

THE JOHNS HOPKINS WHITE PAPERS

DIGESTIVE DISORDERS



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M E D I C I N E

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JOHNS HOPKINS MEDICINE
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Dear Reader:

Welcome to the 2010 *Digestive Disorders White Paper*—your personal guide to the prevention, diagnosis, and management of conditions that can affect your upper and lower digestive tract, liver, gallbladder, and pancreas.

This year's highlights include:

- On the horizon: New **minimally invasive surgical treatments** for **GERD**. (page 10)
- Which **proton pump inhibitor** is **most effective** for **reflux esophagitis**? (page 13)
- Change your **lifestyle** and **reduce your risk** of **chronic pancreatitis**. (page 31)
- What to do if you **notice blood** in your **vomit** or **stools**. (page 32)
- Learn about a more effective **bowel preparation** for **colonoscopy**. (page 39)
- The **best ways** to settle an **upset stomach**. (page 40)
- **Digestive disorders** that can put you **at risk** for a **vitamin deficiency**. (page 48)
- An **over-the-counter treatment** that helps to **relieve IBS symptoms**. (page 63)
- **Hypnosis**: Can your mind **heal your gut**? (page 64)
- The truth about **colonics**, **enemas**, and **cleansing fasts**. (page 72)

If you have any digestive health-related queries you would like answered in the White Papers or comments about the White Papers in general, please e-mail the editors at whitepapers@johnshopkinshealthalerts.com.

Wishing you the best of health in 2010,

A handwritten signature in green ink that reads "H. Franklin Herlong".

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P.S. Please visit www.HopkinsDigestion.com for the latest news on digestive disorders and other information that will complement your Johns Hopkins White Paper.

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CONTENTS

The Digestive Tract.....	1
Anatomy of the Upper Digestive Tract.....	2
Tests for Examining the Upper Digestive Tract.....	4
Disorders of the Upper Digestive Tract.....	7
Dysphagia	7
Hiatal Hernia	8
Gastroesophageal Reflux Disease (GERD)	9
Esophageal Motility Disorders	18
Esophageal Stricture.....	19
Barrett’s Esophagus	20
Gastritis.....	21
Peptic Ulcer Disease	23
Anatomy of the Liver, Gallbladder, and Pancreas	24
Disorders of the Liver, Gallbladder, and Pancreas	26
Hepatitis	26
Cirrhosis	28
Gallstones	29
Pancreatitis.....	34
Anatomy of the Lower Digestive Tract	35
Tests for Examining the Lower Digestive Tract.....	36
Disorders of the Lower Digestive Tract	39
Constipation.....	42
Diverticulosis and Diverticulitis.....	45
Diarrhea	47
Celiac Disease.....	51
Crohn’s Disease.....	53
Ulcerative Colitis.....	55
Irritable Bowel Syndrome.....	61
Hemorrhoids.....	66
Anal Fissure	68
Fecal Incontinence	70
Colorectal Polyps	74
Colorectal Cancer	75
Glossary.....	79
Abbreviations and Acronyms.....	81
Health Information Organizations and Support Groups.....	82
Leading Hospitals for Gastrointestinal Disorders.....	82
Index.....	83

DIGESTIVE DISORDERS

A wide array of disorders can affect your digestive tract, a long tube of organs that begins at your mouth and ends at your anus. Some of these disorders, such as an occasional bout of heartburn or constipation, are minor annoyances. But many digestive disorders, such as Crohn's disease or irritable bowel syndrome, can severely affect your ability to go about your daily activities, and some, like colorectal cancer or a perforated ulcer, can be life threatening. This White Paper covers many conditions that affect the digestive tract, including diseases of the esophagus, stomach, liver, gallbladder, bile ducts, pancreas, small intestine, large intestine, rectum, and anus. You will learn how to prevent these diseases and, when symptoms arise, the best ways for you and your doctor to diagnose and treat them.

Approximately 70 million Americans have digestive disorders, which prompt nearly 60 million visits to doctors' offices and hospitals each year. Doctors who treat digestive disorders are called gastroenterologists. Although digestive disorders can affect people of any age, many of these problems occur more frequently as we get older.

Digestive disorders have many possible causes. The most common are infections and dietary factors. Some people have a genetic predisposition that makes them more susceptible to these and other environmental triggers. But the causes of some digestive disorders are still unknown.

Although many of the symptoms of digestive disorders—gas, diarrhea, constipation, and blood in the stool—can be embarrassing to discuss, it's important to contact your doctor if you develop any of them. These symptoms can be a sign of something wrong with your digestive tract, and detecting the problem early will improve the chances of successful treatment. Fortunately, treatment options ranging from lifestyle measures to medications and surgery can alleviate the symptoms, often completely.

The Digestive Tract

The digestive tract consists of a series of hollow and solid organs that spans the length of the body from your mouth to your anus (see the illustration on page 3). The major organs along the tract are the

esophagus, stomach, small intestine, large intestine (colon), and rectum. The role of the digestive tract is to break down food and fluids to provide the energy it needs to function properly as well as the substances required to build and nourish cells. Through a process called peristalsis, rhythmic muscle contractions push the food through the length of the digestive tract. Nutrients from food are absorbed in the small intestine, and what remains undigested passes into the colon and ends up in the stool.

Anatomy of the Upper Digestive Tract

Your upper digestive tract consists of the mouth, pharynx (throat), esophagus, stomach, and duodenum (first part of the small intestine).

Mouth and Pharynx

Your mouth is the first part of your digestive tract. It is where food is chewed and mixed with saliva until it becomes a soft mass that can be swallowed. Saliva is released into the mouth even before food enters it—the odor or thought of food can make you salivate. An enzyme in saliva called amylase starts breaking down the carbohydrates from food in your mouth. When you swallow, food moves into your pharynx, a passageway that is 5 inches long and carries both food and air.

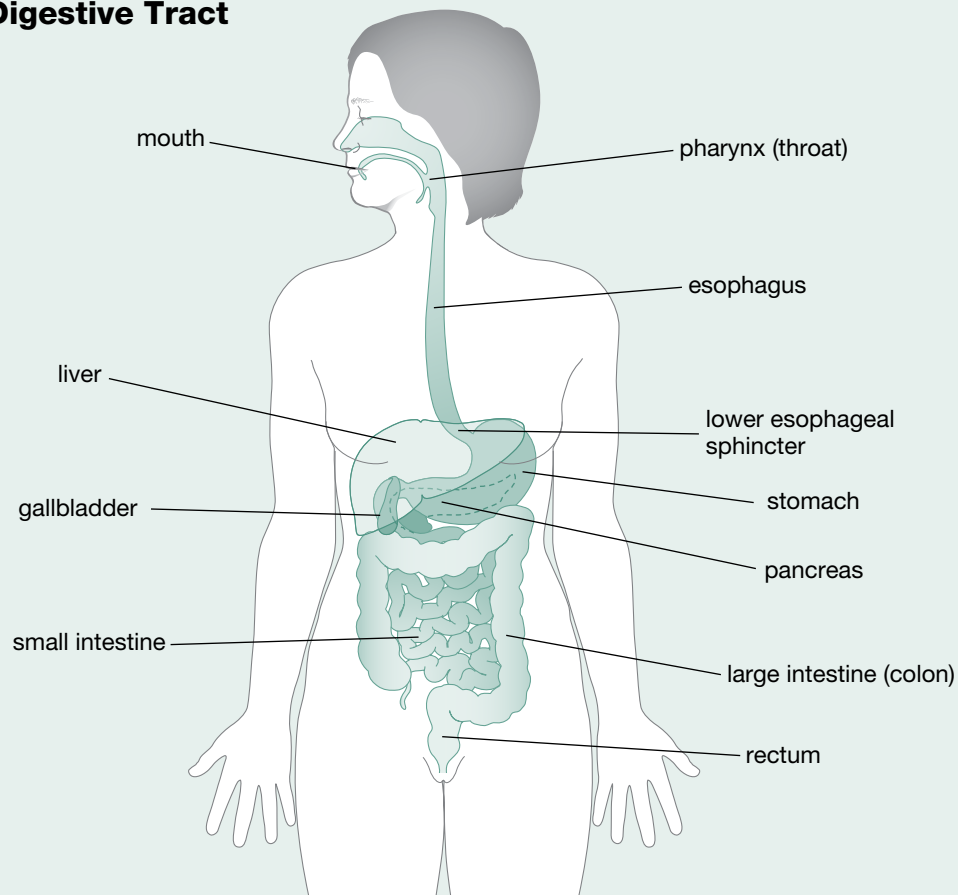
Esophagus

From the throat, food enters the esophagus—a hollow, muscular tube about 10 inches long. At the upper end of the esophagus is a circular area of muscle tissue called the upper esophageal sphincter. When you swallow, this sphincter relaxes to allow food to enter the esophagus. After you swallow, the sphincter contracts to prevent air in the throat from entering the esophagus. A structure called the epiglottis closes over the trachea to prevent the food from entering the airways or lungs. Peristalsis pushes food through your esophagus.

The esophagus descends into the stomach through an opening in the diaphragm (a thin muscle that separates your chest cavity from your abdominal cavity). At the lower end of the esophagus is a ring of muscle tissue called the lower esophageal sphincter. When food approaches, the lower esophageal sphincter relaxes to allow food to pass through to the stomach. It then contracts to prevent reflux (the backflow of stomach contents into the esophagus).

The esophagus contains a protective inner lining called the mucosa. In a healthy esophagus, the mucosa is smooth and pink. The

Your Aging Digestive Tract



You can develop a digestive disorder at any age, but the chances are much greater as you get older. Nearly 40% of all older adults have one or more digestive symptoms each year, largely due to the changes that occur in the digestive tract with age.

Mouth and esophagus. Swallowing can become difficult as a result of dry mouth or tooth decay. A stroke, dementia, or neurodegenerative diseases (such as Parkinson's disease) also can lead to swallowing difficulties. The esophagus and lower esophageal sphincter become weaker as we age, although these changes do not seem to contribute to the greater likelihood of heartburn and gastroesophageal reflux disease (GERD) in older adults.

Stomach. With age, the stomach takes longer to empty into the small intestine, making older adults more vulnerable to ulcers and bleeding from medications such as nonsteroidal anti-inflammatory drugs (NSAIDs)—the longer these drugs are in the stomach, the more likely they are to cause these problems. The stomach also becomes less elastic and can hold less food, meaning that older adults feel full more quickly.

Small intestine. The small intestine does not seem to change dramatically with age, although it does become less able to absorb certain vitamins and minerals (such as vitamin D, vitamin B₁₂, and calcium). Bacterial overgrowth can occur as well, which can cause diarrhea and unintentional weight loss in older adults.

Large intestine. In the large intestine, a loss of muscle strength can result in diverticulosis (small pouches that bulge outward through weak points in the intestinal wall). Undigested food components take longer to move through the large intestine, leading to constipation. Polyps and colon cancer are more common in older adults, although it's unclear what effect age has on the development of these benign and cancerous growths.

Other parts of the digestive tract. The liver becomes less able to metabolize medications, so it is more susceptible to damage. The gallbladder produces less bile, which may lead to gallstones. The pancreas, however, does not seem to change much with age. ■

place where the esophagus makes contact with the stomach is called the gastroesophageal junction; it forms an irregular white line called the Z-line that can be seen by your doctor with an endoscope.

Stomach and Duodenum

Your stomach is a large, stretchy bag located slightly to the left in the upper portion of your abdomen. Its function is to hold ingested food and to continue the digestive process that began in your mouth by secreting gastric acid and digestive enzymes.

Your stomach has four sections:

- the cardia, a short segment next to the gastroesophageal junction
- the fundus, the top of the stomach located under the left dome of the diaphragm
- the body, the largest portion of the stomach located between the fundus and the antrum
- the antrum, a short, channel-like portion near the outlet of the stomach.

The pylorus is a circular muscle below the antrum that connects the outlet of the stomach with the duodenum. The duodenum, the first portion of the small intestine, is a C-shaped tube that curves around the head of the pancreas. The part of the duodenum closest to the stomach is called the duodenal bulb.

Farther along in the duodenum is the major duodenal papilla, a protuberance where the common bile duct and main pancreatic duct enter the duodenum. The common bile duct carries bile secreted from the liver after it is stored in the gallbladder into the duodenum; the main pancreatic duct carries enzymes formed in the pancreas. The bile and pancreatic enzymes help digest food in the duodenum.

Tests for Examining the Upper Digestive Tract

Your doctor usually can't assess the health of your upper digestive tract from an external exam. He or she needs an internal view of your digestive tract through an upper endoscopy, an upper gastrointestinal (GI) series, esophageal manometry, or pH monitoring.

Upper Endoscopy

An upper endoscopy examines the inside lining of the esophagus, stomach, and duodenum. A long, thin, flexible tube with a tiny light

and video camera at its tip (an endoscope) looks for abnormalities such as inflammation, ulcers, and tumors. If you're experiencing difficulty swallowing, nausea, vomiting with or without blood or coffee grounds-like material, heartburn, indigestion, upper abdominal pain, or chest pain, your doctor may perform an upper endoscopy.

This test is performed in a hospital or doctor's office and takes about 30 minutes. A numbing agent is often sprayed into your throat to prevent gagging when the endoscope is inserted. A pain medication and a sedative also are given to keep you relaxed and sleepy. While you lie on your left side, the doctor slowly and gently passes the endoscope through your mouth and into your esophagus, stomach, and duodenum. Air is blown through the endoscope to make it easier for the doctor to see the lining of the digestive tract.

The doctor views the images from the endoscope on a television monitor. If he or she notices anything abnormal in the lining of the upper digestive tract, a sample of the tissue may be removed (biopsied) and examined under a microscope. Instruments can be inserted through the endoscope to stop bleeding from an ulcer, to remove a noncancerous (benign) growth, or to stretch a narrowed area of the esophagus, stomach, or duodenum.

Upper endoscopy is safe when performed by a doctor who is trained and experienced in the procedure. Serious complications, such as excessive bleeding, allergic reactions to the sedative, aspiration of stomach contents or saliva into the lungs, and puncture of the intestinal wall, are rare. Some people have mild complications, such as a sore throat or bloating. These problems usually disappear within 24 hours. If you experience signs of a serious complication after the procedure (for example, fever, swallowing difficulties, or increasing throat, chest, or abdominal pain), you should contact your doctor immediately.

Upper Gastrointestinal (GI) Series

An upper GI series (also called a barium x-ray) is usually used to evaluate areas of the small intestine that an endoscope cannot reach. In addition, if you cannot undergo an upper endoscopy—perhaps because you tend to bleed excessively or the number of platelets in your blood is low—an upper GI series may be performed to examine the esophagus, stomach, and duodenum.

An upper GI series is performed by a radiologist. First, you drink a solution containing barium (a heavy metal). The radiologist follows the passage of the barium through the upper digestive tract using a machine called a fluoroscope. X-rays also are taken. The barium

coats the inner layer of the digestive tract, making it visible on the x-rays. The x-rays can reveal ulcers, tumors, strictures (abnormal narrowings due to scar tissue), areas of swelling and inflammation, and fistulas (abnormal connections between two organs).

Capsule Endoscopy

An upper endoscopy does not provide information about the small intestine beyond the duodenum. For this, the U.S. Food and Drug Administration (FDA) approved the use of a tiny ingestible camera in a capsule that takes close-up pictures of the small intestine as the capsule moves through the digestive tract. For more, see page 39. (An ingestible camera is also approved for esophageal endoscopy.)

Esophageal Manometry

This test measures pressure and evaluates contractions in the esophagus. It is typically performed to diagnose gastroesophageal reflux disease (GERD) and swallowing problems. During the test, a physician or specially trained technician inserts a thin, pressure-sensitive probe through the nose and into the esophagus that measures pressure within the esophagus while it contracts; it also measures pressure of the lower esophageal sphincter. Abnormal muscle contractions in the esophagus and decreased lower esophageal sphincter pressure indicate weakening of the antireflux barrier. The test takes about an hour.

pH Monitoring

A pH monitoring test is often given to diagnose the severity of heartburn and GERD. A tiny tube or wireless capsule is placed in your esophagus for 24 hours, while you go about your daily activities, to record fluctuations in acid backing up into your esophagus from your stomach. Two-day pH monitoring can detect GERD more accurately than standard 24-hour pH monitoring.

Esophageal Impedance Testing

This test also involves having a tiny tube inserted into your esophagus and measures whether gas or liquid is backing up into the esophagus. It is a helpful diagnostic tool for those with nonacidic reflux, since these substances wouldn't be detected by pH monitoring.

Duodenal Gastroesophageal Reflux Testing

Duodenal gastroesophageal reflux (bile reflux) can be a complicating factor in GERD. This test detects whether contents of the duodenum,

such as bile or pancreatic enzymes, are backing up into the esophagus. You go about your daily activities while wearing a tiny tube in your esophagus. The attached fiberoptic tool detects the yellow color of bilirubin, the major component of bile.

Disorders of the Upper Digestive Tract

A number of disorders can arise in the upper digestive tract. They include dysphagia (difficulty swallowing), a hiatal hernia, GERD and other esophageal problems, gastritis, and peptic ulcers.

Dysphagia

Dysphagia is difficulty swallowing. There are two types: oropharyngeal (which is related to problems in the mouth or pharynx) and esophageal. In oropharyngeal dysphagia, individuals have problems initiating a swallow; in esophageal dysphagia, the person can swallow but problems arise as food passes through the esophagus.

Causes of dysphagia

Oropharyngeal dysphagia is caused by problems getting food from the mouth into the upper esophagus. Neurological disorders, such as a stroke or Parkinson's disease, are frequently to blame. Inflammation or cancer of the mouth or throat also can lead to oropharyngeal dysphagia.

Esophageal dysphagia can be caused by narrowing of the esophagus or by a disruption in normal esophageal motility (movement). Cancer of the esophagus, esophageal strictures (caused by scar tissue), esophageal diverticula (abnormal pouches in the esophageal wall), and esophageal rings or webs (thin, fragile mucosal folds that partially or completely block the esophagus) all can narrow the esophagus, making the passage of food more difficult. Esophageal motility can be disrupted by scleroderma (an autoimmune disease that affects the skin and internal organs), diffuse esophageal spasm (prolonged and excessive contractions of the esophagus), and achalasia (the inability of the lower esophageal sphincter to relax).

Symptoms of dysphagia

Typically, the first symptom of both oropharyngeal and esophageal dysphagia is a problem in swallowing solid food. Difficulty in beginning a swallow, coughing or inhaling food into the lungs while

ASK THE DOCTOR

Q. What is an abdominal hernia? How could I get one, and how is it treated?

A. Abdominal hernias occur when a part of the small intestine bulges through an opening or weak portion of the abdominal wall. The bulge may go back into place when you push on it, and it often disappears if you're lying down.

In contrast, hiatal hernias occur when a part of the stomach protrudes into the chest cavity. (For more on hiatal hernias, see pages 8-9.)

Contrary to popular belief, lifting heavy objects doesn't cause hernias, but it can make them more painful or obvious. Risk factors for abdominal hernias include being overweight or obese, constipation, and pregnancy.

Your doctor can usually diagnose a hernia by asking you to stand or cough, which makes the hernia more noticeable. Occasionally, an abdominal ultrasound is needed to confirm the diagnosis.

Hernias that remain small or don't cause symptoms may not need treatment; larger or more painful ones may require surgery. Hernias can be repaired laparoscopically with traditional surgery, depending on your specific condition. Most hernia surgeries can be scheduled at your convenience; however, a hernia that suddenly becomes very painful, triggers nausea or vomiting, or completely restricts bowel movement is a medical emergency and needs immediate attention.

attempting to swallow, and food coming up through the nose are common symptoms of oropharyngeal dysphagia. If you have esophageal dysphagia, it may feel as if food is stuck in the esophagus, and you may have to strain or eat with your head turned to one side to propel food through the esophagus into your stomach.

Diagnosis of dysphagia

Your doctor will try to identify your particular swallowing problem. Difficulty swallowing both liquids and solids usually results from a motility problem. Difficulty swallowing only solids suggests a structural problem. The doctor will also perform an upper endoscopy or an upper GI series to determine the cause of dysphagia.

Treatment of dysphagia

The treatment of dysphagia depends on what is causing the problem. If the cause is esophageal strictures, rings, or webs or if you have achalasia, a procedure called endoscopic dilation may be performed to expand the esophagus. In this procedure, the esophagus is gradually stretched using special dilators or a balloon inserted through an endoscope and then inflated. Surgery or radiation therapy may be necessary to treat esophageal tumors that have narrowed the esophagus.

You also may be referred to a speech-language pathologist who diagnoses and treats dysphagia in addition to dealing with language, voice, and speech problems. Therapy may involve special exercises, body positions, and other techniques to improve your ability to swallow. The speech-language pathologist may also recommend foods and liquids with textures that are safer and easier to swallow.

Hiatal Hernia

The esophagus passes through a small opening in the diaphragm, which separates the chest cavity from the abdominal cavity. Normally, the lower esophageal sphincter at the bottom of the esophagus is aligned with this opening in the diaphragm (the hiatus). The rest of the esophagus is located above the diaphragm in the chest cavity, and the stomach is located below the diaphragm in the abdominal cavity.

If you are one of the 25% of people over age 50 who have a hiatal hernia, your lower esophageal sphincter and a small portion of your stomach have slipped through the opening in the diaphragm and are now protruding into your chest cavity. The resulting separation between the lower esophageal sphincter and the diaphragm weakens the barrier against reflux of acid from the

stomach into the esophagus, increasing the risk of GERD and erosive esophagitis (damage to the lining of the esophagus).

Causes of hiatal hernia

A hiatal hernia can be congenital, meaning that you are born with it. It can develop later in life, as the result of either a weakening of the muscle that surrounds the opening of the diaphragm or a rise in pressure in the abdominal cavity. Risk factors for a hiatal hernia include being overweight and lifting heavy objects.

Symptoms of hiatal hernia

Most hiatal hernias produce no symptoms and are found by chance during tests for other health problems. However, when the lower esophageal sphincter is significantly displaced from its normal position in the hiatus, reflux symptoms (such as heartburn) can occur.

Diagnosis and treatment of hiatal hernia

Hiatal hernias are diagnosed by an upper GI series or an upper endoscopy. If a hiatal hernia is not causing symptoms, treatment isn't needed. When symptoms such as recurrent heartburn arise, they can often be relieved with lifestyle measures and medication. If the hiatal hernia is causing severe reflux, it can be repaired surgically by pulling the stomach back into the abdominal cavity and repairing the defect in the diaphragm that allowed the stomach to slip into the chest cavity. To prevent future slippage and to strengthen the lower esophageal sphincter, the surgeon may also perform a Nissen fundoplication, in which the top portion of the stomach is wrapped around the bottom of the lower esophageal sphincter.

Gastroesophageal Reflux Disease (GERD)

The contents of your stomach empty into the small intestine, but sometimes they flow backwards into your esophagus. This phenomenon, known as gastroesophageal reflux, happens to everyone from time to time. It usually produces no symptoms other than occasional heartburn—a burning sensation behind the breastbone.

When gastroesophageal reflux occurs often, however, you may begin to experience significant discomfort related to the acid reflux—then, it is considered gastroesophageal reflux disease (GERD). Many people in the United States have GERD: Heartburn affects about 7 to 10% of U.S. adults every day and up to 44% at least once a month. Symptoms of reflux are more common in individuals who are obese, smoke cigarettes, or drink alcohol.

ASK THE DOCTOR

Q. *How will losing weight help improve my GERD?*

A. With both obesity and GERD on the rise in the United States, a link between the two conditions appears strong. Recently, two large studies found that people who were overweight were around 50% more likely to have GERD than normal-weight people; obese individuals were twice as likely.

Extra fat in the abdomen may increase pressure on the stomach and cause the lower esophageal sphincter to relax, allowing stomach contents to flow back up into the esophagus. In addition, body fat may release chemicals that decrease pressure in the lower esophageal sphincter or slow the clearance of acid from the esophagus.

Another possibility is that estrogen levels may play a role: One study found that obese women were more likely than obese men to have GERD; the risk was highest in premenopausal women and in postmenopausal women taking estrogen.

Whatever the cause, losing weight seems to help. A 2006 review article found that losing weight and elevating the head of the bed were the only practical lifestyle measures that helped relieve GERD symptoms. According to a 2006 study of women in *The New England Journal of Medicine*, decreasing body mass index by more than 3.5 points (the equivalent of losing about 20 lbs or more) may reduce the risk of experiencing frequent GERD symptoms.

On the Horizon: New Surgical Treatments for GERD

These minimally invasive procedures may offer relief

For the millions of Americans who suffer from gastroesophageal reflux disease (GERD), medication alone is enough to treat their symptoms. But up to 20% of people are not helped by antireflux medications.

Some of these people—or those who don't want to be on long-term medication—may turn to surgery, most commonly a procedure called a Nissen fundoplication. However, this invasive procedure is not without side effects, and it also fails to correct the problem in up to 20% of patients. As a result, researchers are investigating less invasive and more successful ways to resolve the symptoms of GERD and correct its cause.

The main reason for reflux is weak muscular tension in the gastroesophageal sphincter, which is the valve that separates the stomach from the esophagus. This valve is supposed to stay closed unless you're swallowing food or liquids. But if the muscle becomes weakened and the valve

opens from time to time, stomach contents can escape upward into the esophagus, causing the familiar symptoms of GERD: heartburn and indigestion. If left untreated, this reflux can eventually damage the esophagus and lead to serious complications such as esophageal ulcers and strictures, Barrett's esophagus (a disorder of the cells lining the esophageal mucosa), and esophageal cancer.

Two new surgical procedures aim to strengthen the esophagus and reconstruct an antireflux valve—therefore ending both GERD and the need for daily medication. They're both less invasive than either traditional or laparoscopic Nissen fundoplication, and they do show promise.

Transoral Incisionless Fundoplication (TIF)

This procedure, performed with a device known as the EsophyX, is just what its name suggests: a surgical treatment that does not involve any incisions. It is part of a growing trend called natural orifice

surgery, in which surgeons can access internal organs through existing openings such as the throat or nose.

TIF is performed under general anesthesia. The surgeon inserts the device through the throat and into the esophagus to the gastroesophageal junction where the stomach and esophagus meet. The EsophyX then forms and secures several tissue folds (or plications) to create a valve at the gastroesophageal junction. Since it is incisionless, TIF may have an advantage over traditional or laparoscopic Nissen fundoplication, as recovery time and pain can be significantly lessened. And since TIF is less invasive, it can be repeated or reversed if necessary—an important consideration given the relatively young age of many GERD sufferers.

Several clinical trials have been conducted on the TIF procedure, including two published in the last year. One from 2008 in the *World Journal of Surgery* was performed at seven clinical

GERD is a serious condition: The acid and digestive enzymes from the stomach can damage tissues in the esophagus as well as in adjacent organs such as the mouth, pharynx (throat), larynx (voice box), trachea (windpipe), and lungs.

Causes of GERD

Coordinated contractions of the lower esophageal sphincter and the diaphragm produce an area of high pressure in the lower segment of the esophagus that prevents stomach contents from entering the esophagus.

This “antireflux barrier” does not always work properly. When it fails occasionally, the esophagus has several defenses to help it deal

centers in Europe. Researchers performed TIF on 86 people with GERD that was controlled with proton pump inhibitors but whose symptoms returned after discontinuing medication for two weeks. After 12 months, 73% of the participants reported at least a 50% improvement in GERD-related quality of life, and 85% were able to discontinue daily proton pump inhibitors. Only three serious complications were reported, including perforation of the esophagus, and other complications were mild and temporary.

A 2009 study conducted at a clinic in Belgium and published in *Surgical Endoscopy* looked at longer-term results for TIF. In a group of 14 people with GERD who underwent the procedure and completed follow-up, 64% had at least a 50% improvement in GERD-related quality of life scores two years later. TIF had eliminated heartburn in 93% of participants, and 71% no longer required daily proton pump inhibitors. No serious complications were reported.

