

## **Fluoroscopy**

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### *What is Fluoroscopy?*

Fluoroscopy is a study of moving body structures, similar to an x-ray "movie." A continuous x-ray beam is passed through the body part being examined, such as blood traveling through a blood vessel, the diaphragm moving up and down, or food moving through the digestive tract, and is transmitted to a TV-like monitor so that the body part and its motion can be seen in detail. It also can be used to help a health professional locate a foreign object in the body, position a catheter or needle for a procedure, or realign a broken bone.

Fluoroscopy can deliver more radiation than conventional X-rays. A dye (contrast material) that shows up on X-rays can be injected or swallowed during fluoroscopy to outline blood vessels or organs.

Fluoroscopy usually is done during other diagnostic procedures. For example, fluoroscopy is done during cardiac catheterization to evaluate the condition of the coronary arteries and the flow of blood through them. Fluoroscopy may also be used to evaluate the condition of the urinary tract or (during an upper gastrointestinal series) the digestive tract. It may also be done during a hysterosalpingogram to evaluate a woman's reproductive organs.



*Fluoroscopy of lower intestine tract.*

*What are some common uses of the Fluoroscopy?*

Fluoroscopy may be done to:

- Screen for and help guide treatment for coronary artery disease (CAD). During cardiac catheterization, fluoroscopy is used to see the condition of the coronary arteries. For more information, see the medical test Cardiac Catheterization.
- Assess lung expansion and contraction during quiet breathing, deep breathing, or coughing. Fluoroscopy can detect uneven or decreased movement of the diaphragm.
- Evaluate blood flow through an artery. Fluoroscopy is done during a diagnostic test called angiography to evaluate possible problems with blood vessels that affect blood flow. For more information, see the medical test Angiogram.
- Guide some diagnostic and surgical procedures, such as the placement of a catheter during angiography, the insertion of a needle for biopsy, the removal of fluid from a body cavity, or the insertion of a tube into the stomach or small bowel. Fluoroscopy also may be used to help identify and remove a foreign object from the body. It also allows for many minimally invasive treatments of the heart, such as angioplasty.
- Help diagnose some diseases or conditions of the digestive tract, such as ulcerative colitis, tumors, bleeding, bowel obstruction, or

an abdominal hernia. When used to evaluate the stomach, esophagus, and duodenum, fluoroscopy is done with an upper gastrointestinal series. Fluoroscopy is done during a barium enema to evaluate the large intestine or during an X-ray test (called small bowel studies) to assess the small intestine. For more information, see the medical tests Upper Gastrointestinal (UGI) Series and Barium Enema.

- Evaluate the urinary tract. Fluoroscopy may be used during a test called a retrograde ureteropyelography to evaluate the structure and function of the urinary tract. It sometimes is used during intravenous pyelography (IVP). For more information, see the medical test Intravenous Pyelogram (IVP).
- Evaluate a woman's uterus and fallopian tubes. During hysterosalpingography, an X-ray test to assess a woman's reproductive organs, fluoroscopy may be used to identify problems with the uterus or to help detect a blocked fallopian tube. Hysterosalpingography is often done for a woman who is having difficulty becoming pregnant. For more information, see the medical test Hysterosalpingogram.
- Treat bone fractures. Fluoroscopy can be used during orthopedic surgery to help a health professional realign a fractured bone or to place a pin in a fractured bone. A radiologist may use fluoroscopy to assess whether a bone fracture is healing properly.

Fluoroscopy of the chest, blood vessels, digestive tract, urinary tract, or reproductive tract is usually done in the X-ray department of a hospital. It usually does not require an overnight stay in the hospital. The test is performed by a radiologist and an assistant.

Before the test begins, you will be asked to remove any clothing, jewelry, and other metallic objects worn between the neck and the hips. You will be given a hospital gown to wear. Intravenous (IV) tubes, EKG leads, safety pins, and metallic clips must be placed so that they do not show up on the X-rays. For your own comfort, empty your bladder before the test.

During the examination, the room may be darkened so the fluoroscopic images can be seen more clearly. Some fluoroscopic equipment uses image intensifiers so the room can remain lighted. The area of your body to be evaluated will be placed between the X-ray and the fluorescent screen.

During the test, the health professional and assistant may leave the room to avoid unnecessary exposure to radiation. If they remain in the room, they may wear protective lead aprons. Depending on which part of your body is

being studied, you may be given a lead shield to wear to protect your genitals or other vital organs from radiation exposure.

