University of California, Berkeley School of Public Health

Special HEALTH GUIDE

Guide to Understanding Atrial Fibrillation

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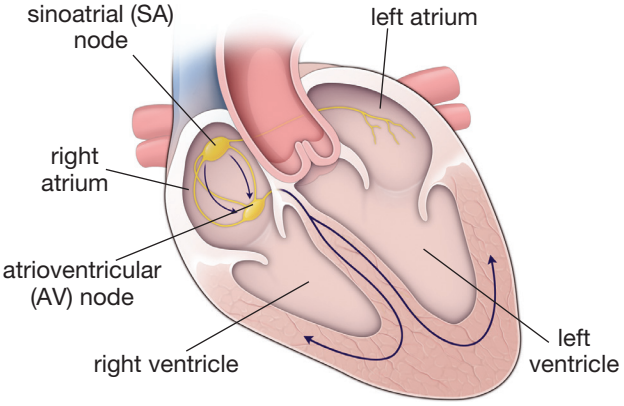
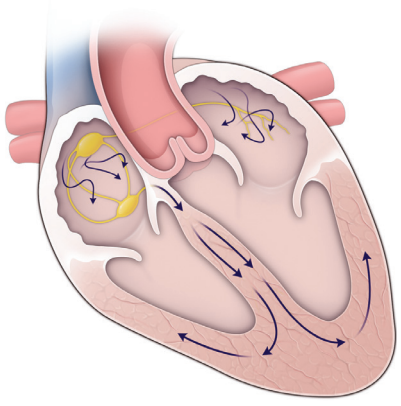
Atrial Fibrillation: An Introduction

Under normal circumstances, the heart beats close to 100,000 times a day. That's about 70 beats per minute, every minute, every hour, every day, every year. However, for some people, the rhythmic lub-dub, lub-dub, lub-dub of the heart is not as precise as a Rolex. With atrial fibrillation (AF), the heart's electrical system goes haywire, leading to less efficient blood circulation and an irregular and chaotic pulse. That's because the heart's atria (upper chambers) quiver rather than contract forcefully, which then leads to an irregular—and often rapid—beating of the lower heart chambers, called



Normal Heart Rhythm—An electrical signal originates in the sinus node, travels through the atria and the atrioventricular (AV) node, and continues into the ventricles. (Arrows denote pathway of electrical signal.)



Atrial Fibrillation—The electrical activity of the atria becomes chaotic and uncoordinated, so that the atria quiver and the blood is pumped less effectively into the ventricles.

the ventricles.

How AF Affects the Heart

The sinoatrial (SA) node (also referred to as the sinus node), which is located in the upper right atrium, acts as a natural pacemaker that governs the heart's rate and rhythm. Special muscle fibers in the heart then conduct these electrical messages through the chambers. When a normally functioning SA node controls heart rhythm, it's called "normal sinus rhythm."

However, the specialized cells of the SA node are not the only ones capable of controlling electrical stimulation; the millions of heart muscle cells all have the ability to create their own electrical signals, disrupting the normal sinus rhythm in the process.

If these cells misfire, the heart may race from a normal resting rate of 60 to 90 beats per minute (bpm) up to 200 bpm, then usually slow down after a few moments. This irregularity may occur hundreds of times a day, or only in several short episodes a year.

These misfirings can result in what are called premature or ectopic beats—that is, coming from a source other than the SA node. If there is a so-called "run" of premature beats in the atria, the heart rhythm can go into what's called atrial fibrillation. This fibrillation—the multiple or rapid firing of electrical signals from different areas of the atria rather than the SA node—alters the movement of blood through the atria. In cases where a person's heartbeat is extremely fast—as high as 190 beats per minute after getting out of bed or rising from a chair—symptoms such as shortness of breath, dizziness, weakness, palpitation, or chest pain may occur, and can range from mild to severe. Some people complain that it feels as if "my heart is going to jump out of my chest."

Who Gets AF?

AF is remarkably common. It is found in approximately 1% of the general population, and it's the most common cardiac arrhythmia seen by doctors today. Men and women over age 40 have a 1 in 4 lifetime risk of developing AF. The ailment becomes more likely with age. AF is rare prior to the age of 50 years, but by the age of 80, 10% of individuals will have AF. In the U.S., hypertensive heart disease and coronary heart disease (CHD) are the most common underlying disorders in patients with AF in developed countries.

