



Patient education: Atrial fibrillation (Beyond the Basics)

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ATRIAL FIBRILLATION OVERVIEW

Atrial fibrillation (also called AF or "A-fib") is an abnormal rhythm of the heart. It is relatively common, affecting 2.3 million adults in the United States. The prevalence increases with age, and most people who develop A-fib are over 65 years of age.

Atrial flutter is a related heart rhythm disorder that overlaps with A-fib with respect to mechanism, management, and prognosis. Some people have A-fib or atrial flutter, and some have both.

WHAT IS ATRIAL FIBRILLATION?

In atrial fibrillation (A-fib), the upper chambers of the heart (the atria) do not work correctly because of abnormal electrical activity. During A-fib, the atria quiver or "fibrillate" instead of contracting or squeezing in a normal organized fashion. This means that blood is not moved out of these chambers as effectively as it should be ([figure 1](#)). The blood that remains in the atria does not move as quickly as normal, which allows blood clots to form. Blood clots increase your risk of having a stroke. The loss of normal atrial contraction also results in the heart not working as effectively as a pump and can cause patients to feel poorly. (See '[Risk of stroke](#)' below.)

There are two forms of A-fib:

- **Paroxysmal (or intermittent) A-fib** – Episodes occur with varying frequency and duration but resolve on their own within seven days.

- **Persistent A-fib** – This lasts continuously for at least seven days and typically requires an active effort for restoration of a normal heart rhythm (also called "sinus rhythm").

In many (but not all) cases, A-fib starts as paroxysmal and over time progresses to a persistent state. The longer the atria fibrillate, the more difficult it is to restore and maintain a normal rhythm.

ATRIAL FIBRILLATION CAUSES

The risk of atrial fibrillation (A-fib) increases with age, and it typically occurs in people who have underlying heart disease. Almost any type of heart disease can increase a person's risk of A-fib, but the most common causes are:

- Heart disease due to chronic high blood pressure (hypertensive heart disease)
- Heart attack (also called "myocardial infarction" or MI)
- Heart failure (when the heart does not pump as well as it should)
- Heart valve disease, such as mitral regurgitation or mitral stenosis (see "[Patient education: Mitral regurgitation \(Beyond the Basics\)](#)")
- A complication of heart surgery and, less often, after other types of surgery

Other behaviors and medical problems are also associated with an increased risk of developing A-fib. These include:

- **Alcohol and binge drinking** – Chronic alcohol use can increase the risk of developing A-fib. Binge drinkers can also develop A-fib that is usually transient. This often occurs over weekends or holidays, when alcohol intake is excessive. It is sometimes called "holiday heart syndrome."
- **Hyperthyroidism** – A-fib occurs in about 13 percent of all people with an overactive thyroid gland (called hyperthyroidism). Blood testing to check thyroid function is recommended in anyone with A-fib, since hyperthyroidism is treatable. (See "[Patient education: Hyperthyroidism \(overactive thyroid\) \(Beyond the Basics\)](#)".)
- **Medications** – Drugs that stimulate the heart can contribute to the development of A-fib. An example is [theophylline](#), which is used in the treatment of asthma or chronic lung disease.
- **Sleep apnea** – There is some evidence that A-fib can be caused by sleep apnea, a condition in which a person stops breathing for prolonged periods of time while sleeping. Patients with A-fib who are overweight or have a history of snoring or

excessive sleepiness during the daytime should be evaluated with a sleep study.

Treatment for sleep apnea can eliminate A-fib in some people. (See "[Patient education: Sleep apnea in adults \(Beyond the Basics\)](#)".)

- A variety of chronic lung diseases, particularly emphysema.
- Obesity. The growing obesity epidemic is a major reason for the growing number of patients with A-fib.
- Diabetes (a disorder in which your body does not manage glucose, or sugar, normally).
- Chronic kidney disease.

Some people with A-fib have no obvious cause. When this occurs in people under age 65, without any associated conditions, the risk of blood clots and stroke is much lower than it is in people who are older or who have known causes of A-fib.