In both studies, the procedure

was effective at reducing or eliminating hiatal hernia, a common cause of GERD in which the lower esophageal sphincter and a small portion of the stomach slip through an opening in the diaphragm and protrude into the chest cavity.

Magnetic Sphincter Augmentation

In this procedure, rather than using the body's own tissue to create a stronger gastroesophageal sphincter, a ring of miniature metal beads is inserted around the sphincter to add extra pressure. A surgeon needs to make only a small laparoscopic incision. He or she then wraps a series of magnetic beads, in the shape of a bracelet, around the bottom of the esophagus. The device, known as the LINX Reflux Management System, is sized to fit each patient. Once it is in place, magnetic attraction keeps the beads together and helps it to keep the gastroesophageal sphincter closed. The valve can still open while swallowing food or belching. Because the procedure is so minimally invasive, it is considered

outpatient surgery, and most people can return to a normal diet the following day.

An early clinical trial in the United States and Italy has shown promising results: Thirty-eight people with GERD underwent the procedure in one of three hospitals. Three months later, 89% of the participants no longer needed antireflux medications, and 79% of participants had a normal 24-hour pH test. No serious complications were reported, and none of the devices had moved out of place.

The Bottom Line

While both of these treatments show encouraging results, these studies are preliminary. The EsophyX device has been approved by the U.S. Food and Drug Administration and is being used at hospitals throughout the country, but the LINX Reflux Management System is still in clinical trials. Larger studies are needed to compare these procedures with Nissen fundoplication and with placebo treatment. ■

with the harsh stomach contents. First, the esophageal secretions and your saliva are alkaline, which helps to neutralize the acid and inactivate the enzymes from the stomach. Second, peristalsis and gravity work together to rapidly clear the esophagus of the acid and enzymes, minimizing the length of time the lining of the esophagus is exposed to the stomach contents. Third, the esophageal mucosa is able to regenerate quickly following injury from acid or enzymes. However, frequent reflux of the acidic stomach contents can overwhelm these protective measures, resulting in damage to the tissues of the esophagus and adjacent organs.

A recent survey of 43,000 people found that smoking and excessive use of table salt can increase the risk of GERD by 70%.

A 2005 study found that a diet high in calories and fat (especially saturated fat) is linked to GERD. Excess weight can also cause GERD.

Medications that relax the lower esophageal sphincter, such as the bronchodilator theophylline (Theo-24, Theo-Dur, Uniphyl, for asthma, emphysema, and chronic bronchitis), calcium channel blockers (for angina or high blood pressure), nonsteroidal anti-inflammatory drugs (NSAIDs, for arthritis and pain), bisphosphonate drugs (for osteoporosis), some medications to treat menopausal symptoms, and a class of antidepressant drugs called tricyclics also can trigger GERD. If you are at risk for GERD or develop it while taking any of these medications, discuss with your doctor the possibility of discontinuing or reducing the dosage of the medication.

Symptoms of GERD

GERD most often produces heartburn, indigestion (discomfort in the upper abdomen, nausea, and sometimes vomiting), and regurgitation of undigested food from the stomach into the esophagus and mouth. Acid from the stomach can even regurgitate into organs connected to the esophagus, such as the larynx, trachea, and lungs. This acid exposure can cause voice changes such as hoarseness, a chronic cough, episodes of asthma, or pain behind the sternum bone that resembles a heart attack. In fact, 10 to 15% of people with GERD experience these symptoms instead of heartburn and regurgitation, making diagnosis and treatment more difficult.

The chest pain associated with an intense episode of heartburn can feel like a heart attack. If you think you are having a heart attack, seek medical assistance immediately. Much of the damage done by a heart attack occurs in the first hour. Therefore, waiting to see if chest pain is due to heartburn could prove fatal.

How can you distinguish between a heart attack and GERD? Your chest pain is more likely to be heartburn if it is accompanied by a bitter or acid taste in your mouth or other symptoms such as belching and difficulty swallowing, and if the pain worsens when you lie down or bend over and improves when you take an antacid. But if the pain is accompanied by a cold sweat, a fast heartbeat, shortness of breath, or lightheadedness and the pain radiates down one or both arms, there's a good chance you're having a heart attack. Again, if you have any doubt about the cause of your chest pain, you should err on the side of caution and call 911 immediately, chew an aspirin, and lie down until an ambulance arrives.

Diagnosis of GERD

To diagnose GERD, your doctor will perform an upper endoscopy as well as other tests to measure the motility and pH (acid concentration) of your esophagus.

Treatment of GERD

There are four types of treatments for GERD: lifestyle measures, medication, surgery, and endoscopic procedures. Treating GERD is important. Untreated GERD can lead to serious complications, such as esophageal ulcers (nonhealing mucosal defects), esophageal strictures, Barrett's esophagus (a disorder of the cells lining the esophageal mucosa, which may lead to cancer), and esophageal cancer.

Lifestyle measures. The treatment of GERD starts with lifestyle measures, which may eliminate symptoms in some people with mild reflux. Traditionally, doctors recommended avoiding large meals as well as acidic foods (such as tomato-based products and citrus fruits), fatty or spicy foods, table salt, garlic, onions, peppermint, spearmint, chocolate, cinnamon, coffee, tea, and carbonated beverages. But a recent study found little evidence for these and other lifestyle measures. The only ones that relieved GERD symptoms were sleeping with the head of the bed elevated and losing weight. Nonetheless, lifestyle measures are worth a try before resorting to medication and other treatments for GERD.

Medication. If lifestyle modifications do not eliminate all of your symptoms, your doctor will recommend that you take medication to neutralize or decrease acid production in the stomach. These medications include antacids, histamine H₂-receptor antagonists (also known as H₂-blockers), mucosal protectants, proton pump inhibitors, and promotility agents. Sometimes a single medication will work, but if it doesn't control your symptoms, you may need to take a second medication. Although there have been concerns over long-term suppression of gastric acid, a recent study suggests that use of H₂-blockers and proton pump inhibitors does not increase the risk of esophageal or stomach cancer. However, long-term use of proton pump inhibitors may increase the risk of osteoporosis.

Antacids. Over-the-counter antacids containing aluminum oxide, magnesium carbonate, and sodium bicarbonate (for example, Gaviscon, Gelusil, Maalox, Mylanta) rapidly neutralize stomach acid and are taken after meals when you experience heartburn. These medications provide fast relief, but their effect is short lived.

H₂-blockers. Over-the-counter or prescription H₂-blockers, such as cimetidine (Tagamet), famotidine (Pepcid), nizatidine (Axid), and

NEW RESEARCH

Nexium May Provide Fastest Relief of GERD Symptoms

Proton pump inhibitors are frequently prescribed to treat GERD because they are the most potent suppressors of gastric acid that causes heartburn symptoms. A new study suggests that for people whose GERD has caused erosive esophagitis (damage to the esophagus lining), esomeprazole (Nexium) may be the best choice.

Researchers in China randomly assigned 274 people with erosive esophagitis to eight weeks of treatment with once-daily omeprazole (Prilosec), lansoprazole (Prevacid), pantoprazole (Protonix), or Nexium. For each of the first seven days, participants were asked to rate the severity of their heartburn and reflux symptoms.

Symptom severity decreased more rapidly and complete resolution of heartburn was reported more quickly in the Nexium group than in the other groups. An endoscopist also performed upper endoscopy on all but 10 of the participants after the eight weeks of treatment. Although the difference was not statistically significant, more people in the Nexium group showed signs that their esophagitis was healing.

The researchers did point out that while Nexium showed an early advantage in the first few days of treating erosive esophagitis, the other proton pump inhibitors appeared to offer similar benefits after five days of treatment.

WORLD JOURNAL OF
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Volume 15, page 990

February 28, 2009

Prescription Drugs for the Treatment of Gastroesophageal Reflux Disease 2010

Drug type: Brand (generic)	Typical daily dosages*	How to take†	Monthly cost‡: Brand (generic)
Proton pump inhibitors			
AcipHex (rabeprazole)	20 mg	One 20-mg tablet 1x/day with or without food. Swallow whole (do not crush, chew, or split).	\$195
Nexium (esomeprazole)	40 mg	One 40-mg capsule 1x/day at least 1 hour before a meal. Swallow whole.§	\$163
Prevacid (lansoprazole)	15-30 mg	One 15- or 30-mg capsule 1x/day 1 hour before eating. Swallow whole.§	\$170-176
Prilosec (omeprazole)¶	20 mg	One 20-mg capsule 1x/day 1 hour before a meal. Swallow whole.§	\$167 (\$33)
Protonix (pantoprazole)	40 mg	One 40-mg tablet 1x/day with or without food. Swallow whole.	\$138 (\$110)
Zegerid (omeprazole/ sodium bicarbonate)	Capsule: 40 mg/1,100 mg Powder: 20 mg/1,680 mg	Capsule: One 40-mg/1,100-mg capsule on an empty stomach 1x/day at least 1 hour before a meal and with a full glass of water. Swallow whole. Powder: Empty one 20-mg/1,680-mg packet into 1-2 Tbsp of water 1x/day. Mix and take immediately with a full glass of water.	Capsule: \$174 Powder: \$178
Histamine H₂-antagonists (H₂-blockers)¶			
Axid (nizatidine)	300 mg	One 150-mg capsule 2x/day with or without food for up to 12 weeks.	\$173 (\$52)
Pepcid (famotidine)	20-40 mg	One 20- or 40-mg tablet 2x/day with or without food for 6-12 weeks.	\$128-227 (\$15-40)
Tagamet (cimetidine)	1,600 mg	Two 400-mg tablets 2x/day or one 400-mg tablet 4x/day with or without food for up to 12 weeks.	\$230 (\$34)
Zantac (ranitidine)	300 mg	One 150-mg tablet 2x/day with or without food.	\$237 (\$15)
Promotility agent			
Reglan (metoclopramide)	40-60 mg	One 10-mg tablet or one 10-mg and one 5-mg tablet 30 minutes before symptoms usually occur (e.g., before meals and sleep) not more than 3-4 times a day.	\$165-219 (\$16-20)

Precautions

Most common side effects

Call your doctor if...

If you are taking warfarin (Coumadin), your doctor may monitor your prothrombin time (a measure of how fast your blood clots) more closely. *Zegerid only:* This medication contains sodium and thus may not be appropriate for people on a low-salt diet.

Headache, diarrhea.

You experience a skin rash or signs of a B₁₂ deficiency (unusual weakness, sore tongue, numbness or tingling of the hands or feet).

People with kidney disease need to take a lower dosage to prevent side effects such as confusion and dizziness.

Headache, dizziness, diarrhea.

You experience signs of liver problems: unusual tiredness, persistent nausea or vomiting, severe stomach or abdominal pain, dark urine, yellowing eyes or skin.

Avoid alcohol, because it can add to the drowsiness side effect.

Diarrhea, drowsiness, fatigue.

You experience involuntary movements of the eyes, face, or limbs; muscle spasms; trembling of the hands.

See next page for legend.

continued on the next page

Prescription Drugs for the Treatment of Gastroesophageal Reflux Disease 2010 (continued)

Drug type: Brand (generic)	Typical daily dosages*	How to take†	Monthly cost‡: Brand (generic)
Mucosal protectant			
Carafate (sucralfate)	4 g	One 1-g tablet 4x/day on an empty stomach (1 hour before each meal and at bedtime).	\$160 (\$44)

* These dosages represent the usual daily dosages for the treatment of gastroesophageal reflux disease. The precise effective dosage varies from person to person and depends on many factors. Do not make any changes to your medication without consulting your doctor.

† These instructions represent the typical way to take the medication. Your doctor's instructions may differ. Always follow your doctor's recommendations.

‡ Prices per drugstore.com.

§ If you have difficulty swallowing pills, empty the contents of the capsule onto 1 Tbsp of cold applesauce. Mix and take immediately.

|| Over-the-counter formulation available: Prilosec OTC. Do not take for more than 2 weeks straight or more often than every 4 months unless directed by your doctor.

¶ Over-the-counter formulations are available: Axid AR, Pepcid AC, Pepcid Complete, Tagamet HB, Zantac 75, Zantac 150. Do not take for more than 2 weeks straight unless directed by your doctor.

ranitidine (Zantac), have a longer effect on gastric acid than antacids. They usually need to be taken twice a day. A combination antacid/H₂-blocker, Pepcid Complete, also appears to be more effective at relieving symptoms than H₂-blockers or antacids alone.

Mucosal protectants. A prescription mucosal protectant called sucralfate (Carafate), which is taken one hour before a meal, coats the esophagus and increases its resistance to reflux from the stomach.

Proton pump inhibitors. These prescription drugs, which include esomeprazole (Nexium), lansoprazole (Prevacid), omeprazole (Prilosec), pantoprazole (Protonix), rabeprazole (AcipHex), dexlansoprazole (Kapidex, approved in 2009), and an omeprazole/sodium bicarbonate combination (Zegerid), are the most potent suppressors of gastric acid secretion. They have a long-lasting effect and need to be taken only once a day. Prilosec is now available without a prescription in a 20-mg formulation, and Prevacid 24HR has been approved by the FDA.

Promotility agents. The effects of H₂-blockers and proton pump inhibitors can be enhanced by taking a promotility agent, such as metoclopramide (Reglan). This medication increases the clearance of acid from the esophagus, raises the pressure of the lower esophageal sphincter, and speeds emptying of the stomach.

Surgery. Lifestyle measures and medications are so effective at controlling reflux symptoms that few people need to undergo surgery.

Precautions	Most common side effects	Call your doctor if...
Can interfere with the absorption of other medications; take other drugs 2 hours before or 2 hours after using Carafate. Can be taken with an antacid, but take the antacid 30 minutes before or after Carafate.	Constipation, dry mouth, upset stomach.	You experience an unusual or persistent feeling of fullness in the stomach, nausea or vomiting, stomach pain (especially after meals).

When surgery is required, the most common procedure is Nissen fundoplication. It involves lifting a portion of the stomach and tightening it around the gastroesophageal junction to increase pressure in the lower esophageal sphincter. The procedure is typically performed using laparoscopy. Five small incisions are made in the abdomen, and the surgeon inserts a tiny camera and specialized instruments through the incisions to perform the procedure.

Nissen fundoplication is performed in a hospital. You will receive general anesthesia and need to stay in the hospital for one to three days. Serious complications are rare but can include a negative reaction to the anesthesia, blood loss, infection, and injury to the esophagus, stomach, or spleen. More common complications are stomach bloating, difficulty swallowing, belching, and vomiting. These problems usually improve within one to three months.

Surgery reduces reflux symptoms in most people, but it does not always eliminate the symptoms. About a third of people who undergo Nissen fundoplication still require medication on a regular basis to control their symptoms. However, a 2008 study found that for many people who undergo Nissen fundoplication, the benefits may last five years or longer.

Endoscopic procedures. These procedures are performed during an upper endoscopy on an outpatient basis and do not require incisions, general anesthesia, or a hospital stay like surgery does.

However, these procedures are relatively new and their long-term effectiveness is not yet fully known.

One of these procedures is called endoscopic gastroplication. In the procedure, a gastroenterologist places a pair of stitches in the upper stomach about a centimeter below the lower esophageal sphincter and pulls the stitches together to form a “pleat.” Usually, two to four pleats are created. By reducing the size of the opening between the stomach and esophagus, the pleats help prevent reflux of stomach contents into the esophagus. A second procedure, full-thickness plication, also places a stitch in the gastroesophageal junction to prevent the reflux of acid into the esophagus.

A third treatment, known as the Stretta procedure, delivers radio-frequency energy to the far end of the esophagus as well as to the upper stomach, creating multiple burns in the tissue there. As the tissue heals, it contracts and narrows the esophagus, helping to reduce reflux. The procedure works moderately well, but serious side effects, including death, have been reported. (For more, see “On the Horizon: New Surgical Treatments for GERD” on pages 10-11.)

Esophageal Motility Disorders

In a healthy esophagus, peristalsis propels food and fluid down the esophagus. Sometimes, however, these contractions become ineffective, resulting in an esophageal motility disorder.

The two most common esophageal motility disorders are diffuse esophageal spasm and achalasia. In diffuse esophageal spasm, several segments of the esophagus contract strongly and simultaneously, preventing the normal, wave-like contractions from moving food and fluid down the esophagus. In achalasia, there is an absence of normal, wave-like contractions in the lower half of the esophagus, and the lower esophageal sphincter fails to relax and allow food to enter the stomach.

Causes of esophageal motility disorders

The causes of esophageal spasm and achalasia are unknown, and there are no known risk factors.

Symptoms of esophageal motility disorders

People with diffuse esophageal spasm experience intermittent episodes of dysphagia (difficulty swallowing), usually with both liquids and solids, as well as pain behind the breastbone. People with achalasia have gradually worsening swallowing problems for both solids and liquids, regurgitation of ingested food, and weight loss.

Diagnosis of esophageal motility disorders

The best test for diagnosing achalasia is esophageal manometry. In people with achalasia, manometry reveals very weak esophageal peristalsis as well as persistent elevated pressure in the lower esophageal sphincter (which indicates that the sphincter muscle cannot relax). In people with diffuse esophageal spasm, esophageal manometry will show intense contractions of the esophageal wall.

An upper GI series also can be used to diagnose these disorders. In people with diffuse esophageal spasm, the radiologist will see strong contractions of the esophagus, which interfere with the movement of barium through the esophagus. Barium x-rays in people with achalasia often reveal widening of the upper portion of the esophagus with a gradual narrowing at the lower end.

In many people with suspected achalasia, an upper endoscopy to obtain a tissue sample from the gastroesophageal junction is necessary to rule out cancer.

Treatment of esophageal motility disorders

Achalasia is initially treated with drugs like calcium channel blockers and nitroglycerin to relax the lower esophageal sphincter. Unfortunately, they are often ineffective, and most people require an endoscopic or surgical procedure to relax the lower esophageal sphincter.

The two endoscopic procedures for achalasia are dilation and injection of botulinum toxin A (Botox). Dilation involves insertion of a balloon device to expand the lower esophageal sphincter. Botox is injected into the lower esophageal sphincter to paralyze and relax it. Because the effects of Botox appear to be temporary, it is only recommended for people who are not good candidates for endoscopic dilation or surgery.

Heller myotomy is the surgical procedure for achalasia. An incision is made through the muscle of the lower esophageal sphincter to weaken it. It can be done using a traditional surgical approach (making a large incision in the abdomen) or through small incisions in the abdomen (laparoscopy) or chest (thoracoscopy).

Unfortunately, there is no effective treatment for diffuse esophageal spasm. Medications such as calcium channel blockers and nitrates may be prescribed but are typically not helpful.

Esophageal Stricture

An esophageal stricture is a narrowing of the esophagus, typically in the lower third of the organ.

ASK THE DOCTOR

Q. *Should I stop taking my proton pump inhibitor because of an increased risk of osteoporosis?*

A. Long-term use of proton pump inhibitors (like esomeprazole [Nexium], lansoprazole [Prevacid], and omeprazole [Prilosec]) may increase the risk of osteoporosis. A 2008 study found that among 63,000 adults over age 50, the 15,792 who had an osteoporosis-related fracture were twice as likely to have used the medication for at least seven years. Those who had a hip fracture were 62% more likely to have used a proton pump inhibitor for at least five years.

Although the connection isn't completely understood, it's believed that gastric acid helps remove calcium from the food you eat. If you reduce your levels of gastric acid by taking a proton pump inhibitor, it makes sense that you will absorb less calcium, which is essential to bone strength.

This connection is especially unsettling considering how many people begin taking proton pump inhibitors as young or middle-aged adults, with the intention of taking them indefinitely. You should never stop taking a medication without consulting with your doctor, but you may want to ask him or her if another type of medication can help control your reflux symptoms just as well. You may also need to take extra steps to protect your bones, such as taking vitamin D and calcium supplements as well as a bisphosphonate drug.

Causes and symptoms of esophageal stricture

Esophageal stricture is the result of chronic inflammation and scar tissue due to poorly controlled GERD. People with the disorder have ongoing difficulties in swallowing solid food, and the problem gradually worsens over time.

Diagnosis and treatment of esophageal stricture

An upper endoscopy must be performed to obtain a tissue sample from the stricture to rule out cancer. Treatment may require esophageal dilation followed by aggressive control of GERD with medications to prevent recurrence of the stricture. If dilation cannot widen the esophagus, surgery is recommended.

Barrett's Esophagus

Barrett's esophagus occurs when cells in the lining of the esophagus, also known as the esophageal mucosa, are replaced by cells that are more resistant to acid, a process called metaplasia.

Causes of Barrett's esophagus

Normally, the esophageal mucosa is lined with multiple layers of flattened, scalelike cells. When these cells are damaged by gastric acid in individuals with gastroesophageal reflux, they are replaced with a single layer of cells that are similar to those that line the stomach and small intestine. A 2008 study suggests that eating a diet high in meat, fast-food, soft drinks, alcohol, and coffee may contribute to the risk of Barrett's esophagus.

Symptoms and diagnosis of Barrett's esophagus

Typically, Barrett's esophagus causes no symptoms, but it should be suspected in people with chronic GERD. An upper endoscopy (either traditional or via an esophageal capsule) is used to diagnose Barrett's esophagus. If the condition is present, the doctor will see tongue-like protrusions above the gastroesophageal junction. Samples of tissue (called biopsy samples) are taken from these projections and examined under the microscope to look for precancerous changes called dysplasia.

Treatment of Barrett's esophagus

Barrett's esophagus increases the risk of esophageal cancer. In fact, about 0.5% of people with Barrett's esophagus develop cancer of the esophagus each year. To reduce the risk, it's important to control GERD and undergo an upper endoscopy and a biopsy

NEW RESEARCH

Radiofrequency Ablation May Better Treat Barrett's Esophagus

Barrett's esophagus, an abnormal development of the cells that line the esophagus, occurs in 10% of people with chronic GERD and increases the risk of esophageal cancer. The standard of care for Barrett's esophagus has been GERD treatment, upper endoscopy, biopsy every three to five years, and, if necessary, surgery to remove most of the esophagus. Now, a new study suggests that radiofrequency ablation may treat Barrett's esophagus.

At 19 centers nationwide, researchers assigned 127 people with Barrett's esophagus to either radiofrequency ablation, in which targeted thermal energy is used to remove the abnormal cells, or a sham endoscopic surveillance procedure.

One year later, Barrett's esophagus was completely resolved in more than 77% of the radiofrequency ablation group compared with only 2% of the control group. In addition, esophageal cancer occurred in only 1% of the radiofrequency ablation group compared with 9% of the control group.

For people with severe Barrett's esophagus, having radiofrequency ablation early may be preferable to endoscopic surveillance.

THE NEW ENGLAND
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May 28, 2009

of the esophageal mucosa every three to five years.

If biopsies indicate severe dysplasia or esophageal cancer, surgery is usually performed. Most of the esophagus is removed and the stomach is pulled up into the chest cavity and attached to what remains of the esophagus.

However, new guidelines suggest that an alternative to surgery may be endoscopy mucosal resection. This procedure can be used to remove any nodules or small polyps that are seen during a traditional endoscopy. The doctor injects a solution into the nodule that forms a blister under it and decreases bleeding. The nodule is then lifted up while a wire loop cauterizes it from underneath and removes it.

A less invasive option is photodynamic therapy, a relatively new treatment that uses a light-sensitizing agent (such as Photofrin) plus a laser to kill sensitized cancerous and precancerous cells. The light-sensitizing agent is injected into a vein. When the agent is exposed to the laser, it produces a chemical reaction that destroys the cancerous and precancerous cells. In a recent study, individuals who underwent photodynamic therapy were more likely to have a complete reversal of their dysplasia than people who did not receive the therapy. Two years after treatment with Photofrin, only 20% of these patients had cancer compared with 50% of those who did not receive the therapy. The risks of photodynamic therapy include esophageal strictures and temporary sensitivity to the sun.

Two new ablation therapies—which use heat or radiofrequency energy to destroy the abnormal cells on the esophageal walls—showed promise in a 2006 clinical trial. About 70% of participants who had radiofrequency ablation or argon plasma coagulation benefited, but these procedures are still considered experimental. (Also see the “New Research” column at left.)

Gastritis

Gastritis occurs when the gastric mucosa, the inner lining of the stomach, becomes inflamed.

Causes of gastritis

Gastritis has many causes, including infections, medications, autoimmune reactions (in which the body begins to attack its own tissues), and food hypersensitivities or allergies.

The most common infection of the stomach is caused by a bacterium called *Helicobacter pylori* (*H. pylori*). Infestation results from ingesting food or water contaminated with *H. pylori* and can result in a lifelong infection. In fact, an estimated 30 to 40% of Americans are

NEW RESEARCH

PPIs May Raise Risk of Hospital-Acquired Pneumonia

Many hospitalized patients are routinely given acid-suppressing medications to prevent stress ulcers, even if they have never taken them before. A new study suggests that this may be ill advised, since proton pump inhibitors (PPIs) appear to increase the risk of pneumonia in hospitalized people.

Researchers analyzed nearly 64,000 hospital admissions between January 2004 and December 2007. Of all the adults hospitalized for three days or more, just over half had been given acid-suppressing drugs, and half of these patients may have never taken acid-blockers before.

Among this group, almost 5% developed pneumonia in the hospital compared with 2% of those who didn't take acid blockers. Because the medication takers may have already been more ill, the researchers adjusted their findings. However, the acid-blocker group still had a 30% higher chance of pneumonia than those who did not take the medication.

Increasing data suggest that PPIs and H₂-blockers can raise pneumonia risk and that it appears highest in the first week of treatment. It's possible that suppressing stomach acid may allow harmful bacteria to flourish in the upper gastrointestinal and respiratory tracts or that white blood cell function is impaired, allowing pneumonia to develop.

JOURNAL OF THE AMERICAN
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infected with *H. pylori*. Infection irritates and inflames the stomach lining and leads to overproduction of gastric acid, which increases the risk of developing peptic ulcers (ulcers in the stomach or duodenum; see pages 23-24) and gastric cancer.

The medications that most often cause gastritis are nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin, ibuprofen (Advil, Motrin), and naproxen (Aleve, Naprosyn). NSAIDs interfere with the protective substances in the stomach that prevent damage to the mucosal lining; these drugs also inhibit the body's ability to stop bleeding. The combination of NSAIDs and *H. pylori* is especially damaging to the gastric mucosa and may lead not only to gastritis but also to the development of erosions (superficial defects) and ulcerations (deep defects) in the mucosal lining of the stomach and duodenum.

Newer types of NSAIDs called COX-2 inhibitors were developed to reduce the risk of gastritis and stomach ulcers associated with traditional NSAIDs. However, not all studies have shown COX-2 inhibitors to be safer for the stomach than other NSAIDs. In fact, the only COX-2 inhibitor currently available, celecoxib (Celebrex), carries a "black box" warning on its label informing consumers of the potential for gastrointestinal side effects. Two other COX-2 inhibitors—rofecoxib (Vioxx) and valdecoxib (Bextra)—were taken off the market, because they increase the risk of heart attacks and strokes.

Symptoms and diagnosis of gastritis

The symptoms of gastritis include indigestion (upset stomach) and abdominal pain, particularly after meals.

The best way to diagnose gastritis is with an upper endoscopy. Your doctor will look for changes in the gastric mucosa, such as swelling, redness, and erosions. A definitive diagnosis is made by microscopic examination of a tissue sample removed during the endoscopy. The pathologist who examines the tissue will look for signs of inflammation, the presence of *H. pylori*, or evidence of autoimmune gastritis. *H. pylori* infection can also be diagnosed by a blood test that detects antibodies to the bacterium, a breath test, or a stool test.

Treatment of gastritis

H. pylori infection can be cured with drugs that suppress gastric acid production and oral antibiotics to eradicate the infection. If a medication you are taking is causing gastritis, your doctor may lower the dosage or switch you to another one. Your doctor may also recommend taking medication to decrease gastric acid production and protect the lining of the stomach. (See the chart on pages 14-17.)