Preparation depends on the type of fluoroscopic examination you are having done. If contrast material will be used during your fluoroscopy, the health professional will want to know whether you are breast-feeding.

*Tell your health professional if you are or might be pregnant. Fluoroscopy is not usually done during pregnancy because of the risk of exposing the fetus to radiation.*

*Who interprets the results of my Fluoroscopy exam and how do I get them?*

Results depend on the type of fluoroscopic examination performed. Your health care professional will inform you of your examination results.

*What are the risks of the Fluoroscopy?*

There is always a slight risk of damage to cells or tissue from being exposed to any radiation, including the low levels of X-rays used for diagnostic X-rays. Fluoroscopy can deliver much larger doses of radiation than conventional X-rays. The amount of radiation you receive depends on how long the fluoroscopy machine is turned on during the procedure. If this test is necessary, the risk of damage from the X-rays is usually very low compared with the potential benefits of the test.

For more information, see the medical tests Cardiac Catheterization, Angiogram, Upper Gastrointestinal (UGI) Series, Barium Enema, Intravenous Pyelogram (IVP), or Hysterosalpingogram.

*What are the limitations of Fluoroscopy?*

The advantages of real-time imaging and the freedom to freely position the X-ray field during examination makes fluoroscopy a very powerful diagnostic tool. However, due to the length of the fluoroscopic examinations, the exposure rate must be kept very much lower than in common radiography.

Many things can interfere with test results, including:

- Metal objects (such as jewelry, EKG leads, IV tubes, or an IUD) within the X-ray field.

- A poorly cleansed digestive tract. Feces (stool), gas, barium from a recent X-ray test, or bismuth from medications such as Pepto-Bismol can interfere with test results.
- Medications, such as narcotics. This may affect a person's ability to take deep and shallow breaths during a fluoroscopic examination of the chest. These medications also may slow bowel motion, which can interfere with the results of digestive tract fluoroscopy.

*What To Think About:*

- Fluoroscopy can deliver more radiation than conventional X-rays. The amount of radiation you receive depends on how long the fluoroscopy machine is turned on during the procedure. If this test is necessary, the risk of damage from the X-rays is usually very low compared with the potential benefits of the test.
- Fluoroscopy is not usually done during pregnancy because of the risk of exposing the fetus to radiation.
- Fluoroscopy is commonly done as part of other diagnostic tests, such as a cardiac catheterization or an upper gastrointestinal series. It also may be done during intravenous pyelography to evaluate the urinary tract or during hysterosalpingography to evaluate the fallopian tubes.

## **Types of Fluoroscopy**

### **Chest Fluoroscopy**

If you are having a fluoroscopic examination of the chest, you may be instructed to take deep and shallow breaths and to cough or sniff while X-rays are taken of your diaphragm and lungs. This test takes about 10 minutes.

There are no special preparations before having a fluoroscopic evaluation of the chest.

You will feel no discomfort from the fluoroscopy X-rays. However, the X-ray table may feel hard and the room may be chilly because air-conditioning is used to keep the X-ray equipment at a constant temperature. You may find that the positions you need to hold are uncomfortable or painful, especially if you have an injury.

## Digestive tract Fluoroscopy

Tell your health professional if you have had an X-ray test using barium contrast material, such as a barium enema, or have taken a medication that contains bismuth, such as Pepto-Bismol, within the past 4 days. Also, tell your health professional if you have an intrauterine device (IUD) in place.

If you are having a fluoroscopic examination of the upper digestive tract, such as an upper GI series or barium swallow, you will swallow several mouthfuls of a thick barium "shake" and swallow repeatedly during the series of X-rays that follow. The radiologist will tell you when and how much to drink. By the end of the test, you may have swallowed 2 cups(473.2 mL) to 2.5 cups(591.5 mL) of the barium mixture. For a barium enema, the contrast material is given through a tube placed in your rectum.

The barium "shake" has a thick, chalky consistency that some people find difficult to swallow, in spite of adding sweeteners and flavoring (usually fruit flavors like strawberry) to make it easier to drink. The tilting of the examination table feels unpleasant to some people. Some people also find the pressure applied to their abdomen slightly uncomfortable.

For 1 to 3 days following the test, your stool (feces) will have a whitish appearance from the barium. Drink plenty of fluids during this time to help flush the barium from your body. If you don't notice a whitish substance in your stool within 2 to 3 days, or if your bowel habits undergo a marked change, inform your health professional. If the barium stays in your intestine, it can harden and cause an obstruction.

The preparation for fluoroscopy of the digestive tract varies, depending on the hospital or clinic. For an upper gastrointestinal series with fluoroscopy, you may be asked not to eat or drink anything for 8 to 12 hours before the test.

