

CARDIAC CATHETERIZATION

Cardiac Catheterization is also known as coronary angiography, angiogram, cardiac cath and heart cath. Cardiac catheterization is a diagnostic imaging procedure used to study the coronary arteries (arteries that supply blood to your heart muscle). It can also show how well your heart muscle pumps, diseases of the valves and aorta. Cardiac cath helps doctors diagnose your problem accurately and choose the best treatment for you.

Why do I need a cardiac catheterization?

In general, cardiac catheterization is done for one or more of the following reasons:

- To evaluate or confirm coronary artery heart disease (for example, in patients with chest discomfort and/ or abnormal stress test)
- To determine the best treatment that can help a patient diagnosed with coronary heart disease.
- To see how well blood flows through the coronary arteries after a previous cardiac intervention or bypass surgery
- To find out how severely the coronary arteries are narrowed or blocked
- To evaluate the cause of heart failure
- To determine if there is significant heart valve disease that might require surgery
- To determine whether there is a congenital heart defect and evaluate how severe it is

What happens during cardiac catheterization?

During cardiac catheterization doctors insert a sheath (short thin tube) into the leg or arm. A catheter (longer thinner hollow tube) is guided to the coronary arteries with a type of x-ray called fluoroscopy. Contrast media (iodinized solution) is injected through the catheter into the coronary artery to produce an x-ray called an angiogram.

The x-ray or angiogram helps doctors identify a narrowing or blockage in the coronary artery. A diseased coronary artery may show an abnormal narrowing, called a “lesion.” Other times, the artery may be completely blocked.

Doctors can estimate how severe the problem is based on how narrow a lesion is, where it is located and how many arteries are diseased. Intra-vascular ultrasound (IVUS) and fractional flow reserve (FFR) can also be used during the cardiac catheterization to obtain more precise measurements and need for treatment of the problem.

IVUS helps the doctors get an accurate view of the inside of the coronary artery by using high-frequency sound waves through a miniature probe. This will produce an image of the location and extent of the plaque.

During FFR a wire is threaded to the coronary artery through the catheter to help determine the severity of blood flow blockages. It helps doctors better identify which specific lesion is responsible for a restriction of blood flow to the heart.

Treatment Options

There are several ways to treat coronary heart disease, including medications, balloon angioplasty, stents and bypass surgery.

- **Medications** can help reduce symptoms of angina by increasing the amount of oxygen that reaches the heart muscle and/or by reducing the amount of oxygen the heart needs. However, medications cannot open narrowed coronary arteries.
- **Balloon angioplasty** is used to widen narrowed coronary arteries without surgery. It helps relieve symptoms of angina by improving the flow of blood to the heart muscle. Angioplasty is a relatively simple procedure that does not require general anesthesia. Most patients remain in the hospital only a day or two and can resume their normal activities within a few days.
Although angioplasty is successful in most cases it does have limitations. In particular, the artery may narrow again, usually within the first 6 months. Also, angioplasty may not be an option when an artery is totally blocked, or when there are multiple lesions (narrowed areas) in several major arteries.
- A **stent** is a small device that is placed in an artery to help keep it open. A stent may be needed when angioplasty cannot open the artery wide enough. Other times, it may be implanted to help reduce the chances that the artery will narrow again. The stent is a permanent implant that remains in the artery.
- During **coronary artery bypass surgery**, surgeons use a graft- a blood vessel from the leg or chest- to create a detour (bypass) around the narrowed or blocked artery. One end of the graft is attached to the aorta, and the other end is sewn to the artery, beyond the narrowed or blocked area. This allows blood to flow freely from the aorta to the heart muscle.

Bypass surgery requires general anesthesia and usually 4-7 days in the hospital. It takes up to 3 months to fully recover after this type of surgery.

Bypass surgery may be the best treatment option for patients who have severe disease in two or three major coronary arteries, especially if the heart is weakened and does not pump well.

The choice among these treatment options depends upon many individual factors, including a person's age, the severity of the coronary heart disease, the relative risks and benefits of various treatments, the presence of other medical conditions and personal preference.