NEW RESEARCH

H₂-Blockers and PPIs Equally Effective for Peptic Ulcers

Peptic ulcers (defects or sores in the lining of the stomach and duodenum) can be caused by taking pain relievers including aspirin. A new study suggests that both proton pump inhibitors (PPIs) and H₂-blockers can help prevent and treat ulcers caused by low-dose aspirin.

Researchers in Japan performed upper endoscopy in 68 people taking low-dose aspirin. Then they randomly assigned 31 people with aspirin-induced bleeding peptic ulcers to take either a PPI or an H₂-blocker.

After eight weeks, upper endoscopy showed that the ulcers had healed completely in 100% of the participants in the PPI group and 92% of those in the H₂-blocker group, which was considered comparable. Peptic ulcers were less severe in people taking either H₂-blockers or PPIs than in people taking other anti-ulcer drugs or no prevention therapy at all.

Older adults, who are likely to take low-dose aspirin for heart disease prevention, are at increased risk for peptic ulcers. For those who may not want to take PPIs because of either their higher cost or potential side effects, H₂-blockers may be just as effective.

WORLD JOURNAL OF
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Peptic Ulcer Disease

Peptic ulcers are deep, nonhealing defects or sores in the lining of the stomach and duodenum. When they occur in the stomach, they're called gastric ulcers. Ulcers in the duodenum are duodenal ulcers. Duodenal ulcers tend to affect young people, especially males. Gastric ulcers are more common with age, because older people are more likely to be infected with *H. pylori* or to use NSAIDs. Both gastric and duodenal ulcers tend to recur after they've been treated.

Causes of peptic ulcer disease

Peptic ulcers occur when the lining of the stomach or duodenum becomes damaged, usually by acid. Between 70 and 80% of gastric ulcers and nearly all duodenal ulcers result from *H. pylori* gastritis. NSAIDs and the osteoporosis drug alendronate (Fosamax) also can damage the lining of the stomach, increasing the risk of gastric ulcers. Smoking increases the risk of slow-healing duodenal ulcers.

Symptoms of peptic ulcer disease

The symptoms of a peptic ulcer depend on whether the ulcer is in your stomach or duodenum. A gastric ulcer results in pain in the upper abdomen 15 to 30 minutes after eating. Because of the pain, you may be afraid to eat and you may lose weight. With a gastric ulcer, pain rarely occurs at night or when you are fasting. A duodenal ulcer, on the other hand, results in pain in the upper abdomen two to three hours after meals, when the stomach is empty. The pain can awaken you at night and is relieved by eating.

If not treated, peptic ulcers can lead to complications such as bleeding, perforation, or penetration. Bleeding occurs when the ulcer causes a blood vessel to rupture in the lining of the stomach or duodenum. Perforation results when an ulcer erodes through the wall of the stomach or duodenum and into the abdominal cavity, leading to infection and inflammation of the abdominal cavity (peritonitis). Penetration happens when an ulcer erodes through the wall of the stomach or duodenum and into adjacent organs, such as the liver, pancreas, or colon (large intestine).

Less often, an ulcer can deform the stomach or duodenum and block the passage of food through the gastric outlet or duodenum, resulting in nausea and vomiting that do not improve with treatment.

Diagnosis of peptic ulcer disease

Peptic ulcers can be diagnosed using an upper endoscopy or an upper GI series. During endoscopy, a peptic ulcer appears as a round

ASK THE DOCTOR

Q. *What is H. pylori infection, and should I be treated if I don't have symptoms?*

A. *Helicobacter pylori* (*H. pylori*) is a bacterium that is present in the stomach in up to 30 to 40% of Americans. It may enter the body through contaminated food and water or mouth-to-mouth contact, such as from kissing. *H. pylori* produces no symptoms in the majority of infected people. Others may experience inflammation of the stomach lining, leading to overproduction and increased sensitivity of gastric acid, peptic ulcers, and an increased risk of gastric cancer.

H. pylori infection can be diagnosed through an upper endoscopy, a blood test, a breath test, or a stool test. Most cases are found when a person is experiencing symptoms such as upset stomach or abdominal discomfort. In these patients, *H. pylori* infection is treated with a combination of medications that reduce the production of gastric acid and antibiotics to combat the infection. (See the chart on page 25.) However, some people may be diagnosed with *H. pylori* infection even when they have no symptoms.

Even though overproduction of gastric acid has been linked to an increased risk of gastric cancer, there's no evidence that *H. pylori* infection alone is responsible.

or elongated defect in the lining of the stomach or duodenum. On an upper GI series, barium accumulates inside the ulcer or shows changes in the normal appearance of the folds of the lining (such as convergence of the folds toward the ulcer).

Treatment of peptic ulcer disease

Peptic ulcers can be healed temporarily by suppressing gastric acid production, usually by taking H₂-blockers and proton pump inhibitors. Ulcers often return once these drugs are stopped.

The more common way to treat ulcers is to eradicate *H. pylori* from the stomach. Once the infection is treated, gastric secretion returns to normal and peptic ulcers are usually cured. The treatment regimen to eradicate *H. pylori* includes antibiotics and acid-reducing medications. Usually doctors first prescribe triple therapy, which consists of a proton pump inhibitor and two antibiotics. This approach cures ulcers more than 90% of the time.

If triple therapy does not produce a cure, a second triple therapy containing different drugs may be tried. Another option is quadruple therapy: bismuth subsalicylate (Pepto-Bismol and other brands), two antibiotics, and a proton pump inhibitor or H₂-blocker (see the chart at right). If the *H. pylori* infection is not eradicated, the likelihood is high that peptic ulcers will recur. Continued use of NSAIDs or cigarette smoking lowers the chances that gastric ulcers will heal.

Bleeding ulcers are commonly treated with endoscopic therapy that stops the bleeding, followed by medication. Ulcers were once commonly treated with surgery: either partial gastrectomy or vagotomy. Partial gastrectomy involves removing the acid-producing portion of the stomach; vagotomy involves cutting the vagal nerve to decrease acid production. Now that ulcers can be effectively treated with medication, surgery is rarely needed. Surgery is still used, however, for people with ulcer complications—for example, to stop bleeding, close perforations, or open up the gastric outlet if an ulcer is blocking it. But these days, ulcers rarely progress to this stage.

Anatomy of the Liver, Gallbladder, and Pancreas

To digest food, your digestive tract needs some help from nearby organs, including the liver, gallbladder, and pancreas, that produce or store enzymes and other substances that help break down food.

Drug Regimens for Treatment of Peptic Ulcers 2010

Regimen	Medications	Dosage	Cost*	Side effects/precautions
Triple therapy (two antibiotics and one proton pump inhibitor for 7-14 days. The duration of the regimen including AcipHex is 7 days; the duration of the other regimens is 10-14 days.)	1) Biaxin (clarithromycin)	One 500-mg tablet 2x/day.	\$350 (\$220)	<i>Biaxin, amoxicillin, metronidazole:</i> Side effects include diarrhea, nausea, vomiting, stomach upset, changes in taste, headache. Call your doctor immediately if you experience persistent diarrhea, abdominal pain or cramping, blood or mucus in your stool. <i>Biaxin only:</i> Take with milk if stomach upset occurs. <i>Amoxicillin only:</i> Drink plenty of liquids. <i>Metronidazole only:</i> Avoid alcohol while taking and for at least one day after finishing the medication. <i>Proton pump inhibitors:</i> See the chart on pages 14-17.
	2) amoxicillin <i>or</i> metronidazole	Two 500-mg capsules 2x/day.	\$60	
		One 500-mg tablet 2x/day.	\$26	
	3) AcipHex (rabeprazole) <i>or</i>	One 20-mg tablet 2x/day.	\$389	
	Nexium (esomeprazole) <i>or</i>	One 40-mg capsule 1x/day.	\$163	
	Prevacid (lansoprazole) <i>or</i>	One 30-mg capsule 2x/day.	\$353	
	Prilosec OTC (omeprazole) <i>or</i> Protonix (pantoprazole)	One 20-mg tablet 2x/day.	\$40 (\$26)	
	One 40-mg tablet 2x/day.	\$227 (\$220)		
Quadruple therapy (bismuth, two antibiotics, and one proton pump inhibitor or H ₂ -blocker for 14 days)	1) Pepto-Bismol (bismuth subsalicylate)	Two 262-mg tablets 3-4x/day or 30 mL liquid 3-4x/day.	T: \$6 L: \$5-6	<i>Bismuth:</i> May cause stools to become gray-black.
	2) metronidazole	One 250-mg tablet 4x/day.	\$21	<i>Metronidazole:</i> See above.
	3) tetracycline	One 500-mg capsule 4x/day.	\$24	<i>Tetracycline:</i> Makes skin more sensitive to sunlight. Wear sunscreen.
	4) proton pump inhibitor (AcipHex, Nexium, Prevacid, Prilosec OTC, Protonix, Zegerid) <i>or</i>	Same as for triple therapy (see above).	Same as for triple therapy (see above)	<i>Proton pump inhibitors:</i> See the chart on pages 14-17.
	Axid (nizatidine) <i>or</i>	One 150-mg capsule 2x/day.	\$173 (\$52)	<i>H₂-blockers:</i> See the chart on pages 14-17.
	Pepcid AC (famotidine) <i>or</i>	One 20-mg tablet 2x/day.	\$19	
	Tagamet (cimetidine) <i>or</i>	One 400-mg tablet 2x/day.	\$115 (17)	
	Zantac 150 (ranitidine)	One 150-mg tablet 2x/day.	\$24 (\$8)	
Combination products	Helidac (bismuth/metronidazole/tetracycline) for 14 days	Chew two 262-mg bismuth tablets, then swallow one 250-mg metronidazole tablet and one 500-mg tetracycline capsule with a glass of water 4x/day (at breakfast, lunch, dinner, and bedtime).	\$108	Side effects include nausea, diarrhea, abdominal pain. Do not take if you have kidney or liver problems. For other precautions, see separate entries for bismuth, metronidazole, and tetracycline.
	Prevpac (amoxicillin/Biaxin/Prevacid) for 14 days	Swallow two 500-mg amoxicillin capsules, one 500-mg Biaxin tablet, and one 30-mg Prevacid capsule 2x/day before eating.	\$360	Side effects include diarrhea, headache, changes in taste. For precautions, see separate entries above for amoxicillin, Biaxin, and proton pump inhibitors.

*Prices per drugstore.com. Generic cost is in parentheses. Cost is for 14 days, except for AcipHex in triple therapy, which is used for only 7 days.

Liver

The liver is a large organ on the upper right side of your torso, opposite the stomach and behind the ribcage. One of its main functions is to make a substance, bile (composed mostly of bilirubin, bile salts, and cholesterol), needed to digest food in the small intestine.

The liver is divided into two sections: a right lobe and a left lobe. Both lobes are made up of cells called hepatocytes. These cells produce bile and secrete it into the bile ducts, which carry bile to the gallbladder where it is stored until used by the small intestine.

Gallbladder and Bile Ducts

The gallbladder is a pear-shaped sac under the right lobe of the liver. Between meals, it stores and concentrates bile, which is produced at a constant rate by the liver. When it is not full of bile, the gallbladder is about 3 inches long and 1 inch wide at its thickest part. After meals, the gallbladder releases bile into the duodenum to aid with digestion.

The cystic duct carries bile from the gallbladder to the common bile duct, which empties into the duodenum. Entry of bile into the duodenum is regulated by layers of muscle called the sphincter of Oddi. Between meals, the sphincter of Oddi closes and prevents bile from entering the duodenum. During and after meals, this sphincter opens and allows bile to enter the duodenum.

Pancreas

The pancreas is a long, thin gland that lies horizontally behind the bottom part of your stomach. It makes digestive enzymes that flow through the pancreatic duct to the small intestine. These enzymes, along with bile from the gallbladder, break down food for use as energy by the body. The pancreas also makes insulin and glucagon, hormones that help regulate blood glucose (sugar) levels.

Disorders of the Liver, Gallbladder, and Pancreas

Disorders of the liver (such as cirrhosis and hepatitis), the gallbladder (gallstones, for example), and the pancreas (for instance, pancreatitis) can affect the proper function of your digestive tract.

Hepatitis

Hepatitis refers to any type of inflammation in the liver and it can be caused by a number of disorders. Heavy alcohol use (alcoholic

hepatitis) is the most common cause of liver injury or hepatitis. Certain medications (such as isoniazid [Laniazid, Nydrazid] to treat tuberculosis, methyldopa to treat high blood pressure, and amiodarone [Cordarone, Pacerone] to treat irregular heart rhythms) result in liver injury in susceptible individuals. The liver also may be injured and become inflamed by the immune system (autoimmune hepatitis) or from increased iron storage (hemochromatosis).

Viral hepatitis

Viral hepatitis is caused most often by one of five viruses: A, B, C, D, or E. About 25,000 new cases of hepatitis A, 43,000 new cases of hepatitis B, and 17,000 new cases of hepatitis C occur each year in the United States. The other types rarely occur in the United States.

Hepatitis A is spread through contact with saliva or feces of someone who has the virus or ingestion of food or water contaminated with the virus. Hepatitis A is transmitted rarely through sexual contact.

Hepatitis B is transmitted through tainted blood that enters the body via contaminated needles (illegal injection drug use or accidentally being stuck with a used needle), blood transfusions, transplants, hemodialysis, tattooing, body piercing, and acupuncture. You can also become infected when you have sex with someone who has the virus. Vaccines are available to prevent hepatitis A and B.

Hepatitis C is the top cause of chronic liver disease. Like hepatitis B, it is transmitted through infected blood exposure (often linked to illegal injection of drugs) and sexual contact with an infected person.

Symptoms of viral hepatitis

If you have viral hepatitis, it may not cause any symptoms at all. If symptoms are present, they can include fever, fatigue, appetite loss, nausea, stomach discomfort, dark urine, and jaundice (yellowing of the skin and whites of the eyes). Symptoms may come on suddenly.

Most people with hepatitis C have no symptoms and are diagnosed when abnormal liver enzymes are identified through a routine blood test. Seventy percent of those with hepatitis C develop chronic disease and 30% may develop cirrhosis within 20 years of virus exposure.

Diagnosis of viral hepatitis

All three types of hepatitis can be detected with routine blood tests.

Treatment of viral hepatitis

There is no treatment for hepatitis A beyond getting rest and drinking plenty of fluids. Most people recover within two to six months.

Most adults with hepatitis B recover within six months, but up to 10% can become chronically infected and are at risk for chronic liver disease.

For those with acute hepatitis B (lasting less than six months), treatment isn't usually prescribed. However, if you know you've been exposed, getting the hepatitis B vaccine and hyperimmune globulin (a drug containing large amounts of antibodies to the hepatitis B virus) immediately after exposure can significantly reduce infection risk.

Chronic hepatitis B (lasting longer than six months) can be treated with pegylated interferon, lamivudine (Epivir-HBV), telbivudine (Tyzeka), adefovir (Hepsera), or entecavir (Baraclude). Pegylated interferon is prescribed less often than the other four drugs because of many side effects associated with its use.

Chronic hepatitis C is treated with pegylated interferon and ribavirin, which results in clearance of the virus in 30 to 40% of people. Unfortunately, side effects are common with this regimen and include worsening of heart disease, retinal detachment, flu-like symptoms, depression, anemia, and alopecia.

If treatment is unsuccessful and the disease progresses, a liver transplant may be necessary.

Cirrhosis

Cirrhosis is the development of scar tissue in the liver caused by any form of chronic liver disease.

Symptoms of cirrhosis

Typically, people have few symptoms in the early stages of cirrhosis. However, as more healthy cells are replaced by scar tissue, symptoms such as loss of appetite, weight loss, weakness, easy bruising, jaundice, and accumulation of fluid in the abdomen and legs may develop.

Diagnosis of cirrhosis

Evidence of cirrhosis typically may be detected by a physical exam, but more often blood tests or imaging studies of the liver are required to determine if chronic liver disease has progressed to cirrhosis. A liver biopsy—where a small sample of liver tissue is removed for laboratory analysis—also may be performed to evaluate how badly the liver is damaged and whether cancer has developed.

Treatment of cirrhosis

To prevent cirrhosis development, treatment is ideally directed toward the underlying cause (viruses, alcohol, or autoimmune

hepatitis). Once scar tissue develops in the liver, it is irreversible. Therapy is then directed at controlling the complications of the scarred liver. Fluid accumulation in the abdomen or legs is treated with a low-salt diet and diuretics. Large blood vessels (varices) that can rupture easily and bleed profusely may form around the stomach and esophagus. These varices may require certain medications (beta-blockers) or endoscopic treatment. If these complications fail to respond to medical therapy, a liver transplant may be necessary.

Gallstones

Gallstones are small, pebblelike substances that develop in the gallbladder. An estimated 20.5 million people in the United States have gallstones. Women are two to three times more likely than men to have them. In fact, 10 to 30% of women develop gallstones in their lifetime.

There are two types of gallstones. Between 70 and 80% are cholesterol gallstones, which are made up mostly of cholesterol. The remaining 20 to 30% are black- or brown-pigment gallstones, which have a much lower cholesterol content and are primarily made of bilirubin (a component of bile made by the liver).

Causes of gallstones

Gallstones form when the liquid (bile) stored in the gallbladder hardens into stones. This hardening occurs when there is too much cholesterol or bilirubin in the bile or when the gallbladder doesn't empty as it should. It's not known why these imbalances occur. Diet may play a role: For instance, eating a diet high in cholesterol and fat and low in fiber may increase the risk of gallstones.

Risk factors for the development of cholesterol gallstones include a genetic predisposition (particularly in people of Pima Indian or Scandinavian ancestry); age (older than age 50); obesity; pregnancy; use of medications such as postmenopausal estrogen, oral contraceptives, or the antibiotic ceftriaxone (Rocephin); prolonged intravenous feeding; rapid weight loss; and diseases of the terminal ileum (the last portion of the small intestine, which is responsible for reabsorption of bile acids from the bowel into the blood). A 2008 study suggests that deficiency of magnesium—an essential mineral found in green vegetables, fish, whole grains, legumes, seeds, and nuts—might be a risk factor as well.

People with hemolytic anemia or a bacterial infection inside the bile ducts are at risk for pigment gallstones.

NEW RESEARCH

Experimental Drug May Improve Hepatitis C Treatment

Current treatment for hepatitis C—a combination of pegylated interferon and ribavirin—is successful in less than 40% of people. But a new study suggests that adding a yet-to-be approved drug may improve results for most patients in half the time.

Researchers randomly assigned 250 people with untreated chronic hepatitis C to either standard treatment plus a placebo or standard treatment plus telaprevir, an antiviral drug that blocks a protease enzyme the hepatitis C virus needs to replicate itself. Some of the telaprevir group took pegylated interferon and ribavirin for the standard 48 weeks, while some were treated for 24 weeks.

Six months after the end of treatment, 67% of those who received 48 weeks of telaprevir and 61% who received 24 weeks of telaprevir had a sustained antiviral response compared with 41% of people in standard treatment. One of the most common side effects from telaprevir was a rash, which did cause some participants to discontinue treatment.

This study may represent an important advance in treating hepatitis C. Two phase III clinical trials are currently attempting to confirm the results, which could lead to approval of telaprevir by the U.S. Food and Drug Administration.

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Symptoms of gallstones

Between 70 and 80% of gallstones produce no symptoms and are discovered by accident during an imaging test for another health problem. There's a 1 to 4% chance each year that a symptom-free gallstone will begin to cause symptoms.

The most common cause of symptoms is gallstone migration. When gallstones migrate, they can obstruct the gallbladder neck (the narrow portion between the gallbladder and the beginning of the cystic duct), the cystic duct, or the common bile duct. The resulting increased pressure inside the gallbladder produces sharp pain in the right upper portion of the abdomen. Intermittent episodes of such pain, due to obstruction and spontaneous release (when the gallstone dislodges), are called biliary colic.

When stones migrate from the gallbladder into the common bile duct, they can cause partial or complete obstruction of bile flow. Signs and symptoms of bile duct obstruction are intermittent abdominal pain, jaundice (yellow discoloration of the skin and eyes), and cholangitis (inflammation of the bile ducts). Gallstones that lodge in the major duodenal papilla (a small elevation in the second portion of the duodenum, where both the common bile duct and the pancreatic duct openings are located) can cause acute pancreatitis (inflammation of the pancreas; see pages 34-35), with abdominal pain, nausea, and vomiting.

If the obstruction persists, a condition called acute cholecystitis may develop. In this condition, rising pressure inside the gallbladder leads to decreased blood flow to the gallbladder wall, inflammation, bacterial infection, and, in some cases, a hole in the wall of the gallbladder (perforation). Symptoms of acute cholecystitis include severe pain, fever, nausea, and vomiting. The pain is located below the bottom edge of the right rib cage and often spreads to the back, right shoulder, or right side of the neck.

Diagnosis of gallstones

The best test to diagnose gallstones in the gallbladder is an abdominal ultrasound, which uses sound waves to create images of the inside of the gallbladder. It is a noninvasive, painless test that is performed by placing an ultrasound probe on the outside of your abdomen. No special preparation is required aside from fasting for six to eight hours. Abdominal ultrasound can detect gallstones as small as 2 mm.

If you have acute cholecystitis, ultrasound can detect thickening of the gallbladder wall as well as the presence of inflammatory fluid (pus that contains bacteria and inflammatory cells) in and around

the gallbladder. Abdominal ultrasound can also detect widening of the common bile duct due to obstruction by a stone.

If your doctor suspects that there is a gallstone in your common bile duct, an endoscopic ultrasound may be performed. This test uses a special endoscope with an ultrasound probe at its tip.

Computed tomography (CT) produces cross-sectional images of the human body using high-resolution x-rays that are processed by a computer. It involves lying on a special table while x-rays are passed through your body. Like abdominal ultrasound, CT is painless and noninvasive. It is better than ultrasound at detecting complications of acute cholecystitis, such as perforation of the gallbladder or bile ducts and the formation of an abscess (a localized accumulation of pus).

A hepatobiliary scintigram, also called a hepato-iminodiacetic acid (HIDA) scan, is used to evaluate the passage of bile through the bile ducts and gallbladder and to detect obstruction of the cystic duct. This test involves the intravenous injection of a small amount of a radioactive substance into a vein in your arm. The radioactive substance is removed from the blood by the liver and then secreted into the bile ducts. A special camera detects the presence of the radioactivity and creates a computer image of the bile ducts. The procedure is safe and exposes you to only small amounts of radioactivity.

Endoscopic retrograde cholangiopancreatography (ERCP) is the best way to diagnose stones in the bile ducts. It uses a special side-viewing endoscope to locate the opening to the duodenum and to place a thin catheter in the bile ducts. A contrast agent is then injected into the bile ducts and x-rays are taken, allowing your doctor to study the anatomy of the ducts and identify any defects or blockages caused by stones, strictures, or masses.

A noninvasive, painless alternative to ERCP is magnetic resonance cholangiopancreatography (MRCP). It uses radiofrequency waves to create pictures of the bile and pancreatic ducts. During the procedure, you will lie very still in the magnetic resonance imaging (MRI) scanner. The test takes about 20 minutes and may not require the injection of a contrast agent.

Treatment of gallstones

If you have gallstones but no symptoms, you do not need treatment. But if you're having frequent episodes of biliary colic, your physician will likely recommend that you have your gallbladder removed, an operation called a cholecystectomy, to prevent recurrences. Nearly all cholecystectomies are performed by laparoscopy, which decreases the amount of pain following the surgery and allows for a faster

NEW RESEARCH

Only Very Heavy Drinking May Increase Chronic Pancreatitis Risk

Alcohol use is known to increase the risk of chronic pancreatitis (inflammation of the pancreas). However, moderate alcohol consumption doesn't appear to be an independent risk factor, according to a new study. Rather, only very heavy drinking raises the risk, and most people with chronic pancreatitis do not drink that much.

As part of the North American Pancreatitis Study Group, researchers examined the alcohol and cigarette use of 1,000 people with pancreatitis and 695 healthy controls. Approximately 25% of both groups never drank. Very heavy drinkers (five or more drinks per day) made up 38% of men and 11% of women in the chronic pancreatitis group and 10% of men and nearly 4% of women in the control group.

Although the risk associated with very heavy drinking was triple that for people who had half a drink per day or less, only 25% of people with chronic pancreatitis actually had five or more drinks a day. The risk of chronic pancreatitis in smokers appeared to increase in proportion to the amount and duration of smoking.

Despite older assumptions that most chronic pancreatitis is due to alcohol use, it appears to be the case only with very high daily consumption.

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Seeing Red

What to do if there's blood in your stool or vomit

Seeing blood in your vomit or stool can be alarming, but most of the time it can be treated effectively. The bleeding simply could be from hemorrhoids, which may be uncomfortable but not life threatening. Bleeding from an ulcer in the stomach or duodenum may be a more serious problem.

Bleeding can occur anywhere in the digestive tract, from the esophagus to the anus, but symptoms vary depending on what part of your gastrointestinal (GI) tract is affected.

What It Means

Bright red blood in your stools, in the toilet bowl, or on toilet paper when you wipe your anus is a sign of active bleeding in the rectum or large intestine (colon). If the blood is a darker red, the bleeding is occurring higher up in the colon or in the lower portion of the small intestine.

If your stools are black and tarry, you may be bleeding in your esophagus, stomach, or upper portion of the small intestine. The blood is dark because it has been exposed to acid, enzymes, and bacteria in your stomach and intestines. Taking iron supplements or the antidiarrhea medication bismuth subsalicylate (Pepto-Bismol) can make the stools appear dark or even black in the absence of bleeding.

Blood in your vomit can be due to bleeding in the esophagus, stomach, or upper small intestine. Bright red blood means that bleeding began recently; material that looks like coffee grounds means that the blood has been in your digestive tract long enough to be partially digested by stomach acid.

Sometimes bleeding in the GI tract cannot be seen with the naked eye. For example, colon polyps and colon cancers bleed intermittently and typically produce small amounts of blood that can only be detected on a special stool test.

Digestive tract bleeding (also called GI bleeding) always needs a doctor's attention. Although serious causes like cancer or a ruptured blood vessel are less common, they are possible and should be ruled out by a medical professional. And even when the cause isn't serious, it likely can and should be treated.

Who's At Risk?

You may experience bleeding if you have any of the digestive problems listed in the chart at right.

Certain medications—including commonly used over-the-counter drugs—also can increase your risk of GI bleeding. Nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen (Advil, Motrin) and naproxen (Aleve), which alleviate pain from chronic conditions like osteoarthritis, can damage tissue in the GI tract and cause ulcers. Combining an NSAID with excessive alcohol consumption can increase the risk of bleeding even more.

Aspirin, also an NSAID and often used as an antiplatelet agent to protect against heart attack, stroke, and other cardiovascular events, also can cause bleeding. Using blood thinners (anticoagulants) such as warfarin (Coumadin, Jantoven) combined with antiplatelet drugs increases this risk as well.

A recent study also suggests that certain antidepressants can increase bleeding risk, particularly

when combined with NSAIDs.

Researchers found that people who took a selective serotonin reuptake inhibitor (SSRI)—sertraline (Zoloft), citalopram (Celexa), or escitalopram (Lexapro)—or the serotonin and norepinephrine reuptake inhibitor (SNRI) venlafaxine (Effexor) had higher rates of bleeding in the upper GI tract. However, acid-reducing medication may prevent this GI distress, as participants who took antidepressants plus either a proton pump inhibitor or histamine H₂-antagonist (H₂-blocker) had a lower risk of bleeding.

If you take any of these medications regularly, talk with your doctor about whether you need to worry about digestive tract bleeding.

