

Lower GI X-ray

Lower gastrointestinal tract radiography or lower GI uses a form of real-time x-ray called fluoroscopy and a barium-based contrast material to help detect disease and abnormalities and diagnose symptoms such as pain, constipation or blood in the stool. It can often provide enough information to avoid more invasive procedures such as colonoscopy.

Tell your doctor if there's a possibility you are pregnant and discuss any recent illnesses, medical conditions, medications you're taking and allergies, especially to contrast materials. Your doctor will instruct you on how to cleanse your bowel, restrict you to clear liquids on the day before your procedure, and not allow you to eat or drink anything after midnight. Take your regular medication with sips of water. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown.



What is a lower GI X-ray?

Lower gastrointestinal (GI) tract radiography, also called a lower GI or barium enema, is an x-ray examination of the large intestine, also known as the colon. This examination evaluates the right or ascending colon, the transverse colon, the left or descending colon, the sigmoid colon and the rectum. The appendix and a portion of the distal small intestine may also be included.

An x-ray exam helps doctors diagnose and treat medical conditions. It exposes you to a small dose of ionizing radiation to produce pictures of the inside of the body. X-rays are the oldest and most often used form of medical imaging.

The lower GI uses a special form of x-ray called fluoroscopy and a contrast material called barium or a water soluble iodinated contrast.

Fluoroscopy makes it possible to see internal organs in motion. When the lower gastrointestinal tract is filled with barium, the radiologist is able to view and assess the anatomy and function of the rectum, colon and sometimes part of the lower small intestine.

What are some common uses of the procedure?

A physician may order a lower GI examination to detect:

- benign tumors (such as polyps).
- cancer.
- ulcerative colitis (inflammatory bowel disease).

- Hirschsprung disease in children (a blockage of the large intestine).

The procedure is frequently performed to help diagnose symptoms such as:

- chronic diarrhea.
- blood in stools.
- constipation.
- irritable bowel syndrome.
- unexplained weight loss.
- a change in bowel habits.
- suspected blood loss.

Images of the small bowel and colon are also used to diagnose inflammatory bowel disease, a group of disorders that includes, fecal incontinence (<https://www.radiologyinfo.org/en/info/fecal-incontinence>) , Crohn's disease and ulcerative colitis.

How should I prepare for the procedure?

Your physician will give you detailed instructions on how to prepare for your lower GI imaging.

Tell your doctor about all the medications you take. List any allergies, especially to iodine contrast materials. Tell your doctor about recent illnesses or other medical conditions.

On the day before the procedure you will likely be asked not to eat, and to drink only clear liquids like juice, tea, black coffee, cola or broth, and to avoid dairy products. After midnight, you should not eat or drink anything. For adults (but not usually in children), it is important that your colon be completely empty for the procedure. You may also be instructed to take a laxative (in either pill or liquid form) and to use an over-the-counter enema preparation the night before the examination and possibly a few hours before the procedure. Just follow your doctor's instructions. You can take your usual prescribed oral medications with limited amounts of water.

You may need to remove some clothing and/or change into a gown for the exam. Remove jewelry, removable dental appliances, eyeglasses, and any metal objects or clothing that might interfere with the x-ray images.

Women should always tell their doctor and technologist if they are pregnant. Doctors will not perform many tests during pregnancy to avoid exposing the fetus to radiation. If an x-ray is necessary, the doctor will take precautions to minimize radiation exposure to the baby. *See the Safety in X-ray, Interventional Radiology and Nuclear Medicine Procedures page* (<https://www.radiologyinfo.org/en/info/safety-radiation>) *for more information about pregnancy and x-rays.*

Infants and children may undergo lower GI radiography. Usually, there is no special preparation, but your doctor will give you detailed instructions to prepare your child for the examination. The use of barium and the taking of x-ray images is similar to that described for adults.

What does the x-ray equipment look like?

This exam typically uses a radiographic table, one or two x-ray tubes, and a video monitor. Fluoroscopy converts x-rays into video images. Doctors use it to watch and guide procedures. The x-ray machine and a detector suspended over the exam table produce the video.

How does the procedure work?

X-rays are a form of radiation like light or radio waves. X-rays pass through most objects, including the body. The technologist carefully aims the x-ray beam at the area of interest. The machine produces a small burst of radiation that passes through your body. The radiation records an image on photographic film or a special detector.

Fluoroscopy uses a continuous or pulsed x-ray beam to create images and project them onto a video monitor. Your exam may use

a contrast material to clearly define the area of interest. Fluoroscopy allows your doctor to view joints or internal organs in motion. The exam also captures still images or movies and stores them electronically on a computer.

Most x-ray images are electronically stored digital files. Your doctor can easily access these stored images to diagnose and manage your condition.

How is the procedure performed?

The lower GI examination is usually done on an outpatient basis and is often scheduled in the morning to reduce the patient's fasting time.