Because coronary heart disease is typically a chronic disease requiring long-term treatment, it is very important to learn as much as possible about this disease and about the benefits and risks of the various treatment options. You should discuss all of these options with a healthcare provider to determine which treatment is best for you.

Preparing for the procedure

Do not eat or drink anything for at least 6 hours before your test, or as directed by your doctor. Having food or drink in your stomach can increase your risk of complications from sedation. Ask your doctor or nurse if you should take your medications with a small amount of amount of water. If you have diabetes ask for instructions about diabetes medications and insulin. You will usually be able to have something to eat or drink soon after your test.

Take all your medications and supplements with you to the test. It is best if you take the original bottles so that your doctor will know the exact dose you take. Notify the doctor or nurse of any allergies to food or medications of significant importance is allergy to contrast media, iodine or shellfish.

Try to relax. People who are having cardiac catheterization may feel anxious or nervous. You will be given medications to help you relax. **Do Not Smoke.**

Unless you are already in the hospital, you will most likely be asked to arrive in the morning on the day of the procedure, or possibly the night before.

You may have several routine tests, such as an ECG (electrocardiogram), x-rays, and blood tests. (These tests may be done a few days before the procedure.)

The doctor will review your medical history and examine you. (You may see the doctor at the office several days before the procedure.)

The doctor will talk with you about the procedure and its purpose, benefits, and risks. This is a good time to ask questions and, most important, to share any concerns you may have. You will then be asked to sign a consent form.

An intravenous (IV) line will be inserted in your hand or arm, and will be used to give you sedation and any additional medications you might need during your procedure.

Cardiac catheterization is performed in a specially equipped x-ray room called a cardiac catheterization laboratory, or simply cath lab.

You will be taken to the cath lab on a stretcher. You will be helped onto an x-ray table. The table has a large x-ray camera above it and television screens close by. There are heart monitors and other instruments.

The cath lab team generally includes a cardiologist, an assistant, nurses , and technologists or cath techs.

Once you are positioned on the x-ray table, you will be connected to several monitors and covered with sterile sheets. The staff will be wearing sterile gowns, gloves, and possibly masks.

Just before the procedure, a nurse or technician may shave the hair from the site where the catheter will be inserted. The site will be cleansed. You will be covered with sterile drapes (sheets).

You will be given a medication to help you relax and make you drowsy. You may be awake, or you may sleep through part or all of the procedure. The staff will be monitoring you at all times. A local anesthetic is injected into the skin with a tiny needle to numb the area. This may cause a stinging sensation before the numbness sets in.

Although you will be sedated, you will be awake during the procedure so that you can follow instructions. Throughout the procedure you may be asked to take deep breaths, hold your breath, cough or place your arms in various positions.

After the procedure

After your catheters are removed, the assistant applies firm pressure to the insertion site for 10-20 minutes, to keep the site from bleeding. In some cases they may use a vascular closure device to seal off the small hole left in the artery after the procedure.

You will be taken to a recovery room while the sedation wears off. This usually takes about an hour. Your oxygen level, blood pressure and heart rate as well as your puncture site will be closely monitored.

If the catheters were inserted in your leg, you will need to lie flat on your back for 2-6 hours, so that the site can begin to heal properly. During that time do not bend or lift your leg. To relieve stiffness, you may move your foot or wiggle your toes.

If the catheters were inserted in your wrist or arm, or if a vascular closure device was used, you will be permitted to get out of bed sooner.

If your procedure was performed through your arm artery you will be able to sit up in bed. A writs band inflated with air will be applied along with an immobilizer. Your arm will be limited for use until healing is complete, usually 2-3 hours.

The nurse will check your pulse and blood pressure often, and will also check the insertion site for bleeding. If you feel sudden pain at the site or if you notice bleeding, let the nurse know right away.

Most patients go home the same day. Some patients may need to stay for more tests or treatments. When it is time to go home, have a family member or a friend drive you.