Imaging and Radiology
Tests and Procedures
**Special Procedures:**

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**Arteriogram/Angiogram**

**What is the test?**
- The test shows where the blood vessels (arteries) are located in your body and help your doctors diagnose and understand your disease. The procedure is done by a Radiologist in the Radiology Department.

**How do I prepare for the test?**
- After midnight on the day of the procedure, drink only clear liquids. Do not eat anything until the procedure is over unless otherwise instructed.
- For your comfort, please go to the bathroom and urinate before leaving for the procedure.
- Your doctor may prescribe medication to relax you. If you take this medication, stay in bed after receiving it. The medication may be given to you in your room or in the Radiology Department.
- You will be asked to sign a permission or “consent” form allowing your doctor or the Radiologist to perform this test.

**What happens when the test is performed?**
- You will lie flat on your back on the x-ray table. The table is lightly padded, but you will still be slightly uncomfortable. If you have any special discomfort, or if you do not feel relaxed, the radiologic technologists. They can help you feel more comfortable.
- An IV (intravenous line) will be started in your hand or arm.
- Your heart rhythm, blood pressure and blood oxygen level will be monitored throughout the procedure.
- A small amount of hair will be shaved from your groin and a towel will be taped into place. The technologist will clean both sides of your groin with an antiseptic (Betadine) and will place sterile towels there.
- The doctor will inject a local anesthetic to numb the area around the artery near your groin. This will feel like a pinprick and will be followed by a stinging or burning feeling for a few seconds. After the local anesthetic is given, you should not feel any pain in your groin.
- An x-ray camera will be placed above the area of your body that will be examined. Then, a thin, flexible tube (catheter) will be inserted into a blood vessel in your groin. The catheter will be moved until the tip is positioned in the arteries being studied.
Arteriogram/Angiogram

What happens when the test is performed? (Continued)

- You will not feel the catheter moving inside you. In fact, you will probably not be aware of it at all.
- Liquid contrast or “dye” will be injected into the catheter. This liquid contrast medium allows your blood vessels to be seen on x-rays. The contrast can make you feel warm, and this feeling may last for 15 to 20 seconds. After this short time, the feeling of heat will disappear completely.
- As the x-ray pictures are taken, lie still and follow the directions given by the Radiologist and the technologists.
- When the procedure is finished, the catheter will be removed. You will not feel the catheter being taken out.
- To prevent bleeding, firm pressure will be applied for 15 to 20 minutes to the artery where the catheter was inserted. A Band-Aid will be put on this area and you will be taken back to your room on a stretcher.

Must I do anything special after the test is over?

- You may eat and drink as usual. Your nurse will check on you often and will look at your groin to see if there is bleeding or swelling.
- Your blood pressure and pulse will be taken at regular intervals. Pulses in your leg and foot will be checked.
- Stay flat in bed and do not sit up until your nurse says that it is okay, or for at least four hours.
- The leg in which the catheter was placed must be kept straight and flat. You may turn from side to side, but keep your leg straight.
- After the procedure, the head of your bed may be raised 30 degrees.
- Drink plenty of fluids, especially water, unless you are specifically told not to. This helps flush the contrast out of the body. Your nurse will measure the amount of liquid you drink and the amount of urine you pass.
- Let the nurse know if you notice tingling, bleeding, swelling, pain or other problems.
- Do not do lifting or strenuous exercise for 24 hours and also avoid going up or down stairs.
- The day after the test, you may remove the Band-Aid from the catheter site and take a shower. Later, your doctor will discuss results of your Arteriogram.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Cystourethrogram

What is the test?

- By filling your bladder with a liquid contrast or “dye” that shows up on x-rays, doctors can watch the motion of your bladder as it fills and empties. Doctors can also see if your urine splashes backwards toward your kidneys as the bladder muscle squeezes. This kind of study can help your doctor to better understand problems with repeated urinary tract infections or problems involving damage to the kidneys. It can also be a useful test for evaluating urine leakage problems.

How do I prepare for the test?

- Let your doctor know if you think you might be pregnant. Women from age 12 – 55 must have had their menstrual cycle within 21 days of the x-ray.
- Tell your doctor before the test if you have ever had an allergic reaction to x-ray contrast (“dye”), or any allergic reaction to seafood.
- If you are taking medication called metformin (Glucophage) to control diabetes, you should talk to your doctor and discontinue the drug before your test.

