

## Percutaneous Coronary Intervention (PCI)

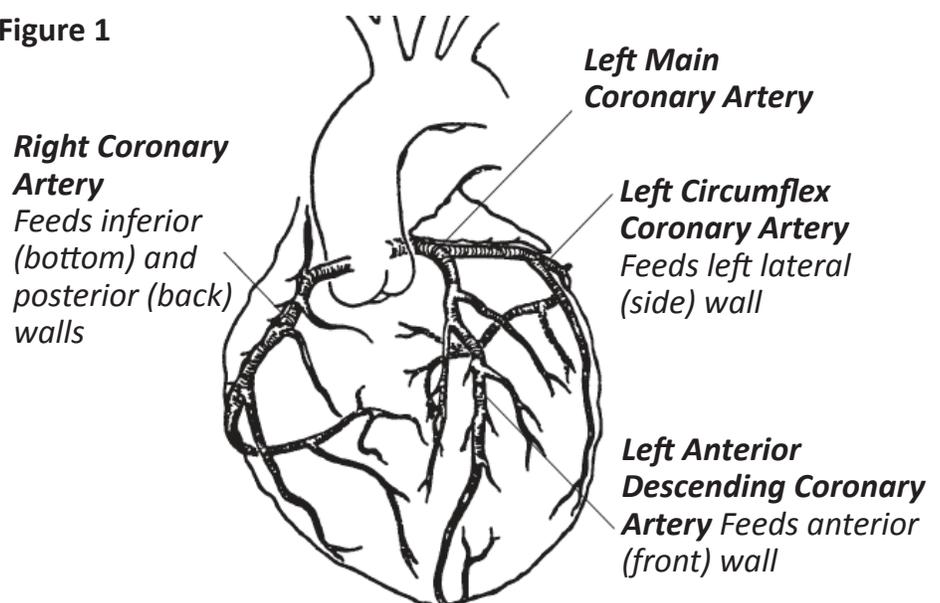
A percutaneous coronary intervention (PCI) may be used to treat stenosis (narrowing) of a coronary artery. To understand PCI, it is helpful to know more about coronary artery disease (CAD) and the heart itself.

### The Heart and CAD

The heart is a muscular organ about the size of a closed fist. It pumps blood to the lungs and to all of the body tissues. The heart, like any other muscle, needs oxygen to do its work well. Oxygen is delivered to the heart through coronary arteries. These arteries lie on the surface of the heart (see Figure 1).

*If you have any questions, please contact your doctor or nurse.*

**Figure 1**



### Before the PCI

The Cardiac Catheterization Lab (Cath Lab) nurse will contact you a few days before the exam. The nurse will answer your questions and review pre-PCI instructions. Please tell the nurse about any of the following:

- Allergies
- Unusual reaction to iodine or X-ray contrast dye
- If you take warfarin (Coumadin®) or other blood thinners (not including aspirin)
- If you take diabetic medication

Blood thinners and diabetic medications need to be adjusted before your procedure. Please notify your primary care doctor that you are scheduled for a PCI. The Cath Lab will assign you an arrival time as well as provide you with eating and drinking instructions the day before your procedure.

## **Day of the PCI**

### ***At Home***

On the day of the test, take only the medicine the nurse has instructed you to take. Medicine should be taken with small sips of water.

### ***At the Hospital***

Check in at the Cardiac Cath Lab reception desk, Galter Pavilion, 675 North Saint Clair Street, 8th floor. Your arrival time will be given to you by the preop Cath Lab nurse the day before the procedure. Parking is available for patients and visitors in the garage at 222 East Huron, across from the Feinberg and Galter pavilions. For discounted rates, please bring your parking ticket with you. Tickets can be validated at the Customer Services Desks on the 1st, 2nd, and 8th floors of the Feinberg and Galter pavilions; 1st floor of Prentice (including the Prentice 24-hour desk near the Superior Street entrance). Be sure to bring:

- A list of allergies
- A list of all your current medications (prescription, over-the-counter, and herbals)
- Photo ID
- Medical insurance information
- Medicare card (Medicare patients only)

Plan to have a responsible adult take you home the day following your PCI.

For their own safety, children under 16 may not visit in the testing area. They may stay in the waiting room with a responsible adult.