AF and Stroke

AF itself is not usually life threatening. However, the presence of AF increases the risk of blood clots (embolisms) forming in the heart, and if a clot travels to the brain, a stroke will result. The stroke risk in patients with AF is up to seven times that of the general public—and the incidence of stroke attributable to AF increases with age, dramatically so after age 80. Upwards of 24% of all ischemic strokes (the most common cause of strokes, caused by a blood clot blocking a narrowed artery or a clot that travels to the brain from somewhere else in the body) are due to AF.

Diagnosis of Atrial Fibrillation

Symptoms of atrial fibrillation (AF) can vary from person to person. Some people with AF are fatigued by the ailment and it puts a crimp on everyday activities; others find themselves short of breath after a little physical exertion. Some people may also find that they have an inability to concentrate. Not everyone who develops AF will experience symptoms, and for those who do, symptoms can range from mild to severe. Symptoms of AF can include the following:

- Fatigue
- Palpitations (irregular, rapid, or a pounding sensation in the neck or chest)
- Shortness of breath
- Lightheadedness
- Dizziness
- Chest pain/discomfort
- Syncope (transient loss of consciousness, or fainting)

Many people with AF have no symptoms—and in such people, AF may be detected as an incidental finding during a physical examination or test that has been ordered for some other reason. Palpitations are a common symptom of AF, and if you experience palpitations—or any of the other symptoms associated with AF—you should make an appointment with your family doctor. If AF is present on your electrocardiogram or if your history suggests atrial fibrillation, your doctor may then refer you to a cardiologist or electrophysiologist (a cardiologist who specializes in the heart's electrical system) for further testing or treatment.

The cardiologist will utilize a patient's medical history plus the results of various procedures to diagnose heart rhythm abnormalities. When an electrical disorder is diagnosed, the electrophysiologist works with your doctor to determine the risk it poses and makes recommendations about possible treatment options.

Sample Tests

Whenever an abnormal heart rhythm is suspected, your doctor may recommend one or more tests to diagnose the arrhythmia and determine if it is causing your symptoms. These tests may include:

Electrocardiogram (ECG). An electrocardiogram (ECG) is a simple test that traces the electrical activity of your heart. The ECG produces a printout that doctors can examine to

diagnose arrhythmias or other types of heart disease. When you have AF, the atria produce a signature set of wiggles in the tracing, and the ventricular rate is typically irregular.

Holter Monitoring. Holter monitoring is a continuous ECG recording—usually for 24 to 48 hours—while you go about your normal daily activities. It is useful to detect arrhythmias that may not occur during a resting ECG.

Exercise Stress Test. Some arrhythmias only occur while a patient is exercising. Because of this, your doctor may recommend an exercise stress test. During this test, you briskly walk or jog on a treadmill while hooked up to an ECG machine. This allows your arrhythmia specialist to determine if you are experiencing any arrhythmias while exercising and also determine if you have evidence of a blocked heart artery.

Electrophysiology Study (EP). In an EP study, a cardiologist inserts several intravenous (IV) lines into large veins. The cardiologist then passes several electrical catheters through the IVs and guides them into the heart using X-ray imaging. This allows the cardiologist to examine the electrical activity inside your heart to determine if and why the rhythm is abnormal. Once that is known, your physician can prescribe the most effective treatment.

Echocardiogram and Transesophageal Echocardiogram. An echocardiogram is a noninvasive, painless test that allows cardiologists to see if your heart is functioning normally or if it is enlarged or weakened or has a damaged valve. Ultrasound waves are directed through the chest to the heart. The echoes of the sound waves are processed and used to produce images of the heart. Additionally, a transesophageal echocardiogram (TEE) may be performed by having you swallow the ultrasound probe (following numbing medication to the throat and appropriate sedation). The TEE provides close-up images of the heart from the esophagus. This technique is an excellent way to search for blood clots in the atria.

Treatment of Atrial Fibrillation

Unlike some arrhythmias, AF is generally not a life-threatening problem. Often the reason to do something about AF, if something is done at all, is because of the bothersome symptoms that may adversely affect your quality of life. The various approaches taken to treat AF or prevent a recurrence of the ailment make use of some of the following:

Medications

Drug therapy is typically the first line of treatment for AF. Drugs can be used as a monotherapy or in combination as a way to control heart rate during AF, as a way to restore heart rhythm, or simply to reduce AF symptoms.

- A variety of antiarrhythmic drugs can be used to get the heart back to normal sinus rhythm.
- The rapid ventricular rate can be controlled with various medications, including beta-blockers, digoxin, and calcium channel blockers.
- Anticoagulants that include warfarin (Coumadin) and newer blood thinning drugs such as dabigatran (Pradaxa), rivaroxaban (Xarelto), and apixaban (Eliquis) are used for the prevention of ischemic stroke for patients who are at risk.