What happens when the test is performed?

- You will need to have a bendable rubber tube (“urinary catheter”) inserted into your bladder. A nurse usually inserts this soft tube. A part of your genital area will be cleaned with soap on a cotton swab. This tube is then coated with a slippery jelly and then pushed gently through the opening of the urethra (at the end of the penis for men and near the opening of the vagina for women).
- You will feel some pressure while the tube slides into the urethra. Once it is in place, a tiny balloon on the end of the tube will be filled with air to hold it in position. The other end (about 6 inches) will hang outside of your vagina or penis. You will be wearing a hospital gown so that you will not be exposed after this time. You will need to lie flat on your back on the x-ray table. The doctor will fill your bladder with fluid containing a “dye” or contrast that shows up on x-rays. You will definitely feel pressure in your bladder as it begins to expand.
Cystourethrogram

What happens when the test is performed? (Continued)

- In order to get a clear picture, your bladder needs to be filled with as much fluid as it can hold. You will probably feel a very strong urge to urinate. A few pictures will be taken with the bladder completely full and then the balloon will be emptied and the tube in your bladder will be pulled out. You will be given a urinal container or bedpan and asked to urinate while you are still on the table under the x-ray camera. Several pictures will be taken while your bladder is emptying. Many patients find this part of the test embarrassing, but it is routine with every patient and the doctor will think nothing of it.

What risks are there from the test?

- There is a small chance of having an allergy to the x-ray “dye” used in the test. Some patients will have some temporary irritation of their urethra after the tube has been in place and this might result in some burning when urinating for a few hours. Let your doctor know if burning or pain with urinating lasts longer than a day; this could mean you have developed an infection.

- As with all x-rays, there is a small exposure to radiation. In large amounts, radiation exposure can cause cancers or (in pregnant women) birth defects. The amount of radiation from x-ray tests is very small. In fact, it is too small an amount to be likely to cause any harm. X-rays such as this kind in the pelvis area should be avoided in pregnant women, because the developing fetus is more sensitive to the radiation risks.

Must I do anything special after the test is over?

- No.

How long is it before the result of the test is known?

- Typically, you can get the results from your doctor within 24 hours.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Embolization

What is the test?

- This test is a way of occluding (closing) one or more blood vessels that are doing more harm than good. Various materials may be used, depending on whether vessel occlusion is to be temporary or permanent, or whether large or small vessels are being treated. The material is passed through a catheter (small plastic tube) with its tip lying in or near the vessel to be closed. This approach can be used to control or prevent abnormal bleeding.

How do I prepare for the test?

- At least one day before embolization, you will receive instructions from the office staff of the radiologist who will be performing the procedure.
- Prior to the procedure, you may have blood drawn to learn how well your kidneys are functioning and whether your blood clots normally.
- Staff will also advise you to change your medication schedule.
- You will be asked to sign a permission or “consent” form allowing the Radiologist to perform this test.
- Do not eat or drink anything after midnight the morning of the procedure unless specifically instructed otherwise.

What happens when the test is performed?

- An x-ray camera will be placed above the area of your body that will be examined. Then a thin, flexible tube (catheter) will be inserted into a blood vessel in your groin, and placed into the appropriate blood vessel. You will not feel the catheter moving inside you. In fact, you will probably not be aware of it at all.
- Liquid contrast or "dye" will be injected into the catheter. This liquid contrast medium allows your blood vessels to be seen on x-rays. The contrast can make you feel warm, and this feeling may last for 15 to 20 seconds. After this short time, the feeling of heat will disappear completely.
- After determining the precise blood vessels that need to be embolized, the Radiologist advances the catheter into the exact position required and places the blocking device or material into that blood vessel through the catheter. Often, multiple blood vessels are blocked in this fashion.
Embolization

- Contrast injection is repeated to confirm that embolization has had the desired effect, and then the catheter is removed.

Must I do anything special after the test is over?

- You may eat and drink as usual. Your nurse will check on you often and will look at your groin to see if there is bleeding or swelling.
- Your blood pressure and pulse will be taken at regular intervals. Pulses in your leg and foot will be checked.
- Stay flat in bed and do not sit up until your nurse says that it is okay, or for at least four hours.
- The leg in which the catheter was placed must be kept straight and flat for 4 to 6 hours. You may turn from side to side, but keep your leg straight.
- After the procedure, the head of your bed may be raised 30 degrees.
- Drink plenty of fluids, especially water, unless you are specifically told not to. This helps flush the contrast out of the body. Your nurse will measure the amount of liquid you drink and the amount of urine you pass.
- Let the nurse know if you notice tingling, bleeding, swelling, pain or other problems.

