

CATHETER ABLATION

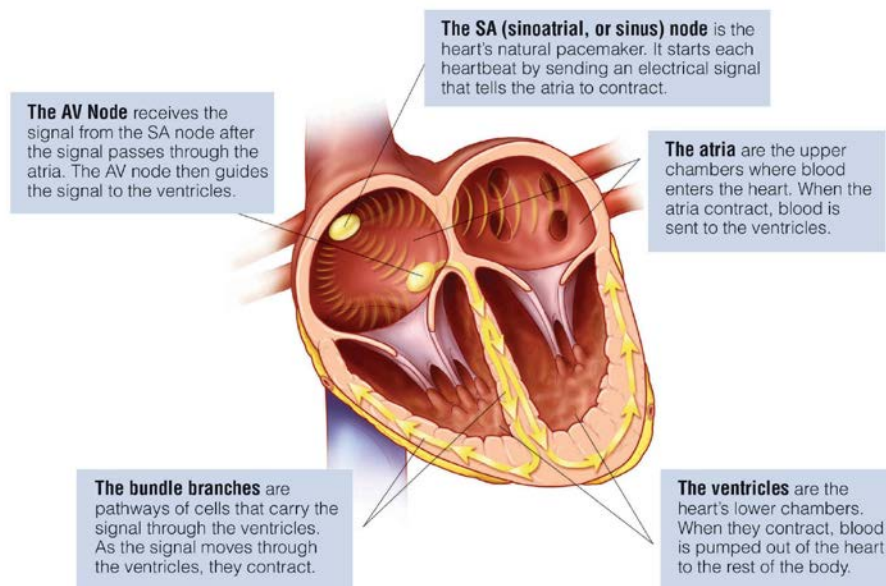
OVERVIEW

Catheter ablation is a procedure that is performed to correct a disturbance in heart rhythm. It is usually called “radiofrequency catheter ablation,” but sometimes “cryothermal ablation” is performed. A brief review of how a normal heart rhythm occurs and a description of some of the rhythm problems that are treated with this procedure will help in the understanding of catheter ablation.

HOW DOES THE NORMAL HEART WORK?

The heart is a pump, and is part of a system which circulates blood around the body to supply oxygen and nutrients to the body tissues. It has 4 key components:

1. A pumping mechanism, which in the case of the heart is a muscle which contracts around a cavity into which blood flows. When the muscle contracts, the cavity is obliterated and the blood is sent elsewhere.
2. valves which are embedded in the muscle and channel the blood in one direction.
3. arteries, which supply the muscle with its own oxygen and nutrients.
4. an electrical system. Like most pumps, electricity makes the heart go, including at what rate. The brain determines what the body needs, and sends signals to the heart’s electrical system via nerves, and the electrical system carries out the task. The figure below shows the setup of the heart’s electrical system.



A normal heartbeat begins with an electrical impulse in the sinoatrial (SA) node, a small bundle of tissue located in the right atrium. The impulse sends out an electrical pulse that causes both atria to contract (squeeze) and move blood into the ventricles. The electrical current then passes through a small bundle of tissue called the atrioventricular (AV) node (the electrical bridge between the upper and lower chambers of the heart), which makes the ventricles squeeze (contract) and release in a steady rhythm. As the chambers relax

and contract, they draw blood into the heart and push it back out to the rest of the body. This is what causes the pulse we feel on our wrist or neck.

Sometimes, the electrical impulses "short circuit" the normal pathway and travel across the heart in an abnormal way. Abnormal pathways, or routes, for the impulses can develop, causing abnormalities in the heartbeat, or arrhythmias. In other cases, arrhythmias arise when areas other than the sinus node become active and begin to send out impulses that either compete with or take over the pacemaker function of the sinus node. Typically, the result of these abnormalities is a heartbeat that is too fast. This may develop in any location within the atria, AV node, or ventricles. When the fast rhythm requires tissue from the upper part of the heart, it is known as supraventricular tachycardia. When it requires tissue from the lower chambers only, it is known as ventricular tachycardia.

WHAT IS CATHETER ABLATION?