A radiology technologist and a radiologist, a physician specifically trained to supervise and interpret radiology examinations, guide the patient through the barium enema.

The patient is positioned on the examination table and an x-ray film is taken to ensure the bowel is clean. After performing a rectal examination, the radiologist or technologist will then insert a small tube into the rectum and begin to instill, using gravity, a mixture of barium and water into the colon. Air may also be injected through the tube to help the barium thoroughly coat the lining of the colon. In some circumstances, the radiologist or referring physician may prefer a water and iodine solution rather than barium. Next, a series of x-ray images is taken.

You must hold very still and may need to hold your breath for a few seconds while the technologist takes the x-ray. This helps reduce the possibility of a blurred image. The technologist will walk behind a wall or into the next room to activate the x-ray machine.

The patient may be repositioned frequently in order to image the colon from several angles. Some x-ray equipment will allow patients to remain in the same position throughout the examination.

When the examination is complete, the technologist may ask you to wait until the radiologist confirms they have all the necessary images.

Once the x-ray images are completed, most of the barium will be emptied through the tube. The patient will then expel the remaining barium and air in the restroom. In some cases, additional x-ray images will be taken.

A barium enema is usually completed within 30 to 60 minutes.

What will I experience during and after the procedure?

As the barium fills your colon, you will feel the need to move your bowel. You may feel abdominal pressure or even minor cramping. Most people tolerate the mild discomfort easily. The tip of the enema tube is specially designed to help you hold in the barium. If you are having trouble, let the technologist or radiologist know.

During the imaging process, you will be asked to turn from side to side and to hold several different positions. At times, pressure may be applied to your abdomen. With air contrast studies of the bowel (air contrast barium enema), the table may be moved to an upright position.

After the examination, you may be given a laxative or enema to wash the barium out of your system. You can resume a regular diet and take orally administered medications unless told otherwise by your doctor. You may be able to return to a normal diet and activities immediately after the examination. You will be encouraged to drink additional water for 24 hours after the examination.

Your stools may appear white for a day or so as your body clears the barium liquid from your system. Some people experience constipation after a barium enema. If you do not have a bowel movement for more than two days after your exam or are unable to pass gas rectally, call your physician promptly. You may need an enema or laxative to assist in eliminating the barium.

Who interprets the results and how do I get them?

A radiologist (<https://www.radiologyinfo.org/en/info/article-your-radiologist>), a doctor trained to supervise and interpret radiology examinations, will analyze the images. The radiologist will send a signed report to your primary care or referring physician who will discuss the results (<https://www.radiologyinfo.org/en/info/article-read-radiology-report>) with you.

You may need a follow-up exam. If so, your doctor will explain why. Sometimes a follow-up exam further evaluates a potential issue with more views or a special imaging technique. It may also see if there has been any change in an issue over time. Follow-up exams are often the best way to see if treatment is working or if a problem needs attention.

What are the benefits vs. risks?

Benefits

- X-ray imaging of the lower GI tract is a minimally invasive procedure with rare complications.
- Radiology examinations such as the lower GI can often provide enough information to avoid more invasive procedures such as colonoscopy.
- Because barium is not absorbed into the blood, allergic reactions are extremely rare.
- No radiation stays in your body after an x-ray exam.
- X-rays usually have no side effects in the typical diagnostic range for this exam.

Risks

- There is always a slight chance of cancer from excessive exposure to radiation. However, given the small amount of radiation used in medical imaging, the benefit of an accurate diagnosis far outweighs the associated risk.
- The radiation dose for this procedure varies. *See the Radiation Dose in X-Ray and CT Exams* (<https://www.radiologyinfo.org/en/info/safety-xray>) page for more information about radiation dose.
- In rare cases, the barium could leak through an undetected hole in the lower GI tract producing inflammation in surrounding tissues.
- Even more rarely, the barium can cause an obstruction in the gastrointestinal tract, called barium impaction.
- Iodinated contrast administered rectally may cause allergic reactions, but this is very rare.
- Women should always tell their doctor and x-ray technologist if they are pregnant. *See the Safety in X-ray, Interventional Radiology and Nuclear Medicine Procedures* (<https://www.radiologyinfo.org/en/info/safety-radiation>) page for more information about pregnancy and x-rays.

A Word About Minimizing Radiation Exposure

Doctors take special care during x-ray exams to use the lowest radiation dose possible while producing the best images for evaluation. National and international radiology protection organizations continually review and update the technique standards radiology professionals use.

Modern x-ray systems minimize stray (scatter) radiation by using controlled x-ray beams and dose control methods. This ensures that the areas of your body not being imaged receive minimal radiation exposure.

What are the limitations of a lower GI X-ray?

This exam is usually not appropriate for someone who is in extreme abdominal pain or who has had a recent colonic biopsy. If perforation of the colon is suspected, the enema should be performed with a water-soluble contrast solution.

X-ray imaging is not usually indicated for pregnant women.

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