



The Challenge of Gastroparesis

A GUIDE TO UNDERSTANDING AND MANAGEMENT



TABLE OF CONTENTS

Gastroparesis: A Serious Digestive Problem	3
How the Stomach Works	4
Typical Symptoms of Gastroparesis	4
Common Causes of Gastroparesis	5
When to Seek Treatment	6
Diagnostic Testing	7
Treatment Options	8
Enterra® Therapy	9
Next Steps	11
For More Information	12
Ask Your Doctor	13
Glossary	14

GASTROPARESIS: A SERIOUS DIGESTIVE PROBLEM

Gastroparesis is a stomach disorder in which food moves through the stomach more slowly than normal. In a healthy digestive system, strong muscular contractions move food from the stomach through the digestive tract. With gastroparesis, however, the stomach muscles work poorly (or not at all), thus preventing the stomach from emptying properly.

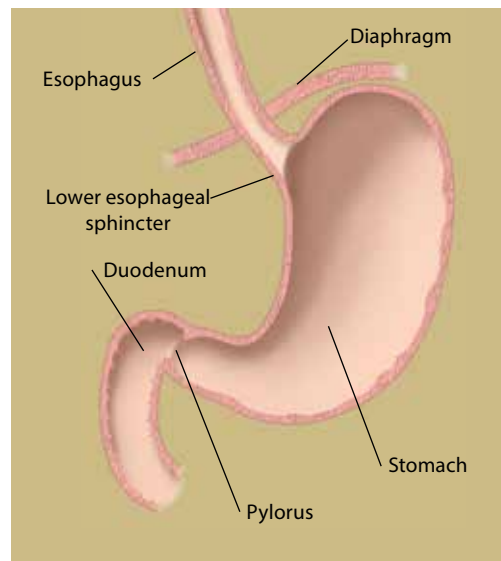
The impact of gastroparesis on physical well-being can be devastating. It can cause chronic nausea and vomiting and lead to malnutrition and inadequate blood sugar levels. Living with gastroparesis also affects emotional well-being—the constant discomfort of chronic nausea and vomiting can have an impact on school and work performance, family and personal relationships, and social activities.

The number of people with gastroparesis is unknown. There is no cure, but there are therapies that improve symptoms and offer hope for a better quality of life.



This booklet provides an overview of gastroparesis—what causes it, how to diagnose it, and possible ways to treat it.

HOW THE STOMACH WORKS



The stomach within the digestive system.

The stomach's job involves storage of food, mixing food with stomach secretions, grinding food into small particles, and moving these particles into the small intestine. Solids and liquids empty at different rates, and emptying is controlled by muscle contractions in different regions of the stomach. All of these processes should occur at a rate that makes digestion easy and efficient.

If stomach muscle contractions stop working properly, the result can be "delayed gastric emptying," where undigested food and fluids sit in the stomach and cause uncomfortable symptoms such as chronic nausea and vomiting.

TYPICAL SYMPTOMS OF GASTROPARESIS

People with gastroparesis experience a number of gastrointestinal symptoms, with chronic nausea and frequent vomiting being the most common. Vomiting usually occurs a few hours after eating when the stomach is full of undigested food and normal stomach secretions. Sometimes, accumulated stomach enzymes and acids can cause vomiting even on an empty stomach. Problems can occur with solid food, a combination of solid food and liquids, and occasionally with liquids alone.

These symptoms prevent a person from eating normally and may lead to dehydration, malnutrition, and electrolyte imbalances.

In addition to nausea and vomiting, symptoms of gastroparesis may include:

- **Abdominal bloating**
- **Abdominal pain**
- **Feelings of fullness after only a few bites of food (early satiety)**
- **Heartburn or gastroesophageal reflux disease (GERD)**
- **Changes in blood sugar levels**
- **Lack of appetite**
- **Excessive weight loss**

COMMON CAUSES OF GASTROPARESIS

Damage to the vagus nerve is the leading cause of gastroparesis. This nerve stretches from the brain stem to the colon and controls many functions in the body, including the esophagus, stomach, and intestines. Damage to stomach muscles also can result in gastroparesis. The most common causes of gastroparesis are:¹

Idiopathic. Diagnosing gastroparesis can be challenging. Delayed gastric emptying without apparent cause or underlying abnormality is the most common form of gastroparesis and accounts for 35.6% of cases. On rare occasions, gastroparesis develops after a person recovers from the flu or other viral illness.