You will be assigned a bed for both your pre- and post-PCI care. After you change into a hospital gown, the nurse reviews your health history and takes your blood pressure and pulse. Blood tests are done as needed. An IV (into the vein) line is inserted into your arm or hand. The IV is used for fluids and needed medicine during the exam. Your groin area is cleaned and shaved. Either the femoral artery in the groin, or the radial artery in the wrist are used for the procedure.

The doctor will discuss the procedure with you. After the doctor has answered your questions, you will be asked to give your written consent.

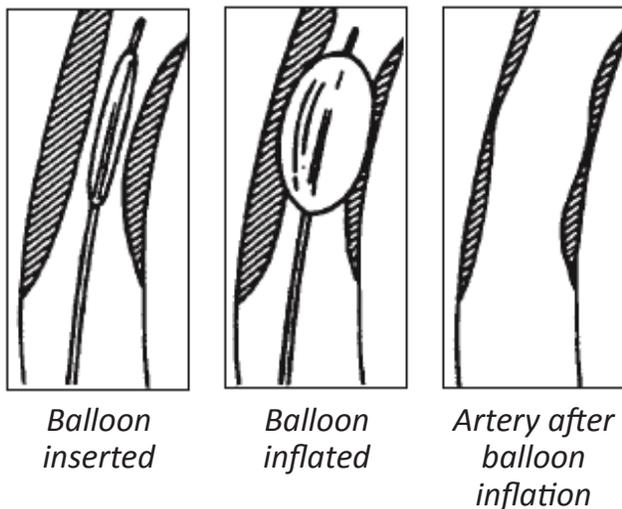
You may wear your watch, glasses, dentures (or bridgework) and hairpieces. You are asked to empty your bladder just before going into the Cath Lab.

## During the PCI

Once in the Cath Lab, you will be assisted onto an X-ray table. The room has an X-ray camera and several television monitors. Medicine to relax you is given into the IV line. You may feel drowsy, but usually you will be awake and comfortable during the test.

The area around the puncture site (the groin or wrist) is cleaned with a special soap that may feel cold. An anesthetic (numbing medication) is injected into the area.

**Figure 2**



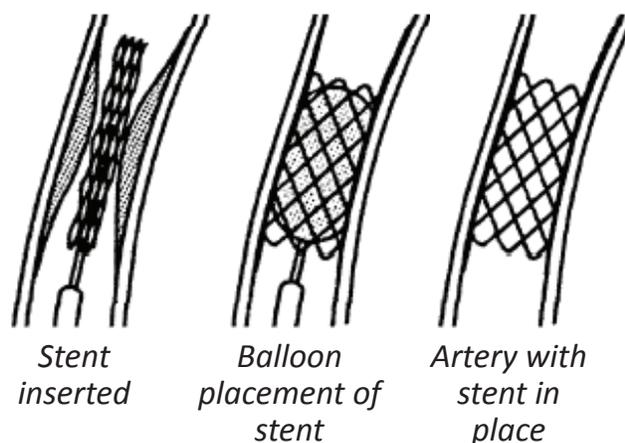
A plastic tube called a sheath is inserted into either the femoral (groin) or radial (wrist) artery. The sheath is used to guide the catheter into place. This usually is not painful. But you may feel pressure and mild discomfort at the site. If needed, added numbing medicine is given.

After the sheath is in place, a catheter is guided up to your heart to the opening of the affected coronary artery (see Figure 2). Another catheter with a balloon tip is then inserted through the sheath and guiding catheter. Guided by X-ray and contrast (dye), the balloon is advanced to the site of the narrowed artery.

Once in place, the balloon is inflated. As the balloon is inflated, the plaque is pushed back up against the arterial wall. This widens the arterial opening. The balloon then is deflated and the catheter removed.

At this time, a small metal coil (stent) may also be used (see Figure 3). A stent is pre-mounted on a balloon catheter. Guided by X-ray and contrast (dye), the catheter is advanced to the area of stenosis (narrowing). The balloon/stent catheter is inflated to compress the stent to the arterial wall. The balloon catheter is deflated and removed. You may have some chest pressure or discomfort when the balloon is inflated. This is normal. The stent is permanent and provides support to the arterial wall.

**Figure 3**



If you feel any discomfort during the procedure, let the doctors and nurses know. Once the artery is opened, all catheters are removed. The sheath will be removed or, in some cases, it will be sutured in place and removed a few hours later.

Most of today's PCIs involve the use of balloons and stents. Drug eluting stents (DES) are coated with a medication that prevents unwanted growth of cells that can narrow the vessel. These stents use very small doses of medication to:

- Deliver the medication right to the vessel.
- Limit the drug's effect on other parts of the body.

