healthcare provider will want to monitor because some people live with AF and do not feel the symptoms. However, the risks are still present.

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Overall, most of the risks, symptoms and consequences of AF are related to how fast the heart is beating and how often rhythm disturbances occur.

AF may be brief, with symptoms that come and go. It is possible to have an atrial fibrillation episode that resolves on its own. Or, the condition may be persistent and require treatment. Sometimes AF is permanent, and medicines or other treatments can't restore a normal heart rhythm.

Risk Factors for Atrial Fibrillation

Any person, ranging from children to adults, can develop atrial fibrillation. Because the likelihood of AF increases with age and people are living longer today, medical researchers predict the number of AF cases will rise dramatically over the next few years. Even though AF clearly increases the risks of heart-related death and stroke, many patients do not fully recognize the potentially serious consequences.

Typically people who have one or more of the following conditions are at higher risk for AF:

- Advanced age - The number of adults developing AF increases markedly with older age.
- Underlying heart disease - Anyone with heart disease, including valve problems and history of heart attack. Additionally, atrial fibrillation is the most common complication after heart surgery.
- High Blood pressure- Ongoing, uncontrolled high blood pressure can increase your risk for AF.
- Drinking alcohol - Binge drinking (having five drinks in two hours for men, or four drinks for women) may put you at higher risk for AF.
- Sleep Apnea - Although sleep apnea isn't proven to cause AF, studies show a strong link between obstructive sleep apnea and AF. Often, treating the apnea can improve AF.
- Other chronic conditions - Others at risk are people with thyroid problems, diabetes, asthma and other chronic medical problems.

Symptoms of Atrial Fibrillation

The most common symptom: a quivering or fluttering heartbeat

Atrial fibrillation (AF) is the most common type of irregular heartbeat. The abnormal firing of electrical impulses causes the atria (the top chambers in the heart) to quiver (or fibrillate). View an [animation of atrial fibrillation](#).

Additional common symptoms of atrial fibrillation

Sometimes people with AF have no symptoms and their condition is only detectable upon physical examination. Still, others may experience one or more of the following symptoms:

- Rapid and irregular heartbeat
- Fluttering or "thumping" in the chest
- Dizziness
- Shortness of breath and anxiety
- Weakness

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- Faintness or confusion
- Fatigue when exercising
- Sweating
- *Chest pain or pressure

***Chest pain or pressure is a medical emergency. You may be having a heart attack. Call 9-1-1 immediately.**

Are there different types of AF? Do they have different symptoms?

The symptoms are generally the same; however the duration of the AF and underlying reasons for the condition help medical practitioners classify the type of AF problems.

- *Paroxysmal fibrillation* is when the heart returns to a normal rhythm on its own. People who have this type of AF may have episodes only a few times a year or their symptoms may occur every day. These symptoms are very unpredictable and often can turn into a permanent form of atrial fibrillation.
- *Persistent AF* is defined as an irregular rhythm that lasts for longer than 48 hours. This type of AF will not return to normal sinus rhythm on its own and will require some form of treatment.
- *Permanent AF* occurs when the condition lasts indefinitely and can no longer be controlled with medication.

Over a period of time, paroxysmal fibrillation may become more frequent and longer lasting, sometimes leading to permanent or chronic AF. All types of AF can increase your risk of stroke. Even if you have no symptoms at all, you are nearly 5 times more likely to have a stroke than someone who doesn't have atrial fibrillation.

How are heart attack symptoms different from AF symptoms?

Fluttering and palpitations are often a key difference, but many heart problems have similar warning signs. If you think you may be having a heart attack, DON'T DELAY. Get emergency help by calling 9-1-1 immediately. A heart attack is a blockage of blood flow to the heart, often caused by a clot or build-up of plaque lodging in the coronary artery (a blood vessel that carries blood to part of the heart muscle). A heart attack can damage or destroy part of your heart muscle. Some heart attacks are sudden and intense — where no one doubts what's happening. But most heart attacks start slowly, with mild pain or discomfort. Often people affected aren't sure what's wrong and wait too long before getting help.

People living with AF should know the symptoms of a stroke

As stated earlier, having atrial fibrillation can put you at an increased risk for stroke. Here are the warning signs that you should be aware of:

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Stroke Warning Signs: F.A.S.T.

F: Facial Droop- Does one side of the face droop or is it numb? Ask the person to smile.

A: Arm weakness- Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?

S: Slurred Speech- Is speech slurred, are they unable to speak, or are they hard to understand? Ask the person to repeat a simple sentence, like "the sky is blue." Is the sentence repeated correctly?