Electrical Cardioversion

Electrical cardioversion uses a powerful but brief electric shock delivered to the heart through paddles placed on the chest. This helps to restore normal heart rhythm when medication does not improve symptoms.

Catheter Ablation

Areas of the heart muscle that trigger abnormal rhythm are eliminated through an innovative minimally-invasive medical procedure called pulmonary vein antrum isolation (PVAI), which delivers concentrated radiofrequency energy waves that heat and destroy a ring of tissue surrounding each pulmonary vein. By achieving electrical isolation of the pulmonary vein, AF is prevented.

The same effect can also be accomplished by positioning a balloon in each pulmonary vein opening. Cryothermal energy (freezing) is then applied to the tissue through the balloon to electrically isolate the pulmonary vein, preventing AF.

Surgical Ablation

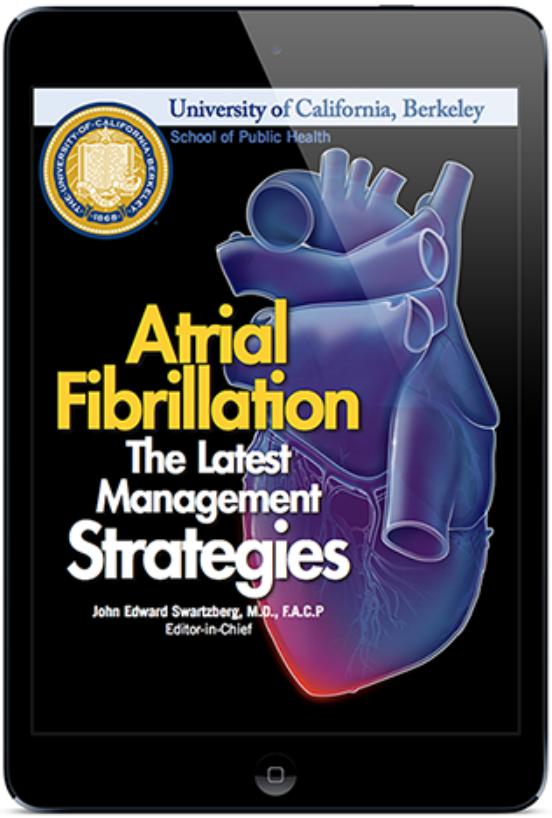
Appropriate candidates for surgical ablation of AF are patients undergoing other cardiac surgical procedures who have bothersome AF symptoms and asymptomatic patients who are undergoing cardiac surgery (and their ablation can be performed with minimal risk). The procedure can also be considered for AF patients who have failed one or more catheter ablation attempts, and also for patients who are not candidates for catheter ablation or prefer a surgical approach.

You've Just Taken a Crucial First Step

It's critically important to learn everything you can now—so you can partner with your doctor effectively, ask the right questions and understand the answers.

That's why the University of California, Berkeley School of Public Health has engaged a team of top atrial fibrillation experts, Dr. Hugh Calkins, Dr. Ronald Berger, Dr. Gregory Marcus and Dr. Pate D Thomson, to bring you ***Atrial Fibrillation: The Latest Management Strategies.*** This authoritative Special Health Report contains vital information you won't find in any other single source.

Learn How to Get Your Copy!



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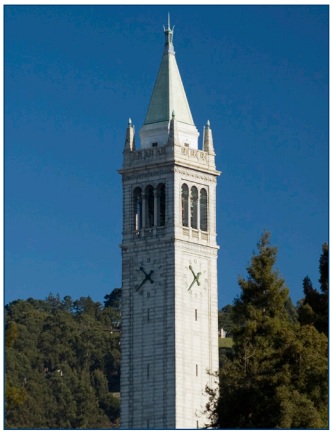

Steve McConnell / UC Berkeley

University of California, Berkeley, and the School of Public Health

One of the most respected educational institutions in the world, the University of California, Berkeley, has built an extraordinary record of achievement since 1868. Its faculty has produced 22 Nobel laureates, 5 Pulitzer Prize winners, 135 appointees to the National Academy of Sciences, and 30 winners of the National Medal of Science.

For more than 70 years, the School of Public Health at UC Berkeley has helped promote and protect the health of Americans. It is one of the nation's leading research and teaching institutions in this field. Its internationally renowned faculty includes physicians, educators, psychologists, nutrition experts, epidemiologists, and public health professionals. Among its areas of research: the control of cancer, the relationship between diet and disease prevention, occupational health, the link between social support and good health, and environmental health.

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