



## What to Expect During Cardiac Catheterization

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Cardiac catheterization is a test during which flexible tubes called catheters are inserted into the heart via an artery or vein under x-ray guidance to diagnose and sometimes treat certain heart conditions. During right heart catheterization, a vein from the neck, arm, or leg is used to enter the right side of the heart to measure pressures and oxygen content. During left heart catheterization, an artery from the wrist, arm, or leg is used to enter the left side of the heart, usually to perform coronary angiography, which refers to the injection of contrast dye into the coronary arteries to determine the amount of blockage from atherosclerotic plaque.

### When Is Cardiac Catheterization Performed?

Cardiac catheterization is most often performed after completion of a history and physical examination and noninvasive cardiac testing such as an ECG, echocardiogram, or stress test to evaluate symptoms. Such symptoms commonly include chest pain (referred to as angina), shortness of breath, fatigue, dizziness, or palpitations. In addition to providing a roadmap of the coronary arteries, cardiac catheterization can help to determine how well

the valves in between the chambers of the heart are working and how well the heart muscle is pumping.

Cardiac catheterization provides definitive confirmation of narrowing in the coronary arteries and may also exclude the presence of coronary artery disease before heart valve surgery or other major surgery. If significant coronary blockages are present, angioplasty, or stenting (also known as percutaneous coronary intervention) can be performed, often during the same procedure, to improve blood flow to the heart muscle and help to relieve symptoms. This procedure may also be performed emergently for persons with suspected heart attack to identify blood clots in the coronary arteries and rapidly restore blood flow to the heart muscle.

### How Is Cardiac Catheterization Performed?

A specialized team of technologists and nurses will help to position you flat on an x-ray table in the catheterization laboratory (Figure). You will be given a mild sedative for comfort and relaxation. The entry point(s) is washed with a cool antiseptic soap, and a local anesthetic is injected into the skin, causing a temporary stinging

sensation. For left heart catheterization and coronary angiography, the femoral artery in the leg has been the traditional access site. However, the radial artery in the wrist is being used more commonly because this approach offers greater patient comfort and may reduce bleeding risks.

Once the site is numb, the artery or vein is accessed with a needle, allowing insertion of a thin wire and placement of a hollow tube called a sheath. Through the sheath, catheters are advanced into the heart with the use of x-ray guidance. If dye is injected through the catheter to view the coronary arteries, you may feel a warm sensation. You will be awake during the test and may be asked to follow instructions as the x-ray camera moves around the table.

A cardiac catheterization takes ≈45 minutes to complete. After a coronary angiogram, depending on the severity and pattern of any blockages detected in the coronary arteries, 3 common treatment paths include medical management, percutaneous coronary intervention, or cardiac surgery. If percutaneous coronary intervention is offered, the interventional cardiologist will determine whether a bare metal or drug-eluting stent (which is coated with a

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**Figure.** A contemporary cardiac catheterization laboratory suite. A, X-ray source generates x-rays to visualize heart arteries; B, movable patient table, which moves over x-ray source during procedure; C, lead shielding, used to protect staff from excess x-rays; and D, video display screens, used to review the x-ray images.

medication to prevent scar tissue formation) is indicated. If a coronary stent is placed, you will be started on a medication called clopidogrel (Plavix), prasugrel (Effient), or ticagrelor (Brilinta) to help to prevent blood clots within the artery.

### What to Expect Before the Procedure

Typically, you may eat and drink up until midnight before the day of the catheterization. On the morning of the test, you can take most routine medications, including aspirin, clopidogrel, prasugrel, or ticagrelor, with a sip of water. Certain oral anticoagulation medications, such as warfarin (Jantoven or Coumadin) or dabigatran (Pradaxa), or any injectable anticlotting drugs should be held as directed by the managing clinician.

If you have diabetes mellitus, any oral diabetes medications should be held the night before and the morning of the procedure, and you may be instructed to adjust your insulin dose. Your blood sugar will be closely monitored during your hospital stay. If you have previously experienced an aller-

gic reaction to contrast dye or if you have impaired kidney function, you should notify your physician to inquire about pretreatment.

Once at the hospital, you will change into a gown and have an intravenous line started in your arm. The hair on your wrist, arm, or legs will typically be shaved. Staff will review your medical history and answer questions from you and your family. After discussion and review of a form outlining details and risks of the procedure, you will be asked to sign to provide your consent.

### Risks of Cardiac Catheterization

Cardiac catheterization is a common diagnostic procedure performed >2 million times per year in the United States with minimal risk. The most common risks of cardiac catheterization include bleeding or hematoma. Rare risks include reaction to contrast dye, impaired kidney function due to contrast dye, abnormal heart rhythm, and infection. Extremely rare complications (<1%) include heart attack,

stroke, need for emergent cardiac surgery, and death.

### What to Expect After the Procedure

After the procedure, the catheter is removed from the access site(s). Manual pressure is applied, and an internal plug or stitch may be used to close the blood vessel. If the leg was used, you will be required to lie flat, keeping the leg straight for several hours, during which you will need to use a bedpan or urinal. If the wrist or arm was used, you may sit up immediately and walk to the bathroom with assistance when awake and alert. A band on the wrist will maintain pressure, and wrist movement will be restricted for several hours. You may be given fluids intravenously and can eat and drink as tolerated. A nurse will monitor you closely during recovery and review discharge instructions. If angioplasty or stenting was performed, you may need to stay in the hospital overnight.

### Additional Information

For more information, see the following:

- American Heart Association: [http://www.heart.org/HEARTORG/Conditions/HeartAttack/Symptoms/DiagnosisofHeartAttack/Invasive-Tests-and-Procedures\\_UCM\\_303931\\_Article.jsp](http://www.heart.org/HEARTORG/Conditions/HeartAttack/Symptoms/DiagnosisofHeartAttack/Invasive-Tests-and-Procedures_UCM_303931_Article.jsp)
- National Heart, Lung, and Blood Institute: [http://www.nhlbi.nih.gov/health/dci/Diseases/cath/cath\\_what.html](http://www.nhlbi.nih.gov/health/dci/Diseases/cath/cath_what.html)
- National Library of Medicine MedlinePlus Medical Encyclopedia: <http://www.nlm.nih.gov/medlineplus/ency/article/003419.htm>

### Disclosures

None.

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