Diabetes, either Type 1 or Type 2. High blood glucose levels and their metabolic effects can damage the vagus nerve over time and interfere with normal function, making diabetes another common cause of gastroparesis (29%). In turn, the inconsistent stomach emptying and poor absorption associated with gastroparesis make blood sugar levels harder to control.

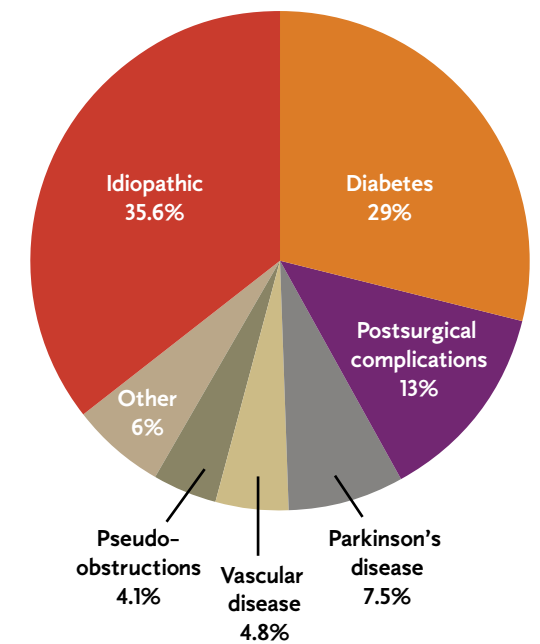
Postsurgical complications. Occasionally, surgical procedures, especially those involving the esophagus, stomach, or upper part of the small intestine, can injure the vagus nerve and lead to gastroparesis (13%). Symptoms may appear immediately or years after the surgery.

Enterra Therapy is not indicated for gastroparetic symptoms due to post surgical complications.

Other Causes. A variety of other medical conditions can cause gastroparesis, such as Parkinson's disease (7.5%), vascular disease (4.8%), and pseudo-obstructions (4.1%).

There are various other causes for gastroparesis (6%). Sometimes medications slow stomach emptying and result in symptoms that mimic gastroparesis.

Causes of Gastroparesis



Ask your doctor about other medical conditions or medications that may cause symptoms similar to those of gastroparesis.

WHEN TO SEEK TREATMENT

Many people experience occasional nausea and vomiting from other conditions. There are, however, significant warning signs that indicate the possible presence of gastroparesis, including:

- Nausea and/or vomiting occurring several times a day
- Nausea and/or vomiting episodes occurring for longer than 12 months
- Weight loss over the past year due to nausea and/or vomiting
 - Excessive weight gain over the past year due to improper nutrition resulting from chronic nausea and/or vomiting
 - Supplemental nutrition needed because of nausea and/or vomiting
 - Repeated hospitalizations due to nausea and/or vomiting
 - Inadequate relief of symptoms from medications for nausea and/or vomiting
 - Diminished quality of life due to chronic nausea and/or vomiting

If you experience one or more of these warning signs, please consult your doctor for further testing and evaluation.

DIAGNOSTIC TESTING

Several other digestive disorders exhibit symptoms of nausea and vomiting. Your doctor will ask for some additional testing (after taking a complete medical history and performing a physical examination) in order to determine a diagnosis. This testing includes:

Primary Tests (required)

Upper Gastrointestinal Endoscopy. This test is used to exclude other conditions that may be causing symptoms (e.g., ulcers, physical abnormalities, or mechanical obstruction). A thin, flexible tube (endoscope) with a tiny camera at the tip is passed through the mouth and guided into the stomach while the patient is asleep. The endoscope allows the doctor to look into the stomach and at its lining for abnormalities.

Gastric Emptying Test (GET). This procedure measures the speed with which food empties from the stomach and enters into the small intestine. The GET, considered the most accurate way to diagnose gastroparesis, requires that the person eat a meal in which a solid food (usually eggs or oatmeal) contains a small and safe amount of a substance that will appear on a medical scan. A scanner is placed over the abdomen to monitor the food's movement.

