

Cardiac Catheterization

Basic Facts

Cardiac catheterization involves the insertion of a catheter, a thin, flexible tube, into an artery in the leg or arm, which a physician then advances to the arteries in the heart.

During angiography, physicians inject dye through the catheter that allows them to create x ray images of the heart's blood vessels.

Both diagnostic and therapeutic catheterization, such as angioplasty and stenting, may occur during the same procedure.

As people age, the normal flow of blood through the arteries can be affected by the buildup of plaque inside the arteries. Over time, plaque continues to grow on arterial walls as cholesterol circulates in the blood; as the plaques enlarge, the arteries become narrow and stiffened. This process is called atherosclerosis, commonly known as "hardening of the arteries," because the plaque buildup thickens the walls of the arteries and narrows the space through which the blood flows, reducing the circulation of blood through the area of the body that gets its blood from the artery.

To find out the extent of blockage in the coronary arteries, doctors use a test called cardiac catheterization.

Cardiac catheterization involves the insertion of a thin tube called a catheter into an artery. The catheter is threaded through the arterial system to the arteries in the heart, where physicians use it to collect information about the heart's blood supply or to assess or treat other cardiac problems.

The most common test that is performed in conjunction with cardiac catheterization is angiography, also called arteriography. During angiography, a contrast dye used to produce images of the heart's blood vessels is pumped through the catheter and into the coronary arteries. A physician traces the flow of this dye with an x ray machine to get a 'road map' of the heart's blood vessels. The pictures that result, called angiograms or arteriograms, help doctors pinpoint the location and extent of problems with the heart's blood supply and decide on treatment.

PRE-TEST GUIDELINES

Prior to the procedure, the patient should:

- Avoid eating or drinking anything for eight to 12 hours before the test;
- Inform their physician of medications to control diabetes, hypertension, high cholesterol or angina;
- Increase fluid intake a few days before the procedure; and
- Notify their physician of any iodine allergies.



People who are allergic to iodine or shellfish, or people with diabetes or kidney problems, may have an increased risk of an allergic reaction to the iodine in the contrast dye and should notify the physician of their allergy before the test. The physician can administer allergy medications before the test to prevent any symptoms.

WHAT TO EXPECT

Other than a sedative, people having a cardiac catheterization done might not receive any other drugs because some anesthetics can alter how the heart functions. Catheterized patients also need to remain alert so they can describe sensations to the physician performing the test and report any chest pain. The test is otherwise generally painless.

Cardiac catheterizations are typically performed with the person being tested lying flat on a table with an x ray machine above or on the side of the table. The site on the leg or arm where the catheters will be inserted is cleaned and any hair around the insertion point is shaved. This helps minimize the risk of infection. The insertion point is numbed with a local anesthetic, and doctors make a tiny incision in the skin to access the artery.

Once the incision has been made, a guide wire is inserted into the artery. A catheter sheath, a short, hollow tube, is then guided over the wire. When the catheters are inserted, most people feel only a slight pressure or a sensation of mild tugging, but because there are no nerve endings inside the arteries, people being catheterized cannot feel the catheters as they move through the body. Using the fluoroscopy screens, the doctors then guide the catheters through the arterial system to the area of the heart that is being studied.

After taking pressure measurements inside the heart using a catheter-based pressure-recording system, the physician will position the catheter in the aorta at the beginning of the arteries that supply blood to the heart. A contrast dye is injected through the catheter and will flow into the coronary arteries. Many people who have undergone an angiography report feeling sensitive to their heartbeats and a warm, flushing sensation when the dye is injected, a normal reaction that lasts for 20 to 30 seconds. The physician may ask the person to cough to help move the dye through the heart's arteries. The dye blocks x rays, flows through the heart's arterial system, and the physician traces its flow with an x ray machine to get pictures of the heart's blood vessels. More than one injection of dye may be used during an angiography.

When the procedure is completed, the catheter is removed through the sheath at the insertion site. Typically, the sheath stays in the artery for a short time and is covered with a small dressing. The sheath may be left in as a precaution in case any problems such as bleeding, pain, or decreased circulation in the leg or foot result from the catheterization. In the event a complication arises, the physician will have quick access through the sheath to investigate or treat the problem.

When the sheath is removed, pressure is applied on the insertion site for 15 to 30 minutes to allow the puncture area to close and prevent bleeding. When the femoral artery in the groin is used as the access point, the patient may have to rest in bed with the leg held straight for one to four hours. Other



techniques that may be used to close the puncture site include a cork-like device inserted into the wound to seal the area or a stitching device with sutures that close the incision and eventually dissolve.

Cardiac catheterization usually takes between 45 minutes and three hours to complete.

POSSIBLE COMPLICATIONS

Complications arising from cardiac catheterization are very rare, and include:

- Allergic reaction to the dye;
- A feeling of light nausea that may be accompanied by perspiration when the contrast dye is injected;
- A small pea- or acorn-sized bruise, knot, or lump at the insertion point;
- Bleeding; and/or
- Swelling, pain, numbness, redness, or drainage at the insertion site.

People who experience any of these symptoms should call their physician as soon as possible.

Less common complications include:

- Infection at the insertion site;
- Damage to the artery and surrounding veins near the insertion point;
- Perforation of blood vessels or of the heart muscle;
- Arrhythmia;
- Kidney damage or kidney failure;
- Stroke caused by dislodged plaque;
- Heart attack; and/or
- Death.

POST-TEST GUIDELINES

Most people can resume normal activities within a few days to a week after their catheterization if no complications result from the procedure. Some guidelines to follow after a cardiac catheterization include:

- Avoid heavy lifting more than five or 10 pounds for the first few days;
- Drink plenty of water and other clear liquids for two days; and
- Avoid tub baths for a few days (showers are usually permitted within 24 hours).