What is Coronary Stenting?

Coronary artery stenting is a catheter-based procedure in which a stent (a small, expandable wire mesh tube) is inserted into a diseased coronary artery to hold it open. Its most common use is in conjunction with balloon angioplasty to treat coronary artery disease.

After the angioplasty reduces the narrowing of the coronary artery, the stent is immediately inserted, typically leaving less than 10 percent of the original blockage in the artery. In fact, stenting is done about 75 percent of the time after a balloon angioplasty and/or atherectomy (in which plaque is removed from an artery).

Benefits & Risks of Coronary Stenting

BENEFITS

Stenting can improve circulation, with potential benefits such as the following:

- Reduced chest pain, pressure or discomfort.
- Less shortness of breath (dyspnea).
- Lower risk of heart attack.
- Less need for additional medical treatment with drugs.
- Less risk of the artery re-closing.
- Nearly no risk of abrupt vessel closures (which occur in about 5% of patients who have balloon procedures without stenting, within the first 24 hours of the procedure).

RISKS

- There is a small chance that stents will damage the vessel when implanted, sometimes causing a tear or dissection of the artery. However, statistics have shown that this generally does not affect long-term prognosis.
- Approximately 20 percent of stents re-narrow within six months of placement. The risk of restenosis is also increased in patients with diabetes and "high-risk" patients with acute coronary syndromes.
- Ongoing attempts to prevent restenosis include the development of stents coated with a chemotherapeutic drug (e.g., sirolimus), which is released into the wall of the artery. Approved by the U.S. Food and Drug Administration in April 2003, such drug-eluting stents have demonstrated an ability to minimize restenosis.
- One uncommon complication of stent placement is subacute thrombosis. This is when platelets aggregate and form a blood clot within the stent, potentially causing closing of the stent and a heart attack. It can occur with both drug-eluting and "bare metal" stenting. To minimize this risk, medications such as aspirin and other antiplatelet drugs may be prescribed.

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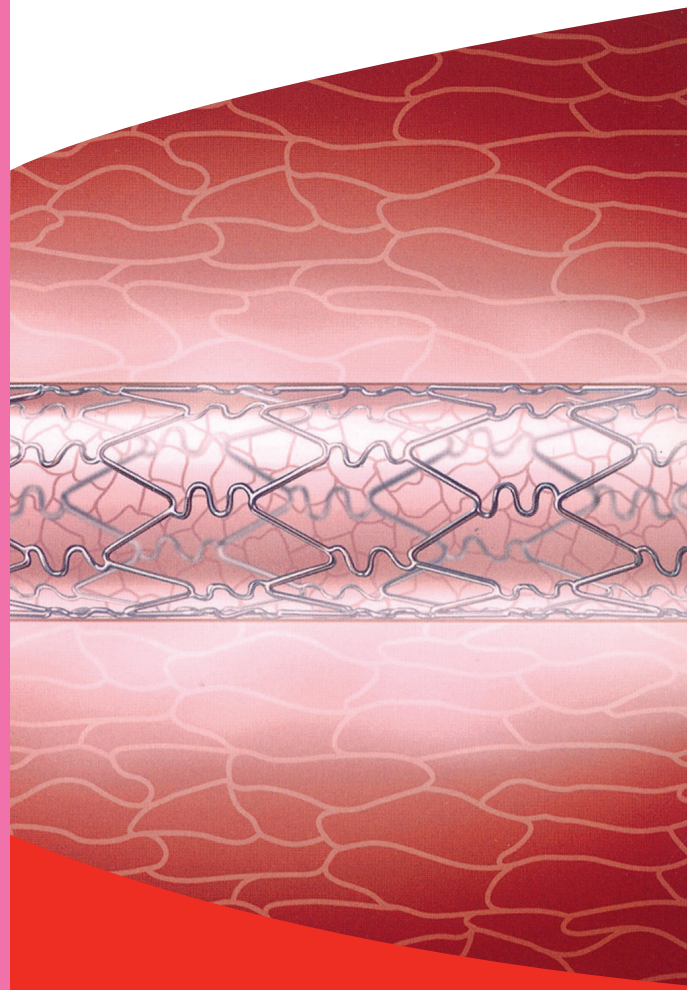
Coronary Stenting



Alternatives to coronary stening

Depending on the nature and extent of the coronary artery disease condition, the cardiologist will be able to determine the most appropriate treatments, which may include:

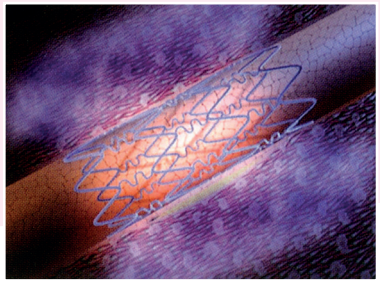
- Medications.
- Balloon angioplasty (percutaneous transluminal coronary angioplasty; PTCA). A procedure in which the physician uses a balloon-tipped catheter to press plaque back against the artery wall to allow for better blood flow in the artery.
- Atherectomy. A catheter is inserted with a device on the tip that cuts away and removes plaque.
- Coronary Bypass surgery. A procedure in which a segment of a blood vessel from another part of the body (usually the leg) is used to reroute blood flow around a clogged artery supplying blood to the heart. If there are two, three, four or five clogged arteries, the situation may call for a double, triple, quadruple or quintuple bypass.