Must I do anything special after the test is over? (Continued)

- Do not do lifting or strenuous exercise for 24 hours.
- Avoid going up or down stairs for the first 24 hours.
- The day after the test, you may remove the Band-Aid from the catheter site and take a shower. Later, your doctor will discuss results of your Embolization.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Hysterosalpingogram

What is the test?

- The Hysterosalpingogram is an x-ray study that takes a picture after contrast ("dye"), has filled the inside of the uterus and fallopian tubes. It is a useful test in determining the cause of infertility. It is sometimes also used to evaluate patients who have had several miscarriages or patients with an IUD (intrauterine device) that cannot be seen on regular examinations. This test can show areas of scarring inside a fallopian tube or changes in the uterine cavity, as might occur with a polyp or other growth in the uterus.

How do I prepare for the test?

- Tell your doctor if you ever had an allergic reaction to x-ray contrast ("dye") or if you have had a recent infection in the pelvis.
- Definitely tell your doctor if you think you might be pregnant. This is very important because the x-ray exposure is directed right at the pelvis and ovaries. It is best to have this test done the week after your period ends. This is before ovulation occurs in your cycle, so there would be the least risk of exposing a new early pregnancy to the radiation used in the test. Some doctors will require you to have tests for pelvic infections prior to having a hysterosalpingogram.
- Some doctors recommend that you take antibiotics before the test. If this is your doctor’s practice he or she will give you a prescription for these medications.
- You will be asked to sign a permission or “consent” form allowing your doctor or the Radiologist to perform this test.

What happens when the test is performed?

- This test takes place in the x-ray department. You will lie on your back on a table with your knees bent, as you would for a pelvic exam. A tube called a “speculum” (which looks like a duck bill that can be opened or closed) is used to open the vagina so that the doctor can see inside. This usually causes slight pressure.
Hysterosalpingogram

What happens when the test is performed? (Continued)

- Your vagina and cervix (the part of the uterus that the doctor sees inside your vagina) will be cleaned with an antibacterial soap. A thin clamp might be clipped onto your cervix to hold it steady while the contrast is put into your uterus. A small bendable plastic tube will be pushed gently through the opening in your cervix into your uterus and a tiny balloon on the end of the tube will be filled with air to hold it temporarily in place.
- The thin tube will be left in place, with one end (about 6 inches of tubing) remaining outside of your vagina. The doctor might have you change position at this time, so that you are lying more comfortably. A small amount of contrast (close to a tablespoon) will be injected through the tube into your uterus, and several x-ray pictures will be taken that can show up on a video screen for the doctor to see. The doctor might ask you to move your pelvis slightly or roll from side to side so that the clearest view of your uterus and tubes can be seen.
- When the x-rays are done, the balloon will be emptied of air from the outside and the tube will be gently pulled out.

What risks are there from the test?

- It is common for patients to have a small amount of bleeding from the vagina and some pelvic cramping for a few days after the procedure. If you have some heavy bleeding, fever, or increasing pain in the pelvis you should call your doctor. The most significant risk from this procedure is infection, which can happen in 3 out of 100 patients. Most doctors use water-soluble contrast when they do this procedure.

Must I do anything special after the test is over?

- No.

How long is it before the result of the test is known?

- Typically, you can get the results from your doctor within 24 hours.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Kyphoplasty

What is the test?

• Kyphoplasty is a technique for treating vertebral compression fractures, small breaks in the thick mass of bone that makes up the front part of the vertebra (called the vertebral body). Vertebral body fractures lead to the collapse or compression of a vertebra causing the spine to shorten and curve forward. This can result in pain and a “hunched-over” appearance. Thinning of bones or osteoporosis is the main cause of vertebral compression fractures.

Who is a candidate for this procedure?

• Kyphoplasty is generally reserved for people with painful progressive back pain secondary to osteoporotic vertebral compression fractures. Candidates for this procedure often experience significant decreases in mobility and function as a result of the fractures. To be a candidate for kyphoplasty, a person’s pain must be related to the vertebral fracture and not due to other problems, such as disk herniation and severe arthritis. Imaging tests such as spinal X-rays, bone scans, CT or MRI scans might be ordered to confirm the presence of a vertebral fracture.