ATRIAL FIBRILLATION SYMPTOMS

Some people have no symptoms at all, while others have a variety of symptoms. Mild symptoms can include:

- Unpleasant palpitations or irregularity of the heart beat
- Mild chest discomfort (sensation of tightness) or pain
- A sense of the heart racing
- Lightheadedness
- Mild shortness of breath and fatigue, especially with exercise

Some people have severe symptoms, such as:

- Difficulty breathing
- Difficulty breathing with exercise or exertion
- Fainting, or near fainting, due to a reduction in blood flow to the brain
- Chest pain
- Severe fatigue

Chest discomfort generally results from inadequate blood flow to the heart muscle. This type of chest pain is called "angina." It can be due to an increase in the heart's need for oxygen and/or a decrease in the heart's supply of blood and oxygen (for example, if the blood vessels to the heart are narrower than normal).

Risk of stroke — A serious complication associated with A-fib is stroke, which can lead to permanent brain damage (if the brain goes without oxygen for too long). A stroke can occur

if a blood clot forms in the left atrium and a piece of the clot (called an embolus) breaks off. The embolus enters the blood circulation and can block a small blood vessel. When this happens in the brain, it causes a stroke. An embolus can also travel to the eyes, kidneys, spine, or important arteries of the arms or legs.

The risk of stroke increases with age. Other factors that increase your risk include diabetes, high blood pressure, coronary artery disease (including prior heart attack), peripheral arterial disease (PAD), heart failure, and prior stroke or embolus. Taking an anticoagulant medication reduces your risk of stroke. Anticoagulants include [warfarin](#) (brand name: Jantoven) as well as the newer agents [dabigatran](#) (brand name: Pradaxa), [apixaban](#) (brand name: Eliquis), [edoxaban](#) (brand names: Savaysa, Lixiana), and [rivaroxaban](#) (brand name: Xarelto). The best medication will depend on your individual situation, history, and risk factors. Non-medication options for the prevention of stroke also exist. (See '[Treatment to prevent blood clots](#)' below.)

When the symptoms of a stroke resolve completely within 24 hours, it is called a transient ischemic attack (TIA). Having a TIA increases your risk of having an actual stroke in the future. (See "[Patient education: Stroke symptoms and diagnosis \(Beyond the Basics\)](#)" and "[Patient education: Transient ischemic attack \(Beyond the Basics\)](#)").

ATRIAL FIBRILLATION DIAGNOSIS

Atrial fibrillation (A-fib) is diagnosed with an electrocardiogram (ECG or EKG), which is a test to measure the heart's electrical activity. Sometimes, AF is diagnosed with a longer-term ECG recording, such as a Holter or event recorder (devices you can wear over a day or two that monitor heart activity). Wearable heart rhythm monitoring devices (such as smart watches and smartphone applications) can also diagnosis A-fib and in some cases help providers manage it. Other tests, such as an echocardiogram (ultrasound), may be performed to look for heart failure or heart valve problems. Blood tests may be used to screen for thyroid disorders. Occasionally, sleep studies and lung function tests are used to look for sleep apnea or underlying lung disease.

ATRIAL FIBRILLATION TREATMENT

There are multiple components to the management of atrial fibrillation (A-fib).

Electrical cardioversion — This involves the use of an electrical shock from a device called a defibrillator, delivered by paddles placed on the chest, to "reset" your heart rhythm. Urgent cardioversion is usually performed if A-fib is interfering with the heart's ability to supply

blood and oxygen to vital organs. (See "[Patient education: Cardioversion \(Beyond the Basics\)](#)".)