For a *barium enema*, preparation usually involves a thorough cleaning of the large intestine, because the colon must be completely clear of stool (feces) and gas. Even a small amount of fecal material can affect the accuracy of the test.

- The preparations usually begin with a clear-liquid diet for 1 to 3 days before the examination.
- The day before the test, you may be asked to take a warm tap water enema to clean any remaining feces from your colon.
- Do not eat or drink anything for 12 hours before the test.

- On the day before the examination, you should drink very large amounts of noncarbonated clear liquids. You will then take a combination of laxatives (often castor oil, magnesium citrate, or bisacodyl) to empty your intestines.
- On the day of the examination, you may need to repeat the tap water enema until the liquid that passes is clear of any stool particles. As an alternative, you may be given a rectal suppository or a commercially prepared enema, such as a Fleets enema, the morning of the examination.

### **Cardiac and Angiography Fluoroscopy**

A fluoroscopic examination of the heart is performed during a cardiac catheterization. The entire procedure usually takes 1 to 2 hours, but it may take longer if additional tests are required.

Blood vessel fluoroscopy is done as part of an angiography test. Angiography usually takes between 1 and 3 hours. .

If you are having a cardiac catheterization or angiography procedure, tell your health professional if you:

- Have asthma, which increases your risk of having an allergic reaction to the contrast material.
- Are allergic to the iodine used as X-ray contrast material or other substances that contain iodine
- Have ever had a serious allergic reaction (anaphylaxis) from any substance, such as the venom from a bee sting or from eating shellfish.
- Have any bleeding problems, or are taking blood-thinning medication, such as aspirin or warfarin (Coumadin).
- Are taking any medications. Cardiac catheterization may require the use of nitrate medication, such as nitroglycerin, that can cause a serious reaction if you have taken sildenafil (Viagra) within the previous 48 hours.

Fluoroscopy of the heart is done during a cardiac catheterization. When the contrast material is injected, you may feel a flushed sensation spread through your body for about 20 to 30 seconds, ranging from mild warmth to

searing heat. You may also experience some nausea, lightheadedness, chest pain, irregular heartbeat, an urge to cough, a headache, mild itching, or hives from the contrast material. If these symptoms occur, tell your health professional. Some people also report a metallic or salty taste from the contrast material.

For many people, the most difficult part of the test is having to lie still for an hour or more on a hard examination table. You may feel some stiffness or cramping.

If you experience chest pain, extreme shortness of breath, dizziness, trouble speaking or swallowing, or paralysis in any part of your body after the test, notify your health professional immediately.

You can expect some soreness, redness, and bruising at the insertion site. But if you feel extreme coldness, pain, numbness, or see a pale color in your arm or leg, report these symptoms to the health professional immediately. These signs could indicate a blockage of blood flow to your arm or leg.

When the contrast material is injected, you will probably feel warmth in the area of your body that is being examined. This sensation lasts only a few seconds. Ask your health professional to tell you in advance where and when you will feel the heat. For some people, the sensation of heat is strong and for others it is very mild.

You may also have a brief headache, flushing of the face, or a salty or metallic taste in your mouth. These sensations will also pass quickly. Some people may feel nauseated or may vomit, but this is uncommon.

After the test, you may notice some tenderness and bruising at the site where the catheter was inserted.

Do not eat or drink for 4 to 8 hours before the test.

### **Reproductive tract Fluoroscopy**

A fluoroscopic examination is done during hysterosalpingography to evaluate a woman's reproductive tract. This test usually takes 15 to 30 minutes. Special preparation is required before having a fluoroscopic test to evaluate the uterus and fallopian tubes.

You will probably feel some cramping similar to menstrual cramps during hysterosalpingography. The amount and length of your discomfort depends upon the condition of your fallopian tubes and the pressure used for

injecting the contrast material. Contrast material injected at high pressure into a blocked tube can produce severe pain that can last for several hours.

### **Urinary tract Fluoroscopy**

A fluoroscopic examination is done during a retrograde ureteropyelography or intravenous pyelography to evaluate the structure and function of the urinary system. Special preparation is required before having a fluoroscopic test to evaluate the urinary tract.

When the contrast material is injected, you may feel slight burning in your arm and flushing throughout your body. You may also notice a salty or metallic taste in your mouth.

### **Orthopedic Fluoroscopy**

If you are having a fluoroscopic examination during orthopedic surgery to treat a bone fracture, your health professional will inform you of any special preparation.