Finding the Source

If you notice blood in your vomit or stool, see your doctor for an evaluation that will include a complete medical history and physical exam as well as a fecal occult blood test (to examine your stool for minute amounts of blood) and a blood test to see if you have anemia. Your doctor may also order:

- **upper endoscopy**, in which a flexible instrument is inserted into your mouth to check for bleeding in the esophagus, stomach, and duodenum
- **colonoscopy or sigmoidoscopy**, in which an instrument is inserted into your anus to look into your intestines for colon cancer or another cause of bleeding
- **capsule endoscopy**, in which you swallow a capsule containing a camera that takes pictures as it travels through the digestive tract, allowing the doctor see if there is

What's Causing Your Bleeding?

Type of Bleeding	Possible Source	Possible Cause
Vomiting bright red blood or material that looks like coffee grounds	Esophagus, stomach, or upper small intestine	Ulcer, inflammation (esophagitis or gastritis), a tear in the esophageal lining, rupture of enlarged veins (varices), benign tumors, or cancer
Bright red blood in stool	Rectum, anus, or colon	Infections, inflammation (ulcerative colitis or Crohn's disease), polyps, cancer, diverticular disease, hemorrhoids, or anal fissures
Maroon/dark-colored blood in stool	Small intestine or upper part of the colon	Ulcer, inflammation (ulcerative colitis or Crohn's disease), polyps, cancer, or diverticular disease
Black or tarry stools	Esophagus, stomach, or upper small intestine	Ulcer, inflammation (esophagitis, gastritis, or Crohn's disease), a tear in the esophageal lining, rupture of enlarged veins (varices), benign tumors, polyps, or cancer.

any irritation in the small intestine.

Using one or more of these diagnostic tests, your doctor should be able to pinpoint the source of the bleeding. (For more on these tests see pages 4-5 and 37-39.)

Fixing the Problem

Many of the tests used to find the source of bleeding can also be used to stop the problem. For instance, if a bleeding ulcer is found in the stomach during an endoscopy, your doctor can stop the bleeding by injecting a chemical or applying an electric current, a heated cauterizing device, a small metal clip, or a laser to the site. Bleeding diverticula and hemorrhoids also can be treated with these methods. In addition, polyps can be removed during a colonoscopy.

If bleeding is caused by taking antiplatelets like aspirin, a 2008 task force with experts from the American College of Gastroenterology and the American Heart Association recommends using proton pump

inhibitors as a protective measure for those at high risk for bleeding, such as those who take antiplatelets as well as NSAIDs. They also recommend treatments including antibiotics and proton pump inhibitors to eradicate *Helicobacter pylori* bacteria in the GI tract for those with a history of ulcers.

If the bleeding is caused by chronic inflammatory bowel disorders like Crohn's disease or ulcerative colitis, aminosalicylates and corticosteroids, among other drugs, may be used to treat the inflammation (see pages 56-59).

In rare cases, when "scope" therapy or medication doesn't resolve the problem, surgery may be performed to remove the diseased tissue that is causing the bleeding.

Without treatment, chronic digestive tract bleeding can cause anemia, meaning that the number of red blood cells in the body is lower than it should be. These cells contain hemoglobin, an iron-rich protein that carries oxygen from the

lungs to the muscles and organs.

Anemia can make you feel fatigued, weak, and lethargic, and if not treated, it can strain your heart as well.

Recognizing an Emergency

Sudden, massive bleeding in the digestive tract from problems like a ruptured enlarged vein in the esophagus or a diverticulum in the large intestine can cause weakness, dizziness, faintness, shortness of breath, abdominal cramps, or diarrhea. A large amount of bleeding can also make your blood pressure drop severely, depleting your organs of blood and oxygen and causing shock. If this happens you may feel confused, dizzy, or faint; your skin may be cold and clammy; and you may urinate less. Shock can be deadly if not treated rapidly with intravenous blood and fluids.

Sudden, massive GI bleeding occurs rarely, but if you or someone else experiences any of the signs or symptoms of major bleeding, immediately call 911. ■

recovery than traditional open surgery. During laparoscopic cholecystectomy, the surgeon may explore the common bile duct as well.

Pressure within the biliary tract, caused by stones that obstruct the bile ducts, can also be relieved by using ERCP to place a small tube (stent) into the common bile duct to keep it open. Stones in the common bile ducts can also be removed during ERCP.

ERCP uses a special device called a sphincterotome to cut the bile duct sphincter and then extract the stones from the bile duct with a special basket or balloon. Since stones are often still present in the gallbladder, a cholecystectomy should also be performed to prevent further obstruction.

Acute cholecystitis usually requires a hospital stay. Fluids and nutrients are given intravenously to let the digestive tract rest, and antibiotics are administered to eliminate the bacterial infection. Once acute cholecystitis develops, the gallbladder should be removed. If you are unable to undergo surgery, the gallbladder can be drained by passing a tube into the gallbladder through a small incision in the abdomen. Ultrasound or CT is used to guide placement of the draining tube.

Pancreatitis

Pancreatitis is an inflammation of the pancreas. When inflamed, the digestive enzymes produced by the pancreas become active within the pancreas instead of in the small intestine as they should. As a result, the pancreas starts to attack itself.

Pancreatitis can be acute or chronic. Acute pancreatitis causes attacks of pain within several hours of eating a large meal or drinking a large amount of alcohol. Chronic pancreatitis occurs in people with acute pancreatitis when the pancreas develops scar tissue and slowly starts to malfunction. Eventually, the pancreas may stop producing digestive enzymes. About 210,000 people in the United States suffer a bout of acute pancreatitis each year, and between three and 10 people per 100,000 suffer from chronic pancreatitis. Both types of pancreatitis are more common in men than in women.

Causes of pancreatitis

Gallstones blocking the bile duct and excessive alcohol consumption are the major causes of pancreatitis. Less frequently, certain medications (in particular, the aminosalicylate anti-inflammatory compounds used to treat Crohn's disease and ulcerative colitis; see the chart on pages 56-59), a duodenal ulcer, an overactive parathyroid gland, or a stomach injury can cause pancreatitis.

Symptoms of pancreatitis

Acute pancreatitis is hard to miss. It causes excruciating pain in the center of your upper abdomen extending through to your back, in addition to nausea and vomiting. You may develop a fever or bruising on your stomach from internal bleeding. You may also go into shock. If you experience severe abdominal pain that lasts more than 20 minutes, go to your doctor or a hospital emergency room for treatment.

With chronic pancreatitis, the abdominal pain can come on suddenly or gradually, usually after eating. It may develop into persistent abdominal pain. You can also develop jaundice, lose weight, and experience symptoms of diabetes (increased thirst and frequent urination) as the pancreas gradually deteriorates.

Diagnosis of pancreatitis

Pancreatitis is diagnosed with blood tests to assess levels of enzymes made by the pancreas as well as other chemicals in the body. X-rays, ultrasound, or CT scans of the pancreas are also done.

Treatment of pancreatitis

For acute pancreatitis, you will probably need a hospital stay to completely rest your intestinal tract (that is, no food by mouth) and to receive intravenous fluids, antibiotics, and painkillers. If you have gallstones, they may need to be removed. Likewise, collections of fluid around the pancreas that develop from acute pancreatitis may be drained or surgically removed. You'll also need to stop drinking alcohol and follow a nutritious, low-fat diet.

If you are diagnosed with chronic pancreatitis, you will likely be prescribed medications that contain pancreatic enzymes to help your body absorb food. If the pain persists, surgery to remove damaged tissue in the pancreas or to cut the nerves that transmit pain may be needed. As with acute pancreatitis, stopping alcohol use and eating a nutritious, low-fat diet are important.

Anatomy of the Lower Digestive Tract

Your lower digestive tract, also known as your bowel, is approximately 25 feet long and consists of the small and large intestines (see the illustration on page 3). Food from the stomach passes through the pyloric valve into the small intestine, a 20-foot tube with three sections: the duodenum, the jejunum, and the ileum. The walls of the small intestine are lined with muscles that contract and relax to carry

FDA APPROVAL

Creon Approved To Treat Pancreatic Insufficiency

The U.S. Food and Drug Administration (FDA) recently approved pancrelipase (Creon) to treat exocrine pancreatic insufficiency (EPI), a complication of cystic fibrosis, pancreatic cancer, gastrointestinal surgery, and chronic pancreatitis. If you have EPI, the body is unable to make or transport the pancreatic enzymes needed to digest food, leading to malabsorption and malnutrition.

In a recent randomized clinical trial, people taking Creon were able to absorb 89% of the fat from their meals compared with 49% in the placebo group.

Creon is available in delayed-release capsules that are taken with each snack and meal throughout the day. Creon and other pancreatic enzyme products have been available for the past 20 years without needing FDA approval; however, Creon is the first to be approved under new FDA guidelines.

Like all pancreatic enzyme products, Creon carries the risk of a rare but serious bowel disorder called fibrosing colonopathy. Other possible side effects include abdominal pain, changes in bowel habits, cough, dizziness, gas, headache, and weight loss. Chewing or failing to completely swallow Creon capsules can cause irritation. Creon should be used with caution in people with gout, kidney problems, hyperuricemia, or an allergy to pig products.

U.S. FOOD AND DRUG ADMINISTRATION
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food along its path. The walls are also covered in microvilli, hairlike projections that help to absorb nutrients into the bloodstream.

When food reaches the duodenum, it begins to get broken down by digestive enzymes and bile. This process turns proteins into amino acids, fats into fatty acids, and carbohydrates into simple sugars. The digested food then moves into the jejunum, where most of its nutrients are absorbed. Vitamin B₁₂ is absorbed in the ileum.

The material left behind—mostly water, electrolytes (such as sodium and potassium), and waste (such as fiber and dead cells)—moves into the cecum, the first part of the colon (also called the large intestine). It then passes through the ascending, transverse, and descending colons; the sigmoid colon; and the rectum. No nutrients are absorbed by the colon. Its job is to remove excess water from the intestinal waste and return it to the bloodstream. Thus, as the material moves along the colon, it slowly dries out and forms a more solid substance called stool. Waste usually spends a day or two in the colon before it is expelled from the body.

When stool moves into the rectum, it stretches the walls of the rectum, which signals the need for a bowel movement. The stool then moves into the anal canal. At the end of the anal canal is the anal sphincter, which is a muscle that usually remains closed; however, it opens to allow stool to pass out of the body.

Tests for Examining the Lower Digestive Tract

Various tests are available to obtain an inner view of the lower digestive tract: barium enema, sigmoidoscopy, colonoscopy, virtual colonoscopy, and capsule endoscopy. All of these procedures can be performed on an outpatient basis at your doctor's office or a hospital.

The colon must be emptied before all of these procedures so that your doctor can obtain a clear view of the inside of your lower digestive tract. Your doctor will give you specific instructions on how to do this, but the process typically involves consuming a liquid diet for up to three days before the procedure. In addition, you will be told not to eat or drink anything after midnight the night before the test and to use laxatives the day before the procedure to cleanse the colon. On the morning of the procedure, an enema (a liquid solution passed into the anus) will be needed to cleanse the colon completely.

Barium Enema

Your doctor may order a barium enema, also called a lower gastrointestinal (GI) series, to detect structural problems at the far end of your bowel. If a colonoscopy (see page 38) cannot be performed, a barium enema may also be used to diagnose inflammatory bowel disease (Crohn's disease and ulcerative colitis) and colon cancer.

Barium sulfate—a type of contrast dye—is administered through the anus and into the colon to help produce x-ray images of the lower digestive tract. During the exam, you lie on your side with your knees bent toward your chest. A lubricated tube is gently inserted through the anus and into the rectum. Barium is then passed through the tube into the rectum, allowing the colon to fill with contrast dye. No sedation or pain medication is needed, but you may feel some abdominal discomfort or an urge to pass stool during the test.

A radiologist will take continuous x-rays of your abdomen and view them on a screen. If any abnormalities are seen, the radiologist will take spot x-rays for later analysis. When the procedure is complete (it typically takes 30 to 45 minutes), you will be taken to the bathroom to expel some of the barium into the toilet. If a buildup of barium prevents you from having a bowel movement in the days after the test, your doctor may recommend a laxative or an enema. Also, your stool may be whitish in color for up to three days after the procedure because of the barium. Serious complications, such as perforation of the colon, are rare.

Sigmoidoscopy

During a sigmoidoscopy, a gastroenterologist examines the inside of the rectum and sigmoid colon (the last part of the large intestine) using a 2-foot, flexible viewing tube called a sigmoidoscope. You might have this test to screen for colorectal cancer (although a colonoscopy is the preferred method) or to investigate suspicious rectal bleeding, diarrhea, or pain.

Usually a sigmoidoscopy is done without a sedative, although you can request one if you feel anxiety or pain. While you lie on your left side, the doctor manually inspects the anus and rectum for any blockages and then gently inserts the sigmoidoscope into the anus, rectum, and lower colon to view the inner lining of these parts of the digestive tract. The physician may take biopsy samples and remove any polyps (abnormal growths).

The procedure takes up to 30 minutes, and, if no sedation was necessary, you usually can drive home afterward. If you do receive sedation, you won't be able to leave until it wears off, and you'll need

someone to drive you home. Some people experience gas or a small amount of bleeding or abdominal cramping following a sigmoidoscopy. More serious complications, such as excessive bleeding and perforation of the colon or rectum, can occur but are rare.

Colonoscopy

A colonoscopy is similar to a sigmoidoscopy, but a longer flexible viewing tube called a colonoscope is used to examine the entire colon and (if necessary) the lower portion of the small intestine. It is typically performed to detect colorectal cancer and to determine the causes of rectal bleeding, chronic diarrhea, chronic constipation, or abdominal pain.

Pain medication and a mild sedative are usually given intravenously just before a colonoscopy. While you lie on the examining table, the doctor manually checks for blockages in the anus and rectum. He or she then gently inserts the tube through the anus and rectum and into the colon. As the colonoscope is slowly withdrawn, the physician inspects the lining of the intestines and may take biopsy samples of any abnormal tissue and remove any polyps. You may experience abdominal cramping, bloating, and a need to pass stool or gas during the procedure. The whole process can take up to an hour.

The sedation will wear off about an hour after the procedure. You'll need to have someone drive you home because of the lingering effects of the sedative. It is common to have gas after the procedure and to have minor rectal bleeding if a biopsy was performed. Serious complications are rare (occurring in fewer than 0.1% of all colonoscopies) and can include excessive bleeding, labored breathing (from the sedative), and perforation of the colon or rectum.

Virtual Colonoscopy

A virtual colonoscopy requires the same preparation to empty the bowels as a standard colonoscopy, but instead of inserting a viewing tube into the colon and rectum, a CT scan of the abdomen is done to obtain two- and three-dimensional images of the intestines. Because the test will cause only minor discomfort, sedation is not needed.

You might be wondering why your doctor wants to perform a standard colonoscopy when a virtual colonoscopy sounds like an easier test to endure. Even though a 2003 study found that a three-dimensional CT virtual colonoscopy was as accurate as a standard colonoscopy for detecting abnormal growths in the colon and rectum, the test has a number of drawbacks. First, biopsy samples cannot be taken with a virtual colonoscopy. This means that if any

abnormalities are detected, you will need to undergo a standard colonoscopy for confirmation of the diagnosis. Second, polyps cannot be removed during virtual colonoscopy as they can during a standard colonoscopy. Third, virtual colonoscopy may not be able to distinguish stool from polyps or cancers. Because of these drawbacks, your doctor won't perform a virtual colonoscopy unless you have a medical condition that makes a standard colonoscopy risky or physically difficult.

Capsule Endoscopy

When symptoms, such as gastrointestinal bleeding or chronic abdominal pain, cannot be explained using standard diagnostic procedures, capsule endoscopy may be a useful technique. It allows for a full view of the small intestine, particularly the areas that are usually unreachable with an upper endoscopy or colonoscopy. However, capsule endoscopy cannot be used to view the esophagus or the stomach, and biopsy samples cannot be taken.

Similar to the other imaging techniques described above, you will need to follow a liquid diet and take a laxative to empty your bowels before the procedure. On the day of the procedure, you will swallow a camera-containing capsule with a full glass of water. The capsule is then propelled through the digestive tract by peristalsis. You can go about your normal daily activities, although you must wait two hours before drinking clear liquids and four hours before eating a light meal.

The capsule is somewhat larger than a vitamin pill and contains a video camera, light, and radio transmitter. It takes pictures (two per second) of the digestive tract and transmits these images to a Walkman-like device that is worn at your waist. After about eight hours, you return the recording device to your doctor, who downloads the information from the device to a computer. The capsule is eliminated in your stool and does not need to be returned. Your doctor, however, may ask you to watch for the capsule in your stool; it gets stuck in the intestines of about 0.5% of people.

Disorders of the Lower Digestive Tract

A large number of disorders can afflict your lower digestive tract, including diverticulosis and diverticulitis, celiac disease, Crohn's disease, ulcerative colitis, irritable bowel syndrome, hemorrhoids, anal

NEW RESEARCH

Simethicone May Improve Bowel Preparation Before Colonoscopy

To prepare for a colonoscopy, patients often use a sodium phosphate enema to clean out the colon in order to provide a clear picture of what's inside. However, this preparation is sometimes inadequate and can lead to inaccurate results. A new study suggests that adding simethicone (Alka-Seltzer, Maalox, Mylanta) to preparation may result in a clearer image and higher patient satisfaction.

Researchers in Thailand randomly assigned 124 people to take two doses of sodium phosphate plus either a simethicone tablet or a placebo. Endoscopists assessed the amount of air bubbles in the colon, which can limit visibility during the procedure, and the overall effectiveness of colon preparation.

All participants in the simethicone group had an acceptably small amount of air bubbles compared with 42% of the placebo group. Endoscopist satisfaction also was improved in the simethicone group, as was patient satisfaction, most likely because reducing air bubbles also lessens gas and discomfort during the procedure. However, incomplete emptying of the colon and haziness in visibility occurred in both groups and with the same frequency.

Although adding simethicone may be somewhat helpful, more research is needed to determine the ideal bowel preparation for colonoscopy.

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Settling Your Stomach

How to avoid and treat nausea and vomiting

We all know what it's like to feel nauseated—that queasy feeling that can mean an episode of vomiting is imminent. Mercifully, nausea typically lasts only a few hours (although that may seem like an eternity) and requires no medical treatment.

The Culprits

While nausea is often a sign of harmless digestive upset, many kinds of digestive disorders can lead to nausea, including gastroesophageal reflux disease (GERD), peptic ulcers, gallbladder problems, hepatitis, and pancreatitis. An upset stomach can also accompany migraine headaches as well as more serious conditions like brain tumors, heart attacks, and strokes.

Sometimes, nausea may develop in reaction to intense stress, anxiety, or pain. You can even feel the urge to throw up simply by seeing someone else vomit. Most commonly, though, nausea and vomiting are caused by eating certain foods, taking specific medications, or traveling in a moving vehicle.

Food. Eating and drinking can lead to a bout of nausea in one of three ways: from indulging in too much food or alcohol; from an allergy or sensitivity to food (such as milk products that contain lactose); or from eating food contaminated with bacteria, such as *Escherichia coli*, Salmonella, and Shigella, or viruses such as the Norwalk virus.

Medication. Although medications are valuable to treat illnesses, a number of them can cause an upset stomach as a side effect:

chemotherapy and hormonal drugs for cancer, antidepressants, antibiotics (particularly erythromycin), pain medications containing opioids such as codeine, theophylline (a drug for asthma), and non-steroidal anti-inflammatory drugs (NSAIDs) like aspirin and ibuprofen (Advil, Motrin).

Nausea is also common after anesthesia for surgery and following radiation therapy for cancer. High doses of zinc and potassium supplements as well as fish oil capsules may also make you feel nauseated.

Motion. Traveling in a moving vehicle such as a car, plane, train, or boat or taking a spin on an amusement park ride can bring on waves of nausea, which in this case is also known as motion sickness. This occurs when the movement of the vehicle causes your eyes and ears to send conflicting messages to the brain about your environment.

Warding Off Nausea

Nausea isn't inevitable, especially when it comes to the most common causes. The following precautions can help minimize your risk:

- **Eat smaller, more frequent meals at a slower pace.** This will allow your stomach to digest foods at a reasonable rate.

- **Be careful what you eat,** especially while traveling in foreign or tropical locales. Don't eat raw or undercooked meat or seafood or food that appears to have been sitting out for a long time. Also avoid spicy and fried foods. In countries with poor sanitation, don't drink tap water or consume any fruits or

vegetables that you can't peel or boil before eating.

- **Wash your hands frequently** to cleanse away any bacteria or viruses.

- **Monitor your medication use closely,** particularly when you first start taking a drug, to see if it causes stomach upset. Often the nausea will go away within a few days or weeks of taking the medication. If it doesn't, talk with your doctor; he or she may lower the dosage, change the time or way you take the medication, or switch you to another drug. When it comes to chemotherapy, your doctor will likely give you anti-nausea drugs, such as dexamethasone or ondansetron (Zofran), to prevent nausea and vomiting.

- **Sit in the front seat of a car,** if possible, and don't read while riding. If you're in a boat, focus on a stationary object on the horizon and stay in the midsection of the ship, where it's most stable. On a train, sit facing the direction in which the train is moving. Over-the-counter drugs such as dimenhydrinate (Dramamine) and meclizine (Bonine) or the prescription medication scopolamine, which is available as a patch (Transderm Scop) or pill (Scopace), should be taken 30 to 60 minutes before you get in the vehicle.

Treating Nausea And Vomiting

If a bout of nausea or vomiting strikes, here are some ways to relieve it:

- **Rest.** Activity can make you feel worse, so rest as much as possible. If you're experiencing motion

sickness, stay as still as possible and get out of the vehicle as soon as you can.

• **Sip clear fluids to settle your stomach.** Chamomile, lemon balm, or ginger tea as well as ginger ale are good choices for nausea. If you're vomiting, suck on ice cubes and drink water, broth, or sports drinks like Gatorade to prevent dehydration.

• **Avoid strong food odors.** Many odors can worsen nausea, so avoid cooking, grocery shopping, or going to a restaurant.

• **Eat bland foods,** like crackers or dry toast, to absorb excess stomach acid. You should also avoid fatty, acidic, or spicy foods, which can upset the stomach further. Wait about six hours after the last time you

vomited to eat solid food.

• **Take antacids** (Maalox, Rolaids, Tums) to neutralize stomach acid or bismuth subsalicylate (Kaopectate, Pepto-Bismol) to coat your stomach. Talk with your doctor if you're taking prescription medications or aspirin; bismuth contains a drug similar to aspirin, so you could be taking a double dose without knowing it. ■

When To Call Your Doctor

If your nausea or vomiting lasts for more than 72 hours and you haven't been able to eat or drink much or if nausea is accompanied by abdominal pain, intense dizziness, or a severe headache, call your doctor. While nausea and vomiting usually aren't serious, they could be if accompanied by the symptoms below.

If you have nausea or vomiting plus these symptoms...

If you have nausea or vomiting plus these symptoms...	You could...	So you should...
Fever, other cold and flu symptoms, dark urine, and yellowing of skin or eyes	Have hepatitis	See your doctor immediately.
Fever, pain in right upper abdomen, worsening symptoms after a high-fat meal	Have gallstones, cholecystitis (infection of the gallbladder), or pancreatitis (inflammation of the pancreas)	See your doctor.
Vomiting blood and/or having black, tarry stools	Have a bleeding ulcer or other serious condition	See your doctor or visit the emergency room immediately.
Headache, blurred vision, numbness, or tingling following a blow to the head	Have a head injury	See your doctor or visit the emergency room immediately.
Numbness on one side of the body or trouble seeing, speaking, or moving	Be having a stroke	Call 911 immediately, even if the symptoms go away after a few minutes.
Chest pain that lasts longer than 10 minutes	Be having a heart attack	Call 911 immediately.
Excessive thirst, dry mouth, little or no urination, severe weakness, dizziness, and lightheadedness	Be dehydrated	Drink water or sports drinks; avoid coffee, tea, and other caffeinated beverages.

fissures, and colorectal cancer. Many of these disorders have constipation or diarrhea as a symptom.

Constipation

Nearly everyone has had a bout of constipation—infrequent bowel movements and difficulty passing stool—at some point in their lives. This common problem is not a disease but rather a symptom that can stem from a number of medical conditions. It becomes more common with age and occurs in at least 25% of people over age 65. In most cases, constipation is not a serious condition and can be treated with lifestyle measures, such as increasing your intake of dietary fiber and level of physical activity or taking a laxative.

Causes of constipation

Constipation typically occurs when fecal matter moves too slowly through the colon. This allows the body to absorb too much water from the stool, leaving it dry and hard. Many experts no longer believe that a low-fiber diet is a *major* contributor to constipation. However, ignoring the urge to have a bowel movement and changing one's daily routine, such as during travel, are contributing factors.

Constipation can also be a side effect of medication, including pain medications (mainly narcotics), antidepressants, diuretics, iron supplements, and aluminum-containing antacids. Some experts think that excessive use of laxatives also may lead to constipation, because the colon becomes dependent on the laxative to initiate defecation. Overuse of enemas can have the same result.

Various medical conditions also can cause constipation. These include Parkinson's disease, diabetes, multiple sclerosis, stroke, lupus, decreased thyroid function, and spinal cord injuries. Constipation can also be a symptom of irritable bowel syndrome. Tumors in the colon and diverticulosis can cause constipation by blocking the passage of fecal matter. Last, constipation can result from mental health problems such as depression and eating disorders.

Symptoms of constipation

What is considered normal in terms of the frequency of bowel movements varies from person to person. In fact, having only three bowel movements a week is just as normal as having three bowel movements a day. Therefore, a sudden decrease in your typical number of bowel movements is a better indicator of constipation than your actual number of movements.

If untreated, constipation can lead to complications. Straining

during bowel movements can irritate or cause hemorrhoids or rectal prolapse (when part of the lining of the rectum pushes out of the anus). Hard stools may lead to anal fissures—tears in the skin near the anus. All of these conditions can cause pain, bleeding, or excessive secretion of mucus. Another potential complication is fecal impaction, an inability to have a bowel movement because the stool has formed a large, dense mass in the colon or rectum.

You should call your doctor if you experience sudden and unexplained constipation, especially if it is accompanied by blood in the stool or severe abdominal pain, or if you experience constipation that lasts longer than a week despite making changes in your diet and physical activity.

Diagnosis of constipation

You are considered to have chronic constipation if you consistently average one or fewer bowel movements per week for at least a year or have at least two of the following signs of constipation:

- two or fewer bowel movements per week
- straining during at least one quarter of bowel movements
- passage of pellet-like or hard stools during at least one quarter of bowel movements
- feeling like not all of the fecal material is eliminated during at least one quarter of bowel movements.

If you have a bowel movement fewer than three times a week but experience no discomfort or change in the pattern of your bowel movements, you likely aren't constipated.

Diagnostic tests like blood tests, abdominal x-rays, sigmoidoscopies, colonoscopies, and barium enemas are not helpful—or necessary—for the diagnosis of constipation.

Treatment of constipation

The first therapies your doctor will recommend if you have constipation are diet and lifestyle modifications. One of these is an increase in fiber consumption. The average American consumes 5 to 20 g of fiber a day; however, the Institute of Medicine recommends that men over age 50 get at least 30 g of fiber daily and that women over age 50 consume at least 21 g. (Younger men and women should aim for 38 g and 25 g of fiber daily, respectively.)

Although a 2006 review concluded that a lack of dietary fiber probably does not contribute to chronic constipation, fiber may help treat constipation by adding bulk (increased volume) and softening the texture of your stools. Fresh fruits and vegetables, whole grains,

NEW RESEARCH

Herbs Could Help Some People With GI Motility Disorders

Up to one quarter of people in Western countries have a functional gastrointestinal disorder that is difficult to treat, such as dyspepsia (upset stomach), irritable bowel syndrome, GERD, and chronic constipation. A new review suggests that two Japanese herbal formulations may relieve symptoms for some people.