Secondary Tests (may not be necessary)

Gastroduodenal Manometry. In this test, the doctor passes a thin, pressure-sensitive tube down the throat and into the stomach and small intestine. A computer connected to the tube monitors the strength and coordination of stomach muscle contractions and how well the stomach is emptying.

Electrogastrography (EGG). This procedure records the electrical signals in the stomach before and after eating. An irregular electrical rhythm may indicate the presence of gastroparesis.

Your doctor may prescribe other tests.

TREATMENT OPTIONS

There is no cure for gastroparesis but several treatments are available that improve symptoms and offer a more comfortable lifestyle. Treatment options include:

Nutrition Education/Diet Modifications. Patients are often initially treated with nutrition education and diet modifications. The purpose of diet modification is to reduce symptoms and maintain adequate fluids and nutrition. A modified diet typically consists of liquids, restricted fats and plant fiber, and frequent small meals.

Medications. The most common drugs used to treat symptoms include:

Prokinetic drugs—used to improve the rate of stomach emptying and thereby reduce nausea and vomiting. Examples include erythromycin (an antibiotic) and Reglan® (metoclopramide).²

Antiemetic drugs—used to control nausea and vomiting but have no effect on stomach emptying. Examples include Compazine® (prochlorperazine) and Phenergan® (promethazine).²

Enteral Nutrition. This therapy involves the delivery of liquid nutrients via a tube placed directly into the stomach or small intestine. Feeding tubes are usually temporary and used only when gastroparesis is severe.

Total Parenteral Nutrition (TPN). TPN supplies nutrients to a person's bloodstream through an intravenous (IV) infusion. TPN is used only if enteral feeding is not tolerated or is insufficient to meet caloric needs.

Surgery. Surgery for gastroparesis is considered a treatment of last resort. One surgery, called pyloroplasty, involves widening of the pyloric valve (the muscle that separates the stomach from the upper region of the small intestine or duodenum). Another procedure, gastrectomy, involves the removal of part or all of the stomach. Other surgical procedures involve bypassing the lowest part of the stomach to improve emptying.

Enterra® Therapy for Gastroparesis. This surgical option is indicated for patients with chronic, drug-refractory (resistant to medication) nausea and vomiting due to gastroparesis of diabetic or idiopathic origin. Enterra Therapy uses a neurostimulator that is implanted beneath the skin and connected to two leads implanted in stomach muscle. Your doctor can determine if you are a candidate for Enterra Therapy. (More information about Enterra Therapy is provided on page 9).

Any combination of diet modification, medication, nutritional support, and Enterra Therapy may be necessary to control symptoms of gastroparesis.

Ask your doctor about potential side effects associated with each treatment option.

ENTERRA THERAPY

Gastric Electrical Stimulation for Gastroparesis

Enterra Therapy is designed to improve chronic, drug-refractory nausea and vomiting associated with gastroparesis of diabetic or idiopathic origin.

The Enterra Therapy system consists of a neurostimulator (about the size of a pocket watch: 2.2" high x 2.4" long x 0.4" thick) implanted beneath the skin, usually in the lower abdominal region. Two leads (insulated wires) are implanted in stomach muscle and then connected to the neurostimulator. The surgical procedure is performed under general anesthesia.



