



Scranton Heart Institute, P.C.

The Very Latest In Modern Cardiac Care

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Information Regarding Cardiac Catheterization and Angioplasty:

Information For Patients Who Have Been Scheduled To Undergo Diagnostic Cardiac Catheterization Or Percutaneous Transluminal Coronary Intervention (Angioplasty)

A clinical decision was made that the performance of a cardiac catheterization is felt to be necessary to provide additional diagnostic information to help make appropriate decisions, which will assist in your cardiac care. The decision to perform cardiac catheterization may be based upon your symptoms, your coronary risk profile, additional suspicious clinical data [i.e. an EKG abnormality], specific non-invasive diagnostic testing, and/or due to additional concern expressed by you or a family member with the knowledge that coronary heart disease is generally felt to be a common dangerous, yet treatable condition). A decision to proceed directly to cardiac catheterization (without preliminary diagnostic testing, or even if prior testing was normal) may be both reasonable and prudent, if you have clinical signs or symptoms, which are either suspicious or recurrent.

Specific non-invasive diagnostic testing may have been performed at the request of your primary care physician, or at our discretion. This testing includes all forms of "stress testing" (with or without myocardial perfusion imaging) to assess for the presence of arteriosclerotic coronary heart disease. Such testing can include the use of an exercise test (using a treadmill or bicycle ergometer), or a pharmacologic agent (such as adenosine or dobutamine). These studies are among the most commonly used for this purpose. The use of perfusion imaging markedly improves the diagnostic accuracy of these studies. The sensitivity and specificity of perfusion imaging is 95% and 90% respectively. That suggests that these studies are reasonably accurate for coronary disease diagnosis (but not perfect). We most often use the findings of such a study to determine which patients may benefit from undergoing diagnostic cardiac catheterization. An abnormality may have been noted on your imaging study that is sufficient enough to recommend a diagnostic cardiac catheterization.

A cardiac catheterization is done in a cardiac catheterization suite. The only hospitals that currently have this type of equipment in the Scranton area are CMC, and Mercy Hospital. For hospitalized patients, the catheterization (cath) is usually performed urgently or emergently. For outpatients, or if an individual's clinical findings are less pressing, the cath can be done electively (as an outpatient). If an outpatient cath has been suggested, we request that you contact our office (telephone number is noted above); to have your cardiac cath scheduled (at your earliest convenience). Generally, it would be best to arrange to have the procedure done within the next few weeks.

On the day of your procedure, you should plan to arrive about an hour ahead of your scheduled procedure time. This will allow time to prepare you for the cath. An intravenous line will be inserted, and you will be provided with appropriate sedation for your procedure; you will not be totally asleep however.

When your procedure begins, you will be brought into a cardiac cath suite (which is effectively a modified X-ray suite). The staff will do all that is possible to see to your comfort. A local anesthetic will be administered to your "groin". This is a "numbing" of the skin in or near the crease where your thigh meets your hip. There should be no more discomfort at any time during the study than this numbing from local anesthesia (as there are no nerve endings anywhere else that the catheter will traverse). A needle will be passed to the artery that runs near the surface beneath the numbed skin to obtain access to an artery.

A sheath will be placed into the artery (a hollow tube with a stopper – not much larger in diameter than a strand of thin spaghetti). A catheter (which is nothing more than a long flexible small hollow tube) is passed through the sheath, and positioned with its tip just within the origin of the coronary arteries (These are the tiny vessels which run along the outside of the heart to provide nourishment to the heart muscle and keep it healthy. It is these coronary arteries that tend to accumulate cholesterol plaques – and cause blockages; which we refer to as arteriosclerotic coronary heart disease.).

A radiocontrast agent (iodine-containing dye) will be injected through the catheter while a high-speed movie camera is activated through the X-ray machine. This allows the radiocontrast (dye) to run-off down the coronary arteries; allowing us to opacify the lumen, and locate any of the blockages that are suspected to be present. We will repeat the dye injection and digital movie imaging in several positions, so that all of an individual's coronary vessels can be evaluated from different angles.

The final image that we take is called a "ventriculogram". A catheter will be positioned within the left ventricular chamber and a spurt of "dye" will be given so that we can assess the left ventricular size and the wall motion of the ventricle.