Researchers in Japan and California reviewed 17 studies on rikkunshi-to (RKT, a combination of eight herbs, including ginseng and ginger) and 27 studies on dai-kenchu-to (DKT, a blend of ginseng, zanthoxylum fruit, and ginger). Unlike many herbal supplements, Japanese herbal preparations are standardized according to the quality and quantity of ingredients.

Several studies suggested that RKT improves symptoms of GERD and dyspepsia, including the type caused by taking some medications. DKT appeared to improve GI transit in people recovering from surgery and chronic constipation in children.

These herbal supplements may help by improving GI motility (the way the body moves food through the digestive tract), but rigorous clinical trials are needed before they can be recommended.

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and beans are examples of fiber-rich foods that you should add to your diet. Avoiding foods with a high-fat and low-fiber content, including meat and full-fat dairy products, also may be helpful. Also, don't ignore the urge to have a bowel movement or delay a trip to the bathroom when the urge develops.

Fiber supplements that act as laxatives (such as Citrucel, Fiberall, Konsyl, or Metamucil) or a prescription-strength laxative such as polyethylene glycol (MiraLax, now available over the counter) are useful for some people with constipation. These laxatives add bulk to the stool and are generally safe to use for a week at a time. If you need to use them for longer than that, you should consult your doctor. You should also slowly increase the amount of fiber you take to avoid problems with gas, and be sure to drink plenty of water or other fluids every day.

If bulk-forming laxatives fail to help, your doctor may recommend an enema or a nonbulk-forming laxative, including stimulants, stool softeners, lubricants, and saline laxatives. Stimulants such as bisacodyl (Correctol, Dulcolax) cause rhythmic muscle contractions in the intestines, stool softeners such as docusate sodium (Colace, Dialose, Surfak) add water to the stool which makes it easier to pass, lubricants such as mineral oil (Fleet) allow stool to move more easily through the colon, and saline laxatives such as magnesium hydroxide (Milk of Magnesia) draw water into the colon which provides a flushing action. Even though these laxatives are available without a prescription, they should be used for only a week at a time. If you need them for longer than that, ask your doctor for guidance.

If constipation results in fecal impaction, your doctor may recommend a stool softener or enema. Then he or she will manually remove the hardened stool. If a drug you are taking for another health problem is the suspected cause of your constipation, your doctor may be able to lower the dosage of the medication or switch you to another drug that does not have constipation as a side effect. (Never stop taking a medication or change the dosage without first consulting your doctor.) When a medical condition is the source of the problem, treating that condition may relieve the symptoms.

Biofeedback—in which you learn to strain more effectively, coordinate your breathing, and properly relax and contract the muscles involved in a bowel movement—may help a small number of people with constipation, particularly the type caused by the inability to relax the pelvic floor muscles.

Diverticulosis and Diverticulitis

As we age, most of us develop small pouches (diverticula) that bulge outward through weak points in the wall of the large intestine—a condition called diverticulosis. The condition is present in about half of Americans ages 60 to 80 and in virtually everyone older than age 80. A disorder called diverticulitis, an infection or inflammation of diverticula, develops in about 10 to 25% of people with diverticulosis. Diverticulosis and diverticulitis are referred to as diverticular disease.

Although diverticulosis can occur anywhere along the length of the colon, the pouches typically develop in the sigmoid colon, the last portion of the colon before the rectum. The number of diverticula can range from one (called a diverticulum) to hundreds. Diverticula are usually 5 to 10 mm in diameter but can exceed 2 cm.

Causes of diverticulosis and diverticulitis

A low-fiber diet is the major culprit in diverticulosis because it leads to hard stools. When you strain to move hardened stool, pressure inside the colon increases, which can cause weak spots in the colon wall to bulge outward and become diverticula. Diverticulosis primarily affects people in affluent, industrialized areas like the United States, Europe, and Australia, where diets low in fiber are common.

Diverticulitis occurs when bacteria or hardened stool is trapped in a diverticulum, causing an infection or inflammation. This may ultimately lead to a small hole in the tip of a diverticulum, which allows bacteria to enter the abdomen and cause infection (peritonitis).

Symptoms of diverticulosis and diverticulitis

Although most people with diverticulosis have no discomfort or symptoms, some experience mild abdominal pain, bloating, and constipation. The pain typically occurs in the lower abdomen, most often on the left side. This area of the abdomen may feel full or tender when touched.

Between 15 and 40% of people with diverticulosis experience mild, painless bleeding from the rectum. Excessive bleeding occurs in only about 5% of people. Bleeding occurs when a small blood vessel adjacent to the diverticulum ruptures. The bleeding usually stops on its own. If it persists or recurs, therapeutic endoscopy may be needed. If bleeding persists, surgery to remove the portion of the colon containing the bleeding diverticulum may be necessary.

Attacks of diverticulitis can occur suddenly and without warning. The most common symptom is pain in the lower left side of

the abdomen. Other potential symptoms include fever, nausea and vomiting, chills, constipation, diarrhea, painful or difficult urination, and increased frequency of urination. The severity of the symptoms depends upon whether the infection has spread beyond the colon and whether any complications such as a perforation have occurred.

Diagnosis of diverticulosis and diverticulitis

Diverticulosis is often discovered by accident during an exam, such as a barium enema, sigmoidoscopy, or colonoscopy, for another gastrointestinal ailment. If you have symptoms and your medical history and examination suggest diverticular disease, your doctor will do one or more tests. A barium enema or CT scan can diagnose diverticular disease and its complications. Your doctor may also recommend a colonoscopy to check whether cancer is causing the symptoms.

Treatment of diverticulosis and diverticulitis

For most people with diverticulosis, eating a high-fiber diet will relieve symptoms and prevent the development of diverticulitis. Diverticulitis is usually treated at home with bed rest, a liquid diet to rest the colon, and oral antibiotics. People with severe diverticulitis may be hospitalized and treated with intravenous antibiotics. About 80% of people with severe diverticulitis can be treated successfully without surgery.

If antibiotics do not eradicate the infection associated with diverticulitis, an abscess (a collection of pus surrounded by inflamed tissue) may form in the abdominal cavity adjacent to the colon. The abscess can be treated with more antibiotics or it may need to be drained by inserting a needle into the abscess through the skin and draining the infected fluid through a catheter. Surgical treatment is necessary in some people with a resistant infection.

Rarely, the infection may leak out of an abscess and spread into the abdominal cavity, causing a condition called peritonitis. In such cases, surgery is required immediately to clean the abdominal cavity and remove the damaged region of the colon.

A fistula (an abnormal connection between two organs) can form when an abscess erodes, creating a passage between the colon and an adjacent organ such as the bladder, small intestine, vagina, or skin. The most common type of fistula connects the colon and the bladder. This abnormality, which occurs far more often in men than in women, can lead to severe, persistent urinary tract infections. Surgery to remove the fistula and the affected part of the colon is needed to correct the problem.

Diarrhea

Diarrhea is a common health problem that causes loose, watery stools. Acute diarrhea lasts for no more than two weeks. However, diarrhea that lasts longer than two months is considered a chronic condition.

Causes of diarrhea

Acute diarrhea is usually caused by an infectious agent. Most organisms causing diarrhea originate in feces and enter the mouth via the hands or contaminated food or water. Acute infectious diarrhea can be caused by a wide variety of bacteria, viruses, and parasites. Bacteria implicated in acute diarrhea include *Salmonella*, *Shigella*, *Campylobacter jejuni*, *Escherichia coli* O157:H7, and *Clostridium difficile*. Viral causes include adenoviruses, rotaviruses, and the Norwalk-like viruses known as the Noroviruses; parasites include *Entamoeba histolytica*, *Giardia lamblia*, and *Cryptosporidium* species.

Chronic diarrhea can be classified into three types: osmotic, secretory, and inflammatory. Osmotic diarrhea is caused by ingestion of poorly absorbed substances (such as magnesium or aluminum salts in oral laxatives) or by incomplete digestion and malabsorption of food components such as lactose and sorbitol.

Secretory diarrhea usually results in large amounts of watery stools. This type of diarrhea is caused by production and secretion of excessive fluid by the small intestine, usually the result of a rare, cancerous neuroendocrine tumor occurring in the digestive tract. The tumors release hormones into the bloodstream that stimulate the small intestine to secrete excessive amounts of fluid and electrolytes such as sodium and potassium. Cholera outbreaks in developing countries may cause secretory diarrhea.

Inflammatory diarrhea produces bloody, watery stools. It occurs when inflammation in the lining of the colon increases stool volume by decreasing the absorption of water from the stool. This type of diarrhea is common in people with Crohn's disease and ulcerative colitis, the two main types of inflammatory bowel disease discussed on pages 53-61. Diarrhea, as well as constipation, is also a hallmark of irritable bowel syndrome (see pages 61-65).

Symptoms of diarrhea

The main symptom of diarrhea is an increased number of bowel movements along with a decreased consistency of the stools, which may be semisolid or watery. Other symptoms of diarrhea include feelings of urgency and abdominal discomfort and pain.

ASK THE DOCTOR

Q. Do antidepressants cause diarrhea or constipation?

A. Like all medications, antidepressants carry some risk of side effects, and they can take a toll on your digestive system by causing diarrhea or constipation. Sometimes these changes are helpful. For example, doctors may prescribe selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine (Prozac) or paroxetine (Paxil) for constipation-predominant irritable bowel syndrome, since they are known to cause diarrhea. Conversely, tricyclic antidepressants such as amitriptyline and nortriptyline (Aventyl), which can cause constipation, may help people with diarrhea-predominant IBS.

Of course, not everyone would welcome these side effects. If your antidepressant is causing constipation or diarrhea, talk with your doctor, who may decide that a lower dose or another type of drug would work just as well.

If you can't change your medication, there are steps you can take to ease your symptoms. To combat chronic diarrhea, stay well hydrated but avoid caffeinated and alcoholic beverages. You may also want to avoid high-fiber, dairy, and very sweet foods; all of these can make diarrhea worse.

However, high-fiber foods (such as fruits, vegetables, and whole grains) can improve constipation; many people find some relief by also drinking enough fluids (six to eight glasses daily). Regular exercise will help aid digestion. You may also want to talk with your doctor about fiber supplements or stool softeners.

Do You Need a Vitamin D or B₁₂ Supplement?

Several digestive disorders can put you at risk for a deficiency

If you believed late-night infomercials and magazine advertisements, you'd think most people are suffering from severe vitamin deficiency—and that the supplement being sold will solve all of their health problems. Thankfully, most adults aren't at risk for serious vitamin deficiency, particularly if they eat a balanced diet, take a multivitamin, and get a small amount of sun exposure.

But the small intestine does become less able to absorb certain vitamins as we age. And if you have one of several digestive disorders—including celiac disease, inflammatory bowel disease (IBD), or liver disease—you may be at risk for low levels of vitamin D or B₁₂. Both vitamins are essential for good health, so it's important to make sure you get enough.

Vitamin D

Our bodies need vitamin D to help absorb calcium in the gut and to maintain adequate levels of calcium in the blood, both of which promote bone health. Vitamin D is also thought to help regulate the immune system, reduce inflammation, and possibly even protect the heart, according to the latest research.

Recommended intake. The National Academy of Sciences recommends 400 IU of vitamin D for adults ages 51 to 70 and 600 IU for those over 70. The

most recent USDA Dietary Guidelines for Americans also recommends 1,000 IU a day for older individuals and those with dark skin, people who live in northern climates, or individuals who are housebound.

How we get it. Our skin makes vitamin D in response to the sun's ultraviolet rays. Ten to 15 minutes of sunlight exposure without wearing sunscreen several times a week will allow most people to meet their vitamin D requirement. (However, if you have had skin cancer or are at risk for it, this is not recommended.) Vitamin D is found naturally in very few foods—best sources include cod-liver oil and fatty fish like salmon—so it's often added to fortified foods like milk and breakfast cereals or taken as a dietary supplement.

Who's most at risk for deficiency? Many people (particularly the elderly) do not get enough vitamin D because they tend to spend less time outdoors and their skin produces less vitamin D from the sun. In addition, having a digestive condition like celiac disease, IBDs such as ulcerative colitis and Crohn's disease, pancreatic enzyme deficiency, and chronic liver disease or having had part of your stomach or small intestine removed puts you at risk for vitamin D deficiency.

Several factors contribute to this deficiency. First, the digestive

problem itself can prevent people from going outside and getting exposure to sunlight. Second, people with digestive disorders may avoid vitamin-D-fortified products like milk and breakfast cereals. Third, digestive-disorder-related inflammation and the resulting damage to the lining of the small intestine can interfere with the absorption of vitamin D as well as dietary fat, which is necessary for vitamin D digestion. Fourth, corticosteroids, such as prednisone, taken to reduce inflammation in the digestive tract, can interfere with the body's use of vitamin D. Fifth, people with liver disease may have difficulty transforming vitamin D to its active form—a job performed in part by the liver.

Signs of deficiency. People who have vitamin D deficiency rarely have symptoms, and a broken bone as a result of reduced bone density is often the first indication. Some people, however, may notice bone pain or muscle weakness.

What to do. It's not always easy to reach your vitamin D goals as you get older, and having a digestive disorder can make it even harder. If you have one of the disorders mentioned above, ask your doctor for a blood test to measure the amount of 25-hydroxy vitamin D in your blood. Levels above 30 nanograms (ng)/mL are considered

normal and will help keep your bones strong. Also important for bone health: Consume 1,200 to 1,500 mg of calcium daily from food or supplements and have your bone density measured on a regular basis.

If your vitamin D level falls below 30 ng/mL, the usual advice of getting up to 1,000 IU of vitamin D a day from sun exposure, foods, or a supplement will likely not be enough. In this case, your doctor may prescribe high doses of a vitamin D supplement to replenish your vitamin D stores. However, you should never take large doses of supplements without your doctor's advice, as amounts of vitamin D above 2,000 IU can be dangerous to your health, causing such problems as confusion and heart rhythm abnormalities.

Vitamin B₁₂

Vitamin B₁₂ is involved in many bodily functions: It helps keep nerves and red blood cells healthy and is needed to make DNA. B₁₂ is also vital for the breakdown and utilization of dietary carbohydrates, fats, and proteins.

Recommended intake. For all adults, the National Academy of Sciences recommends 2.4 micrograms (mcg) daily.

How we get it. Vitamin B₁₂ is found naturally in many foods. Good sources include poultry, fish, meat, eggs, milk, and other dairy products. Fortified breakfast cereals are another common

source. You can also get vitamin B₁₂ from supplements.

Who's most at risk for deficiency? Most Americans consume enough vitamin B₁₂, but deficiency is a risk for strict vegetarians as well as older people and those who have digestive disorders that affect the stomach or small intestine or who use medications that reduce the amount of hydrochloric acid in the stomach. These last two groups include people who have celiac disease, Crohn's disease, or atrophic gastritis (overgrowth of intestinal bacteria), have had part of their stomach or small intestine removed, or take proton pump inhibitors or histamine H₂-antagonists (H₂-blockers) for gastroesophageal reflux disease (GERD) or peptic ulcers.

These digestive conditions and medications increase the risk of vitamin B₁₂ deficiency by blocking absorption of this vitamin. Absorption of vitamin B₁₂ is a complex process, involving first the separation of B₁₂ from food by hydrochloric acid in the stomach, then attachment of B₁₂ to a substance called intrinsic factor so that the vitamin can pass through the lining of the small intestine into the bloodstream. Removal of part of the stomach or taking a proton pump inhibitor or H₂-blocker interferes with the first part of the B₁₂-absorption process. Inflammation and damage to the lining of the small intestine from certain digestive disorders

interfere with the second part.

Signs of deficiency. Symptoms of vitamin B₁₂ deficiency can include fatigue, weakness, constipation, loss of appetite, and weight loss. You may also experience numbness or tingling in your hands and feet, balance problems, depression, confusion, memory loss, and soreness of the mouth or tongue. Because the liver stores an extra supply of vitamin B₁₂, symptoms may not appear until years after your body stops efficiently digesting the vitamin. Vitamin B₁₂ deficiency can also cause anemia, in which the blood doesn't carry enough oxygen to the rest of the body.

What to do. If you have one of the digestive disorders mentioned above or take a medication that lowers acid levels in your stomach, you may need to get more than the current recommendation of 2.4 mcg per day. To find out, ask your doctor to measure your B₁₂ level with a blood test. Levels below 200 picograms (pg)/mL indicate B₁₂ deficiency. Treatment typically involves taking B₁₂ supplements at doses of 1,000 mcg per day for up to a month. Even though vitamin B₁₂ is very safe, even at high levels, always talk to your doctor before taking such large doses. Once healthy B₁₂ levels are reached, you should get your B₁₂ mainly from vitamin supplements or fortified foods because B₁₂ from these sources is absorbed more readily than that from animal products. ■

Diagnosis of diarrhea

Most cases of acute diarrhea do not require a call to your doctor. But if diarrhea persists for more than 48 hours, is severe (more than six stools a day), or is accompanied by fever, severe abdominal pain, or blood in the stool, you should see a doctor. You may be asked to give a stool sample to identify the infectious agent causing the diarrhea.

Diagnosing chronic diarrhea is more involved. It requires a detailed evaluation that includes an upper endoscopy and/or a colonoscopy with a biopsy to rule out infections or inflammation.

Treatment of diarrhea

Most of the time, a bout of acute diarrhea requires no treatment beyond rest and drinking plenty of fluids to prevent dehydration until the symptoms subside on their own. Medications to control acute diarrhea are not recommended; you should allow the illness to run its course. However, if the diarrhea is causing you much inconvenience, you can take an antidiarrheal product such as bismuth subsalicylate (Pepto-Bismol and other brands), attapulgite (Kaopectate), or kaolin/pectin (Kao-Spen, Kapectolin) to solidify the stool. Other antidiarrheal medications, such as loperamide (Imodium A-D) or diphenoxylate/atropine (Lomotil), also are helpful because they slow the movement of the GI tract.

Intravenous fluid administration in a hospital is required in some cases of severe diarrhea. Certain cases of infectious diarrhea, particularly those caused by bacteria like *Salmonella typhi* and *E. coli* O157:H7, can be serious. Antibiotics to eradicate the organism are usually recommended if your symptoms have not improved after 48 hours of treatment with fluids and an antidiarrheal product. The antibiotics most frequently used to treat diarrhea caused by bacteria are ciprofloxacin (Cipro) and trimethoprim plus sulfamethoxazole (Bactrim). Cases of acute diarrhea caused by a parasite are often treated with metronidazole (Flagyl). Antibiotics are most effective when started in the first three days of the illness.

Treatment of osmotic diarrhea involves avoiding foods, drinks, or medications that cause the condition. For example, stimulant laxatives such as Correctol or Dulcolax should not be used, and people should limit their use of chewing gum and foods that contain the artificial sweetener sorbitol. If the pancreas produces insufficient digestive enzymes to break down fats, supplemental digestive enzymes can be taken with meals. Treatment of secretory diarrhea caused by a neuroendocrine tumor requires locating and removing the tumor.

Treatment of inflammatory diarrhea involves treating the underlying inflammatory bowel disease.

Celiac Disease

People with celiac disease are sensitive to gluten, a component of wheat and other grains. The disorder was once thought to be rare in the United States, but research now shows that about one in 100 Americans has the disease. Many people don't know they have celiac disease, either because they or their doctor have attributed the symptoms to another illness or because they have no symptoms.

Causes and symptoms of celiac disease

Celiac disease is an autoimmune disorder (the body's immune system attacks itself) and a malabsorption disorder (nutrients from foods are not absorbed). Gluten, which is found in wheat and other grains, contains a protein called gliadin. In people with celiac disease, consuming gliadin produces an immune reaction that causes the villi (fingerlike projections in the intestines) to flatten or disappear. This decreases the ability of the villi to absorb nutrients from food. As a result, diarrhea, bloating, weight loss, anemia, and vitamin deficiencies are common and are some of the first signs of the disorder. Eventually, long-term damage to the small intestine may result.

Osteoporosis is common in people with celiac disease because of poor absorption of vitamin D and calcium. Other possible symptoms related to poor nutrient absorption include fatigue and muscle or bone pain. Long-term malabsorption of nutrients can even damage the nerves, bones, teeth, pancreas, and liver. In addition, a type of cancer called lymphoma is six times more likely in people with celiac disease than in those without the condition.

Risk factors for celiac disease

Celiac disease is most common in whites and people of European ancestry. Seventy percent of cases occur in women. A family history of the disease is another important risk factor. As many as 10% of people with celiac disease have a close relative (a parent, child, or sibling) who also has the disease. If you have no close relatives with the disease, however, your risk of celiac disease is less than 1%.

Screening and diagnosis of celiac disease

About 20% of newly diagnosed cases of celiac disease are in people age 60 or older; some of them have had symptoms for many years. In fact, a recent survey revealed that the average person with celiac

disease has symptoms for 11 years before the condition is diagnosed. One reason is that many people with celiac disease do not have the most common symptoms—diarrhea, bloating, gas, and weight loss—and 40% have no symptoms at all. Celiac disease is especially difficult to diagnose in older adults because they are more likely to have nonspecific symptoms (for instance, pain in the joints or numbness in the legs) or nutritional deficiencies because of their age or other health problems.

If you have a close relative with celiac disease, you should be screened for the condition with a blood test. Screening should also be considered if you have thyroid disease or type 1 diabetes (which are autoimmune disorders), unexplained digestive symptoms, or weight loss. The blood test measures three specific antibodies that are present when a person with celiac disease ingests gluten. If these three antibodies are found, a biopsy of the small intestine is usually performed to look for damaged villi. The biopsy involves inserting an endoscope down the throat, through the stomach, and into the small intestine. It is important not to avoid foods that contain gluten before these tests, since avoidance could make blood test and biopsy results appear normal and prevent an accurate diagnosis.

Treatment of celiac disease

No medication or surgical procedure can cure celiac disease. The only way to treat it is to adopt a completely gluten-free diet: avoiding all food and drink containing wheat, barley, rye, and other grains. You must also look out for hidden sources of gluten, like medications, lipstick, communion wafers, and even postage stamps.

A gluten-free diet can be difficult to follow, since gluten is naturally present in many foods and is added to other products such as ice cream and salad dressings. Moreover, some labels do not indicate that a product contains gluten. Thus, you will need to ask about ingredients at restaurants, learn to substitute gluten-free ingredients in recipes, and make sure your foods don't become cross-contaminated with gluten from other foods (for example, from knives, toasters, or cutting boards).

A registered dietitian can help you recognize what foods you can and cannot eat, and the Celiac Sprue Association/USA (see page 82 for contact information) sells publications that list gluten-free foods and medicines. Joining a support group for people with celiac disease also can be helpful.

A gluten-free diet eliminates symptoms and reverses damage to the small intestine in 95% of people with celiac disease.

Symptoms usually improve within a few days of eliminating gluten, although complete recovery may take anywhere from a few months to several years. To remain symptom free and avoid further damage to the small intestine, you must follow a gluten-free diet for life.

The 5% of people who do not improve on a gluten-free diet usually have severe damage to the small intestine. In these cases, medications such as the aminosalicylate anti-inflammatory compound mesalamine (Asacol, Pentasa) or the corticosteroid prednisone (see the chart on pages 56-59) may control inflammation in the small intestine and any problems from poor absorption of nutrients.

Crohn's Disease

Crohn's disease is a chronic inflammatory disorder that primarily affects the small intestine, but it also can affect any segment of the digestive tract, including the colon, anus, mouth, and stomach. Crohn's disease can even affect the skin. About 500,000 people in the United States have Crohn's disease.

Causes of Crohn's disease

Despite extensive research, the cause of Crohn's disease is poorly understood. Three factors likely play a role. Genetics is one of them: Certain people inherit a susceptibility to the disease. The second factor is environmental: A stimulus (perhaps a virus or bacterium) triggers the disease by causing the immune system to mount an attack against the digestive tract. Once the immune system gets turned on, it doesn't turn off properly. The third factor is race and ethnicity: Whites (particularly American Jews of European descent), followed by blacks, are more likely to get Crohn's than Hispanics and Asians.

Symptoms of Crohn's disease

Most often, Crohn's disease causes chronic inflammation of the small intestine. The inner lining of the small intestine becomes swollen and may develop erosions and ulcerations. These inflammatory changes usually result in abdominal pain and bloody diarrhea. The chronic inflammation can also lead to complications such as bowel perforation, peritonitis, abscesses, fistulas, and strictures.

Symptoms of Crohn's disease usually begin in the teen or young adult years. Once you have the disease you will have it for life. However, you will have symptom-free periods (remissions) that can last for years. A reappearance of symptoms is called a flare-up.

Diagnosis of Crohn's disease

The tests used to diagnose Crohn's disease depend on where your doctor thinks the inflammation is occurring. An upper GI series is the best test for Crohn's disease of the small intestine. Capsule endoscopy is being investigated for diagnosis. In a 2005 study, capsule endoscopy detected more cases of Crohn's disease of the small intestine than other diagnostic techniques.

Colonoscopy is the best test for Crohn's disease of the large intestine. If a colonoscopy is not possible because of narrowing of the rectum or colon, a barium enema can be performed instead. If a fistula is suspected, the doctor may choose a more watery contrast dye called Gastrografin instead of barium.

Treatment of Crohn's disease

No drug or surgical procedure can cure Crohn's disease. Treatment is aimed at preventing and treating flare-ups and complications. Commonly prescribed drugs are listed in the chart on pages 56-59.

Because eating can irritate an inflamed bowel, severe flare-ups usually require hospital treatment with intravenous nutrition and fluids to allow the bowel to rest. You will also be given intravenous corticosteroids like methylprednisolone and mesalamine capsules (Pentasa) or tablets (Asacol or Apriso, approved in 2009) or sulfasalazine (Azulfidine) tablets to reduce inflammation. Pentasa can be used to treat disease in both the small and the large intestine. If the disease is present only in the colon, Asacol or Azulfidine can be used.

If the disease responds to these treatments, you can switch from intravenous to oral corticosteroids such as prednisone or budesonide (Entocort EC). Eventually, you will likely be weaned off corticosteroids, but you will still take mesalamine or sulfasalazine. When Crohn's disease is limited to the far end of the colon and the rectum, you may receive hydrocortisone (Colocort) or mesalamine (Rowasa) enemas in addition to the treatments just mentioned.

If Crohn's disease does not improve with corticosteroids and mesalamine or sulfasalazine, immunosuppressive drugs may be tried (although a 2008 study suggests that using immunosuppressants as initial therapy may offer better results and avoid the risks associated with corticosteroids). The most commonly used are mercaptopurine (Purinethol) and azathioprine (Imuran), both given orally. The immunosuppressant infliximab (Remicade) is especially effective when fistulas are present. It is injected about once every two months and is usually tried only when you do not respond to conventional therapy. Serious complications have been reported in people using

Remicade, and in 2006, the U.S. Food and Drug Administration (FDA) began requiring the medication's label to warn about infections and hypersensitivity reactions. In addition, because Remicade can allow latent (silent) tuberculosis to develop into full-blown tuberculosis, you should receive a tuberculin skin test before beginning therapy.

Adalimumab (Humira) is also available for the treatment of moderately to severely active Crohn's disease. Humira is also an immunosuppressant, but it does not require intravenous injection—the drug is packaged in an injection pen that can be self-administered once every two weeks. Humira is intended for people who cannot tolerate Remicade or who become resistant to it over time. Like Remicade, Humira carries a risk of infection, and it may increase your risk of a cancer called lymphoma. In fact, the FDA is currently conducting a safety review of Humira and Remicade to determine whether they are associated with cancer, especially lymphoma, in children and young adults.

In 2008, the FDA approved two new immunosuppressants to treat Crohn's disease: natalizumab (Tysabri) and certolizumab pegol (Cimzia). Cimzia is a similar medication to Remicade and Humira. It is administered by injection at your doctor's office. The first three injections are given two weeks apart; if the medication appears to be helping, you'll receive additional doses every four weeks.