Is it safe? Will it hurt?

• Kyphoplasty is safe when performed by appropriately trained and experienced interventional radiologists. As in any other invasive procedure, certain complications and side effects can occur. These will be explained to you in detail before you give your consent for the procedure.
• There may be mild discomfort during the injection of local anesthetic (numbing medication) into the skin prior to the insertion of the needle.

How do I prepare for the test?

• Your doctor will give you specific instructions about taking your regular medications before the procedure.
• You must not eat or drink for 6 hours prior to the procedure.
• Tell your doctor if you are allergic to iodine or have ever had an allergic reaction to X-ray “dye”.
• You will need to have someone drive you home after the procedure.
Kyphoplasty

What happens when the test is performed?

- An IV (intravenous line) will be started in your hand or arm.
- Your heart rhythm, blood pressure and blood oxygen level will be monitored throughout the procedure.
- You may be given local or general anesthesia depending upon the doctor and your medical needs.
- You will lie on your stomach. The skin over the spine is cleaned with a special iodine solution and covered with drapes in order to prevent infection. Local anesthetic (numbing medication) is injected into the skin.
- Once the area is numb, the interventional radiologist will insert a hollow needle (called a trocar) through the skin and into the vertebra. A type of x-ray (fluoroscopy) is used to guide the trocar into position.
- Once the trocar is in position, an inflatable balloon-like device is inserted into the vertebra through the trocar. As the balloon is inflated, it opens up a space to be filled with the bone cement.

How does this technique work?

- Kyphoplasty usually provides pain relief and improved mobility within 48 hours of the procedure. In some cases, however, patients feel pain relief immediately.
- More than 95% of the patients are satisfied with the results with many returning to all their normal activities before the vertebral fracture occurred. Two-thirds of the patients are able to significantly reduce their use of pain medication within a few weeks of the procedure.

Must I do anything special after the test is over?

- You might feel sore in the area where the trocar was inserted. However, this should go away in 2 to 3 days. Applying ice to the area can help relieve the soreness.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Myelography

What is the test?

- A myelogram is an x-ray study that uses contrast media, also referred to as “dye”, directly injected into your spinal canal to help show places where your spinal canal may be getting pinched by the vertebrae in your back. This test is used to help diagnose back or leg pain problems, especially if surgery is planned.

How do I prepare for the test?

- There is no special preparation for the test. Tell your doctor before the test if you have ever had an allergic reaction to the medication lidocaine or the numbing medicine used at the dentist’s office. You should also tell your doctor if you have ever had an allergy to x-ray “dyes”.
- Also let your doctor know if you think you might be pregnant. Women from age 12 – 55 must have had their menstrual cycle within 21 days of the x-ray.
- If you are taking a medication called Metformin (Glucophage) to control diabetes, you should talk to your doctor and discontinue the drug before your test.

What happens when the test is performed?

- Patients usually will be asked to wear a hospital gown. In most cases, you will be asked to lie on your side with your knees curled up against your chest. In some cases, the doctor will ask you to sit on the bed or table instead, leaning forward against some pillows.
- The doctor will feel your back to know where your lower vertebrae are and will feel the bones in the back of your pelvis. An area on your lower back will be cleaned with soap. Medicine through a small needle is used to numb the skin and the tissue underneath the skin in the area. This causes some very brief stinging.
- A different needle is then placed in the same area and moved forward until fluid can be injected through it into the spinal canal. This fluid is a type of dye that shows up on x-rays and allows your doctor to get a clear picture of the fluid space around your spinal cord and to see places where the space is narrowed by bones around it. Because the needle must be placed through a small opening in between two bones, it is sometimes necessary for the doctor to move the needle in and out several times to locate the opening.
Myelography

What happens when the test is performed? (Continued)

- Because of the numbing medicine used in this area, most patients experience only a feeling of pressure from this movement. Occasionally, some patients do experience a sharp feeling of pressure in the back or (rarely) in the leg. Let your doctor know if you feel anything painful.
- Once the dye has been injected, the needle is removed and several x-ray pictures are taken of your back. Sometimes a CT (computed tomography) scan is taken instead.

What risks are there from the test?