T: Time to Call 911! - If the person shows any of these symptoms, even if the symptoms go away, call 9-1-1 and get them to the hospital immediately

Treatment of Atrial Fibrillation

The treatment goals of atrial fibrillation (AF) start with a proper diagnosis through an in-depth examination from a physician. The exam usually includes questions about your history and often an EKG or ECG. Some patients may need a thorough electrophysiology study.

Although no one is able to absolutely guarantee that a stroke or a clot can be preventable, there are ways to reduce risks for developing these problems.

After a patient is diagnosed with atrial fibrillation, the ideal goals may include:

- Restoring the heart to a normal rhythm
- Reducing an overly high heart rate
- Preventing blood clots
- Managing risk factors for stroke
- Preventing additional heart rhythm problems
- Preventing heart failure

Avoiding atrial fibrillation and subsequently lowering your stroke risk can be as simple as foregoing your morning cup of coffee. In other words, some AF cases are only as strong as their underlying cause. If hyperthyroidism is the cause of AF, treating the thyroid condition may be enough to make AF go away.

Doctors can use a variety of different medications to help control the heart rate during atrial fibrillation.

"These medications, such as beta blockers and calcium channel blockers, work on the AV node," says Dr. Andrea Russo of University of Pennsylvania Health System. "They slow the heart rate and may help improve symptoms. However, they do not 'cure' the rhythm abnormality, and patients still require medication to prevent strokes while remaining in atrial fibrillation."

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Medications For Atrial Fibrillation

Medications, for most patients, are the most helpful form of treatment. However, many studies show that patients often stop taking medications because of side effects or their own belief that they no longer need it. Discontinuing medications can be very dangerous!

If you have been prescribed heart medications, taking and tracking your medications is one of the best things you can do for your health.

Tell your healthcare provider about all your other drugs and supplements, including over-the-counter medications and vitamins.

Medications are often prescribed to prevent and treat blood clots which can lead to a stroke. Additional drugs may be prescribed to control heart rate and rhythm in the AF patient. These medications may also be used in conjunction with other treatments. The heart rhythm can be more difficult to control. The longer you have untreated AF, the less likely it is that normal rhythm can be reestablished.

Medication options may include blood thinners, rate controllers, and rhythm controllers. Lists included here are not intended to be comprehensive, and we encourage you to revisit our page often to keep up with the newest in AF medication options.

Preventing Clots with Medication (antiplatelets and anticoagulants)

Drugs such as blood thinners are given to patients to prevent blood clot formation or to treat an existing blood clot. Examples include:

- Aspirin
- Warfarin
- Other FDA approved anticoagulants

Overview of Side Effects

Antiplatelets can increase your risk of bleeding. Even though aspirin can be purchased over the counter, it is important that you do not take more than the dose prescribed by your doctor. Report any of the symptoms stated below to your healthcare provider.

Anticoagulants increase risk of bleeding. If you are prescribed warfarin-there is usually follow up blood tests that are necessary to monitor and achieve optimal dosing.

Important Precautions when taking anti-clotting medications

- Call your healthcare provider right away if you have any unusual bleeding or bruising

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- If you forget to take your daily anticoagulant dose, **don't** take an extra one to catch up! Follow your healthcare provider's directions about what to do if you miss a dose.

Always talk to your healthcare provider about switching from one anticoagulant to another (including changing to a generic version). Even small variations in the amount of the dose of a medication can cause problems.

- Always tell your doctor, dentist and pharmacist that you take one of these medicines. This is especially important before you start taking a new medication or have any procedure that can cause bleeding.
- Discuss any new medications with your healthcare providers. Many drugs change the effects of these agents on the body. Even vitamins (and some foods) could change the effect.

It is also wise to take extra care with contact sports or any other situation that might risk unnecessary trauma. Here are some things to watch for or report to your physician:

- If you have an accident of any kind
- If you often find bruises or blood blisters
- If you feel sick, weak, faint or dizzy
- If you think you are pregnant
- If you notice red, dark brown or black urine or stools
- If you bleed more with periods
- Bleeding gums
- Bad headache or stomach ache that won't go away

Heart Rate Controlling Medication

- Beta blockers. These are drugs used to slow the heart rate. Most people can function and feel better if their heart rate is controlled.
Examples: atenolol, metoprolol, carvedolol, Bystolic
- Calcium channel blockers. These medications have multiple effects on the heart. They are used to slow the heart rate in patients with AF and to reduce the strength of the muscle cell's contraction.
Examples: Diltiazem, Verapamil
- Digoxin. This medication slows the rate at which electrical currents are conducted from the atria to the ventricle.

Heart Rhythm controlling Medications

Once your heart rate is under control, the next management consideration is usually treating the abnormal heart rhythm with medications to restore the heart rhythm to normal. Significant side effects may occur, and your healthcare provider will most likely want to monitor progress closely.

