Gastroparesis

National Digestive Diseases Information Clearinghouse

U.S. Department of Health and Human Services

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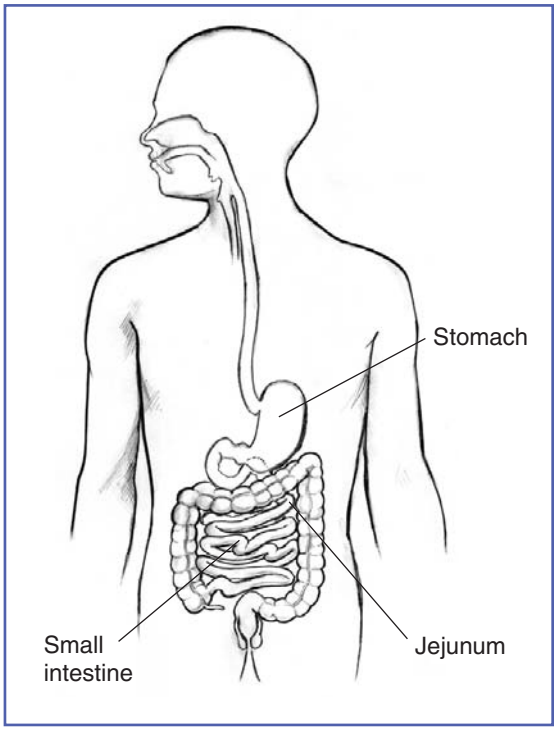
What is gastroparesis?

Gastroparesis, also called delayed gastric emptying, is a disorder that slows or stops the movement of food from the stomach to the small intestine. Normally, the muscles of the stomach, which are controlled by the vagus nerve, contract to break up food and move it through the gastrointestinal (GI) tract. The GI tract is a series of hollow organs joined in a long, twisting tube from the mouth to the anus. The movement of muscles in the GI tract, along with the release of hormones and enzymes, allows for the digestion of food. Gastroparesis can occur when the vagus nerve is damaged by illness or injury and the stomach muscles stop working normally. Food then moves slowly from the stomach to the small intestine or stops moving altogether.



Gastroparesis slows or stops the movement of food from the stomach to the small intestine.

What causes gastroparesis?

Most people diagnosed with gastroparesis have idiopathic gastroparesis, which means a health care provider cannot identify the cause, even with medical tests. Diabetes is the most common known cause of gastroparesis. People with diabetes have high levels of blood glucose, also called blood sugar. Over time, high blood glucose levels can damage the vagus nerve. Other identifiable causes of gastroparesis include intestinal surgery and nervous system diseases such as Parkinson's disease or multiple sclerosis. For reasons that are still unclear, gastroparesis is more commonly found in women than in men.

What are the symptoms of gastroparesis?

The most common symptoms of gastroparesis are nausea, a feeling of fullness after eating only a small amount of food, and vomiting undigested food—sometimes several hours after a meal. Other symptoms of gastroparesis include

- gastroesophageal reflux (GER), also called acid reflux or acid regurgitation—a condition in which stomach contents flow back up into the esophagus, the organ that connects the mouth to the stomach
- pain in the stomach area
- abdominal bloating
- lack of appetite

Symptoms may be aggravated by eating greasy or rich foods, large quantities of foods with fiber—such as raw fruits and vegetables—or drinking beverages high in fat or carbonation. Symptoms may be mild or severe, and they can occur frequently in some people and less often in others. The symptoms of gastroparesis may also vary in intensity over time in the same individual. Sometimes gastroparesis is difficult to diagnose because people experience a range of symptoms similar to those of other diseases.

How is gastroparesis diagnosed?