The medication delivery for these stents can be in effect for up to 120 days. DES help reduce the rate of re-stenosis to less than 10%.

At Northwestern Memorial Hospital, this combined treatment of angioplasty and DES is most often used. Other advanced therapies are available, if needed.

## **After the PCI**

After your PCI, you will return to the Invasive Cardiac Recovery (ICR) or Cardiac Surveillance Unit (CSU). The nurses will see you often to check your:

- Blood pressure
- Heart rate
- Groin or wrist site(s) for any bleeding or swelling

You will be on bed rest for several hours. It is important to keep the affected leg(s) or arm(s) straight at all times. In some cases when the groin is used, the sheath remains in place after your procedure until your blood clotting time is normal. As the sheath is removed, the nurse will apply firm pressure at the groin site for at least 10 to 20 minutes.

You will remain in the hospital overnight, and in most cases discharged the following morning. During this time:

- Your heart rate is monitored.
- Your blood pressure and pulse are checked.
- Blood tests and electrocardiogram (ECG) are completed.
- Your groin or wrist site is monitored for bleeding or swelling.

It is important to have a responsible adult take you home. Before going home:

- You will get a stent information card.
- Your doctor also will discuss needed follow-up visits.

## PCI Home Care

### ***After Angioplasty/Stenting***

The Cardiac Cath Lab Discharge Instructions will answer many questions about your care. In addition, please follow these added guidelines to assist your recovery.

### ***Activities***

While the groin is healing, bleeding or swelling can occur as a result of stress or strain to the groin and abdominal muscles. Carefully follow these guidelines:

- On the day of discharge, limit your activities.
- Do not drive for 24 hours.
- You may shower after 24 hours, but no tub baths are allowed for 1 week.
- Climb stairs with a slow, steady pace until 2 days after the PCI.
- Do not lift more than 10 pounds for the next 3 days.
- No sexual activity for 1 week.

If your radial (wrist) artery was used:

- On the day of discharge, limit your activities.
- Do not bend your wrist for 24 hours.
- No driving for 24 hours.
- No soaking the wrist for 3 days (such as bath tub, cleaning, dishwashing).
- Do not lift more than 3 to 5 pounds with affected wrist for 1 week.
- Climb the stairs with a slow, steady pace until 2 days after the PCI.
- No sexual activity for 1 week.

For the first week after your PCI, avoid any physical activity that would raise your heart rate (examples may include tennis, jogging or weightlifting).

### ***Medications***

Your doctor will prescribe blood-thinning medicines to help prevent blood clots. Each should be taken with food. The medicines include:

- Aspirin (ASA)  
You will take one 81 mg (non-enteric coated) aspirin daily. This may be for several months or years.
- Antiplatelet Medication  
You will be prescribed 1 of the following antiplatelet medications after your PCI.
  - Plavix® (clopidogrel)
  - Effient® (prasugrel)
  - Brilinta® (ticagrelor)

Your doctor will tell you how long you need to take this medication.

**Do not stop taking these medicines without talking to your doctor.**

Take all other medicines as directed by your doctor. Do not take any extra aspirin or ibuprofen. Doing so can increase your risk of bleeding. Many over-the-counter drugs contain aspirin. If you are unsure about what the drug contains, check with your pharmacist before taking it.

For mild discomfort, you may take plain Tylenol® (acetaminophen). Follow dose directions, but do not take more than 4,000 mg of acetaminophen in 24 hours. This includes other medicines that you may be taking.

- Many medicines including narcotic pain medicines have acetaminophen in them. Be sure to read labels carefully or check with your pharmacist to be sure. It is important that you look at your total intake of acetaminophen. Do not take more 4,000 mg of acetaminophen in 24 hours.
- Talk with your doctor about 24-hour limits that may be proper for you. Patients who are fasting, undernourished, have diabetes, are taking isoniazid or are frequent alcohol users may need to limit acetaminophen to just 2,000 to 3,000 mg per day—in divided doses. It is possible your doctor may tell you not to take acetaminophen at all.

### **Special Instructions for Stent Patients**

Carry your stent card with you at all times. This provides useful information about your heart disease for any doctor who may be caring for you. It also is important to tell your healthcare providers that you are taking aspirin and a prescribed antiplatelet (such as Plavix®, Effient®, or Brilinta®).