Rarely, people with newly diagnosed A-fib can undergo emergent electrical or medical cardioversion (in which an antiarrhythmic drug is used to reset or restore the normal heart rhythm) immediately. However, due to the risk of stroke from blood clots lodged in the left atrium, most people are advised to delay cardioversion until they have started treatment with an anticoagulant. Historically, this has been [warfarin](#), but the newer anticoagulants are now more commonly used in this setting. Anticoagulant medication is given for at least three to four weeks before cardioversion, which allows most preexisting blood clots in the left atrium to stabilize or resolve. After cardioversion, anticoagulation should continue for four weeks at the very least, but many people continue taking an anticoagulant for substantially longer.

Transesophageal echocardiogram — A procedure called a transesophageal echocardiogram (TEE) is an alternative to delaying cardioversion after starting an anticoagulant medication. It involves swallowing a thin tube, which your doctor can then use to view the heart with ultrasound. This allows the doctor to see the left atrium and look for evidence of blood clots. If there is no evidence of blood clots, cardioversion can be performed without three to four weeks of anticoagulant pretreatment.

Although the TEE can avoid the need for delaying cardioversion until three to four weeks after starting the anticoagulant, it is still important to be taking an anticoagulant at the time of the cardioversion. This can be [warfarin](#), one of the newer agents, or heparin blood thinners that are administered as an injection subcutaneously (under the skin) or intravenously (through a vein).

Although there is still a risk that cardioversion could result in a stroke even when a clot is not seen on the TEE, the risk is quite small. Following cardioversion, you will need to continue taking an anticoagulant for at least a month, assuming your heart rhythm continues to be normal.

Long-term treatment — For people with persistent A-fib, there are two long-term treatment options: rhythm control and rate control.

Rhythm control — Rhythm control involves trying to restore and maintain a normal heart rhythm (called a sinus rhythm). Approaches include cardioversion and antiarrhythmic drugs, as well as ablation, pacemaker implantation, and surgical procedures (see '[Nonpharmacologic treatments](#)' below). After successful conversion to normal sinus rhythm, only 20 to 30 percent of people are still in sinus rhythm after one year without antiarrhythmic drug therapy. This can be increased to 50 percent or more with the addition of an antiarrhythmic drug.

The advantages to rhythm control may include reduced symptoms and improved cardiac function. Some people who maintain a normal rhythm can stop taking an anticoagulant. However, rhythm control is more likely to reduce the frequency of A-fib (as opposed to eliminating it entirely). Thus, most people treated with antiarrhythmic medications continue to take an anticoagulant indefinitely in the absence of a bleeding risk or complication.

The disadvantages of rhythm control are the high rate of recurrent A-fib and side effects associated with antiarrhythmic drugs, including the development of new abnormal heart rhythms. Rarely, adverse effects of antiarrhythmic drugs can be life-threatening.

Rate control — Rate control involves trying to bring the heart rate down to a near normal level. If you are treated with rate control, you will continue to have A-fib. However, you will take a medication (a beta blocker, calcium channel blocker, or less commonly, [digoxin](#)) to slow the electrical conduction from the upper heart chambers (atria) to the lower chambers (ventricles). This keeps your heart rate in the normal range. Many people who use this treatment require treatment with an anticoagulant as well, since there is a risk of blood clot formation and possible stroke (see '[Treatment to prevent blood clots](#)' below). Ablation of the atrioventricular node and implantation of a pacemaker are non-drug forms of rate control. (See '[Catheter ablation](#)' below and '[Pacemaker](#)' below.)

The major disadvantage of the rate control strategy is that it is sometimes difficult to adequately control the rate and relieve symptoms.

Choosing an approach — Either a rate control or a rhythm control strategy, along with anticoagulation to prevent blood clots, may be appropriate for the long-term treatment of A-fib. For people with A-fib that has started in the past year and who are also at higher risk for complications of cardiovascular disease (based on their age, sex, and medical history), rhythm control is often the preferred approach.

Your doctor can talk to you about the risks and benefits of each type of treatment. Sometimes goals change during the course of treatment.

Nonpharmacologic treatments — There are other ways to manage patients with A-fib besides medication, including catheter ablation, use of a pacemaker, and several surgical procedures.