At the end of the study, a dye picture will be taken of the femoral artery (where the sheath is inserted). Most often, a vascular closure device (either a collagen plug or a suture) will be used to close the artery in the groin area. This allows a patient to be up and around much sooner (usually within an hour or two). The entire time of the catheterization should require no more than fifteen to thirty minutes.

If no abnormality is identified (or if it is felt that a patient does not require additional therapy at that time), you should expect to leave the hospital within one-to-two hours after the completion of the procedure.

If an abnormality is identified that is deemed "fixable" (many blockages can be repaired or corrected at the same time through the catheter), the cardiologist may elect (with your permission) to proceed to an angioplasty.

Angioplasty is the vessel repair procedure that may ensue in individuals that require it. Angioplasty technically means "vessel modification". The prototype procedure (developed more than 30 years ago) involved the passage of a guidewire through the catheter down the coronary artery and across the blockage. The guidewire is not much larger around than a human hair. It has a soft supple tip and a stainless steel shaft. A tiny catheter is passed coaxially over the guidewire to the point of the blockage. The tiny catheter has an inflatable balloon at its tip that can be filled with dye. The inflated balloon resembles a "hot dog" (but is infinitely smaller – no larger than the true diameter of the coronary vessel). It stretches open the vessel at the point of the blockage. The balloon is then deflated and removed (effectively restoring blood flow down the vessel).

Many technological modifications and improvements have been made in angioplasty over the past few decades. There now exist a wide variety of specialized catheters for opening vessels and/or plaque removal. These can include laser catheters, shaving or cutting catheters, suction catheters, grinding catheters, and stents.

A stent is a tiny metallic mesh tube that can be mounted on a coronary balloon, or can be of a "self-expanding" variety that comes housed in a sheath, which is withdrawn, to allow the stent to expand to its natural position. Stents have demonstrated the ability to "prop-open" a vessel, provide for an improved angiographic appearance, and reduce both potential procedural complications and long-term results. Because of this, most cardiologists prefer to use a stent as part of an angioplasty procedure, if possible.

The risks of the diagnostic cardiac catheterization include an extremely low risk of serious complications (stroke, heart attack, and death). Again, these complications are relatively rare (less than 0.1%). Other minor complications can occur more frequently (but are still rather uncommon), and include; vascular injury [potentially requiring repair and/or transfusion] (less than 2%), radiocontrast allergy (less than 2%), and kidney damage [related to radiocontrast use] (less than 2%).

If an angioplasty is performed, the procedural risks are greater (which is understandable, as an angioplasty involves a mechanical modification or correction of a coronary plaque that is causing a blockage, and a potential danger in itself). These complications include those that are mentioned above (some already noted have an increased incidence); specifically, the incidence of death is less than 1%, and the incidence of heart attack is 3%. Additional potential risks (with angioplasty) include: coronary vessel dissection (5-10%), abrupt coronary closure (less than 5%), coronary perforation (1-2%), hemopericardium with or without cardiac tamponade [extravasation of blood into the pericardial sac exerting an outward pressure on the heart] (1%), emergency coronary bypass operation (less than 0.1%), and restenosis [a recurrence of a blockage] (~30% with routine angioplasty, ~15% with the use of a stent, and ~1-3% with a "drug-eluting" stent).

In the unusual event that a complication occurs, it may be necessary for your cardiologist to perform additional procedures at his discretion to attempt to protect your heart and your life. These procedures may include: insertion of an intra-aortic balloon pump (a mechanical pump to assist with heart function while other measures are considered or undertaken to provide additional stabilization), insertion of a temporary trans-venous pacemaker (to assist your heart rhythm), and/or performance of a pericardiocentesis (insertion of a needle and possibly also a catheter into the pericardial sac to remove fluid). During such a situation (although uncommon), it may also be necessary for your cardiologist to select additional physicians (anesthesiologist, cardiothoracic surgeon, etc.) to assist with your breathing and subsequent care.

The overall success rate of angioplasty in the hands of an experienced operator is about 95-98%. If an angioplasty is performed, you can expect to remain in the hospital overnight and be released the following morning (barring any other complicating issues).