- Risks from this test are minimal. A few people can have an allergic reaction to the contrast used in the test. Some people can have soreness in their back for a short time or a headache.

Must I do anything special after the test is over?

- No. Usually a Band-aid is the only dressing necessary for your back.

How long is it before the result of the test is known?

- Typically, you can get the results from your doctor within 24 hours.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Percutaneous Nephrostomy

What is the test?
- Percutaneous nephrostomy is a therapeutic procedure in which a catheter is placed through the skin into the renal collecting system (part of the urinary tract draining the urine between the kidney and bladder), with the assistance of image guidance.

When should I have a Percutaneous Nephrostomy Procedure?
- Indications for this test include obstructions or blockages of the renal collecting system with or without associated infection. Specific diagnoses include hydronephrosis, ureteropelvic junction obstruction and ureterovesical junction obstruction.

Is it safe? Will it hurt?
- The technique of percutaneous nephrostomy, when performed by an appropriately trained and experienced interventional radiologist, is safe. Like any other invasive procedure, certain complications and side effects can occur. These will be explained to you in detail before you give your consent. There may be some discomfort associated with the initial placement of the needle and this is minimized by the administration of general anesthesia or sedation medication and by injection of local anesthetic (numbing medication) into the skin.

How do I prepare for the test?
- You must not eat any solid foods for 8 hours prior to the procedure, although it is okay to drink clear liquids for up to 3 hours before the procedure.

What happens when the test is performed?
- You will be asked to lie flat on your stomach on the x-ray table. The table is lightly padded, but you will still be slightly uncomfortable. If you have any special discomfort, or if you do not feel relaxed, tell the radiologic technologists. They can help you feel more comfortable.
- An IV (intravenous line) will be started in your hand or arm.
- Your heart rhythm, blood pressure and blood oxygen level will be monitored throughout the procedure.
Percutaneous Nephrostomy

What happens when the test is performed? (Continued)

- The interventional radiologist will examine your kidneys with an ultrasound probe. Once you are relaxed, the skin on your back will be washed with a special iodine solution and sterile drapes will be placed over you to prevent infection.
- After injection of the local anesthesia (numbing medicine), the interventional radiologist will, using the ultrasound probe for guidance, pass the needle directly into the collecting system of the kidney. This needle can be used to inject contrast medium to highlight the collecting system inside the kidney on the x-ray monitor images.
- The needle will then be exchanged for a catheter for drainage of urine. This catheter can be connected to a collection bag and kept in place until the cause of the obstruction to urine drainage has been resolved. The catheter can also be used to introduce other catheters or instruments for balloon dilation of narrowed areas within the ureter or removal of kidney stones.

How does this technique work? What does the Radiologist see?

- Ultrasound guidance allows the interventional radiologist to see the best course for passage of a needle from the skin, through the kidney, into the fluid containing structures inside the kidney.
- Once the needle or catheter has been placed inside the kidney and contrast medium is injected, the resulting x-ray images show the collecting system inside the kidney. The radiologist can then determine whether the collecting system is blocked, and if so, exactly where the obstruction is.
- Once the nephrostomy catheter is in place, the urine can flow out of the kidney through the catheter, relieving the pressure in the kidney. The urine drained through the catheter can also be sent for tests to determine whether an infection is present and to determine the best antibiotic medication.
- In certain cases, the catheter can be used to infuse antibiotics and other drugs directly into the kidney. As described above, some obstructions can be treated through the catheter by inflating a balloon across the obstruction and stretching the obstructed area. The x-ray pictures can then be repeated to see whether or not the obstruction has improved.
Percutaneous Nephrostomy

Must I do anything special after the test is over?
  • Explicit instructions will be given to you following the procedure.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Percutaneous Transhepatic Cholangiogram

What is the test?
- Transhepatic cholangiogram is an invasive imaging study that precisely outlines the bile ducts in the liver. It is performed by an interventional radiologist using image guidance and involves placement of a needle, and possible a catheter, directly through the skin and liver and into one of the bile ducts.

When should I have a Transhepatic cholangiogram?
- The physicians involved in your care will decide when to recommend transhepatic cholangiogram. In general, this technique is reserved for patients who have, or are suspected to have, blockage of the bile ducts draining the liver, and in whom precise demonstration of the site and nature of the blockage is needed for medical care. Transhepatic cholangiography is often combined in one procedure with therapy to relieve the blockage or to drain the bile from the liver.