How should I prepare for the procedure?

Before the day of the coronary stenting, patients should discuss their medical history with the physician and inform him or her of any medications currently being taken. Certain medications may need to be stopped or reduced. It is also recommended that patients with diabetes consult with a physician regarding food and insulin intake, because people are generally ordered not to eat or drink anything after midnight before the test. Individuals should talk with their physician if they have a blood-clotting disorder or an allergic reaction to any of the following:

- Iodine
- Shellfish (e.g., crab or shrimp)
- X-ray contrast media

On the day of the procedure, the patient will be admitted to the hospital. A nurse or physician will explain what is going to happen. You will have to sign a written consent to the procedure. A small needle or plastic tube will be inserted into a vein usually in the arm. This will be used to give you fluids and medicine during the procedure.



What happens during the procedure?

- The patient will lie down on a table under an x-ray camera.
- He or she will be given a mild sedative and remain awake but relaxed for the duration of the procedure.
- Once the patient is comfortable, heart monitoring begins, an intravenous line (I.V.) is established and the area where the sheath is to be inserted is sterilely prepped and locally anesthetized.
- The majority of stent procedures are performed via the femoral artery in the groin. However, the brachial artery in the arm or the radial artery in the wrist can be utilized as well.
- The injection of the local anesthesia may result in a brief period of minimal discomfort. This is normal and should be no cause for concern.
- An anticoagulant is then administered through the I.V. to prevent blood clot formation within the artery during the procedure.
- The guiding catheter is then advanced through the sheath to the heart and is positioned near the origin of the coronary artery.
- The cardiologist will inject dye (contrast medium) through the catheter. The dye can be seen on a special x-ray equipment and serves as a road map for the procedure.
- The physician may ask the patient to perform tasks such as coughing, turning the head, taking a deep breath or not speaking for a while. Throughout the procedure, blood pressure will be monitored.
- Stenting is then performed. Equipped with a premounted stent, a balloon-tipped catheter is advanced to the target area. The balloon is inflated for several seconds to several minutes, expanding the stent, which adheres to the wall of the artery.
- The balloon catheter is removed while the stent remains permanently fixed to the artery. About 10 percent of stenting procedures use self-expanding stents (which are not attached to a balloon-tipped catheter). By approximately four to six weeks after the stent is inserted, it will become completely covered by a thin layer of arterial tissue.

After the stenting procedure

Once the procedure is completed, the patient will be transferred to a cardiac recovery room. He or she may feel groggy from the sedative. The catheter insertion site may be bruised and sore.

If the groin area was used as the point of catheter insertion, then the patient will be instructed to lie in bed with legs out straight. The physician may choose to use one of two techniques for removing the sheath that was placed at the initiation of the procedure. The traditional technique is to wait until the effects of the anticoagulant have passed (four to six hours) and then to apply pressure while removing the sheath from the femoral artery. Another technique allows the sheath to be removed immediately after the procedure through the use of hemostatic devices that seal or stitch the femoral artery.

If the wrist or arm was used as the point of catheter insertion, then the patient does not need to stay in bed. Throughout the post-procedure monitoring, the point of catheter entrance will be checked for bleeding, swelling or inflammation. Vital signs will be continuously monitored during this observation period. Usually, the patient will stay overnight for further observation.

Post-stenting instructions

- During the first day or two after stenting, patients should drink plenty of fluids to prevent dehydration and to help flush from the body the dye that was used during the procedure.
- Exercise and exertion. Patients are reminded to refrain from lifting heavy objects and engaging in strenuous exercise or sexual activity for 24 hours after the procedure.
- Care of the incision area. Bruising and soreness is possible and normal. Undue pain, swelling or inflammation may require medical attention.
- Medications. Patients will be prescribed medications (e.g., aspirin) to prevent the formation of blood clots (thrombosis) in the stent. These medications will be taken for life. Also, for four weeks following the procedure, patients will be prescribed an additional antiplatelet medication to minimize the risk of blood clot formation within the stent. Finally, in the first eight weeks after the procedure, patients will need to take antibiotics before any dental, medical or surgical procedure.