Gastroparesis is diagnosed through a physical exam, medical history, blood tests, tests to rule out blockage or structural problems in the GI tract, and gastric emptying tests. Tests may also identify a nutritional disorder or underlying disease. To rule out any blockage or other structural problems, the health care provider may perform one or more of the following tests:

- **Upper gastrointestinal (GI) endoscopy.** This procedure involves using an endoscope—a small, flexible tube with a light—to see the upper GI tract, which includes the esophagus, stomach, and duodenum—the first part of the small intestine. The test is performed at a hospital or outpatient center by a gastroenterologist—a doctor who specializes in digestive diseases. The endoscope is carefully fed down the esophagus and into the stomach and duodenum. A small camera mounted on the endoscope transmits a video image to a monitor, allowing close examination of the intestinal lining. A person may receive a liquid anesthetic that is gargled or sprayed on the back of the throat. An intravenous (IV) needle is placed in a vein in the arm if general anesthesia is given. The test may show blockage or large bezoars—solid collections of food, mucus, vegetable fiber, hair, or other material that cannot be digested in the stomach—that are sometimes softened, dissolved, or broken up during an upper GI endoscopy.

- **Upper GI series.** An upper GI series may be done to look at the small intestine. The test is performed at a hospital or outpatient center by an x-ray technician, and the images are interpreted by a radiologist—a doctor who specializes in medical imaging. Anesthesia is not needed. No eating or drinking is allowed for 8 hours before the procedure, if possible. If the person has diabetes, a health care provider may give different instructions about fasting before the test. During the procedure, the person will stand or sit in front of an x-ray machine and drink barium, a chalky liquid. Barium coats the small intestine, making signs of gastroparesis show up more clearly on x rays. Gastroparesis is likely if the x ray shows food in the stomach after fasting. A person may experience bloating and nausea for a short time after the test. For several days afterward, barium liquid in the GI tract causes stools to be white or light colored. A health care provider will give the person specific instructions about eating and drinking after the test.
- **Ultrasound.** Ultrasound uses a device, called a transducer, that bounces safe, painless sound waves off organs to create an image of their structure. The procedure is performed in a health care provider's office, outpatient center, or hospital by a specially trained technician, and the images are interpreted by a radiologist; anesthesia is not needed. The images can show whether gallbladder disease and pancreatitis could be the cause of a person's digestive symptoms, rather than gastroparesis.
- **Gastric emptying scintigraphy.** The test involves eating a bland meal—such as eggs or an egg substitute—that contains a small amount of radioactive material. The test is performed in a radiology center or hospital by a specially trained technician and interpreted by a radiologist; anesthesia is not needed. An external camera scans the abdomen to show where the radioactive material is located. The radiologist is then able to measure the rate of gastric emptying at 1, 2, 3, and 4 hours after the meal. If more than 10 percent of the meal is still in the stomach at 4 hours, the diagnosis of gastroparesis is confirmed.
- **SmartPill.** The SmartPill is a small electronic device in capsule form. The SmartPill test is available at specialized outpatient centers. The images are interpreted by a radiologist. The device is swallowed and moves through the entire digestive tract, sending information to a cell-phone-sized receiver worn around the person's waist or neck. The recorded information provides a detailed record of how quickly food travels through each part of the digestive tract.
- **Breath test.** With this test, the person eats a meal containing a small amount of radioactive material; then breath samples are taken over a period of several hours to measure the amount of radioactive material in the exhaled breath. The results allow the health care provider to calculate how fast the stomach is emptying.

How is gastroparesis treated?

Treatment of gastroparesis depends on the severity of the person's symptoms. In most cases, treatment does not cure gastroparesis, which is usually a chronic, or long-lasting, condition. Gastroparesis is also a relapsing condition—the symptoms can come and go for periods of time. Treatment helps people manage the condition so they can be as comfortable and active as possible.

Eating, Diet, and Nutrition

Changing eating habits can sometimes help control the severity of gastroparesis symptoms. A health care provider may suggest eating six small meals a day instead of three large ones. If less food enters the stomach each time a person eats, the stomach may not become overly full, allowing it to empty more easily. Chewing food well, drinking noncarbonated liquids with a meal, and walking or sitting for 2 hours after a meal—instead of lying down—may assist with gastric emptying.