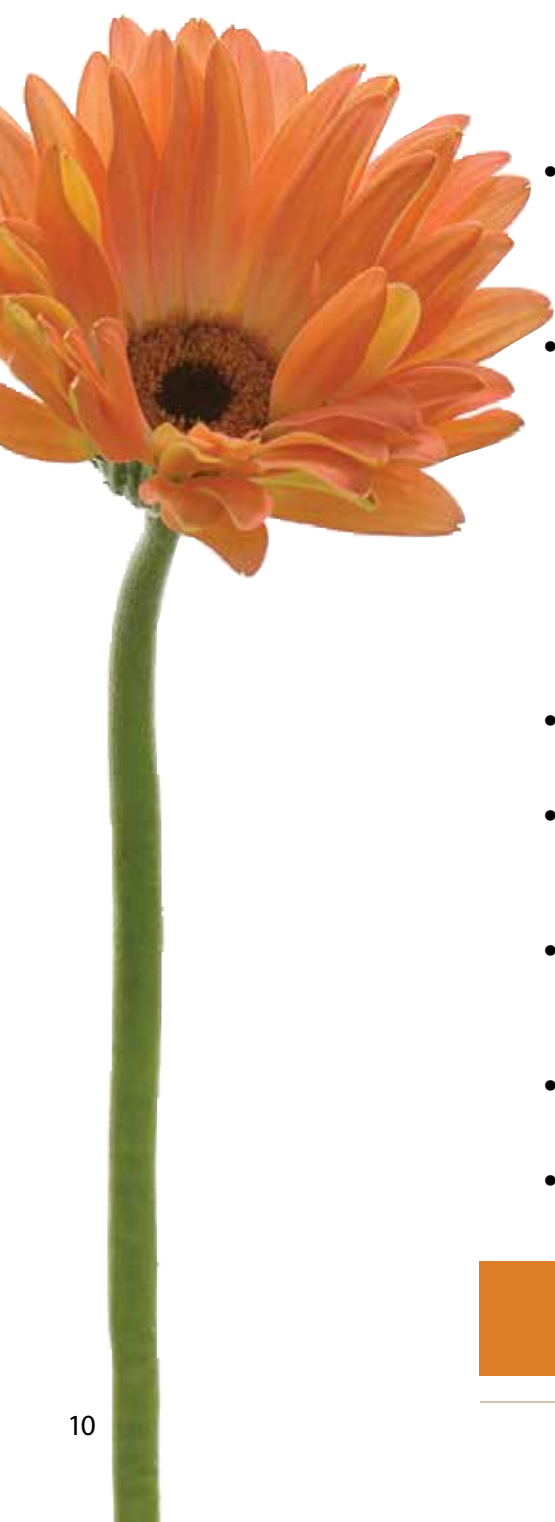
The neurostimulator sends mild electrical pulses through the leads to stimulate the nerves and smooth muscles of the lower stomach. This helps to control the chronic nausea and vomiting caused by gastroparesis.

During an office visit, the doctor uses a handheld, external programmer to adjust the neurostimulator and customize therapy for each patient. This is done without surgery. The therapy can be turned off by the doctor at any time if a patient experiences any intolerable side effects.

Enterra Therapy received Humanitarian Device Exemption (HDE) approval from the US Food and Drug Administration (FDA) in 2000. HDE status allows Medtronic, Inc. to provide Enterra Therapy for the treatment of drug-refractory nausea and vomiting associated with gastroparesis of diabetic or idiopathic origin. The effectiveness for the labeled indication has not been demonstrated. Because of the HDE status, the system must be implanted in a medical center whose institutional review board (IRB) has approved use of the device.



The implanted Enterra Therapy system.



Things to Consider Before Choosing Enterra Therapy

If your doctor determines that you are a candidate for Enterra Therapy, before making a decision about your treatment, please consider the following:

- The therapy is intended to reduce symptoms of chronic nausea and vomiting associated with gastroparesis of idiopathic or diabetic origin that resists treatment with medication. However, Enterra Therapy is not a cure.
- Improvements in symptoms may be gradual or immediate. The rate of improvement varies from person to person.
- Implanting an Enterra Therapy system has risks and side effects. Surgical complications are possible and may include infection, bleeding, bruising, and pain at the implant site. Once implanted, the system may become infected, devices may move or wear through the skin, the lead may entangle with or obstruct the bowel, irritation/inflammation over implant site may occur. The therapy system could stop suddenly because of mechanical or electrical problems. Any of these situations may require additional surgery or cause your symptoms to return.
- Most often, a combination of Enterra Therapy, diet modification, and medication is necessary to effectively control symptoms of gastroparesis.
- If you have an Enterra Therapy system implanted, some precautions are necessary around certain electrical and medical equipment and when going through theft detection and security screening gates.
- Enterra Therapy is not appropriate for patients who are not candidates for surgical procedures and/or anesthesia because of physical or mental conditions.
- Enterra Therapy should not be used for patients who will be exposed to diathermy (deep heat treatment).
- Enterra Therapy has not been evaluated in pregnant women or in patients younger than age 18 or older than age 70.



Please ask your doctor for more detailed information about Enterra Therapy.