Catheter ablation — Catheter ablation is a procedure that can sometimes cure A-fib. It involves using heat ("radiofrequency ablation") or cold ("cryoablation") to destroy the heart tissue that is sending abnormal electrical signals.

Increasingly, this therapy is being considered an initial option in young people who have symptoms of A-fib who do not wish to take long-term medications. It is also being used increasingly in patients who are having recurrent A-fib, despite using one or more

antiarrhythmic drug. (See "[Patient education: Catheter ablation for abnormal heartbeats \(Beyond the Basics\)](#)".)

Pacemaker — Pacemakers are electronic devices that stimulate the heart with electrical impulses to prevent the heart beat from being too slow. A pacemaker does not prevent episodes of A-fib. Some people with A-fib have periods of slow heart rates when they convert from A-fib to a normal rhythm (called "tachycardia-bradycardia syndrome"). In some cases, a pacemaker is needed. Ablation can be used in conjunction with pacemaker implantation in people with A-fib that does not respond to other treatments. (See "[Patient education: Pacemakers \(Beyond the Basics\)](#)".)

Surgical procedures — Surgical procedures, including the complete "maze procedure" and the less invasive alternative surgeries, may be considered in some people with A-fib, especially those who must undergo open-heart surgery for other reasons. Sometimes surgical techniques are used in combination with catheter ablation in an attempt to cure A-fib (this is sometimes called a "hybrid" or "convergent" procedure). Standalone surgical treatment for A-fib, without concurrent heart surgery or catheter ablation, is not commonly performed.

TREATMENT TO PREVENT BLOOD CLOTS

Atrial fibrillation (A-fib) increases your risk of blood clots forming in the heart, which can lead to stroke (see '[Risk of stroke](#)' above). Because of this, you will likely need treatment to reduce the risk of developing blood clots.

Anticoagulant drugs — Anticoagulants ("blood thinners") are the most effective treatment for preventing blood clots in people at high risk of stroke. Taking an anticoagulant medication can reduce the risk of having a stroke by approximately 50 to 70 percent.

[Warfarin](#) is an anticoagulant that has been used for many years, but a major problem with it is that it increases the risk of bleeding. The most serious type of bleeding is bleeding into the brain. However, the benefit of preventing strokes is greater than the small risk of bleeding into the brain in most cases. If you take warfarin, you will need careful monitoring with periodic blood tests (sometimes as often as weekly, particularly when you first start taking it) to be sure you are taking the right dose of warfarin. (See "[Patient education: Warfarin \(Beyond the Basics\)](#)".)

[Dabigatran](#) (brand name: Pradaxa), [apixaban](#) (brand name: Eliquis), [edoxaban](#) (brand names: Savaysa, Lixiana), and [rivaroxaban](#) (brand name: Xarelto) are newer anticoagulants that work as well as [warfarin](#), but do not require regular blood tests. Your doctor can talk to you about whether one of these newer agents is appropriate for you.

Mechanical devices — Some people cannot take anticoagulants to prevent stroke because their risk of bleeding while taking these medications is very high. In some cases, a small mechanical device can be placed in the left upper chamber of the heart to prevent clots from leaving the heart.

WHERE TO GET MORE INFORMATION

Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

[Patient education: Atrial fibrillation \(The Basics\)](#)

[Patient education: Implantable cardioverter-defibrillators \(The Basics\)](#)

[Patient education: Pacemakers \(The Basics\)](#)

[Patient education: Catheter ablation for the heart \(The Basics\)](#)

[Patient education: Wolff-Parkinson-White syndrome \(The Basics\)](#)

[Patient education: ECG and stress test \(The Basics\)](#)

[Patient education: Heart failure and atrial fibrillation \(The Basics\)](#)

[Patient education: Tachycardia \(The Basics\)](#)

[Patient education: Atrial flutter \(The Basics\)](#)

[Patient education: Mitral stenosis in adults \(The Basics\)](#)

[Patient education: Supraventricular tachycardia \(SVT\) \(The Basics\)](#)