A health care provider may also recommend avoiding high-fat and fibrous foods. Fat naturally slows digestion and some raw vegetables and fruits are more difficult to digest than other foods. Some foods, such as oranges and broccoli, contain fibrous parts that do not digest well. People with gastroparesis should minimize their intake of large portions of these foods because the undigested parts may remain in the stomach too long. Sometimes, the undigested parts form bezoars.

When a person has severe symptoms, a liquid or puréed diet may be prescribed. As liquids tend to empty more quickly from the stomach, some people may find a puréed diet helps improve symptoms. Puréed fresh or cooked fruits and vegetables can be incorporated into shakes and soups. A health care provider may recommend a dietitian to help a person plan meals that minimize symptoms and ensure all nutritional needs are met.

When the most extreme cases of gastroparesis lead to severe nausea, vomiting, and dehydration, urgent care may be required at a medical facility where IV fluids can be given.

Medications

Several prescription medications are available to treat gastroparesis. A combination of medications may be used to find the most effective treatment.

Metoclopramide (Reglan). This medication stimulates stomach muscle contractions to help with gastric emptying. Metoclopramide also helps reduce nausea and vomiting. The medication is taken 20 to 30 minutes before meals and at bedtime. Possible side effects of metoclopramide include fatigue, sleepiness, and depression. Currently, this is the only medication approved by the FDA for treatment of gastroparesis. However, the FDA has placed a black box warning on this medication because of rare reports of it causing an irreversible neurologic side effect called tardive dyskinesia—a disorder that affects movement.

Erythromycin. This antibiotic, prescribed at low doses, may improve gastric emptying. Like metaclopramide, erythromycin works by increasing the contractions that move food through the stomach. Possible side effects of erythromycin include nausea, vomiting, and abdominal cramps.

Other medications. Other medications may be used to treat symptoms and problems related to gastroparesis. For example, medications known as antiemetics are used to help control nausea and vomiting.

Botulinum Toxin

Botulinum toxin is a nerve blocking agent also known as Botox. After passing an endoscope into the stomach, a health care provider injects the Botox into the pylorus, the opening from the stomach into the duodenum. Botox is supposed to help keep the pylorus open for longer periods of time and improve symptoms of gastroparesis. Although some initial research trials showed modest improvement in gastroparesis symptoms and the rate of gastric emptying following the injections, other studies have failed to show the same degree of effectiveness of the Botox injections.[1]

Gastric Electrical Stimulation

This treatment alternative may be effective for some people whose nausea and vomiting do not improve with dietary changes or medications. A gastric neurostimulator is a surgically implanted battery-operated device that sends mild electrical pulses to the stomach muscles to help control nausea and vomiting. The procedure may be performed at a hospital or outpatient center by a gastroenterologist. General anesthesia may be required. The gastroenterologist makes several tiny incisions in the abdomen and inserts a laparoscope—a thin tube with a tiny video camera attached. The camera sends a magnified image from inside the stomach to a video monitor, giving the gastroenterologist a close-up view of the tissues. Once implanted, the settings on the battery-operated device can be adjusted to determine the settings that best control symptoms.

Jejunostomy

If medications and dietary changes don't work, and the person is losing weight or requires frequent hospitalization for dehydration, a health care provider may recommend surgically placing a feeding tube through the abdominal wall directly into a part of the small intestine called the jejunum. The surgical procedure is known as a jejunostomy. The procedure is performed by a surgeon at a hospital or outpatient center. Anesthesia is needed. The feeding tube bypasses the stomach and delivers a special liquid food with nutrients directly into the jejunum. The jejunostomy is used only when gastroparesis is extremely severe.

Parenteral Nutrition

When gastroparesis is so severe that dietary measures and other treatments are not helping, a health care provider may recommend parenteral nutrition—an IV liquid food mixture supplied through a special tube in the chest. The procedure is performed by a surgeon at a hospital or outpatient center; anesthesia is needed. The surgeon inserts a thin, flexible tube called a catheter into a chest vein, with the catheter opening outside the skin. A bag containing liquid nutrients is attached to the catheter, and the nutrients are transported through the catheter into the chest vein and into the bloodstream. This approach is a less preferable alternative to a jejunostomy and is usually a temporary treatment to get through a difficult period of gastroparesis.