Is it safe? Will it hurt?
- Transhepatic cholangiography is safe when performed by appropriately trained and experienced interventional radiologists. As in any other invasive procedure, certain complications and side effects can occur. These will be explained to you in detail before you give your consent for the procedure.
- There may be mild discomfort during the injection of local anesthetic (numbing medication) into the skin prior to the insertion of the needle.

How do I prepare for the test?
- You must not eat any solid foods for 8 hours prior to the procedure, although it is okay to drink clear liquids for up to 3 hours before the procedure.

What happens when the test is performed?
- You will be asked to lie flat on your back on the x-ray table. The table is lightly padded, but you may still be slightly uncomfortable. If you have any special discomfort, or if you do not feel relaxed, tell the radiologic technologists. They can help you feel more comfortable.
- An IV (intravenous line) will be started in your hand or arm.
Percutaneous Transhepatic Cholangiogram

What happens when the test is performed? (Continued)

- Your heart rhythm, blood pressure and blood oxygen level will be monitored throughout the procedure.
- You will be given medication to help you relax.
- The skin over the abdomen is cleaned with a special iodine solution and covered with drapes in order to prevent infection. Local anesthetic (numbing medication) is injected into the skin.
- Once the area is numb, the interventional radiologist uses ultrasound or fluoroscopy images to guide a needle into one of the bile ducts.
- Once the needle is in good position, contrast medium is injected to outline the bile ducts. A number of x-ray images are taken in different positions to outline all the bile ducts.
- The radiologist may place the needle with a small catheter (tube) to permit more precise injection or to drain the bile.
- Three possible therapeutic options that can be performed through the catheter include balloon dilatation of narrowing in the bile ducts, removal of gallstones with a special basket device and placement of a stent (tube of metallic mesh) across the blocked bile duct. Alternatively, the radiologist may decide to leave a special soft catheter in place to continue draining the bile.

How does this technique work? What does the Radiologist see?

- The contrast injections into the bile ducts allow the radiologist to see all of the bile ducts in the liver and determine whether or not any of them are abnormally blocked or enlarged. The contrast injection also outlines any gallstones or other abnormal material within the bile ducts.

Must I do anything special after the test is over?

- Explicit instructions will be given to you following the procedure.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Peripherally Inserted Central Catheter Placement (PICC)

What is the test?

- You are scheduled for peripherally inserted central catheter (PICC) placement. The PICC is a soft, flexible tube about 24 inches long. It is inserted by a doctor or nurse into one of the major veins in your arm leading to your heart. The PICC may have one or two openings, which can be used for drawing blood, giving fluids, blood medication or nutrition.

How do I prepare for the test?

- Before the PICC is placed, the nurse or doctor will explain the risks involved in placing and using this device.
- You may eat, drink and take your medication prior to the procedure as sedation is not used.

What happens when the test is performed?

- You will be asked to lie down on a bed.
- The vein for catheter placement will be found usually in the upper arm.
- The skin will be prepped with antiseptic solution and draped with sterile coverings and a doctor or nurse will inject a local anesthetic to numb the area.
- A small needle will be guided into the vein using ultrasound guidance.
- The PICC line will then be carefully threaded into the vessel and the placement will be confirmed by an x-ray.
- The device is secured in place.
- Your nurse will be given a report detailing the procedure.

Must I do anything special after the test is over?

- No. You will be provided with written instructions on the care of your PICC line in addition to the contact information for the staff in case you have any questions after you get home.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Transjugular Intrahepatic Portosystemic Shunt (TIPS)

What is TIPS?
- Transjugular Intrahepatic Portosystemic Shunt (TIPS) is the creation of a communication or “shunt” between the portal vein and hepatic vein, using catheter techniques and devices introduced through the internal jugular vein.

When should I get TIPS?
- TIPS is used to lower the blood pressure in the portal vein in patients who have portal hypertension (elevated portal vein pressure), usually due to liver disease. Lowering portal vein pressure is effective in controlling bleeding from the upper gastrointestinal tract in patients who’s bleeding caused by elevated portal vein pressures.

Is it safe? Will it hurt?
- When performed by appropriately trained and experienced Interventional Radiologists, TIPS has a low rate of serious complications (less than 1%). However, it is an invasive procedure with possible complications and side effects. These will be explained to you in detail before you give your consent for the procedure.