Tysabri is a multiple sclerosis drug that has a risk of severe side effects, including a serious and potentially deadly brain infection called progressive multifocal leukoencephalopathy (PML). As of May 2009, the makers of Tysabri have suspended marketing of their drug.

Two other drugs to treat Crohn's disease are currently in clinical trials: abatacept (Orencia), a rheumatoid arthritis drug, and an experimental stem-cell drug called Prochymal.

Surgical removal of a section of the bowel is required if you develop problems such as an intestinal obstruction due to serious strictures or complications like fistulas or abscesses that won't heal. In this procedure, the affected portion of the small or large intestine is removed and the two ends are reattached. This is not a cure for Crohn's disease, since the remaining bowel is still susceptible to the disease.

Ulcerative Colitis

Ulcerative colitis is a chronic inflammatory disease of the large intestine caused by an abnormal autoimmune reaction. It affects about 700,000 Americans and usually surfaces between ages 15 and 40.

Drug Therapy for Crohn's Disease and Ulcerative Colitis 2010

Drug type: Brand (generic)	Typical daily dosages*	How to take†	Monthly cost‡: Brand (generic)
Aminosalicylate anti-inflammatory compounds			
Oral			
Asacol (mesalamine, delayed-release)	1,600-2,400 mg	One 400-mg tablet 4x/day, two 400-mg tablets 2x/day, or two 400-mg tablets 3x/day. Swallow whole (do not crush, chew, or break). Take with or without food.	\$199-298
Azulfidine, Azulfidine-EN (sulfasalazine)	2,000-4,000 mg	Four 500-mg tablets 1x/day with food or after meals with a glass of water.	\$69-83 (\$23)
Colazal (balsalazide)	6,750 mg	Three 750-mg capsules 3x/day with or without food.	\$434 (\$309)
Dipentum (olsalazine)	1,000 mg	Two 250-mg capsules 2x/day with food or after meals.	\$235
Lialda (mesalamine, delayed-release)	2.4-4.8 g	Two to four 1.2-g tablets taken once daily with a meal. Swallow whole.	\$513-662
Pentasa (mesalamine, controlled-release)	4,000 mg	Four 250-mg capsules 4x/day or two 500-mg capsules 4x/day with or without food. Swallow whole.	\$533-538
Rectal			
Canasa (mesalamine suppositories)	1,000 mg	Insert one 1,000-mg suppository at bedtime. For best results, have a bowel movement before using and keep in your rectum for at least 2 hours.	\$446
Rowasa (mesalamine enema)	4 g	At bedtime, insert the tip of one bottle into your rectum and empty the bottle's contents. For best results, use after a bowel movement and hold the medicine in your rectum overnight.	\$702 (\$340)
Corticosteroids			
Oral			
Entocort EC (budesonide)	6-9 mg	Two or three 3-mg capsules 1x/day in the morning. Swallow whole (do not chew or break).	\$569-823
(prednisone)	40-60 mg	A combination of 1-, 2.5-, 5-, 10-, 20-, or 50-mg tablets 1x/day in the morning with food to prevent stomach upset.	(\$15-18)
Intravenous			
(methylprednisolone)	32-60 mg	Requires administration by a health professional who will infuse the medication into your body through a needle placed in a vein in your arm.	Not available
Rectal			
Colocort (hydrocortisone enema)	100 mg	At bedtime, insert the tip of one bottle into your rectum and empty the bottle's contents. For best results, use after a bowel movement and hold the medicine in your rectum for at least 1 hour (and preferably overnight).	\$285

Precautions

Do not take if you are allergic to aspirin. Avoid alcohol to reduce the risk of dizziness and stomach bleeding. *Azulfidine only*: You'll need regular blood and urine tests to monitor the health of your blood, liver, and kidneys. *Canasa only*: Handle as little as possible, because heat from your hands can melt the suppository. *Canasa and Rowasa only*: May stain surfaces such as your clothing, floors, or countertops.

Most common side effects

Headache, upset stomach, nausea, abdominal pain, diarrhea, gas. *Azulfidine only*: May cause skin or urine to turn orange-yellow. This is harmless and goes away when the medication is stopped.

Call your doctor if...

You experience worsening stomach pain or cramping, worsening bloody diarrhea, rash, itching, yellowing eyes or skin, dark urine, fever, fatigue, headache. *Asacol and Azulfidine only*: You notice intact or partially intact tablets in your stool.

Avoid consumption of grapefruit and grapefruit juice; these foods can increase the amount of corticosteroids in your blood. Avoid exposure to people with chicken pox or measles and get your doctor's permission before having any vaccinations. If you have diabetes, monitor your blood glucose levels more closely; corticosteroids can cause your blood glucose levels to rise. Do not stop taking abruptly; to go off the drug, you need to slowly decrease the dose over time to prevent extreme fatigue, weakness, stomach upset, or dizziness. Corticosteroids can increase your risk of osteoporosis; be sure to get 1,200-1,500 mg of calcium and 400-800 IU of vitamin D a day, and have your bone density measured on a regular basis.

Headache, nausea, stomach upset, dizziness, trouble sleeping, weight gain.

You exhibit signs of high steroid levels in your body: swelling of your face and neck, acne, bruising. You have signs of infection: fever, fatigue, cough, flu-like symptoms.

* These dosages represent the usual daily dosages (unless indicated otherwise) for the treatment of Crohn's disease or ulcerative colitis. The precise effective dosage varies from person to person and depends on many factors. Do not make any changes to your medication without consulting your doctor.

† These instructions represent the typical way to take the medication. Your doctor's instructions may differ. Always follow your doctor's recommendations.

‡ Prices per drugstore.com.

continued on the next page

Drug Therapy for Crohn's Disease and Ulcerative Colitis 2010 (continued)

Drug type: Brand (generic)	Typical daily dosages*	How to take†	Monthly cost‡: Brand (generic)
Immunomodulators			
Oral			
Imuran (azathioprine)	50-150 mg	One or more 50-mg tablets 1-2x/day. Take with food to reduce stomach upset.	\$121-341 (\$28-71)
Purinethol (mercaptopurine)	50-100 mg	One to two 50-mg tablets 1x/day.	\$164-328 (\$93-186)
Intramuscular injection			
(methotrexate)	15-25 mg/week	Visit your doctor 1x/week for an injection.	Not available
Antibiotics			
Cipro (ciprofloxacin)	1,000 mg	One 500-mg tablet with or without food in the morning and evening.	\$354 (\$28)
Flagyl (metronidazole)	1,000-2,000 mg	One or two 500-mg tablets 2x/day in the morning and evening with food or a glass of water or milk to reduce stomach upset.	\$321-616 (\$26-37)
Monoclonal antibody			
Cimzia (certolizumab pegol)	400 mg every 2 weeks for first 3 doses, then every 4 weeks	You will go to your doctor to receive an injection.	Not available
Humira (adalimumab)	40 mg every 2 weeks	You inject the medication under your skin via a single-use injection pen once every 2 weeks.	\$1,636
Remicade (infliximab)	5 mg every 8 weeks	You will go to your doctor every 8 weeks to receive the medication through a needle in a vein in your arm. This takes about 2 hours.	Not available
Tysabri (natalizumab)	300 mg every 4 weeks	You will go to an infusion center every 4 weeks to receive the medication through a needle in a vein in your arm. This takes about 1 hour.	Not available

* These dosages represent the usual daily dosages (unless indicated otherwise) for the treatment of Crohn's disease or ulcerative colitis. The precise effective dosage varies from person to person and depends on many factors. Do not make any changes to your medication without consulting your doctor.

† These instructions represent the typical way to take the medication. Your doctor's instructions may differ. Always follow your doctor's recommendations.

‡ Prices per drugstore.com.

The inflammation starts in the rectum and gradually progresses to the sigmoid, descending, transverse, and ascending colon and, eventually, the cecum. The inflammation does not extend beyond the colon to affect the small intestine.

Precautions	Most common side effects	Call your doctor if...
<p>You should have a blood test called a complete blood count at least once a month to check for bone marrow suppression. <i>Methotrexate only</i>: Avoid alcohol, because it can cause dizziness. You will also be more sensitive to the sun, so wear sunscreen and avoid excessive sun exposure and sun lamps.</p>	<p>Nausea, vomiting, diarrhea, loss of appetite, stomach pain, drowsiness, dizziness.</p>	<p>You experience unusual bleeding or bruising or signs of infection: fever, fatigue, cough, flu-like symptoms.</p>
<p>Drink plenty of liquids. Consumption of dairy products (milk, yogurt, or calcium-fortified juice) greatly reduces absorption. Can cause sun sensitivity; use sunscreen and avoid excessive sunlight or sun lamps.</p> <p>Alcohol should be avoided for at least 1 day afterward; the drug slows the breakdown of alcohol, which can lead to nausea and vomiting. Can cause sun sensitivity; use sunscreen and avoid excessive sunlight or sun lamps.</p>	<p>Stomach upset, loss of appetite, diarrhea, nausea, headache, vision changes, dizziness.</p> <p>Diarrhea, nausea, metallic taste in the mouth, darkened urine (which is harmless).</p>	<p>You experience a rash or signs of peripheral neuropathy: pain, burning, tingling, numbness, weakness in your hands or feet.</p> <p>You experience unsteadiness, seizures, mental or mood changes, numbness or tingling of your hands or feet, painful urination.</p>
<p>Before receiving, your doctor will do a skin test to see if you have been exposed to tuberculosis (TB). If the test is positive, you will receive treatment for TB, because these medications can activate a latent (silent) TB infection. Tysabri increases the risk of progressive multifocal leukoencephalopathy, a serious brain infection. To receive this drug, you must be enrolled in a program that tracks safety information.</p>	<p>Headache; nausea, vomiting, or stomach pain; redness, itching, pain, or swelling at the injection site.</p>	<p>You experience signs of an infection: fever, fatigue, cough, flu-like symptoms. Signs of new or worsening heart failure: shortness of breath, swelling of the ankles or feet. Signs of a blood disorder: persistent fever, bruising, bleeding, paleness. <i>Humira and Cimzia</i>: Signs of lymphoma (unusual lumps or growths, swollen glands).</p>

Causes of ulcerative colitis

The cause of ulcerative colitis is unknown, but some people appear to have a genetic predisposition. Like Crohn’s disease, ulcerative colitis is hypothesized to be activated by an environmental factor,

such as an infection or food allergy, which triggers an abnormal response by the immune system. The disease is more common in whites than in nonwhites and in Jewish than in non-Jewish people.

Symptoms of ulcerative colitis

Active ulcerative colitis usually causes abdominal pain and bloody, mucousy diarrhea. Severe attacks may also produce nausea, vomiting, and fever. Like Crohn's disease, ulcerative colitis cycles between flare-ups and remissions.

Diagnosis of ulcerative colitis

The best diagnostic tests for ulcerative colitis are sigmoidoscopy and colonoscopy. The disease is diagnosed when the inner lining of the colon appears swollen and red and contains erosions and ulcerations. Biopsies of the affected areas may be done to distinguish ulcerative colitis from other conditions affecting the colon, for example, cancer, infections, ischemia (reduced blood flow), or Crohn's disease.

Treatment of ulcerative colitis

The medications used to treat ulcerative colitis are similar to those for Crohn's disease (see the chart on pages 56-59). If you have mild disease limited to the rectum and sigmoid colon, corticosteroid- or mesalamine-containing enemas may help to control flare-ups. If this therapy fails, you may need to take oral drugs such as Asacol, Azulfidine, balsalazide (Colazal), olsalazine (Dipentum), or Pentasa.

If you have extensive ulcerative colitis—meaning it affects most of the colon—you may need intravenous or oral corticosteroids and oral mesalamine to treat a flare-up, followed by maintenance therapy with mesalamine to prevent future flare-ups. Severe cases may also require immunosuppressive drugs such as Purinethol or Imuran to keep the disease under control.

Surgical removal of the entire colon (called a colectomy) may be necessary if you have severe flare-ups that do not respond to corticosteroids and mesalamine, complications such as a perforation, colon cancer, or symptoms that significantly impair your quality of life.

After a colectomy, an opening called an ileostomy is made in the skin to allow fecal material to pass directly from the small intestine into an external plastic bag. Most people with an ileostomy lead normal, active lives and engage in the same job and recreational activities they did before the surgery. Ulcerative colitis predisposes individuals to colon cancer and requires surveillance colonoscopy to

look for dysplasia (abnormal cells that can become cancer). When dysplasia is identified, colectomy is required.

Irritable Bowel Syndrome

Irritable bowel syndrome (IBS) is one of the most common—and frequently misunderstood—digestive disorders. One in five adults in the United States has symptoms of IBS, yet only a small number of people with symptoms seek treatment. In a recent poll of 201 women who had not been diagnosed with IBS but had symptoms of the disorder, 88% had heard of IBS but 21% had not talked to a doctor about their symptoms because they didn't think it was a real medical condition. And 14% didn't think there was any treatment for IBS.

The good news is that: 1) IBS can often be effectively managed once an accurate diagnosis is made—although you will require a number of tests to rule out other diseases; and 2) it appears that the disorder does not cause long-term damage to the digestive tract or lead to serious complications.

Causes of irritable bowel syndrome

The cause of IBS is not well understood. Some researchers have proposed that IBS may result from malfunctions in the rhythmic muscle contractions that propel food through the small and large intestines. Contractions that are too strong can push food contents through the intestines too quickly, causing diarrhea and bloating; weak contractions can lead to constipation.

Because women are diagnosed with IBS about three times more often than men, some experts hypothesize that symptoms may be related to hormone levels. Other proposed causes include hypersensitivity to pressure in the small and large intestines, an imbalance in neurotransmitters (chemicals found in both the brain and digestive tract), and infection.

Psychological factors may also play a role. IBS and mental stress appear to be closely related, and people with depression or anxiety tend to be more susceptible to IBS. Studies also show an increased risk of IBS in women who have been physically or sexually abused.

Symptoms of irritable bowel syndrome

The symptoms of IBS usually first appear during the teenage years or young adulthood, although the condition can develop at any time, even in older adults. One of the most common symptoms is abdominal discomfort or pain, accompanied by diarrhea, constipation, or alternating bouts of constipation and diarrhea.

Other symptoms include abdominal bloating, a feeling of incomplete emptying of the bowels after passing stool, and mucus in the stool.

If you have IBS, you may find the symptoms distressing and disruptive to your life. The severity of symptoms varies: About 70% of people experience mild symptoms, although they can become more severe and even disabling at times. Some women report that IBS symptoms are worse before and during their menstrual periods. The symptoms may even awaken some people in the middle of the night.

Diagnosis of irritable bowel syndrome

IBS is difficult to diagnose because the disease causes no known physical abnormalities that doctors can identify through physical exams, imaging studies, or laboratory testing. As a result, doctors make a diagnosis only after ruling out other conditions. If you have symptoms suggestive of IBS, your doctor will take a medical history, perform a physical exam, and order blood tests. A barium enema, sigmoidoscopy, or colonoscopy may be needed to view the rectum and colon.

Once your doctor determines that your abdominal pain is not due to a physical abnormality, two of the following three criteria must be met to make a diagnosis of IBS:

- bowel movements alleviate pain
- pain is accompanied by constipation or diarrhea
- pain is associated with a change in the form of the stool (watery, loose, or pelletlike).

These symptoms must be present, all of the time or occasionally, for at least three months.

Because the symptoms of IBS overlap with so many other digestive disorders, people with IBS are sometimes misdiagnosed. IBS can easily be confused with diverticulitis, colon cancer, intestinal obstruction, ulcerative colitis, Crohn's disease, gastrointestinal infection, celiac disease, and lactose intolerance. In fact, a study from the Netherlands found that about 25% of people diagnosed with IBS actually had lactose intolerance (an inability to properly digest lactose, a sugar found in most dairy products). When these individuals switched to a lactose-restricted diet, their symptoms improved significantly. Another study found that at least 39% of adults with unexplained, nonspecific gastrointestinal symptoms tested positive for intolerance to the sugar fructose, suggesting that many people with fructose intolerance may be mistakenly diagnosed with IBS.

Treatment of irritable bowel syndrome

Treatment of IBS focuses on relieving the most bothersome symptoms. If your main complaint is abdominal pain, anticholinergic drugs such as dicyclomine (Bentyl and other brands) and hyoscyamine (Levbid and other brands) may be used to reduce the intestinal spasms that are causing the pain. Sometimes, abdominal pain responds to a low dose of an antidepressant medication.

Constipation-predominant IBS. When constipation is your main complaint, adding fiber to your diet and increasing your fluid intake can be helpful. You may also benefit from the use of laxatives, although these medications should be used for only a week at a time unless your doctor recommends a longer period.

The drug Zelnorm, used by many women with constipation-predominant IBS, was withdrawn from the market in 2007 as it was suspected to increase the risk of chest pain, heart attacks, and strokes.

In 2008, the FDA approved lubiprostone (Amitiza) for treating constipation-predominant IBS in women. A laxative that was already approved for chronic idiopathic constipation, Amitiza was shown to be effective in two studies of more than 1,000 adults, mostly women.

Diarrhea-predominant IBS. For mild to moderate diarrhea, increasing the amount of fiber in your diet or using an antidiarrheal product such as loperamide (Imodium A-D), diphenoxylate/atropine (Lomotil), or cholestyramine (Questran) may be helpful.

If you are suffering from severe diarrhea-predominant IBS and you're a woman, a drug called alosetron (Lotronex) may be considered. Lotronex has serious risks, however. It was withdrawn from the market in 2000 after reports arose of dangerous gastrointestinal side effects, including two deaths. Lotronex is now back on the market, but with strong restrictions. Only doctors registered with the drug's manufacturer can prescribe it. These doctors must agree to educate patients about Lotronex's risks and provide a written pamphlet describing these risks to their patients. Also, patients must sign an agreement indicating that they understand the risks associated with Lotronex prior to obtaining their first prescription.

Cilansetron (Calmactin), another drug in the same class as Lotronex, is currently in clinical trials. In a three-month study, Calmactin effectively relieved abdominal pain and discomfort and normalized bowel habits in half of the patients with diarrhea-predominant IBS who received it. The most common side effect was constipation, which affected 19% of the patients.

General advice. Keeping a diary of food intake and symptoms can help you identify foods that trigger symptoms. You may find that

NEW RESEARCH

Probiotic Supplement May Help Relieve IBS Symptoms

Because irritable bowel syndrome (IBS) is difficult to treat, people with the condition often turn to complementary medicine, including the use of probiotics. Introducing these "friendly" bacteria, in supplement form or in food, into the GI tract may help outnumber problem-causing microorganisms. However, probiotics have not been appropriately studied, and few have any valid research to back up their claims. But a new study finds that one strain, *Bifidobacterium infantis* 35624, may be useful in the treatment of IBS.

Researchers reviewed 16 studies of 13 different probiotic strains and combinations of strains used to treat IBS.

Most of the studies failed to show sufficient improvement in symptoms or provide adequate data on safety and side effects. However, two randomized clinical trials found that *Bifidobacterium infantis* was associated with significant improvements in abdominal pain and discomfort, bloating, gas, and bowel habit satisfaction. In one study, overall satisfaction in the probiotic group was 20% higher than in the placebo group. Side effects could not be clearly evaluated.

Bifidobacterium infantis is available as a supplement marketed as Align. If you think you might benefit from taking it, talk to your doctor.

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Can Your Mind Heal Your Gut?

Treating digestive disorders with hypnosis

If you think of hypnosis as a magic trick or a Las Vegas lounge act, you're not the only one. But hypnosis is more than just entertaining: When practiced by a trained professional, hypnosis may help treat a variety of medical conditions, including some digestive disorders.

What It Is

Hypnosis involves using words and imagery to bring about an altered state of consciousness somewhere between sleep and full alertness. People who are hypnotized are highly focused and open to suggestion. In clinical hypnosis, practitioners make use of this state to target health problems and suggest ways to make beneficial changes.

Hypnosis has been used medically since the early 18th century to induce a form of anesthesia for surgery. In the late 19th century, hypnosis gained interest as a treatment for psychiatric conditions. The American Medical Association approved hypnosis as a medical treatment in 1958, and it is now practiced by a wide variety of health professionals.

In the last few decades, hypnosis has been shown to be effective in relieving cancer pain,

chemotherapy-related nausea, and medical procedure-related distress in children and teenagers. It has also been used to help people stop smoking or lose weight. And recently, evidence shows that hypnosis can help treat digestive disorders.

Your Stomach's Brain

You may be unaware that in addition to the brain in your head, there is a "brain" in your belly that coordinates digestive functions. Called the enteric nervous system (ENS), this second brain acts in concert with the central nervous system (CNS), which is composed of your "head" brain and your spinal cord.

The ENS is made up of a vast network of neurons (cells that transmit nerve impulses) throughout the digestive tract, in the esophagus, stomach, small intestine, and colon. These neurons include the same hormones and chemicals that control your brain, such as serotonin, norepinephrine, nitric oxide, and acetylcholine. The gut neurons work together to handle the complex processes of digesting the foods, beverages, medications, and supplements you consume. They also are involved in mounting immune responses to any foreign

substances (for example, bacteria, viruses, or toxins) that enter the digestive tract.

The CNS and the ENS are constantly in communication with each other. If you experience a stressful event, your CNS sends messages to the ENS that release chemical substances that cause intestinal grief. Conversely, the ENS sends out signals to the CNS if something in the digestive tract is not working properly or when you are hungry, full, nauseated, or need to vomit. And sometimes their functions overlap—for example, both the CNS and ENS control emptying of the stomach.

So it makes sense that hypnotherapy could improve the symptoms of various digestive disorders by guiding the brain to control the gut. During a session, a practitioner may use guided imagery to help you soothe chronic anxiety and change your ideas about your condition. You may imagine your intestines as the path of a lovely garden that you stroll effortlessly along as a vision of how you'd like your digestive system to work or picture a soothing color gently winding its way through your digestive tract. Although the way it works is not completely understood, hypnosis

your symptoms are caused or worsened by fatty foods, certain vegetables (such as broccoli and cabbage), caffeine, alcohol, fructose, or sorbitol (a sweetener often used in diet candy and sugar-free gum). Certain drugs, such as antibiotics and magnesium-containing antacids or laxatives, also can be triggers.

Many people with IBS find that their symptoms improve when they exercise regularly and eat at the same times each day. If stress is

appears to reduce pain perception and suppress the release of stress hormones. It can also allow you to accept certain suggestions, such as the idea that your digestive system will work properly or that you will feel less abdominal pain.

The Evidence

Research in hypnosis is in the early stages and ongoing, as large-scale, randomized trials are needed to confirm these findings. Studies have shown encouraging results in the following areas:

Irritable bowel syndrome (IBS). Hypnosis has been studied most often in IBS because it has a strong psychological component and because it is difficult to treat with medication. Several review articles have suggested that hypnosis may be an effective treatment for IBS. In one larger study, published in the journal *Gut*, 204 participants who had completed a course of gut-directed hypnotherapy rated their symptoms before, immediately after, and up to six years after the study. Seventy-one percent of participants found that their symptoms improved with treatment initially, and 81% of these people maintained their improvement over time. Participants also reported fewer doctor visits and less medication use for IBS following therapy.

Ulcerative colitis. A 2008 study in the *American Journal of Gastroenterology* assigned 17 people with active ulcerative colitis to a single 50-minute session of gut-focused hypnotherapy. Participants were instructed to focus on relaxation and reducing inflammation. A control group of eight participants listened to their choice of music for 50 minutes. After the session, rectal inflammation was reduced by an average of 82% in the hypnotherapy group, while no change was seen in the control group. Reductions were also observed in the body's overall inflammatory response in the hypnosis group but not in the control group.

Crohn's disease. A small clinical trial recently performed 12 sessions of gut-focused hypnotherapy on 15 people with severe or very severe inflammatory bowel disease (including Crohn's disease). Five years later, four participants were in complete remission, eight had mild disease, and one had moderately severe disease. Eighty percent reported good quality of life after treatment, and 60% were able to stop corticosteroid treatment completely. Only two participants had not responded to hypnotherapy and required surgery.

Functional dyspepsia. A cause of chronic indigestion, functional

dyspepsia can be difficult to treat. One problem may be that food is overstaying its welcome in the stomach, causing discomfort. A recent, small study suggests that hypnosis can help speed food through the stomach and relieve symptoms. Researchers studied the passage of food through the stomach under normal conditions, after taking a heartburn medication, and during a 90-minute hypnotic trance. Hypnosis was more effective than medication in speeding gastric emptying in both healthy subjects and people with functional dyspepsia.

Ready To Go Mainstream?

Hypnosis seems promising, and it has little potential for side effects. It can be expensive and time-consuming, however, and finding a trained practitioner can be difficult.

Hypnosis should not be used in lieu of conventional treatments, especially when it comes to serious inflammatory bowel diseases. But if it's something you'd like to pursue as an adjunct therapy, talk with your doctor. He or she may be able to recommend a hypnotherapist or suggest audio tapes or CDs to help you with self-hypnosis. You can also get a referral through the American Society of Clinical Hypnosis (www.asch.net). ■

a trigger for IBS, psychotherapy, hypnosis, or relaxation techniques may be beneficial. Several complementary therapies, including peppermint oil and probiotics, also show some promise. (See the "New Research" column on page 63.)

Finally, try to talk to others who have IBS. It can help to know that they face the same challenges and share coping strategies. The website for the IBS Self Help and Support Group is www.ibsgroup.org.

Hemorrhoids

Hemorrhoids—clusters of swollen veins in and around the anus and rectum—are a common condition. More than half of all Americans develop hemorrhoids by age 50, and men and women are at equal risk. In fact, the condition is so ubiquitous that hemorrhoid sufferers have their own patron saint, St. Fiacre. Although the exact cause of hemorrhoids is not fully understood, they are thought to result from increased pressure on the veins in the anus or rectum. Hemorrhoids usually can be managed with lifestyle and self-care measures, but surgical removal is required in some cases.

There are two types of hemorrhoids: internal and external. Internal hemorrhoids are located in the lower portion of the rectum and cannot be seen from outside the rectum. External hemorrhoids are visible beneath the skin around the anus.

Causes of hemorrhoids

A number of factors increase the risk of hemorrhoids or can make them worse. For example, they are more common with age, peaking at around age 65. Hemorrhoids are also associated with obesity, pregnancy and childbirth, liver disease, prostate enlargement, chronic cough, and diarrhea—all of which can increase pressure on veins in the anus and rectum.

Contrary to popular belief, heavy lifting, long periods of sitting, and chronic constipation do not lead to hemorrhoids, although these factors can irritate existing hemorrhoids. Excessive rubbing or cleaning of the anal area also can irritate an existing condition.

Symptoms of hemorrhoids

The most common symptom of internal hemorrhoids is bleeding during a bowel movement. Such bleeding ranges in severity from blood on the toilet paper or on the outside of stools to blood in the toilet bowl. Because the membranes inside the rectum lack pain-sensitive nerves, internal hemorrhoids typically cause no pain or discomfort. However, you may experience a sensation of fullness in the rectum after a bowel movement. Internal hemorrhoids may also prolapse—meaning that the hemorrhoid protrudes outside of the anus. Prolapse can occur after straining during a bowel movement.

Unlike internal hemorrhoids, external hemorrhoids frequently cause irritation and pain, usually lasting no more than 10 days. Acute pain and inflammation can occur when a blood clot in an external hemorrhoid forms a hard lump near the anus. Mucus draining from an external hemorrhoid can cause mild itching.

See your doctor if you suspect that you have hemorrhoids and if the condition causes pain or frequent rectal bleeding.

Diagnosis of hemorrhoids

Doctors diagnose hemorrhoids by first asking about any changes in your bowel patterns and about any symptoms of pain, bleeding, or itching. The doctor may then perform an external inspection of the anus, a digital rectal exam (placing a gloved finger into the rectum to feel for hemorrhoids), and an anoscopy (an examination of the anus and lower rectum using a device called an anoscope, a short, rigid, hollow tube with a light source). Sigmoidoscopy (to view the rectum and lower colon) or colonoscopy (to view the entire colon) may be performed to see if the bleeding is originating from a source other than the hemorrhoids.