### **When to Call the Doctor**

Please contact your doctor right away or go to the nearest Emergency Room if you have:

- Severe angina or chest pain. (This may be a sign of a problem with your stent.)
- Excessive bruising.
- Blood in your urine or stool.
- Black tarry stools.

Contact the Cardiac Cath Lab doctor at 312.926.5135, extension 3 if you have a new rash or itching. This may be a sign that you have an allergy to your antiplatelet medicine.

### **Groin or Wrist Care**

After the procedure, a small dressing is applied to the groin or wrist site. You may remove the dressing the day after the exam. Do not reapply a dressing. Keep the site clean and dry. Do not use lotions, ointments or powders at the groin or wrist site for 1 week.

## Groin Site Healing

The healing groin site should remain soft and dry. A bruise or a marble-sized lump may be present. Please contact your doctor or the Cardiac Cath Lab doctor if any of the following signs appear:

- Redness around the groin
- Drainage from the groin
- A lump at the puncture site that enlarges or is larger than marble size
- Pain at the puncture site that makes walking difficult
- Numbness or tingling in the thigh or leg
- Calf tenderness or pain
- Swelling of the ankle or foot
- Increased area of bruising extending into the thigh, buttock, or groin
- Discoloration or coolness of the leg or foot

## Radial (Wrist) Site Healing

The healing wrist site should remain soft and dry. A bruise (black and blue) or a marble size lump may be present. Notify the Cardiac Cath Lab doctor if you have any of the following signs:

- Redness around the wrist site
- Drainage from the wrist site
- A lump at the puncture site that enlarges or is larger than marble size
- Numbness, tingling or swelling of the fingers, hand, wrist or arm
- Increased area of bruising with discoloration extending into the arm
- Coolness of the hand or arm

### ***Arterial Bleeding***

The following signs could indicate that the puncture in the vessel has re-opened and that there is active bleeding:

- Quickly increasing swelling around the wound, which may be pulsating
- Profuse blood streaming from the puncture site

***This would be rare, but is a medical emergency. Immediately apply hard pressure and call 911.***

- For a groin site, apply hard pressure with all the fingers of 1 hand above the puncture site.
- For a wrist site, hold firm pressure with your thumb against the puncture site and your finger against the back of the wrist.

## Recovery

### **Warning Signs and Symptoms**

Please notify your doctor right away if you have:

- Chest discomfort or pain (angina) that radiates to the neck, jaw or arm
- New symptoms or the return of your pattern of angina
- Nausea or profuse sweating
- Shortness of breath with exertion
- An irregular heartbeat
- Lightheadedness or dizziness that makes you lie down
- A fainting spell

### **Go to the nearest Emergency Room if you have:**

- Chest discomfort or pain lasting longer than 10 minutes and not relieved by taking 1 nitroglycerin tablet under the tongue.
- Frequent, recurring episodes of chest discomfort or pain.

## Risk Factor Modification

Atherosclerosis leading to coronary artery disease (CAD) cannot be cured. But taking steps to reduce your risk factors may prolong life, improve quality of life and decrease the need for future PCIs and surgery.

To control atherosclerosis, it is important to make the following lifestyle changes:

- Control high blood pressure and diabetes.
- Stop smoking.
- Exercise regularly and discuss an exercise plan with your doctor.
- Reduce stress in your life.
- Modify your diet and discuss your diet with your doctor.

If you have any concerns or questions, please call the Cath Lab at 312.926.5135, extension 3.

## Northwestern Medicine – Health Information Resources

For more information, contact Northwestern Memorial Hospital's Alberto Culver Health Learning Center (HLC) at [hlc@nm.org](mailto:hlc@nm.org), or by calling 312.926.5465. Health information professionals can help you find the information you need and provide you with personal support at no charge.

For more information about Northwestern Medicine, please visit our website at [nm.org](http://nm.org).

*Para asistencia en español, por favor llamar al Departamento de Representantes para Pacientes al 312.926.3112.*

The entities that come together as Northwestern Medicine are committed to representing the communities we serve, fostering a culture of inclusion, delivering culturally competent care, providing access to treatment and programs in a nondiscriminatory manner and eliminating healthcare disparities. For questions, please call either Northwestern Memorial Hospital's Patient Representatives Department at 312.926.3112, TDD/TTY 312.926.6363 or the Northwestern Medical Group Patient Representatives Department at 312.695.1100, TDD/TTY 312.926.6363.

Developed by: NMH Cardiac Catheterization Department