How do I prepare for the test?
- You must not eat any solid foods for 8 hours prior to the procedure, although it is okay to drink clear liquids for up to 3 hours before the procedure. Blood tests will be performed prior to the procedure.

What happens when the test is performed?
- The neck is washed with an iodine solution to sterilize it and you will be covered with sterile drapes to prevent infection. The Interventional Radiologist passes a needle through the skin of the neck and into the right internal jugular vein. This needle is then replaced with a catheter system that extends from the jugular vein to the hepatic veins (main veins in the liver).
Transjugular Intrahepatic Portosystemic Shunt (TIPS)

What happens when the test is performed? (Continued)

- The catheter system is used to pass a long needle through the liver tissue between the hepatic vein and the portal vein. Once the needle has entered the portal vein, a guide wire is placed into the main portal vein, the needle is removed and the guide wire is used to then pass a balloon catheter into the main portal vein. The balloon is inflated and this enlarges the track between the two veins.
- The balloon catheter is then removed and a catheter, which has been loaded with a metal stent (tube of metallic mesh), is then placed across the track between two veins. The stent is enlarged by the balloon catheter until it widens the track to the appropriate size by measuring the pressure across the track or shunt and by viewing the portal vein with angiographic images. Once the desired result is achieved, the catheters are removed and general pressure is applied to the site of catheter entry in the neck until there is no further bleeding.

How does this technique work? What does the Radiologist see?

- Bleeding occurs in patients with liver disease because the associated elevation of pressures in the portal vein (a large blood vessel that drains the stomach and bowel and nourished the liver) causes the veins in the stomach and esophagus (varices) to enlarge and erupt.
- Before the TIPS procedure is performed, ultrasound examinations are used to find signs of elevated pressure in the portal vein, which include a reversal of flow (change in direction of blood flow away from the liver).
- Contrast injections show the blood flowing away from the liver into the varices. The shunt created by the TIPS procedure lowers the pressures in the portal vein, so the blood in the vein’s branches along the stomach (the varices) decompresses and drains toward the liver. This reduces the chance of rupture and bleeding of these varices.
- After the TIPS procedure, contrast injections and ultrasound images show blood flow directed toward the liver. The blood in the portal vein passes through the shunt to the heart, thus by passing the diseased liver and the varices.
Transjugular Intrahepatic Portosystemic Shunt (TIPS)

Must I do anything special after the test is over?

- After the procedure you will be sent to an Intensive Care Unit for observation.
- You will need to lie flat for 4 hours.
- If you are feeling fine after the observation period (approximately 12 hrs), you will be able to resume your normal activities with the exception of any heavy lifting.

If there is anything we can do to make you more comfortable while in the Radiology Interventional Department, please do not hesitate to ask.
Uterine Fibroid/Artery Embolization (UFE/UAE)

What is the test?

- This test is a new way of treating fibroid tumors of the uterus. Fibroid tumors, also known as myomas, are masses of fibrous and muscle tissue in the uterine wall. Although benign, they may cause heavy menstrual bleeding, pain in the pelvic region or pressure on the bladder or bowel. Today, UFE is the treatment for women having symptom-producing uterine fibroids.

Who is a candidate for this procedure?

- UAE should be performed on a premenopausal woman with symptoms from fibroid tumors who no longer wishes to become pregnant, but wants to avoid having a hysterectomy.
- UAE may be an excellent alternative for women who do not want to receive blood transfusions.
- This procedure also benefits women who for any reason cannot receive general anesthesia.

How do I prepare for the test?

- You must have a gynecological work-up to make sure that fibroid tumors are the actual cause of the symptoms.
- Imaging of the uterus by Ultrasound or MRI is performed to fully assess the size, number and locations of the fibroids.
- Sometimes, your gynecologist may want to take a direct look by performing laparoscopy.
- If bleeding is a major symptom, a biopsy of the endometrium (the inner lining of the uterus) may be done to exclude the possibility of cancer.
- You will be asked to sign a permission or “consent” form allowing the Radiologist to perform this test.
- Do not eat or drink anything after midnight the morning of the procedure unless specifically instructed otherwise.

Is it safe? Will it hurt?