Treatment of hemorrhoids

If you have mild symptoms, lifestyle and self-care measures are frequently effective. To treat constipation that can exacerbate symptoms, you should increase your fiber and fluid intake to make stools bulkier, softer, and easier to pass. Also, you should not ignore the urge to have a bowel movement and should try not to strain when passing stool. Regular physical activity also may be helpful.

To avoid irritation of hemorrhoids, do not rub your anus too much with toilet paper after a bowel movement. Instead, try wiping gently with wet toilet paper or moist towelettes. Also, avoid sitting on the toilet for long periods.

Although research has not shown that over-the-counter suppositories, ointments, or hydrocortisone creams are effective in the treatment of hemorrhoids, many people report that they are beneficial. You may also get relief from pads containing witch hazel or a numbing agent.

To reduce irritation, try to keep the anal area clean. Avoid using soap, because it can be an irritant. Soaking in a warm bath or using a sitz water bath (a plastic basin of warm water that fits over the toilet) three to four times a day may be helpful. Afterwards, dry the anal area with a hair dryer to reduce moisture that can cause irritation. Applying cold compresses or ice packs to the anal area up to four times a day can reduce swelling.

If these conservative measures do not provide sufficient relief of symptoms, there are additional treatments for hemorrhoids. Rubber band ligation is the most common treatment for internal hemorrhoids. A small rubber band is placed at the base of the hemorrhoid

to cut off its blood supply. After about a week, the hemorrhoid withers and falls off. This technique works about three quarters of the time. Sometimes, a chemical solution is injected into the hemorrhoid to shrink it—a procedure called sclerotherapy. Other options for internal hemorrhoids use laser heat or infrared light to destroy hemorrhoids. Most internal hemorrhoids can be treated effectively with one or more of these techniques.

A small percentage of people with internal hemorrhoids are not helped by the above therapies and require surgery to remove the hemorrhoids. This procedure, called a hemorrhoidectomy, requires a one- to two-day hospital stay and is the best way to ensure permanent removal of internal hemorrhoids.

For external hemorrhoids, oral pain relievers such as acetaminophen (Tylenol) or aspirin can provide some relief. However, if a hemorrhoid forms into a hard lump due to a blood clot and severe pain lasts longer than seven to 10 days, surgical removal of the clotted hemorrhoid often provides relief from symptoms.

Anal Fissure

An anal fissure is a tear in the skin that lines the anal canal, the part of the rectum closest to the anus. Most experts believe that anal fissures are caused by passing hard stool, which can tear the skin of the anal canal and cause pain and bleeding. Anal fissures are a common problem that affects most people at some point in their life. Many anal fissures heal on their own, but medication or surgery is needed if they become a chronic problem.

Causes of anal fissure

Although constipation is a common cause of anal fissures, other causes include diarrhea, childbirth, colonoscopy or sigmoidoscopy, and surgery. A high resting anal pressure (tight anus) also appears to be a factor. Tightness, or spasm, within the anus also interferes with blood supply to the anal canal, which may prevent healing of a tear. Furthermore, an anal fissure may be a sign of a more serious condition, such as syphilis, herpes, gonorrhea, chlamydia, HIV infection or AIDS, Crohn's disease, ulcerative colitis, tuberculosis, or a tumor.

Symptoms of anal fissure

The hallmark of anal fissures is pain, sometimes severe, during or after a bowel movement. The pain may be brief or continue for hours afterwards. Bleeding frequently accompanies the bowel movement, and the blood appears on the outside of the stool. About half

of individuals with anal fissures also experience anal itching.

Anal fissures are frequently confused with hemorrhoids, but hemorrhoids usually do not cause pain while passing stool. Nonetheless, you can have both hemorrhoids and an anal fissure.

Diagnosis of anal fissure

To diagnose anal fissures, the doctor spreads apart your buttocks to view the anus. The fissure appears as a tear, most often in the middle of the anus toward the back of the body. While an anal fissure is usually easy to see, your doctor may use an instrument called an anoscope to view the inside of the anal canal.

Treatment of anal fissure

Between 50 and 90% of anal fissures heal on their own or with simple treatments such as eating a high-fiber diet, increasing your intake of water and other fluids, using stool-softening laxatives, and taking warm sitz baths for 10 to 15 minutes after each bowel movement. Topical corticosteroids and anesthetics are not effective.

If an anal fissure does not heal after six weeks of the simple treatments described above, you have a chronic anal fissure. This usually requires additional treatment, the most common of which is nitroglycerin ointment. A pea-sized amount of the ointment is placed on the fissure two to three times a day for up to eight weeks. This treatment heals between 70 and 80% of chronic anal fissures. The most common side effect of the ointment is headaches, which can be severe, though pain relievers such as acetaminophen (Tylenol) and aspirin may relieve the pain.

Other medicines used for anal fissures are calcium channel blockers—medications commonly used to treat high blood pressure and chest pain. The oral calcium channel blocker nifedipine (Procardia and other brands) heals 60% of chronic anal fissures when used for eight weeks. Nifedipine may work by decreasing anal pressure. Another calcium channel blocker, diltiazem (Cardizem), which is available in oral and cream forms, also appears to be beneficial for the treatment of chronic anal fissures. Common side effects include headache and swelling of the feet and ankles.

Low doses of botulinum toxin A (Botox), a paralyzing agent, also can be used to treat anal fissures. Studies show that a single injection can heal more than 80% of chronic anal fissures, possibly by lowering anal pressure. Although it has a high success rate, some people find the injections painful. Rare complications include bleeding, blood clots under the skin around the anus, loss of bowel

control, and sepsis (a bacterial infection of the blood).

If a chronic anal fissure does not heal with medications, surgery may be necessary. Sphincterotomy, which involves cutting part of the muscle in the anal canal, is the surgery of choice. It helps heal about 98% of anal fissures. Sphincterotomy decreases the spasms and pressure in the anal canal and is a good option for people with chronic anal fissures and a high resting anal pressure. Another surgical treatment, anal dilation or a four-fingered anal stretch, heals 40 to 90% of chronic anal fissures. In this procedure, the physician uses four fingers to hold the anus open for four minutes to reduce spasms and pressure in the anal canal. However, almost 40% of people who undergo anal dilation have difficulty controlling flatulence or soil themselves occasionally; some 16% experience loss of bowel control.

Fecal Incontinence

Fecal incontinence (the involuntary loss of bowel control) affects more than 6.5 million Americans. Although it is a relatively common problem in older adults, it is not a normal part of aging. The inability to control your bowels can lead to embarrassment and cause you to avoid social situations, but fecal incontinence is often treatable with medication, lifestyle measures, or surgical repair of the damaged sphincter muscles. In addition, some people can benefit from an implanted device called an artificial sphincter.

Causes of fecal incontinence

Fecal incontinence is not a disease but a symptom of another gastrointestinal problem. The most common causes are:

- damage to the sphincter muscles in the anus (usually due to hemorrhoid surgery or childbirth). These muscles normally contract to prevent stool from leaving the rectum.
- damage to nerves in the anal sphincter muscles or rectum (due to chronic constipation, stroke, diabetes, multiple sclerosis, or childbirth). Nerve damage in the sphincter muscles leads to a loss of proper functioning of the muscles, while nerve damage in the rectum leads to loss of sensation in that area, so that you no longer recognize that stool is present.
- loss of storage capacity in the rectum (due to rectal surgery, radiation therapy for cancer, or inflammatory bowel disease). Normally, the rectum stretches to hold stool until you reach the toilet; with loss of elasticity, an accident is much more likely.
- diarrhea. Loose, watery stools are much harder to control than solid stools.

- pelvic floor dysfunction (such as rectal prolapse, in which the rectum sags). By supporting the organs in the pelvis and lower abdomen, the muscles of the pelvic floor play a role in preventing fecal incontinence.

Symptoms of fecal incontinence

The symptoms of fecal incontinence are easily recognizable, ranging from the occasional leakage of liquid or solid stool and gas to the inability to hold a bowel movement until you reach the toilet. Other possible symptoms include diarrhea and constipation.

Diagnosis of fecal incontinence

Because self-treatment of fecal incontinence is rarely successful, you should see your doctor if you experience any of the symptoms above. The doctor will take a medical history, do a thorough physical examination, and may order one or more diagnostic tests. These tests could include anal manometry to measure the tightness of the anal sphincter, anorectal ultrasonography to examine the structure of the anal sphincter, proctography/defecography to determine how well the rectum holds and eliminates stool, proctosigmoidoscopy to detect signs of diseases or other problems inside the rectum and sigmoid colon, and anal electromyography to test for nerve damage.

You should bring to your doctor's appointment a list of all the medications that you take. Some medications, such as sedatives, antacids, and muscle relaxants, can cause or increase the frequency of fecal incontinence, especially in older adults.

Treatment of fecal incontinence

Treatment depends on the cause and severity of fecal incontinence and may include changes in diet, bowel training, medication, or surgery. Treatment helps control fecal incontinence in about 50% of patients.

Dietary changes. Because it is difficult for the anal sphincter to handle large amounts of waste material, changes in your diet may be necessary to make the stool firmer and more compact. Foods that thicken the stool include rice, bananas, yogurt, and cheese. Increasing fiber intake—to 21 g daily if you're a woman over age 50 and to 30 g daily if you're a man over age 50—by consuming more whole grains, fruits, and vegetables also may help.

Alcohol and caffeine may cause diarrhea and should be eliminated. Some people are unable to digest lactose (a sugar found in dairy products) or food additives and flavorings like sorbitol and nutmeg.

Does Your Colon Need to Be Cleaned?

The truth about colonics, enemas, and cleansing fasts

A colonic irrigation, enema, or cleansing fast may seem like a good idea. After all, we like things to be clean, and ridding ourselves of excess waste sounds beneficial. But our bodies are actually quite efficient at self-cleaning, keeping what's needed and getting rid of what's not. Interfering with this process, even with the best of intentions, can do more harm than good.

The Background

The idea of cleansing the body of waste products goes back as far as the ancient Egyptians, who were fond of enemas (an injection of liquid into the rectum to stimulate a bowel movement). Colonic irrigation, a type of enema that requires flushing the bowel, became popular in the late 1800s and was even advocated by many medical doctors of that era to treat “autointoxication”—a purported state in which toxins build up in the colon, are absorbed into the bloodstream, and poison the body, creating a myriad of symptoms and disorders. By the mid-1930s, however, the theory of autointoxication and colonic irrigation along with it had fallen out of favor.

With the recent surge of interest in alternative therapies, colonic irrigation (also referred to as colonics, high colonic, or colon hydrotherapy) has resurfaced as

a service offered by nonmedical health practitioners and spas. Proponents claim that colon detoxification enhances the body's overall health, increases energy and mental focus, and improves natural healing. As a result, colonics, enemas, and cleansing fasts are touted to help a wide variety of health conditions, from asthma and arthritis to memory problems and cancer, as well as digestive disorders like constipation and diverticulitis.

Mainstream doctors and institutions do not recommend these cleansing techniques for the prevention or treatment of any medical condition. However, doctors do use enemas and recommend a clear, liquid diet (a type of cleansing fast that lasts a day or two) to clean the colon before a surgical procedure or an endoscopic exam like a colonoscopy or sigmoidoscopy. Doctors also prescribe medically supervised fasts to people with complications from digestive disorders in order to give the bowels a rest.

The Processes

The purported goal of colonics, enemas, and cleansing fasts is to remove waste products and toxins that supposedly accumulate in the colon.

Colonics. During a colonic, a colon hydrotherapist inserts a rubber tube through your rectum

and into the colon, approximately 3 inches but sometimes as far as 30 inches. Up to 20 gallons of warm or cool water—possibly supplemented with soap, herbs, coffee, enzymes, minerals, or other substances—is then pumped into your colon and allowed to sit for a few seconds to a few minutes. The therapist then massages your stomach to loosen feces that are believed to have hardened in your colon. The water is then drained out of your body through a second tube, bringing the fecal matter with it. This process is typically repeated several times to completely cleanse the bowel and takes about 45 minutes to an hour. Home colonic kits are also available.

Enemas. A less invasive version of a colonic, an enema involves having a small tube inserted into the rectum and about a quart of fluid pumped in to flush out only the rectum. Substances like coffee or other agents may be used. Enemas are often self-administered at home.

Fasting. During a cleansing fast, you abstain from all food and subsist solely on water, fruit or vegetable juices, and herbal tea—which is thought to give the body a break from digesting food and flushes toxins out of the colon. The fast may also include herbal supplements or laxatives.

Because improper digestion of these substances could contribute to diarrhea and fecal incontinence, they should be avoided as well.

Bowel training. Some people with fecal incontinence need to relearn how to control their bowels. One way to retrain the bowels is

The Evidence

Despite their long history, there's little or no well-designed research showing that colonics, enemas, or cleansing fasts offer any benefit, either to healthy people or to those with digestive disorders. Furthermore, there's no evidence that toxins collect in the colon or can be removed by these procedures.

Still, early research does show that colonic irrigation when performed by medical professionals may benefit specific groups of people—for example, individuals with an ostomy (a surgically created connection between the intestine and the side of the body), those who experience colon spasms during a colonoscopy, and people with fecal incontinence who have not responded to other treatment options. But more research is needed before these uses of colonic irrigation become standard practice.

The Risks

If this lack of evidence is not enough to steer you away from having a colonic, the risks should give you pause—particularly if you are over age 65; have a bowel disease, such as diverticulitis, Crohn's disease, ulcerative colitis, severe or internal hemorrhoids, or tumors in the colon or rectum; or have heart or kidney disease. All of these factors can increase your particular risk of experiencing a

complication from the procedure.

Following are the most common dangers of undergoing colonics:

- The bowel wall can be perforated by the tip of the rubber tubing or by the use of too much water pressure. A perforation can lead to a life-threatening infection.
- You can have an allergic reaction to the nozzle at the tip of the rubber tubing (particularly if you are allergic to latex) or to one of the cleansing substances added to the water.
- You can develop an imbalance in electrolytes, such as potassium and sodium, since colonics rinse away minerals that are normally absorbed into the bloodstream from the large intestine.
- You can be infected with bacteria and viruses if the equipment is not properly sterilized between treatments. (Most colon hydrotherapists use disposable, sterile tubing, so this is less of a risk than in the past.)

In a small number of cases, deaths have resulted from contaminated equipment, puncture of intestinal walls, or electrolyte imbalance.

Occasional use of an enema to treat a bout of constipation, for example, likely causes no harm. But constant use of enemas to promote regular bowel movements can make your body dependent on them.

As far as fasts go, those that last for a day or two don't appear to be harmful if you're healthy—although headaches, weakness, shaking, nausea, and depression may occur as your body runs out of ready sources of energy. Fasts that extend beyond three days can lead to life-threatening imbalances in the electrolytes in your body, can cause potentially fatal disturbances in your heart rhythm, and can worsen conditions such as cancer, diabetes, gout, hypoglycemia (low blood sugar), stomach ulcers, and diseases of the liver, kidney, or lung.

The Bottom Line

Today, experts in the medical community, including us here at Johns Hopkins, look on colonics, enemas, and cleansing fasts as questionable procedures to prevent or treat digestive disorders and advise against their practice because of concerns about the potential risks—not to mention that they are unnecessary, given that the body is designed to be self-cleansing.

In the absence of convincing data about their safety and benefits, we believe that following good dietary practices—eating plenty of fiber-rich fruits, vegetables, and whole grains—and exercising regularly represent a far better way to keep your colon functioning properly and to safeguard your health. ■

through biofeedback, which uses a computer to monitor muscle contractions as you learn exercises to strengthen the rectum and pelvic muscles. Stronger muscles can help retain stool. If fecal incontinence is caused by constipation, your doctor may recommend starting a

routine of having a bowel movement at the same time every day.

Medication. Drugs may be used if fecal incontinence is caused by diarrhea. Imodium A-D is an antidiarrheal medication that thickens the stool and also increases the strength of the rectal muscles. Other medications help treat fecal incontinence in other ways, for example, by decreasing intestinal secretions, contracting the muscle that closes the rectum, or slowing the movement of stool through the bowel.

External incontinence devices. If you're unable to regain fecal continence, you can wear an external device to collect any leaking stool. These prescription devices, available at medical supply stores and some pharmacies, typically consist of a drainable pouch attached to an adhesive wafer. The hole in the center of the wafer is placed over the rectum to allow stool to pass through. These devices can remain in place for 24 hours, but they must be changed if any stool leakage occurs.

Surgical repair. If fecal incontinence is caused by injury to the pelvic floor, anal canal, or anal sphincter, surgery may be performed to repair the problem. For example, damaged muscles in the anus may be replaced with muscle from the leg or arm.

Artificial sphincter. If your anal sphincter muscles are not capable of holding in stool, an artificial anal sphincter can be surgically implanted. This sphincter consists of a fluid-filled cuff that surrounds the anal canal, a pressure-regulating balloon in the anal canal, and a control pump located just under the skin. Normally, the cuff is full of fluid, which squeezes the anal canal closed. When you need to have a bowel movement, you squeeze the pump several times; the fluid then drains from the cuff into the balloon, and stool can pass through the open anal canal. After the bowel movement, the cuff automatically refills with fluid from the balloon. One study found that 11 of 16 patients had improved bowel control and quality of life two years after implantation of an artificial sphincter.

Colostomy. Severe fecal incontinence that does not respond to treatment may require a colostomy, a procedure in which the large intestine is connected to the abdominal wall. Instead of entering the rectum, stool goes directly from the intestine into a special bag outside the body.

Colorectal Polyps

Colorectal polyps are small, noncancerous (benign) clumps of cells that grow in the rectum and colon. Over the course of 10 to 15 years, some of these polyps—usually the ones that are larger than a pea—can become cancerous. Fortunately, regular screening for colorectal

cancer helps to identify and remove polyps, often before they progress to cancer.

Causes of colorectal polyps

It is not known why polyps develop, but some people are more prone than others. For instance, the older you get—especially after age 50—the more likely you are to have them. You're also more likely to develop polyps if you've had them before (polyps tend to recur) or if someone in your family has had polyps or cancer of the colon. Your behavior also influences your risk: Eating a lot of fatty foods, smoking cigarettes, drinking alcohol, not exercising, and being overweight can all contribute to the formation of polyps.

Symptoms of colorectal polyps

Most polyps don't cause any symptoms. You might not know you have them until your doctor finds one or more during a physical examination or colorectal cancer screening test. However, some people notice rectal bleeding (especially after a bowel movement), constipation or diarrhea that lasts longer than a week, or blood in their stool (the stool looks black or contains red streaks). In these cases, you should see your doctor for an evaluation.

Diagnosis of colorectal polyps

Polyps can be diagnosed by a digital rectal exam, barium enema, sigmoidoscopy, or colonoscopy. The last three tests are described on pages 36-38.

Treatment of colorectal polyps

Polyps are removed during a sigmoidoscopy or colonoscopy. The removed polyps are then tested to see if they are cancerous and if any further treatment is needed.

Colorectal Cancer

In 2009, colorectal cancer—cancer of the colon or rectum—was diagnosed in about 147,000 people in the United States. It is the second most common cause of death from cancer, killing about 50,000 Americans each year. The good news is that most colorectal cancers and deaths can be prevented.

Causes of colorectal cancer

Cancer occurs when a genetic mutation causes cells in the body to reproduce in a rapid, disorderly, and dangerous manner. The precise

cause of this mutation is unclear, but it appears to result from a combination of personal and environmental risk factors.

Risk factors for colorectal cancer include:

- increasing age
- polyps in the colon or rectum or a history of these polyps, especially an inherited condition called familial polyposis
- breast, endometrial, or ovarian cancer
- ulcerative colitis or Crohn's disease
- a close relative (mother, father, or sibling) diagnosed with colorectal cancer before age 60
- dietary factors, such as eating red and processed meats.

Symptoms of colorectal cancer

Colorectal cancer often produces no symptoms in its early stages, which is why screening is so important. However, any of the following symptoms should prompt a visit to your doctor:

- frequent, unexplained abdominal pain or cramps
- blood in or on your stool or blood in the toilet or on your underwear after passing stool
- an increase or decrease in bowel movements
- alternating between frequent bowel movements and constipation
- passing narrowed stools
- weakness and fatigue
- unexplained weight loss.

Screening for colorectal cancer

All adults age 50 and over should be screened for colorectal cancer. New guidelines from the American Gastroenterological Association in 2008 emphasized that the primary goal of colorectal cancer screening should be prevention—specifically, tests that can identify polyps before they become cancerous. The guidelines recommend one of the following:

- colonoscopy every 10 years
- flexible sigmoidoscopy every five years
- barium enema every five years
- virtual colonoscopy every five years.

The following tests can also help detect cancer but not polyps:

- fecal occult blood test every year
- fecal immunochemical test every year
- stool DNA test, though the ideal interval is not determined.

New to the recommendations is inclusion of virtual colonoscopy

and stool DNA testing as acceptable screening tools for colorectal cancer. The stool test involves sending an entire bowel movement to a diagnostic company, which looks for DNA material shed by tumors.

The ideal screening test for the entire population has not been determined, although an increasing number of doctors favor colonoscopy. If you have been determined to be at high risk or if you have had colon cancer or a related cancer, your doctor will recommend a more aggressive screening schedule.

A 2008 study from the Centers for Disease Control and Prevention (CDC) found that colorectal cancer screening is on the rise in the United States, but the numbers still fall short. In 2006, only 56% of adults age 50 or older had undergone either a colonoscopy or sigmoidoscopy within the recommended time frame. This percentage was up from 50% in 2004 and 45% in 2002.

Colorectal cancer screening often includes a yearly fecal occult blood test which usually involves smearing a small amount of stool on a specially designed card and bringing it to your doctor or a laboratory where it is examined for the presence of blood. If blood is found in the stool, even trace amounts, you will need to undergo a colonoscopy to find the cause of the bleeding.

If your annual fecal occult test is negative (no blood found in the stool), you will still need to undergo a colonoscopy every 10 years starting at age 50. During a colonoscopy, the doctor can view the rectum and the entire colon and remove any polyps.

Barium enema is a less expensive option than a colonoscopy or sigmoidoscopy, but it cannot distinguish polyps or cancer from stool and it can produce a large number of erroneous results.

Besides regular screening, lifestyle measures may reduce the colorectal cancer risk. These include eating a diet low in animal fat and high in fruits and vegetables, exercising regularly, maintaining a healthy weight, not smoking, and not drinking alcohol excessively.

Diagnosis of colorectal cancer

Fecal occult blood testing, barium enema, sigmoidoscopy, and colonoscopy are used to diagnose colorectal cancer. Because colorectal cancer can cause intestinal bleeding, a blood test is used to check for anemia (a low red blood cell count). Imaging tests such as ultrasound, CT scans, MRI, chest x-rays, and angiography (an x-ray technique that uses an injected contrast material) may be used to visualize the intestines or to see if the cancer has spread to other sites in the body. If cancer is diagnosed, the stage of the cancer must be

identified to determine the best course of treatment. The stage of the cancer is based on how large the tumor is and whether it has spread to the lymph nodes or other parts of the body.

Treatment of colorectal cancer

Surgery is the most common treatment for colorectal cancer and can eliminate the cancer in about half of all cases. It involves removal of the part of the colon or rectum that contains the cancer, some of the healthy tissue that surrounds it, and nearby lymph nodes (to determine if the cancer has spread to the lymphatic system). Common side effects of surgery include diarrhea or constipation, which usually improves on its own.

Other treatments for colorectal cancer include chemotherapy and radiation therapy, which can be used alone, in combination, or with surgery. Chemotherapy delivers medication intravenously to attack cancer cells throughout the body. It can be used after surgery (to increase the odds that all cancer cells have been eliminated) or before surgery to help shrink a tumor. If colorectal cancer has spread, chemotherapy may be used to slow the progression of the cancer and relieve symptoms (without the expectation of a cure). Adverse effects may include nausea, vomiting, fatigue, diarrhea, mouth sores, hair loss, and bone marrow suppression.

Radiation therapy involves directing x-rays at the cancer cells. It is used only for rectal cancer. Unlike chemotherapy, which affects the whole body, radiation therapy specifically targets cancer cells while minimizing damage to healthy cells. As with chemotherapy, it may be used before or after surgery, or for symptom relief when cancer has spread and a cure is not possible. The radiation may be delivered internally from implanted radioactive “seeds” or externally from an x-ray machine. Common adverse events include fatigue, nausea, diarrhea, appetite loss, bloody stool, and damage to the skin and other organs near the radiation site. ■

GLOSSARY

abscess—A localized accumulation of pus resulting from an infection.

achalasia—A disorder of the esophagus caused by the inability of the lower esophageal sphincter to relax and by abnormal esophageal contractions. Results in difficulty swallowing.

acute cholecystitis—Inflammation of the gallbladder producing severe pain, fever, nausea, and vomiting.

anal fissure—A tear in the skin that lines the anal canal, the part of the rectum closest to the anus.

antireflux barrier—A mechanical impediment created by the lower esophageal sphincter and the diaphragm that prevents the contents of the stomach from entering the esophagus.

anus—The opening at the end of the digestive tract through which stool is expelled. It is controlled by two sphincters and is only open during defecation.

autoimmune disease—A health problem in which the body's immune system begins to attack its own tissues.

barium x-ray—See upper GI series.

Barrett's esophagus—A disorder in which the cells that normally line the inside of the esophagus are replaced by more acid-resistant cells; associated with an increased risk of esophageal cancer.

bile—A substance synthesized by the liver, stored and concentrated in the gallbladder, and released into the duodenum to aid digestion and absorption of dietary fat.

bile ducts—Tubes that carry bile from the left and right lobes of the liver to the gallbladder.

biliary colic—Intermittent episodes of sharp pain in the right upper portion of the abdomen that occur when gallstones block the flow of bile from the gallbladder.

bilirubin—A component of bile made by the liver. Pigment gallstones are primarily made up of bilirubin.

bowel—The lower digestive tract, which is about 25 feet long and consists of the small and large intestines.

capsule endoscopy—A noninvasive test that allows for a full view of the small intestines, particularly the areas that are usually unreachable with an upper endoscopy or colonoscopy. You ingest a capsule that contains a video camera, which takes pictures of the digestive tract and transmits these images to a recording device.

cecum—The first part of the colon (large intestine).

celiac disease—A disorder that occurs in people who are sensitive to gluten, a component of wheat and other grains. Can cause diarrhea, bloating, weight loss, anemia, and vitamin deficiencies.

cholangitis—Infection and inflammation of the bile ducts.

cholecystectomy—Surgical removal of the gallbladder.

cirrhosis—A disease that causes the liver to slowly deteriorate and eventually malfunction as a result of the replacement of healthy tissue with scar tissue. Typically caused by alcohol abuse.

colectomy—Surgical removal of part or all of the colon.

colon—The part of the digestive tract that is connected to the small intestine. The colon absorbs water and electrolytes such as potassium from undigested foods before passing waste on to the rectum for release from the body. Also called the large intestine.

colonoscopy—A diagnostic procedure in which an endoscope is inserted through the anus and rectum to view the colon and the final portion of the small intestine (terminal ileum).

colorectal cancer—Cancer of the colon or rectum. Often preceded by the development of colorectal polyps.

common bile duct—A tube that carries bile from the liver and gallbladder to the small intestine.

constipation—A common but typically benign condition characterized by infrequent bowel movements and difficulty passing stool.

