

Lower GI Series

National Digestive Diseases Information Clearinghouse



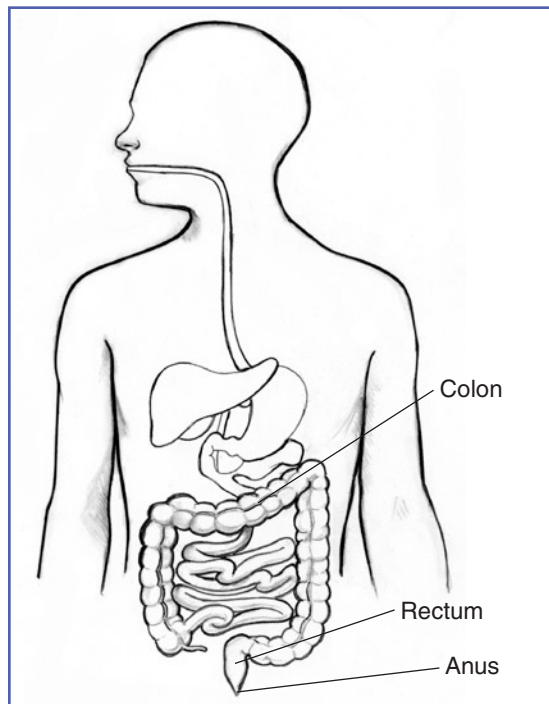
U.S. Department
of Health and
Human Services

NATIONAL
INSTITUTES
OF HEALTH

NIDDK
NATIONAL INSTITUTE OF
DIABETES AND DIGESTIVE
AND KIDNEY DISEASES

What is a lower gastrointestinal (GI) series?

A lower GI series uses x rays to help diagnose problems of the large intestine, which includes the colon and rectum. A lower GI series is sometimes called a barium enema because the large intestine is filled with barium liquid. The barium liquid coats the lining of the large intestine and makes signs of disease show up more clearly on x rays.



A lower GI series uses x rays to help diagnose problems of the large intestine, which includes the colon and rectum.

What problems can a lower GI series detect?

A lower GI series can detect problems of the large intestine, including

- polyps
- diverticula—bulges in the intestinal wall
- cancerous growths
- ulcers
- fistulae—abnormal openings in the intestinal wall that lead to the abdominal cavity, other organs, or the skin's surface
- inflammation

When is a lower GI series used?

A lower GI series can be used to help determine the cause of

- chronic diarrhea
- rectal bleeding
- abdominal pain
- changes in bowel habits
- unexplained weight loss

How to Prepare for a Lower GI Series

To prepare for a lower GI series, patients must empty all solids from the GI tract during a “bowel prep,” which is usually done at home. The doctor provides written bowel prep instructions. Generally, patients follow a clear liquid diet for 1 to 3 days before the procedure. Acceptable liquids include

- fat-free bouillon or broth
- strained fruit juice
- water
- plain coffee
- plain tea
- sports drinks, such as Gatorade
- gelatin

A laxative or enema is usually used the evening before a lower GI series. A laxative is medicine that loosens stool and increases bowel movements. Laxatives are usually swallowed as a pill or as a powder dissolved in water. An enema involves flushing a liquid solution into the anus using a special squirt bottle. Enemas are sometimes repeated the morning of the test.

Sometimes, especially when only the rectum or end of the colon is being evaluated, emptying all solids from the entire GI tract beforehand is not necessary. Instead, the patient undergoes one or more enemas the day of the procedure to remove solids from just the large intestine.

Before starting the bowel prep, patients should tell their doctor about all health issues and medications. Women who may be pregnant should discuss getting an alternate test, such as colonoscopy, or taking precautions to minimize radiation exposure to their unborn child.

How is a lower GI series performed?

A lower GI series is conducted by a radiology technologist or a radiologist—a doctor who specializes in x-ray imaging—at a hospital or outpatient center.

While the patient lies on an x-ray table, a lubricated tube is inserted into the anus and the large intestine is filled with barium liquid. Patients may experience some discomfort and will feel the urge to have a bowel movement. Leakage of barium liquid is prevented by an inflated balloon on the end of the tube. To evenly coat the inside of the large intestine with barium liquid, patients are asked to change positions several times.

X-ray pictures and possibly x-ray video are taken while patients hold still in various positions, allowing the technologist or radiologist to see the large intestine at different angles. If a technologist conducts the lower GI series, a radiologist will later examine the images to look for problems.

When the imaging is complete, the balloon on the tube is deflated and most of the barium liquid drains through the tube. The patient expels the remaining barium liquid into a bed pan or nearby toilet. An enema may be used to flush out the remaining barium liquid. The entire procedure takes 30 to 60 minutes—longer if it includes a double contrast study.

What is a double contrast study?

The double contrast study gets its name from the combination of air and barium liquid working together to create a more detailed view of the intestinal lining on x rays. If performed, a double contrast study takes place after the patient has expelled most of the barium liquid. What remains clings to the intestinal wall. The large intestine is inflated with air, expanding the barium-coated large intestine, and additional x rays are taken.