- Several different types of particles are available for UAE. All of which have been shown to be safe and effective use of fibroid embolization. These include polyvinyl alcohol (a material resembling coarse sand), gelatin sponge (Gelfoam) and microspheres.
- The particles wedge in the uterine vessels, avoiding the risk that they will travel to distant parts of the body.
Uterine Fibroid/Artery Embolization (UFE/UAE)

What happens when the test is performed?

- An IV (intravenous line) will be started in your hand or arm so that a sedative may be injected to make you sleepy.
- Your heart rhythm, breathing, blood pressure and blood oxygen level will be monitored throughout the procedure, which takes 60 to 90 minutes.
- You may be given local anesthesia to make the skin numb at the groin depending upon the doctor and your medical needs.
- The Interventional Radiologist will make a small nick in the skin less than a ¼ inch long and thread a thin tube (catheter) into the femoral artery.
- Using an x-ray camera and liquid contrast or ”dye” to map the blood vessels, the catheter is threaded into the uterine arteries. The contrast can make you feel warm, and this feeling may last for 15 to 20 seconds. After this short time, the feeling of heat will disappear completely.
- Under x-ray observation, the particles are injected until blood flow in the uterine arteries is blocked. In most cases, both uterine arteries can be treated through a single catheter insertion.

How does this technique work?

- It usually takes 2 to 3 months for the fibroids to shrink enough so that symptoms such as pain and pressure improve. It is common for heavy bleeding to improve during the first menstrual cycle following the procedure.

Must I do anything special after the test is over?

- After completing UAE, the site of the skin puncture is cleaned and bandaged.
- You may experience pelvic cramps for several days and mild nausea and low grade fever as well. Your nurse will monitor your side effects. The discomfort is usually controlled with intravenous pain medication. Oral pain medication may be provided upon discharge depending upon your physician.
- Most patients recover from the effects within 1 to 2 weeks and may return to their normal activities.
Uterine Fibroid/Artery Embolization (UFE/UAE)

How long is it before the result of the test is known?

- The Interventional Radiologist that performs your procedure will typically interpret the results within 24 to 48 hours and discuss them with you gynecologist.

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Venography

What is the test?
- A venogram is a diagnostic procedure that precisely demonstrates the veins in a specific part of your body. It is done by a Radiologist who injects contrast medium (X-ray “dye”) into a vein. X-ray images taken during the injection show the inside of the vein.

When should I have a Venogram?
- Since venography is an invasive technique, it is recommended only in specific situations: when precise information regarding veins is required and when this precision cannot be adequately provided by a noninvasive imaging technique such as ultrasound.
- Examples of specific conditions that are investigated with venography include thrombosis (blood clots) of the veins in the legs or other parts of the body and malformations of the veins.
- Venography is also sometimes performed to outline the venous anatomy prior to surgical procedures (such as placement of central venous catheters or hemodialysis fistulas).
- Venography may also be combined with a therapeutic procedure that is performed through the same catheter (like angioplasty or thrombolysis-infusion of drugs to dissolve blood clots).

Is it safe? Will it hurt?
- Venography, when performed by appropriately trained and experienced interventional radiologists, is a safe procedure with no significant long-term side effects. However, as with any other invasive procedure, certain complications can occur. These will be explained to you in detail before you give your consent for the procedure.
- The procedure involves placement of a needle or catheter into a vein. The discomfort of needle placement is minimized by the use of local anesthetic (numbing medication) into the skin prior to the insertion of the needle.
- The remainder of the examination is not painful, although you must lie very still during the procedure.

How do I prepare for the test?
- You must have nothing to eat or drink for 8 hours prior to the procedure.
- A Radiologist or Radiology Nurse will explain the procedure in detail and obtain your signed consent (permission) before the procedure starts.
Venography

What happens when the test is performed?

- Initially, an intravenous line (called an IV) will be started in a vein in the area requiring evaluation. In a leg venogram, for instance, the IV is placed in a vein on the foot. Contrast medium is injected through the IV and a series of X-ray pictures are taken.
- During the time when the X-rays are being taken, you will be asked to hold your breath and lie very still.
- Once the examination is completed, the IV is removed.

How does this technique work? What does the Radiologist see?

- The injection of contrast through an IV helps show the veins on the X-ray images. The Radiologist is then able to determine the location and nature of any abnormalities of the veins such as blockages, areas of enlargement or abnormal anatomy.

Must I do anything special after the test is over?

- No, you may resume your normal activities unless instructed otherwise.

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