Crohn's disease—A chronic inflammatory disorder that primarily affects the small intestine but can involve any segment of the gastrointestinal tract.

cystic duct—A tube that carries bile from the gallbladder to the common bile duct.

diaphragm—The muscle that separates the chest from the abdomen; its movements play an important role in breathing.

diarrhea—An increase in the number of bowel movements and a decrease in the consistency of stools.

diffuse esophageal spasm—Prolonged and excessive contractions of the esophagus.

digital rectal exam—Insertion of a gloved finger into the rectum to feel for polyps and other abnormalities.

diverticulitis—A disorder in which small pouches in the wall of the large intestine (diverticula) become inflamed or infected.

diverticulosis—The development of small pouches (diverticula) that bulge outward through weak points in the wall of the large intestine.

duodenal bulb—The portion of the duodenum that is closest to the stomach.

duodenal ulcer—A nonhealing defect or sore that occurs in the lining of the duodenum.

duodenum—The first portion of the small intestine.

dysphagia—Difficulty swallowing food or liquids.

endoscopic dilation—An endoscopic procedure to treat achalasia in which a balloon device is inserted into the esophagus to expand the lower esophageal sphincter.

endoscopic retrograde cholangiopancreatography

(**ERCP**)—A diagnostic test that combines endoscopy with x-rays to view the pancreatic ducts and bile ducts.

endoscopy—A procedure that uses a thin, lighted viewing tube to visually examine the interior of a hollow organ, such as the esophagus, stomach, or small intestine.

esophageal manometry—A diagnostic test for esophageal disorders that measures lower esophageal sphincter pressure and evaluates esophageal contractions.

esophageal rings and webs—Thin, fragile folds in the inner lining of the esophagus that partially or completely block the esophagus.

esophageal stricture—A narrowing of the esophagus caused by chronic inflammation and scar tissue.

esophageal ulcers—Nonhealing defects in the inner lining of the esophagus.

esophagus—A muscular tube that is part of the upper digestive system. Food moves from the mouth to the throat and then to the esophagus.

fecal incontinence—The involuntary loss of bowel control; a relatively common problem in older adults.

fistula—An abnormal channel or connection in the body caused by disease. May develop between different segments of the digestive tract, or between the digestive tract and other organs, usually the bladder, vagina, or skin.

gallbladder—A pear-shaped sac located under the liver that stores bile. Plays an important role in the digestion and absorption of dietary fat.

gallstones—Small “pebbles” that form in the gallbladder and cause pain. Most gallstones are made of cholesterol, but some are made of bilirubin (a component of bile made by the liver).

gastritis—An inflammation of the inner lining of the stomach.

gastroesophageal junction—The place where the esophagus meets the stomach.

gastroesophageal reflux disease (GERD)—A backflow of the stomach’s contents into the esophagus that leads to heartburn and indigestion.

Heller myotomy—A surgical procedure for the treatment of achalasia in which an incision is made through the muscle of the lower esophageal sphincter to weaken it.

hemorrhoids—Clusters of swollen veins in and around the anus and rectum that can cause pain.

hepatobiliary scintigram—A test for acute cholecystitis in which a small amount of radioactive material is injected into a vein to visualize the bile duct system. Also called a hepato-iminodiacetic acid (HIDA) scan.

hiatal hernia—A protrusion of the gastroesophageal junction and a portion of the stomach into the chest

cavity. These parts of the gastrointestinal tract are normally located in the abdominal cavity.

H₂-blockers—Drugs that inhibit gastric acid secretion. Also known as histamine H₂-antagonists.

ileostomy—A procedure that attaches the last part of the small intestine (ileum) to an opening in the skin of the abdomen so that fecal material can pass out of the body.

ileum—The last portion of the small intestine.

irritable bowel syndrome—A common and frequently misunderstood digestive disorder that affects more women than men and can cause diarrhea, bloating, or constipation.

ischemia—A reduced supply of oxygen to any part of the body due to the obstruction of blood flow.

jejunum—The middle section of the small intestine.

laparoscopic surgery—A minimally invasive surgery performed through small incisions in the abdomen using specialized instruments and a tiny camera.

large intestine—The part of the digestive tract that is connected to the small intestine. It absorbs water and electrolytes such as potassium from undigested foods before passing waste on to the rectum for release from the body. Also called the colon.

liver—A large organ located on the upper-right side of your torso, opposite your stomach and behind your rib cage. Its main function is to make a substance called bile that is needed to digest food in the small intestine.

lower esophageal sphincter (LES)—A ring of muscle at the lower end of the esophagus that contracts to prevent the reflux of stomach contents into the esophagus.

main pancreatic duct—A tube that carries digestive juices from the pancreas to the duodenum.

major duodenal papilla—A protuberance in the duodenum that contains openings for the common bile duct and the main pancreatic duct.

metaplasia—A change in the cells in a tissue from a normal to an abnormal state, as occurs in Barrett’s esophagus.

mucosal protectants—Drugs that increase the resistance of the inner lining of the digestive tract to damaging acid from the stomach.

Nissen fundoplication—A surgical procedure for gastroesophageal reflux disease and hiatal hernia that involves lifting a portion of the stomach and tightening it around the gastroesophageal junction to increase lower esophageal sphincter pressure.

pancreas—A long, thin gland that lies horizontally behind the bottom part of the stomach and makes digestive enzymes that flow through the pancreatic duct to the small intestine. These enzymes, along with bile from the gallbladder, break down food for use as energy.

pancreatitis—Inflammation of the pancreas.

peptic ulcer—A nonhealing defect or sore in the inner lining of the stomach or duodenum.

perforation—A hole in an organ.

peristalsis—A series of wavelike muscle contractions that occur automatically to move food and fluid through the digestive tract.

peritonitis—Inflammation or infection of the lining of the abdominal cavity.

pH—A measurement of acidity or alkalinity.

polyp—A small, noncancerous (benign) clump of cells that grows in the rectum and colon. Over the course of 10 to 15 years, some polyps—usually those larger than a pea—may become cancerous.

proton pump inhibitors—Drugs that increase digestive tract motility, resulting in faster removal of acid from the esophagus, greater esophageal sphincter pressure, and better emptying of the stomach.

proton pump inhibitors—Drugs that strongly suppress acid production in the stomach.

pylorus—A circular muscle that connects the opening at the end of the stomach with the duodenum.

rectum—The area into which the colon pushes waste products for storage before they are released through the anus during a bowel movement.

sigmoidoscopy—A procedure in which the last 25 inches of the colon are examined with a short, flexible endoscope inserted through the anus.

small intestine—The portion of the digestive tract that absorbs nutrients from foods. The stomach passes food into the small intestine where digestive juices help break it down. Undigested food components (waste) pass from the small intestine to the large intestine.

sphincter of Oddi—The layers of muscle that control the entry of bile and pancreatic juices into the duodenum from the common bile duct and the pancreatic duct.

stomach—The part of the digestive tract that breaks down food and mixes it with digestive juices. When the food becomes a thick liquid, it passes into the small intestine.

stricture—An abnormal narrowing of hollow tubes in the body, such as the esophagus or bile ducts, due to the formation of scar tissue.

trachea—The windpipe.

ulcer—A nonhealing defect or sore in the mucosal lining of organs such as the stomach and duodenum.

ulcerative colitis—A chronic inflammatory disease of the large intestine caused by an abnormal autoimmune reaction that causes the body to attack its own bowel.

upper endoscopy—A procedure that examines the inside lining of the esophagus, stomach, and duodenum using a long, thin, flexible tube with a light and tiny video camera at its tip to look for abnormalities such as inflammation, ulcers, and tumors.

upper esophageal sphincter—A muscular tissue area at the upper end of the esophagus that contracts to prevent air from entering the esophagus when not swallowing.

upper GI series—X-rays of the esophagus, stomach, and duodenum that are taken after the patient swallows barium to make the organs visible on x-ray film.

virtual colonoscopy—A noninvasive test in which a CT scan of the abdomen is done to obtain two- and three-dimensional images of the colon and rectum. It has a number of drawbacks and typically is not performed unless standard colonoscopy cannot be done.

Z-line—An irregular white line seen on endoscopy that corresponds to the gastroesophageal junction, the place where the esophagus meets the stomach.

ABBREVIATIONS AND ACRONYMS

CDC—Centers for Disease Control and Prevention

CNS—central nervous system

CT—computed tomography

ENS—enteric nervous system

ERCPC—endoscopic retrograde
cholangiopancreatography

FDA—U.S. Food and Drug Administration

GERD—gastroesophageal reflux disease

GI—gastrointestinal

HIDA—hepato-iminodiacetic acid

IBD—inflammatory bowel disease

IBS—irritable bowel syndrome

MRCPC—magnetic resonance
cholangiopancreatography

MRI—magnetic resonance imaging

NSAID—nonsteroidal anti-inflammatory drug

PML—progressive multifocal leukoencephalopathy

PPI—proton pump inhibitor

TB—tuberculosis

HEALTH INFORMATION ORGANIZATIONS AND SUPPORT GROUPS

About GERD

P.O. Box 170864
Milwaukee, WI 53217-8076
☎ 888-964-2001/414-964-1799
www.aboutgerd.org
Provides general information about GERD symptoms, treatments, and new research.

The American College of Gastroenterology

P.O. Box 342260
Bethesda, MD 20827-2260
☎ 301-263-9000
www.acg.gi.org
A professional organization that provides general information and health tips on gastrointestinal disorders as well as help finding a physician.

American Gastroenterological Association

4930 Del Ray Ave.
Bethesda, MD 20814
☎ 301-654-2055
www.gastro.org
A nonprofit professional organization offering publications about digestive health. Website provides message boards and help finding a gastroenterologist.

American Society of Colon & Rectal Surgeons

85 W. Algonquin Rd., Ste. 550
Arlington Heights, IL 60005
☎ 847-290-9184
www.fascrs.org
Professional society representing board-certified colon and rectal surgeons. Can help you find a surgeon.

American Speech-Language-Hearing Association

2200 Research Blvd.
Rockville, MD 20850-3289
☎ 800-638-8255/
301-296-5650 (TTY)
www.asha.org
Gives information on communication and swallowing disorders and referrals to speech-language pathologists who can help with swallowing disorders.

Celiac Sprue Association

P.O. Box 31700
Omaha, NE 68131-0700
☎ 877-272-4272
www.csaceliacs.org
Sponsors a network of local chapters and support groups and publishes a newsletter and additional educational materials relating to celiac disease.

Crohn's & Colitis Foundation of America

386 Park Ave. South, 17th Fl.
New York, NY 10016
☎ 800-932-2423
www.ccfca.org
Nonprofit health organization dedicated to improving the lives of people with Crohn's disease or ulcerative colitis.

International Foundation for Functional Gastrointestinal Disorders

P.O. Box 170864
Milwaukee, WI 53217-8076
☎ 888-964-2001/414-964-1799
www.iffgd.org
A nonprofit education and research organization that informs and supports patients with gastrointestinal disorders.

National Digestive Diseases Information Clearinghouse

2 Information Way
Bethesda, MD 20892-3570
☎ 800-891-5389/
866-569-1162 (TTY)
www.digestive.niddk.nih.gov
A branch of the National Institutes of Health. Provides publications on the treatment of digestive diseases.

LEADING HOSPITALS

for Digestive Disorders as Ranked by U.S. News & World Report

- 1. Mayo Clinic**
Rochester, MN
☎ 507-284-2511
www.mayoclinic.org
- 2. Cleveland Clinic**
Cleveland, OH
☎ 216-444-2200
www.clevelandclinic.org
- 3. Johns Hopkins Hospital**
Baltimore, MD
☎ 410-955-5000
www.hopkinsmedicine.org
- 4. Massachusetts General Hospital**
Boston, MA
☎ 617-726-2000
www.massgeneral.org
- 5. Ronald Reagan University of California, Los Angeles, Medical Center**
Los Angeles, CA
☎ 310-825-9111
www.uclahealth.org
- 6. University of Chicago Medical Center**
Chicago, IL
☎ 773-702-1000
www.uchospitals.edu
- 7. Mount Sinai Medical Center**
New York, NY
☎ 212-241-6500
www.mountsinai.org
- 8. Hospital of the University of Pennsylvania**
Philadelphia, PA
☎ 215-662-4000
www.pennhealth.com
- 9. University of California, San Francisco, Medical Center**
San Francisco, CA
☎ 415-476-1000
www.ucsfhealth.org
- 10. Cedars-Sinai Medical Center**
Los Angeles, CA
☎ 310-423-5000
www.cedars-sinai.edu

A

Ablation therapies, 21
 Achalasia, 7, 18–19
 Acid reflux. *See* gastroesophageal reflux disease (GERD)
 AcipHex (rabeprazole), 14–15, 16, 25
 Aging of digestive tract, 3
 Alcohol, 31
 Align (*Bifidobacterium infantis*), 63
 Alka-Seltzer (simethicone), 39
 Aluminum oxide, 13
 Aminosalicylate anti-inflammatory compounds, 56–57
 Amitiza (lubiprostone), 63
 Amoxicillin, 25
 Amylase, 2
 Anal canal, 36
 Anal fissure, 68–70
 constipation and, 43
 Anal sphincter, 36
 artificial, 74
 Anal stretch, 70
 Anatomy and physiology
 liver, gallbladder, and pancreas, 24, 26
 lower digestive tract, 35–36
 upper digestive tract, 2, 4
 Antacids, 13, 41
 Antibiotics, 50, 58–59
 Antidepressants, 12, 32, 47
 Antinausea drugs, 40
 Apriso (mesalamine), 54
 Argon plasma coagulation, 21
 Asacol (mesalamine)
 celiac disease, 53
 Crohn's disease, 54, 56–57
 ulcerative colitis, 56–57, 60
 Axid (nizatidine)
 for GERD, 13, 14–15, 16
 for peptic ulcers, 25
 Azulfidine (sulfasalazine), 54, 56–57, 60

B

Bactrim (trimethoprim plus sulfamethoxazole), 50
 Barium enema, 36, 76, 77
 See also upper gastrointestinal (GI) series
 Barium sulfate, 37
 Barrett's esophagus, 20–21
 Bentyl (dicyclomine), 63
 Biaxin (clarithromycin), 25
Bifidobacterium infantis 63
 Bile, 26
 Bile ducts, 26
 Biofeedback, 44, 72–74
 Biopsy, 5

Bismuth subsalicylate. *See* Pepto-Bismol
 Bleeding, GI (gastrointestinal), 32–33
 Blood thinners, 32
 Botox (botulinum toxin A), 19, 69–70
 Bowel movements, 42–43
 Bowel training, 72–74

C

Calcium channel blockers, 19, 69
 Calmactin (cilansetron), 63
Campylobacter jejuni, 47
 Canasa (mesalamine), 56–57
 Capsule endoscopy
 diagnosing Crohn's disease, 54
 diagnosing GI bleeding, 32–33
 lower digestive tract, 36, 39
 upper digestive tract, 6
 Carafate (sucralfate), 16–17
 Cardizem (diltiazem), 69
 Cecum, 36
 Celebrex (celecoxib), 22
 Celiac disease, 51–53
 Central nervous system (CNS), 64–65
 Chemotherapy, 78
 Chest pain, heart attack vs. heartburn, 12
 Cholangiopancreatography, 31
 Cholecystectomy, 31, 34
 Cholecystitis, acute, 30–31, 34
 Cholera, 47
 Cimzia (certolizumab pegol), 55, 58–59
 Cipro (ciprofloxacin), 50, 58–59
 Cirrhosis of liver, 28–29
 Cleansing fasts, 72–73
 Celexa (citalopram), 32
Clostridium difficile, 47
 Colazal (balsalazide), 56–57, 60
 Colectomy, 60
 Colitis, ulcerative. *See* ulcerative colitis
 Colocort (hydrocortisone enema), 56–57
 Colon, 36, 72–73
 Colonics, 72–73
 Colonoscopy, 38–39
 cancer screening, 76–77
 Crohn's disease diagnosis, 54
 GI bleeding diagnosis, 32
 virtual, 38–39, 76–77
 Colorectal cancer
 causes of, 75–76
 diagnosis of, 77–78
 screening for, 76–77
 treatment of, 78
 Colorectal polyps, 74–75
 Colostomy, 74
 Common bile duct, 4
 Computed tomography (CT), 31
 Constipation, 42–44

 hernia risk factor, 7
 Japanese herbal supplements, 43
 COX-2 inhibitors, 22
 Creon (pancrelipase), 35
 Crohn's disease, 53–55
 hypnosis treatment, 65
 medications for, 56–57

D

Dai-kenchu-to (DKT), 43
 Diaphragm, 2
 Diarrhea, 47, 50–51
 Diet
 Barrett's esophagus risk and, 20
 for constipation, 43–44
 for fecal incontinence, 71–72
 GERD risk and, 12
 gluten-free, 52–53
 Dietary fiber, 43–44
 Diffuse esophageal spasm, 7, 18
 Digestive disorders
 hypnosis, 64–65
 of liver, gallbladder, and pancreas, 26–31, 34–35
 lower digestive tract, 39, 42–78
 overview of, 1
 upper digestive tract, 7–13, 16–24
 Digestive tract, 3
 See also lower digestive tract; upper digestive tract
 Dipentum (olsalazine), 56–57, 60
 Diverticulosis and diverticulitis, 45–46
 DNA testing, stool, 76–77
 Duodenal bulb, 4
 Duodenal gastroesophageal reflux testing, 6–7
 Duodenal papilla, major, 4
 Duodenal ulcers. *See* peptic ulcer disease
 Duodenum, 4, 35, 36
 Dyspepsia, 43, 65
 Dysphagia, 7–8
 Dysplasia, 20, 60–61

E

Elevating bed, 9, 13
 Endoscopic retrograde
 cholangiopancreatography (ERCP), 31, 34
 Endoscopy and endoscopic procedures
 capsule, 6, 39, 54
 dilation, 8, 19
 for GERD, 17–18
 mucosal resection for Barrett's esophagus, 21
 ultrasound, 31
 upper endoscopy, 4–5
 Enemas, 42, 72–73
Entamoeba histolytica, 47

Enteric nervous system (ENS), 64–65
 Entocort EC (budesonide), 54, 56–57
 EPI (exocrine pancreatic insufficiency), 35
 Epiglottis, 2
 Esophageal cancer, 20, 21
 Esophageal dysphagia, 7
 Esophageal impedance testing, 6
 Esophageal manometry, 6, 19
 Esophageal motility, 7, 18–19
 Esophageal sphincter, 2, 3, 6
 Esophageal stricture, 19–20
 Esophagitis, erosive, 13
 Esophagus, 2, 4, 20
 EsophyX, 10
 Estrogen levels, 9
 Exocrine pancreatic insufficiency (EPI), 35

F

Familial polyposis, 76
 Fecal impaction, 43
 Fecal incontinence, 70–74
 Fecal occult blood test, 76, 77
 Fiber, dietary, 43–44, 71
 Fiber supplements, 44
 Fibrosing colonopathy, 35
 Fistula, 46, 54–55
 Flagyl (metronidazole), 50, 58–59
 Flexible sigmoidoscopy, 37–38
 colorectal cancer screening, 76, 77
 GI bleeding and, 32
 Food allergies, 40, 51–53
 Food poisoning, 40
 Fosamax (alendronate), 23
 Fundoplication, Nissen, 9, 10, 17

G

Gallbladder, 3, 24, 26
 Gallstones, 29–31, 34
 Gastric acid, 19
 Gastric mucosa, 2, 4
 Gastric ulcers. *See* peptic ulcer disease
 Gastritis, 21–22
 Gastroenterologists, 1
 Gastroesophageal reflux disease (GERD), 9–18
 causes of, 10–12
 diagnosis and tests for, 6–7, 13
 endoscopic procedures for, 17–18
 Japanese herbal supplements, 43
 lifestyle changes, 13
 medications for, 13–17
 surgical treatments for, 10–11, 16–17
 symptoms of, 12
 weight loss and, 9
 Gastroesophageal sphincter, 10
 Gastrointestinal (GI) bleeding, 32–33
 Gastrointestinal (GI) motility disorders, 43
 Gastroplication, endoscopic
 for GERD, 18
 GERD. *See* gastroesophageal reflux disease (GERD)

Gliadin, 51
 Gluten-free diet, 52–53

H

H₂-blockers. *See* histamine H₂-receptor antagonists
 Heart attack symptoms, 12
 Heartburn, 9, 12
Helicobacter pylori (*H. pylori*), 21–23, 24
 Helidac (bismuth/metronidazole/tetracycline), 25
 Heller myotomy, 19
 Hemorrhoidectomy, 68
 Hemorrhoids, 41, 66–68
 Hepatitis, 26–28, 29
 Hepato-iminodiacetic acid (HIDA) scan, 31
 Hepatobiliary scintigram, 31
 Herbal supplements, 43
 Hiatal hernia, 7, 8–9
 Histamine H₂-receptor antagonists
 with antidepressant medications, 32
 for GERD, 13, 14–15, 16
 for peptic ulcers, 22, 24
 pneumonia risk, 21
 vitamin B₁₂ deficiency, 49
 Humira (adalimumab), 55, 58–59
 Hypnosis, 64–65

I

IBS. *See* irritable bowel syndrome (IBS)
 Ileostomy, 60–61
 Ileum, 35, 36
 Immunomodulators, 54, 58–59
 Imodium A-D (loperamide), 50, 63, 74
 Imuran (azathioprine), 54, 58–59, 60
 Incontinence devices, external, 74
 Inflammatory diarrhea, 47, 51
 Intestines, anatomy of, 35
 Iron supplements, 32
 Irritable bowel syndrome (IBS)
 causes and symptoms of, 61–62
 constipation as symptom of, 41
 constipation-predominant, 63
 diarrhea-predominant, 63
 hypnosis treatment, 65
 Japanese herbal supplements, 43
 treatment of, 63–65

J

Japanese herbal supplements, 43
 Jejunum, 35, 36

K

Kapixid (dexlansoprazole), 16

L

Large intestine, 35
 Laxatives, 42, 44, 50
 Levbid (hyoscyamine), 63
 Lialda (mesalamine), 56–57
 Lifestyle changes, 13, 35
 LINX Reflux Management System, 11

Liver, 3
 anatomy of, 24, 26
 digestive disorders of, 26–29
 Liver cirrhosis, 28–29
 Lomotil (diphenoxylate/atropine), 50, 63
 Lotronex (alosetron), 63
 Lower digestive tract
 anatomy of, 35–36
 disorders of, 39, 42–78
 tests for examining, 36–38

M

Maalox (simethicone), 39
 Magnesium intake, gallstones and, 29
 Magnetic resonance cholangiopancreatography (MRCP), 31
 Magnetic Sphincter Augmentation, 11
 Major duodenal papilla, 4
 Manometry, esophageal, 6, 19
 Medications
 causing GERD, 12
 causing liver injury, 27
 for celiac disease, 53
 for Crohn's disease, 56–59
 for diarrhea, 50
 for esophageal motility disorders, 19
 for fecal incontinence, 74
 for GERD, 13–17
 for irritable bowel syndrome (IBS), 63
 for peptic ulcer disease, 25
 for ulcerative colitis, 56–59
 Methotrexate, 58–59
 Methylprednisolone, 54, 56–57
 Metronidazole, 25
 Monoclonal antibodies, 58–59
 Motion sickness, 40
 Mouth, 2
 Mucosa, 2, 4, 20
 Mucosal protectants, 16–17
 Mylanta (simethicone), 39
 Myotomy, Heller, 19

N

Naprosyn (naproxen), 22
 Nausea, 40–41
 Neurological disorders, dysphagia and, 7
 Nexium (esomeprazole)
 for GERD, 13, 14–15, 16
 for peptic ulcers, 25
 Nissen fundoplication, 9, 10, 17
 Nitroglycerin, 69
 Nonsteroidal anti-inflammatory drugs (NSAIDs)
 causing digestive disorders, 12, 22, 23
 causing GI bleeding, 32
 causing nausea, 40
 with proton pump inhibitors, 33

O

Obesity, 9
 Orencia (abatacept), 55

Oropharyngeal dysphagia, 7
Osmotic diarrhea, 47, 50
Osteoporosis, 19, 51
Overweight, 9

P

Pancreas, 24, 26
Pancreatic enzyme deficiency, 48
Pancreatitis, 34–35
Pentasa (mesalamine), 53, 54, 56–57, 60
Pepcid (famotidine)
for GERD, 13, 14–15, 16
for peptic ulcers, 25
Peptic ulcer disease, 22–24
vitamin B₁₂ deficiency, 49
Pepto-Bismol (bismuth subsalicylate), 24, 25, 50
Peristalsis, 2, 18
Peritonitis, 46
PH monitoring, 6
Pharynx, 2
Photodynamic therapy, 21
Photophrin, 21
PML (progressive multifocal leukoencephalopathy), 55
Pneumonia risk, 21
Prednisone, 53, 54, 56–57
Prevacid (lansoprazole)
for GERD, 13, 14–15, 16
for peptic ulcers, 25
Prevpac (amoxicillin/Biaxin/Prevacid), 25
Prilosec (omeprazole)
for GERD, 13, 14–15, 16
for peptic ulcers, 25
Probiotic supplements, 63
Procardia (diltiazem), 69
Prochymal, 55
Progressive multifocal leukoencephalopathy (PML), 55
Promotility agents, 14–15, 16
Proton pump inhibitors
with antidepressant medications, 32
for GERD, 14–15, 16
osteoporosis risk, 19

for peptic ulcers, 22, 24, 25
pneumonia risk, 21
Protonix (pantoprazole)
for GERD, 13, 14–15, 16
for peptic ulcers, 25
Purinethol (mercaptopurine), 54, 58–59, 60
Pylorus, 4

Q

Questran (cholestyramine), 63

R

Radiation therapy, 8, 78
Radiofrequency ablation, 20, 21
Rectal prolapse, 43
Rectum, 36
Reglan (metoclopramide), 14–15, 16
Remicade (infliximab), 54–55, 58–59
Ribavirin, 28, 29
Rikkunshi-to (RKT), 43
Rowasa (mesalamine), 56–57
Rubber band ligation, 67–68

S

Saliva, 2
Scintigram, hepatobiliary, 31
Scleroderma, 7
Sclerotherapy, 68
Secretory diarrhea, 47, 50
Sigmoidoscopy, 32, 37–38, 76
Simethicone, 39
Small intestine, 3, 35–36
Smoking, 11, 31
Sodium bicarbonate, 13
Speech-language pathologist, 8
Sphincter of Oddi, 26
Sphincterotomy, 70
Spinclerotomy, 34
Stomach, 3, 4
Stomach ulcers. *See* peptic ulcer disease
Stool DNA testing, 76–77
Stool softeners, 44
Stretta endoscopic procedure, 18
Swallowing, difficulty. *See* dysphagia

T

Tagamet (cimetidine)
for GERD, 13, 14–15, 16
for peptic ulcers, 25
Telaprevir, 29
Transoral Incisionless Fundoplication (TIF), 10–11
Tetracycline, 25
Tricyclic antidepressants. *See* antidepressants
Tysabri (natalizumab), 55, 58–59

U

Ulcerative colitis, 55–60
hypnosis treatment, 65
vitamin D deficiency, 48
Ultrasound, abdominal, 30–31
Upper digestive tract
anatomy of, 2, 4
digestive disorders of, 7–13, 16–24
tests for examining, 4–7
Upper endoscopy, 4–5
Upper gastrointestinal (GI) series
for lower GI problems, 36, 37
for upper digestive tract, 5–6
See also barium enema

V

Viral hepatitis, 27–28
Virtual colonoscopy, 38–39, 76–77
Vitamin B₁₂, 36, 48–49
Vitamin D, 48–49, 51, 57
Vitamin supplements, 48–49
Vomiting, 40–41

W

Weight loss, 9, 13

Z

Zantac (ranitidine)
for GERD, 13, 14–15, 16
for peptic ulcers, 25
Zegerid (omeprazole/sodium bicarbonate), 14–15, 16, 25
Zelnorm, 63

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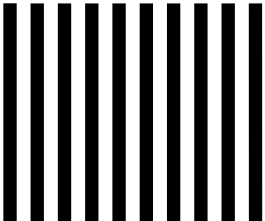


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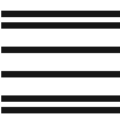
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