[Patient education: Medicines for atrial fibrillation \(The Basics\)](#)

[Patient education: Warfarin and your diet \(The Basics\)](#)

[Patient education: Ambulatory heart monitoring \(The Basics\)](#)

[Patient education: Cardioversion \(The Basics\)](#)

[Patient education: Overview of heart arrhythmias \(The Basics\)](#)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

Patient education: Mitral regurgitation (Beyond the Basics)

Patient education: Hyperthyroidism (overactive thyroid) (Beyond the Basics)

Patient education: Sleep apnea in adults (Beyond the Basics)

Patient education: Stroke symptoms and diagnosis (Beyond the Basics)

Patient education: Cardioversion (Beyond the Basics)

Patient education: Pacemakers (Beyond the Basics)

Patient education: Implantable cardioverter-defibrillators (Beyond the Basics)

Patient education: Catheter ablation for abnormal heartbeats (Beyond the Basics)

Patient education: Warfarin (Beyond the Basics)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

[Antiarrhythmic drugs to maintain sinus rhythm in patients with atrial fibrillation:](#)

[Recommendations](#)

[Prevention of embolization prior to and after restoration of sinus rhythm in atrial fibrillation](#)

[Atrial fibrillation in adults: Use of oral anticoagulants](#)

[Atrial fibrillation: Atrioventricular node ablation](#)

[Control of ventricular rate in patients with atrial fibrillation who do not have heart failure:](#)

[Pharmacologic therapy](#)

[Epidemiology, risk factors, and prevention of atrial fibrillation](#)

[Atrial fibrillation: Overview and management of new-onset atrial fibrillation](#)

[Paroxysmal atrial fibrillation](#)

[Atrial fibrillation: Catheter ablation](#)

[Atrial fibrillation: Cardioversion](#)

[Management of atrial fibrillation: Rhythm control versus rate control](#)

[Role of echocardiography in atrial fibrillation](#)

[Atrial fibrillation: Surgical ablation](#)

The following organizations also provide reliable health information.

- National Library of Medicine

(www.nlm.nih.gov/medlineplus/healthtopics.html)

- National Heart, Lung, and Blood Institute

(www.nhlbi.nih.gov/)

- American Heart Association

(www.americanheart.org)

- Heart Rhythm Society

(www.hrsonline.org)

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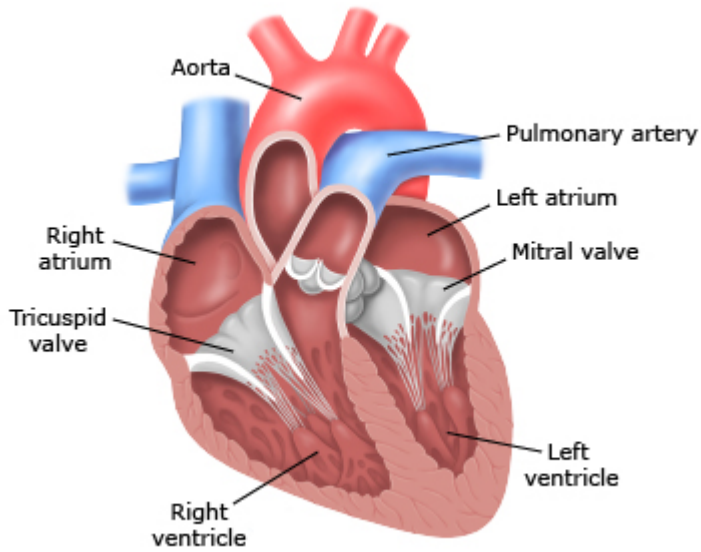
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GRAPHICS

Normal heart



This is a drawing of a normal heart. The heart has 4 chambers: right atrium, left atrium, right ventricle, and left ventricle. Blood flows from the right atrium to the right ventricle through the tricuspid valve. Blood flows from the left atrium to the left ventricle through the mitral valve.

Graphic 56936 Version 4.0

