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Stroke Prevention in Atrial Fibrillation

Christian T. Ruff, MD, MPH



Atrial fibrillation (also called AF or A Fib) is the most common abnormal heart rhythm or arrhythmia. The heart's job is to pump blood to the rest of the body. During each heartbeat, the 2 upper chambers of the heart (atria) contract, followed by the 2 lower chambers (ventricles). The heart has its own electric circuit that coordinates activity among the different chambers of the heart so that they all pump efficiently together at the same time. The normal heartbeat begins in a specialized area of the heart called the sinoatrial node, which is located in the top right chamber. The electric signal then travels to the lower chambers of the heart, which pump the blood to the lungs and the body. Because this signal is sent at regular intervals, we normally have a regular heartbeat. In AF, instead of a single regular signal, there are multiple electric signals. Although not all of these extra signals are able to activate the electric system of the heart, some of them do. This usually leads to an irregular and fast heartbeat.

What Causes Atrial Fibrillation?

Several factors and medical conditions make it more likely to develop AF. AF

is more common in older people and in those individuals with conditions that can damage the heart's electric system. Damage can be caused by any of the following:

- High blood pressure
- Heart attacks
- Abnormal heart valves
- Heart defects you are born with (congenital)
- Overactive thyroid or other metabolic imbalance
- Stimulants: medications, caffeine, tobacco, or alcohol
- Previous heart or lung surgery
- Lung disease
- Stress caused by pneumonia, surgery, or other illnesses
- Sleep apnea
- Obesity

What Are the Symptoms of Atrial Fibrillation?

Some patients do not experience any symptoms (the Table) when they are in AF, but many patients feel like their heart is pounding or have chest discomfort. Sometimes people feel dizzy and lightheaded or get short of breath and tire more easily. Most symptoms of AF are related to how fast the heart

Table. Symptoms of Atrial Fibrillation

Palpitations (feeling that your heart is skipping a beat or fluttering)
Shortness of breath
Fatigue
Chest pain
Dizziness

is beating and often improve when the heart rate is slowed.

How Is Atrial Fibrillation Diagnosed?

AF is diagnosed on the basis of a medical history, a physical examination, and the results from tests and procedures (Figure 1):

- The most common test is an electrocardiogram (ECG or EKG), which is a recording of the electric activity of the heart. This is a simple procedure in which electrodes are placed on the skin at specific locations on the body (chest, arms, and legs) that allow an electric tracing of the heart's activity to be recorded. On a normal ECG, the electric activity of the heart appears as regular peaks and valleys. On an ECG of a person

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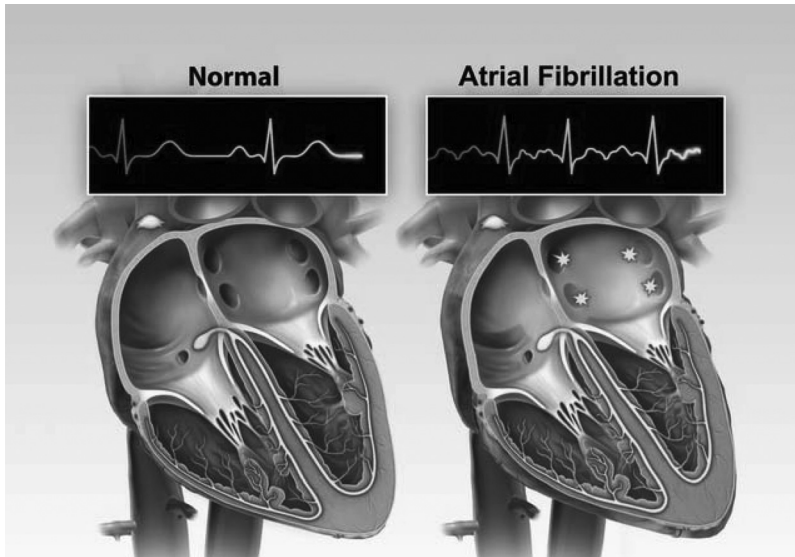


Figure 1. Diagnosis of atrial fibrillation. Illustration by Medmovie (<http://www.medmovie.com/>).

with AF, the peaks and valleys are not regular and usually are closer together because the heart rate is too fast. Occasionally, other types of

portable ECG devices are used (called Holter or event monitors) that allow doctors to monitor your heartbeat for longer periods of time.

