

## **Radiography - Lower GI Tract - (Barium Enema)**

### **What is Lower Gastrointestinal (GI) Tract Radiography?**

This is an x-ray evaluation of the large intestine, also known as the colon. This includes the right or ascending colon, the transverse colon, the left or descending colon and the rectum. The appendix may be seen if it is present and a portion of the small intestine may be visualized as well. Radiological images are created by passing small, highly controlled amounts of radiation through the body and capturing the resulting shadows and reflections on film. Most people are familiar with x-ray images, which produce a still picture of the body's internal organs. A similar imaging method, fluoroscopy, uses x-rays to capture an image of an organ while it is functioning. Though still x-ray images can be useful in examining the colon and rectum, dynamic fluoroscopy is used to obtain optimal images of the colon with the patient in a variety of positions during a barium enema examination.

### **What are some common uses of the procedure?**

A physician may request a lower GI examination to look for diverticula (small outpouchings of the bowel wall), benign tumours (polyps, for example), cancer, or signs of certain other intestinal illnesses. The procedure is frequently performed on individuals suffering from chronic diarrhoea, blood in stools, constipation, irritable bowel syndrome, unexplained weight loss, a change in bowel habits, or to detect a source of suspected blood loss. Images of the bowel and colon are also used to diagnose inflammatory bowel disease, a group of disorders that includes Crohn's disease and ulcerative colitis.

### **How should I prepare for the procedure?**

You should tell your doctor about any allergies you might have to medications, and about any recent illnesses or other medical conditions, especially if you have had any irradiation treatment in the past for cancer of the prostate, uterus or rectum.

Women should always inform their doctor or x-ray technologist if there is any possibility that they are pregnant.

Your doctor will give you detailed instructions on how to prepare for your lower GI imaging. During 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 avoid dairy products. After midnight, you should take nothing by mouth. 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 evening, or even a few hours before the procedure. Just follow your doctor's instructions. It is permissible to take usual prescribed oral medication with limited amounts of water.

Once you arrive at the imaging center, you will be asked to change into a gown before your examination. You may also be asked to remove jewelry, eyeglasses, or any metal objects that could obscure the images.

## **What does the x-ray equipment look like?**

The equipment used for most lower GI examinations consists of a large, flat table. A moveable apparatus extends over a portion of the table and sends real-time images to a television monitor. Multiple static images are obtained by the radiologist and technologist for later review. The table can move and tilt and contains a drawer with a fluorescent plate that captures the image and sends it to a nearby television monitor for viewing.

## **How does the procedure work?**

Very small, physician-controlled amounts of x-ray radiation are passed through the body. Different tissues—such as bone, blood vessels, muscles, and other soft tissues—absorb x-ray radiation at different rates. When a special film plate is exposed to the absorbed x-rays, a detailed image of the inside of the abdomen is captured.

The tissues of the lower GI tract are similar in density, so a contrast material is needed to provide exquisite detail of the inside of the colon. Liquid barium, a dense, non-absorbable metallic solution, is introduced into the colon through a rectal tube. The barium coats the inside of the rectum, colon, and a part of the lower small intestine, and produces a sharp, well-defined image.

## **How is the procedure performed?**

A lower GI radiological examination is often done on an outpatient basis. The radiologist or technologist will discuss details of the examination and can review rare contraindications (circumstances that need special consideration). The patient is positioned on the table, and a preliminary film may be obtained to check for adequacy of the bowel preparation. The radiologist or technologist will then make the contrast material introduction through a small tube inserted into the rectum. A mixture of barium and water is passed into the patient's colon through the tube. To help the barium thoroughly coat the lining of the colon, air or carbon dioxide gas may also be injected through the tube. In some circumstances, the radiologist or referring physician may prefer a water and iodine solution rather than barium to opacify the colon. Then a series of images is captured.

Sometimes spasm of the colon prevents a good examination. The radiologist may give you an injection of Buscopan or Glucagon to relax the colon so as to obtain good quality images.

The patient may be repositioned frequently to enable the radiologist or technologist to capture views of their colon from several angles. Some equipment allows patients to remain in the same position throughout the exam. During the study, the radiologist will monitor the delivery of barium and take or request special views or close-ups.

Once the x-ray images are completed, most of the barium is drawn back into a bag, and the patient is directed to the washroom to expel the remaining barium and air. In some cases, the technologist may then take additional images to help the doctor see how well the colon has cleared. The patient is then released.

A lower GI study typically takes 30 to 60 minutes.

### **What will I experience during 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. These are common sensations, and 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 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, the table may be turned into an upright position.

You are able to return to a normal diet and activities immediately after the exam. Your stools may appear white for a day or so, as your body clears the metallic liquid from your system. You will be encouraged to drink additional water for 24 hours after the examination. After a barium enema, some people experience constipation. 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 doctor promptly. You may need an enema or laxative to assist in eliminating the barium, and your doctor will prescribe the right solution for you.

### **Who interprets the results and how do I get them?**

A radiologist, a physician experienced in GI studies and other radiology examinations, will analyze the images and send a signed report with his or her interpretation to your primary care or referring physician, who will inform you about your results. New technology also allows for distribution of diagnostic reports and referral images over the Internet at many facilities.

### **What are the benefits vs. risks?**

#### **Benefits**

- With the use of the barium contrast material, lower GI imaging provides valuable, detailed information to assist physicians in diagnosing and treating conditions from diverticular disease to inflammation to polyps to cancer.
- X-ray imaging of the lower GI tract is a minimally invasive procedure with rare complications.
- You may return to normal activity following the examination.
- The imaging process is fast and well-tolerated.
- Radiology examination can often provide enough information to avoid more invasive procedures, such as colonoscopy, or may show polyps or other conditions that may need colonoscopy to further investigate or treat them.

#### **Risks**

- In rare cases, the barium suspension could leak through an undetected perforation 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.
- The effective radiation dose from this procedure is about 4 mSv, which is about the same as the average person receives from background radiation in 16 months. *See the Safety page for more information about radiation dose.*
- Women should always inform their doctor or x-ray technologist if there is any possibility that they are pregnant.

**Radiation risks are further minimized by:**

- In rare cases, the barium suspension could leak through an undetected perforation in the lower GI tract, producing inflammation in surrounding tissues.
- Perforation of the rectum is more likely if the bowel is fragile such as after previous irradiation treatment for pelvic cancer. In this situation, the radiologist will modify the technique to increase the safety level.
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**What are the limitations of Lower GI Tract Radiography?**

A barium enema is usually not indicated for someone who is in extreme abdominal pain or had a recent colonic biopsy. If perforation is suspected, the enema should be performed with the iodinated solution. X-ray imaging is not usually indicated for pregnant women.

Provided for your information by the Canadian Association of Radiologists.  
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