Finding an Enterra Therapy Doctor

Find a doctor who specializes in Enterra Therapy by calling Medtronic Patient Services at 1-800-510-6735, or visiting the Medtronic website at www.medtronic.com/neuro/enterra/.

NEXT STEPS

1. Get Evaluated

Your doctor will determine appropriate screening tools and diagnostic tests for you.

2. Review the Results

Review the results from screening and testing with your doctor.

3. Discuss Treatment Options

Ask your doctor for a treatment recommendation. Ask questions and review possible side effects of each therapy. Share any concerns you may have with your doctor.

4. Take Action

With your doctor's help, choose the treatment option that is most appropriate for you. Follow the therapy plan, including diet modification, regular follow-up visits, and other instructions.

5. Seek Prior Authorization

If your doctor determines Enterra Therapy is right for you, please ask that he/she obtains prior authorization for Enterra Therapy from your health insurance company before the implant.

FOR MORE INFORMATION

Publications

The Official Patient's Sourcebook on Gastroparesis: A Revised and Updated Directory for the Internet Age. Icon Health Publications, 2002

Gastroparesis – A Medical Dictionary, Bibliography, and Annotated Research Guide to Internet References. Icon Health Publications, 2004

Websites for Education, Information and Support

Advocacy for Patients with Chronic Illness, Inc.
www.advocacyforpatients.org
860-674-1370

American College of Gastroenterology
www.acg.gi.org/patients/gihealth/gastroparesis.asp
301-263-9000

Association of Gastrointestinal Motility Disorders, Inc.
www.agmd-gimotility.org
781-275-1300

Cyclic Vomiting Syndrome Association
www.cvsaonline.org
414-342-7880

Gastroparesis & Dysmotilities Association
www.digestivedistress.com
403-247-3215

Gastroparesis Patient Association for Cures & Treatments, Inc.
www.g-pact.org
888-URG-PACT

International Foundation for Functional Gastrointestinal Disorders
www.iffgd.org
414-964-1799

National Digestive Diseases Information Clearinghouse
www.digestive.niddk.nih.gov/ddiseases/pubs/gastroparesis/index.htm
800-891-5389

National Institute of Diabetes & Digestive & Kidney Diseases
www.niddk.nih.gov
301-496-3583

National Pancreas Foundation
www.pancreasfoundation.org
866-726-2737

Oley Foundation (Nutritional Support)
www.oley.org
518-262-5079

ASK YOUR DOCTOR

- I have some warning signs that indicate gastroparesis. What testing do you recommend for further evaluation?
- What medical conditions or medications cause symptoms of gastroparesis?
- What are the potential side effects of each treatment option for gastroparesis?
- What are the potential risks, complications, and side effects of Enterra Therapy?
- What additional information can you give me about Enterra Therapy?
- I have other questions and concerns (please list):

Glossary

contraction: tightening of a muscle

diaphragm: the muscle wall between the chest and the abdomen that the body uses for breathing

digestive tract: includes the mouth, esophagus, stomach, small and large intestines, rectum, and anus

drug-refractory: resistant to treatment with medication

duodenum: the upper part of the small intestine

electrogastrography (EGG): a procedure that records the electrical signals in the stomach before and after eating

enteral: through or within the intestines or gastrointestinal tract

Enterra Therapy: also called gastric electrical stimulation (GES) — a therapy in which an implanted stimulation system sends mild electrical pulses to the stomach to help reduce chronic nausea and vomiting associated with gastroparesis of diabetic or idiopathic origin

esophagus: the tube that connects the throat to the stomach

FDA: Food and Drug Administration, an agency of the US Public Health Service

gastric: pertaining to the stomach

gastroduodenal manometry: test of pressure changes within the stomach and upper intestine during digestion

gastrointestinal: related to the digestive tract, which includes the mouth, esophagus, stomach, and intestines

gastroparesis: also called delayed gastric emptying; a stomach disorder in which food moves through the stomach more slowly than normal

GERD (gastroesophageal reflux disease): esophageal irritation or inflammation, often due to stomach acid that backs up into the esophagus

GET (gastric emptying test): a test that measures the speed with which food empties from the stomach and enters into the small intestine