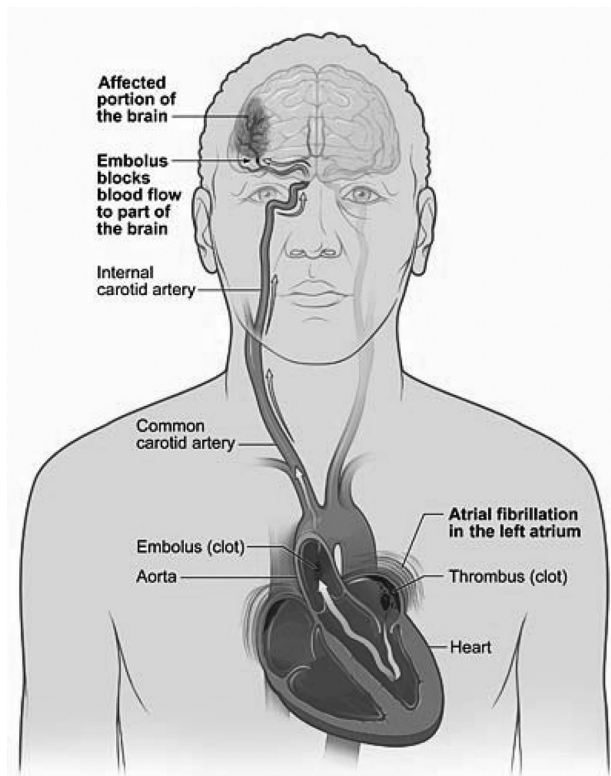


Figure 2. Atrial fibrillation and the risk of stroke. Source: National Heart, Lung, and Blood Institute, National Institutes of Health, US Department of Health and Human Services (<http://www.nhlbi.nih.gov/health/health-topics/topics/af/signs.html>).

- Blood tests are performed to check the level of the thyroid hormone in your body and the balance of your body's electrolytes such as potassium and magnesium, which are important in maintaining a normal heart rhythm.
- An echocardiography, or echo, is a common test that uses sound waves to create a picture of your heart that allows doctors to see how effectively the heart is pumping and to make sure there are no structural abnormalities of the heart.

Complications

In AF, the upper chambers of the heart do not pump all of the blood into the lower chambers. When this happens, a blood clot can form. If the clot breaks off, it can leave the heart and block an artery in the brain, causing a stroke (Figure 2). People with AF are at a much higher risk of stroke. The risk can vary, depending on the age of the patient and the presence of other medical conditions such as hypertension, diabetes mellitus, heart failure, and whether the patient has already suffered a prior stroke. Most patients with AF, except those who are very young and have no other medical problems, require treatment to prevent strokes.

Possible Treatments

Preventing blood clots from forming is the most important part of the treatment of AF. Doctors prescribe blood-thinning medications to reduce the risk of stroke. Several options are available:

- The most effective medications are called anticoagulants and include warfarin, dabigatran, and rivaroxaban. Patients taking any of these medications require close supervision by their doctor and may require blood tests to check how well the medications are working and to make sure that they are not bleeding. For patients with a lower risk of stroke or those at a high risk of bleeding, aspirin can be used instead to prevent strokes, although it is not as effective as an anticoagulant. It is



important to talk to your doctor about which blood thinner is right for you.

Other treatment goals are to slow the heart rate to improve the heart's ability to pump effectively and potentially to return you to a normal heart rhythm.

- If the heart rate is allowed to be too fast for a long period of time, it can cause heart failure, which makes patients feel really tired and short of breath. β -blockers and calcium channel blockers are types of medications that can slow the heart rate.
- Sometimes your doctor may try to get you back into a normal heart rhythm. This is called cardioversion. It can be accomplished by several methods. Electric cardioversion is a procedure in which an electric charge is given to the heart through the chest while a patient is sedated. Special drugs called antiarrhythmics may also be given to restore a normal rhythm. Other procedures involving surgery or use of a catheter

are available for individuals with severe symptoms. A catheter ablation is performed by inserting a wire through a vein until it reaches the heart. Radio-wave energy is sent through the wire to destroy abnormal heart tissue that causes AF. A surgical operation called a Maze procedure may also be done in which precise surgical incisions are made to prevent the abnormal impulses from affecting the heart.

Although slowing the heart rate and restoring a normal rhythm can make patients feel better, patients usually still are a high risk of stroke and most need a blood thinner for the rest of their lives.

Prevention

Following a healthy lifestyle and taking steps to lower the risk of heart disease may help prevent AF. These steps include the following:

- Being physically active
- Not smoking
- Maintaining a healthy weight

- Limiting alcohol excess
- Treating high blood pressure, high cholesterol, and diabetes mellitus if you have these conditions

Prognosis

If patients with AF see their doctors regularly, take their medications as prescribed, and live a healthy lifestyle, they can live normal and active lives.

Further Information

For additional information, please consult one of the following resources:

- American Heart Association (www.americanheart.org)
- National Heart, Lung, and Blood Institute (www.nhlbi.nih.gov/health/health-topics/topics/af/)
- To learn about clinical trials, see www.clinicaltrials.gov.

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