Catheter ablation is a procedure that is intended to cure short circuits. Via special coated wires that are moved to the heart, usually from the blood vessels in the groin, radiofrequency energy (low-voltage, high-frequency electricity) targeted toward the area(s) causing the abnormal heart rhythm, permanently damaging small areas of tissue with heat. In some cases, cryoablation, which damages tissue by freezing rather than heating, may be used rather than radiofrequency energy. The damaged tissue is no longer capable of generating or conducting electrical impulses.

WHICH RHYTHM PROBLEMS CAN BE TREATED?

Catheter ablation can be used to treat many arrhythmias that cause a fast heartbeat. Catheter ablation may be recommended for:

- Supraventricular tachycardia
- Atrial flutter
- Inappropriate sinus tachycardia
- Ventricular tachycardia and premature ventricular contractions
- Atrial fibrillation

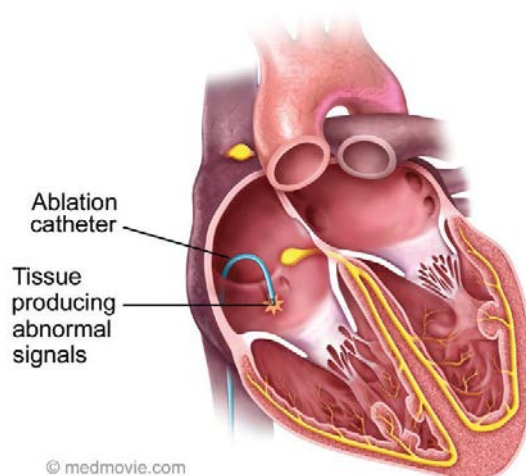
THE CATHETER ABLATION PROCEDURE

Preparation

Patients may be asked to discontinue certain medications in the days before the procedure. Patients are instructed to stop eating and drinking at midnight the night before the procedure. A pregnancy test is usually done immediately before the procedure in women of child bearing capacity because of the small but significant radiation exposure incurred during the procedure.

Procedure

Before the procedure begins, you will be put to sleep by an anesthesiologist. Small coated wires (also called catheters) will be moved to the heart. The wires are inserted into the vein or artery in the right and left groin (inner thigh) and are then positioned within the chambers of the heart using fluoroscopy (low energy x-rays). Occasionally, catheters are inserted via veins into the side of the neck, upper chest, or arm. The doctor will test various parts of the heart and usually will try to provoke the arrhythmia. The sections of the heart that are causing your arrhythmia can be identified. The doctor will then use the radiofrequency energy (heat or electrocautery) or cryoablation (freezing) to treat the problem area (cartoon).



The length of the procedure varies from patient to patient, depending upon the type of arrhythmia being treated and other factors, but typically lasts at least 2 hours. You will have no pain or recollection of the procedure.

Post-ablation care

You will be taken to a recovery area while the effects of the sedative medication wear off. The catheter site will be monitored for bleeding and the heart rhythm is observed closely during this period. You must stay in bed for several hours to reduce the risk of bleeding from the catheter site. You usually feel tired but well. Pain medication is usually needed for only a short time, if at all.

Some patients are admitted to the hospital after the procedure while others go home later the same day. Certain activities are not recommended for a brief period to avoid straining the catheter site.

You may be asked to take aspirin every day for several weeks after the procedure to prevent blood clots. After some ablations, a more powerful blood thinning medication is required (anticoagulant). The doctor will give more detailed information about medications needed after the procedure.

Risks of the Catheter Ablation Procedure

- Problems related to moving the catheters through the blood vessels such as bleeding, infection, blood clots, bruising, and injury to the vessel(s).
- Injury to the heart as a result of the catheters; this includes a heart attack, perforation through the muscle, or damage to one of the valves within the heart.
- Blood clots that travel to the lungs (pulmonary embolism) or brain (stroke).
- Heart block or failure of any electrical impulse to travel from the top parts of the heart to the bottom. This complication, if permanent, requires implantation of a pacemaker.
- New arrhythmias.
- Exposure to radiation during the procedure, which can take several hours. This can produce a very small increase in the risk of cancer or genetic defects.
- Death (occurs in approximately 0.1 percent of cases).