HDE: Humanitarian Device Exemption, determined by the FDA, typically for treatments of conditions that occur in fewer than 4000 individuals annually

idiopathic: of unknown cause

IRB: Institutional Review Board, a committee of doctors, statisticians, researchers, community advocates, etc., that ensures a clinical trial is ethical and the rights of study participants are protected

lead: a small, insulated wire with an electrode that delivers electrical stimulation to a nerve or muscle

nausea: the urge to vomit

neurostimulator: a small implantable device that sends mild electrical pulses to a nerve or muscle

parenteral: administration of a substance outside the digestive system (e.g., injections or transfusions)

pseudo-obstruction: a condition characterized by poor functioning of the muscles and nerves in the intestines, resulting in symptoms similar to a bowel obstruction

pyloric valve: also called the pylorus, the sphincter muscle that separates the stomach from the upper region of the small intestine

pyloroplasty: widening of the pyloric valve

stomach: part of the digestive system, located between the esophagus and small intestine

upper gastrointestinal endoscopy: the examination of the inside of the stomach and its lining using a tiny camera at the end of a thin, flexible tube

vagus nerve: this nerve stretches from the brainstem to the colon and controls many functions in the body, including the esophagus, stomach, and intestines

References

1. Soykan I, Sivri B, Sarosiek I, et al. Demography, clinical characteristics, psychological and abuse profile, treatment and long-term follow-up of patients with gastroparesis. *Dig Dis Sci*. 1998;43:2398-2404.
2. American Gastroenterology Association. Technical review on the diagnosis and treatment of gastroparesis. *Gastroenterology*. 2004;127:1592-1622.

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Compazine by GlaxoSmithKline
Phenergan and Reglan by Baxter Healthcare Corporation

Important Safety Information for Medtronic Enterra® Therapy for Gastroparesis

Medtronic Enterra® Therapy for Gastroparesis: Patient should always discuss the potential risks and benefits of the device with the physician.

Indications for Use: The Enterra Therapy System for gastric electrical stimulation is indicated for use in the treatment of chronic, intractable (drug refractory) nausea and vomiting associated with gastroparesis caused by diabetes or an unknown origin.

Contraindications: The Enterra Therapy System is not intended for patients whom the physician determines are not candidates for surgical procedures and/or anesthesia due to physical or mental health conditions. You cannot have diathermy (deep heat treatment from electromagnetic energy) if you have an Enterra device.

Warnings/Precautions/Adverse Events: This system has not been evaluated for pregnant women, for use in patients under the age of 18, or patients over the age of 70. Strong sources of electromagnetic interference (EMI) can result in serious injury, system damage, or operational changes to the system. The system may be affected by or adversely affect cardiac devices, electrocautery, defibrillators, ultrasonic equipment, radiofrequency (RF)/microwave ablation, radiation therapy, MRI and theft detectors/screening devices. Patients on anticoagulation therapy may be at a greater risk for post-operative complications. The use of non-Medtronic components with this system may result in damage to Medtronic components, loss of therapy, or patient injury. There is the possibility of an allergic or immune system response to the implanted materials. When possible, a physician is to identify and treat any infections prior to surgery. Infections at the implant site almost always require the surgical removal of the implanted system. The lead can become entangled with the bowel and cause life-threatening blockage or infections that require immediate medical attention, and may require surgery.

Patients should avoid activities that may put undue stress on the implanted system components (activities that include sudden, excessive, or repetitive bending, twisting, bouncing, or stretching that can cause component fracture or dislodgment).

Adverse events related to the therapy, device, or procedure can include: infection, pain at the surgery site, device components may wear through the skin, bruising at the neurostimulator site, bleeding, loss of therapeutic effect, undesirable change in stimulation (described as a jolting, shocking or burning sensation), and gastrointestinal complications (in that the lead may perforate your stomach or device components may become entangled with or obstruct other internal organs, requiring surgery). The system could stop because of mechanical or electrical problems. Any of these situations may require additional surgery or cause your symptoms to return.

Humanitarian Device: Authorized by Federal law for use in the treatment of chronic, intractable (drug refractory) nausea and vomiting associated with gastroparesis caused by diabetes or an unknown origin. The effectiveness of this device for this use has not been demonstrated.

For further information, please call Medtronic at 1-800-328-0810 and/or consult Medtronic's website at <http://www.medtronic.com>.

USA Rx only. Rev 01/13

www.enterratherapy.com

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