Recovery from a Lower GI Series

For an hour or so after the procedure, most patients experience bloating. Not eating before the test and the test itself may cause one to feel tired. Repeated bowel movements and enemas during the bowel prep may cause anal soreness. And for several days, traces of barium liquid in the large intestine cause stools to be white or light colored. Unless otherwise directed, patients may immediately resume their normal diet.

What are the risks associated with a lower GI series?

Mild constipation from the barium enema is the most common complication of a lower GI series. Rarely, a barium enema causes bowel obstruction, a life-threatening condition that blocks the intestines. Drinking plenty of liquids after a lower GI series flushes out the barium and reduces the risks of constipation and bowel obstruction.

A 1 to 4 percent risk of acute kidney injury exists from sodium phosphate—a commonly used laxative for lower GI series bowel preps.¹ Laxatives can also lead to temporary but potentially serious imbalances in electrolytes—salts and minerals in the body—possibly causing sluggishness, confusion, muscle cramps, and seizures. People with—or those at risk for—kidney disease should discuss options for minimizing bowel prep-related risks with their doctor.

Rarely, barium liquid causes an allergic reaction, which is treated with antihistamines.

Leakage of barium liquid into the abdomen through a tear in the lining of the large intestine is a rare but serious complication that usually requires emergency surgery to repair.

The risk of radiation-related damage to cells or tissues from a lower GI series is low. People who have recently undergone other x-ray tests should talk with their doctor about potential risks.

Patients who experience any of the following rare symptoms after a lower GI series should contact their doctor immediately:

- severe abdominal pain
- rectal bleeding
- failure to have a bowel movement within 2 days after the procedure
- inability to pass gas
- fever

¹Lien, YH. Is bowel preparation before colonoscopy a risky business for the kidney? *Nature Clinical Practice Nephrology*. 2008;4(11):606–614.

Points to Remember

- A lower gastrointestinal (GI) series uses x rays to help diagnose problems of the large intestine, which includes the colon and rectum.
- A lower GI series can detect polyps, diverticula, cancerous growths, and other problems.
- To prepare for a lower GI series, patients must empty all solids from the GI tract during a “bowel prep,” which is usually done at home.
- A lower GI series is performed by a radiology technologist or a radiologist at a hospital or outpatient center.
- During the procedure, the large intestine is filled with barium liquid and x-ray pictures and possibly x-ray video are taken.
- After the procedure, patients may feel tired and bloated and may experience anal soreness from the bowel prep.
- Possible risks of a lower GI series include mild constipation, bowel obstruction, kidney injury, electrolyte imbalances, an allergic reaction to barium liquid, leakage of barium into the abdomen, and cell or tissue damage from radiation exposure.

Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) conducts and supports basic and clinical research into many digestive disorders.

Participants in clinical trials can play a more active role in their own health care, gain access to new research treatments before they are widely available, and help others by contributing to medical research. For information about current studies, visit www.ClinicalTrials.gov.

For More Information

Fact sheets about other diagnostic tests are available from the National Digestive Diseases Information Clearinghouse at www.digestive.niddk.nih.gov, including

- *Colonoscopy*
- *ERCP (Endoscopic Retrograde Cholangiopancreatography)*
- *Flexible Sigmoidoscopy*
- *Liver Biopsy*
- *Upper GI Endoscopy*
- *Upper GI Series*
- *Virtual Colonoscopy*

American College of Gastroenterology

P.O. Box 342260
Bethesda, MD 20827-2260
Phone: 301-263-9000
Fax: 301-263-9025
Email: info@acg.gi.org
Internet: www.acg.gi.org

American Gastroenterological Association

4930 Del Ray Avenue
Bethesda, MD 20814
Phone: 301-654-2055
Fax: 301-654-5920
Email: member@gastro.org
Internet: www.gastro.org

Acknowledgments

Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts. This publication was reviewed by M. Brian Fennerty, M.D., Oregon Health and Science University.

You may also find additional information about this topic by visiting MedlinePlus at www.medlineplus.gov.

This publication may contain information about medications. When prepared, this publication included the most current information available. For updates or for questions about any medications, contact the U.S. Food and Drug Administration toll-free at 1-888-INFO-FDA (1-888-463-6332) or visit www.fda.gov. Consult your doctor for more information.

The U.S. Government does not endorse or favor any specific commercial product or company. Trade, proprietary, or company names appearing in this document are used only because they are considered necessary in the context of the information provided. If a product is not mentioned, the omission does not mean or imply that the product is unsatisfactory.

National Digestive Diseases Information Clearinghouse

2 Information Way
Bethesda, MD 20892-3570
Phone: 1-800-891-5389
TTY: 1-866-569-1162
Fax: 703-738-4929
Email: nddic@info.niddk.nih.gov
Internet: www.digestive.niddk.nih.gov

The National Digestive Diseases Information Clearinghouse (NDDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health of the U.S. Department of Health and Human Services. Established in 1980, the Clearinghouse provides information about digestive diseases to people with digestive disorders and to their families, health care professionals, and the public. The NDDIC answers inquiries, develops and distributes publications, and works closely with professional and patient organizations and Government agencies to coordinate resources about digestive diseases.

This publication is not copyrighted. The Clearinghouse encourages users of this publication to duplicate and distribute as many copies as desired.

This publication is available at
www.digestive.niddk.nih.gov.



U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES
National Institutes of Health

NIH Publication No. 10-4334
December 2009