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[1]Bai Y, Xu MJ, Yang X, et al. A systematic review on intrapyloric botulinum toxin injection for gastroparesis. *Digestion.* 2010;81(1):27–34.

How is gastroparesis treated if a person has diabetes?

An elevated blood glucose level directly interferes with normal stomach emptying, so good blood glucose control in people with diabetes is important. However, gastroparesis can make blood glucose control difficult. When food that has been delayed in the stomach finally enters the small intestine and is absorbed, blood glucose levels rise. Gastric emptying is unpredictable with gastroparesis, causing a person's blood glucose levels to be erratic and difficult to control.

The primary treatment goals for gastroparesis related to diabetes are to improve gastric emptying and regain control of blood glucose levels. In addition to the dietary changes and treatments already described, a health care provider will likely adjust the person's insulin regimen.

To better control blood glucose, people with diabetes and gastroparesis may need to

- take insulin more often or change the type of insulin they take
- take insulin after meals, instead of before
- check blood glucose levels frequently after eating and administer insulin when necessary

A health care provider will give specific instructions for taking insulin based on the individual's needs and the severity of gastroparesis.

In some cases, the dietitian may suggest eating several liquid or puréed meals a day until gastroparesis symptoms improve and blood glucose levels are more stable.

What are the problems of gastroparesis?

The problems of gastroparesis can include

- severe dehydration due to persistent vomiting
- gastroesophageal reflux disease (GERD), which is GER that occurs more than twice a week for a few weeks; GERD can lead to esophagitis—irritation of the esophagus
- bezoars, which can cause nausea, vomiting, obstruction, or interfere with absorption of some medications in pill form
- difficulty managing blood glucose levels in people with diabetes
- malnutrition due to poor absorption of nutrients or a low calorie intake
- decreased quality of life, including work absences due to severe symptoms

Points to Remember

- Gastroparesis, also called delayed gastric emptying, is a disorder that slows or stops the movement of food from the stomach to the small intestine.
- Gastroparesis can occur when the vagus nerve is damaged by illness or injury and the stomach muscles stop working normally. Food then moves slowly from the stomach to the small intestine or stops moving altogether.
- Most people diagnosed with gastroparesis have idiopathic gastroparesis, which means a health care provider cannot identify the cause, even with medical tests.

- Diabetes is the most common known cause of gastroparesis. People with diabetes have high levels of blood glucose, also called blood sugar. Over time, high blood glucose levels can damage the vagus nerve.
- The most common symptoms of gastroparesis are nausea, a feeling of fullness after eating only a small amount of food, and vomiting undigested food—sometimes several hours after a meal. Other common symptoms include gastroesophageal reflux (GER), pain in the stomach area, abdominal bloating, and lack of appetite.
- Gastroparesis is diagnosed through a physical exam, medical history, blood tests, tests to rule out blockage or structural problems in the gastrointestinal (GI) tract, and gastric emptying tests.
- Changing eating habits can sometimes help control the severity of gastroparesis symptoms. A health care provider may suggest eating six small meals a day instead of three large ones. When a person has severe symptoms, a liquid or puréed diet may be prescribed.
- Treatment of gastroparesis may include medications, botulinum toxin, gastric electrical stimulation, jejunostomy, and parenteral nutrition.
- For people with gastroparesis and diabetes, a health care provider will likely adjust the person's insulin regimen.

Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases' (NIDDK's) Division of Digestive Diseases and Nutrition supports basic and clinical research into GI motility disorders, including gastroparesis.

Researchers are studying whether new medications or surgery can improve gastric emptying and reduce gastroparesis symptoms. Researchers are evaluating the safety and effectiveness of nortriptyline for treatment of gastroparesis. More information about one such study, funded under the National Institutes of Health clinical trial number NCT00765895, can be found at *www.ClinicalTrials.gov*.

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*.

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