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- Sodium channel blockers which help the heart's rhythm by slowing the heart's ability to conduct electricity.
Examples: Flecainide (Tambocor®), Propafenone (Rythmol®), Quinidine (Various).
- Potassium channel blockers help the heart's rhythm by slowing down the electrical signals that cause AF.
Examples: Amiodarone (Cordarone® or Pacerone®), Sotalol (Betapace®)

Non-Surgical Procedures for Atrial Fibrillation

Electrical cardioversion– the rhythm reset

Electrical Cardioversion is a procedure in which a patient receives an electrical shock on the outside of the chest (while under mild anesthesia) using either paddles or patches. The shock can be used to “reset” the heart to a normal rhythm. The procedure is similar to defibrillation, but uses much lower levels of electricity.

The decision to use electrical cardioversion

Your provider may recommend a transesophageal echocardiogram (TEE) as a first step. The TEE procedure involves swallowing a small ultrasound device that allows the healthcare team to look inside your heart atria for blood clots.

If you already have clots in the atria, you will need protection from increasing your stroke risk. For this reason, your healthcare provider may recommend that you take a blood thinner before having an electrical cardioversion procedure. It often successfully restores regular heart rhythm, but for some patients their atrial fibrillation may return. In many instances, anti-arrhythmia medications are needed indefinitely to keep the heart's rhythm and rate in the best range.

Radiofrequency ablation or catheter ablation

Ablation is used for cardiac arrhythmias when long-term medications or electrical cardioversion are either not preferred or were not effective. Before ablation surgery, electrical mapping of the heart is performed. An electrically sensitive catheter is used to map the heart muscle and the origins of the “extra” electrical activity throughout the heart. The map tells the physician which areas of the heart are creating problematic electric signals that interfere with the proper rhythm.

How is an ablation performed?

A catheter (thin, flexible tube) is inserted into the patient's blood vessels and is gently guided to the heart. The physician carefully destroys malfunctioning tissue using the catheter to deliver energy (such as radiofrequency, laser or cryotherapy) to scar the problematic areas. The scarred areas will no longer send abnormal signals. If successful, the heart will return to a normal rhythm. This minimally invasive procedure usually has a short recovery period. Patients are generally placed on a short course of anti-arrhythmic drugs while the procedure takes full effect.

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Common types of ablation for AF include:

- Pulmonary vein isolation ablation (PVI ablation or PVA). In some AF patients, fibrillation is triggered by extra electrical currents in the pulmonary veins. During this procedure, the catheter tip is used to destroy the tissue that is sending the extra currents and, in most cases, normal heart rhythm returns.
- AV node ablation with pacemakers. In other AF patients, the trigger for their AF occurs in the AV node (the place where the electrical signals pass from the atria to the ventricles). The catheter is placed near the AV node and a small area of tissue is destroyed. A pacemaker is then implanted to restore and maintain the heart's normal rhythm.

Surgical; Procedures for Atrial Fibrillation

Pacemakers

A pacemaker is a small electrical device implanted in the body with wires going to the heart to regulate the heartbeat. It is implanted under the skin near the collarbone and sends out an electrical signal to keep a steady contracting rhythm in the heart. Some pacemakers sense when the heartbeat is too fast or too slow and fire impulses that help the heart return to the proper rhythm and speed.

Open-heart maze procedure

Maze heart surgery is a complex procedure in which a surgeon creates small cuts in the upper part of your heart. The cuts are then stitched together and scar tissue forms. The scars interfere with the transmission of electrical impulses that can cause AF. Normal heartbeat is then restored.

Prevention of Atrial Fibrillation

What can I do to prevent (reduce my risk for) atrial fibrillation (AF)?

To reduce your risk for the onset of AF, maintaining a heart-healthy lifestyle is always your best option. If you have been diagnosed with AF, take medications if they are prescribed for you, and get proper [treatment](#) and management of your condition so you can reduce the risk of AF's harmful consequences. [View an animation of atrial fibrillation.](#)

What can I do to reduce my risk of complications associated with atrial fibrillation?

- Get regular physical activity
- Eat a heart healthy diet, low in saturated fats, trans fats, and cholesterol
- Manage high blood pressure
- Avoid excessive amounts of alcohol and caffeine
- Don't smoke
- Control cholesterol
- Maintain a healthy weight

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All of these goals aid in the prevention of (reducing the risk for) heart disease, and will help keep your circulatory system in the best condition.

Other underlying conditions may need treatment because they can contribute to the onset of AF:

- Sleep apnea
- Thyroid disease
- Diabetes
- Chronic lung disease
- Other heart conditions
- Family history