Gastroesophageal reflux disease (GERD) affects 18 million to 20 million people in the U.S. It is caused by stomach acid backing up into the esophagus. This handout explains what causes GERD, its symptoms, and how it is treated.

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What is GERD?

Gastroesophageal reflux disease (GERD) is the most common disorder of the esophagus in the United States. It affects 18 million to 20 million people, including infants and children.

GERD occurs when stomach acid rises up into the esophagus, the tube that carries food from the mouth to the stomach. This is often caused by problems with the lower esophageal sphincter (LES). The LES is a muscle that acts as a valve between the esophagus and stomach. Normally, it keeps stomach acid out of the esophagus.

Anyone can develop GERD, but it is most common in people over age 40. This is because as we age, the LES may weaken and our peristalsis (the contractions that move food through the esophagus) may not work as well.

What are the symptoms of GERD?

The most common symptom of GERD is heartburn. Heartburn is a feeling of pain behind the sternum (breastbone) or in the abdomen.

Other less common, but important symptoms of GERD are:

- Chest pain
- Bad breath and a sour taste in the throat
- Regurgitation of stomach acid (stomach acid rises up into the esophagus)
- Hoarseness or voice changes
- Airway problems, coughing, and throat-clearing
- Pneumonia
- Asthma
- Lung diseases
- Ear or sinus pain
- Dysphagia: painful or difficult swallowing
- Burping

Almost everyone has acid reflux at some time. Talk with your doctor if you have reflux 2 to 3 times or more a week for 3 months.

What complications can occur with GERD?

- Over time, the stomach acid can harm the sensitive lining of the esophagus. This can cause esophagitis (inflammation, irritation, or swelling of the esophagus), which can lead to esophageal ulcers (sores).
• Stomach acid can also change the cell structure of the esophagus so that it becomes more like the inner lining of the stomach and intestine. This is called Barrett’s esophagus. It is linked with a higher risk of esophageal adenocarcinoma (cancer), especially in older adults.

• The stomach often moves upward through the esophageal hiatus and can cause a bulge called a hiatal hernia. The esophageal hiatus is the hole in the diaphragm that the esophagus passes through. See “What causes GERD,” below, for more about a hiatal hernia.

• Other complications from GERD may include cancer of the larynx and asthma.

**What causes GERD?**

GERD may be caused by several things:

• The LES or esophagus may be damaged or not working well. This allows stomach acid to rise up into the esophagus.

• There may be a hiatal hernia, where the stomach moves up through an enlarged hole in the diaphragm and out of the abdominal cavity. This moves the LES and keeps it from working properly.

A hiatal hernia occurs when part of the stomach protrudes up through an opening in the diaphragm.

• Excess weight and fat from obesity or pregnancy can push on the stomach. This can move or put pressure on the LES.

• Acid and bile do not fully empty out of the stomach.
Eating smaller meals can help ease your GERD symptoms. Other tips include:

- **Eat less of the foods that are likely to cause reflux, or do not eat them at all.**
- **Avoid tobacco and alcohol.**
- **Sleep with the head of your bed raised.**
- **Do not eat close to bedtime.**

Some things that may make GERD worse are:

- Eating habits, such as eating:
  - Too much spicy, fatty, or citrus food
  - Too much caffeine and chocolate
  - Large meals
  - Too close to bedtime
- Using tobacco of any kind
- Drinking alcohol
- Using some medicines
- Wearing clothing that is tight around your waist

**How is GERD diagnosed?**

To diagnose GERD, your health care provider will do a complete evaluation. This will include a detailed review of your medical history and these tests:

- **Flexible upper endoscopy** of your esophagus and stomach
- **Manometry** test, which measures pressure in your esophagus
- **24-hour esophageal pH monitoring**
- **X-rays** of your upper gastrointestinal tract (esophagus and stomach)

These tests help your provider assess your symptoms and determine if you have GERD. They can also detect other related health issues. Many of these tests are done with instruments inserted through your mouth or nose.

Here is more information about each of these tests:

**Flexible Upper Endoscopy**

This test shows the structure of your esophagus and stomach. The endoscopy can:

- Show whether you have esophagitis or Barrett’s esophagus (also called **intestinal metaplasia**)
- Detect a hiatal or paraesophageal hernia (a very large hiatal hernia)
- Assess whether your LES is blocked or twisted
- Rarely, an endoscopy can have unexpected results, such as finding cancer in your esophagus, stomach, or **duodenum** (the first part of the small intestine)
During an endoscopy, a thin flexible tube called an endoscope is put down your throat.

**Manometry**

A manometry test assesses the *motility* (movement) of your esophagus. It will show:

- The *amplitude* (size) and wave action of the muscle contractions in your esophagus
- The pressure, location, and relaxation of your LES

The results of the manometry test will help your health care provider determine if surgery will help treat your GERD. This surgery is called a *fundoplication*.

**24-hour pH Esophageal and Pharyngeal pH Monitoring**

Esophageal pH monitoring measures the amount of acid in your upper and lower esophagus. It is the best way to determine if you have GERD, and it will help rule out other causes of your symptoms.

This test can also be used to see whether your reflux episodes happen at the same time as your symptoms.

Pharyngeal pH monitoring measures the amount of acid in your *pharynx* (the structure that connects the mouth and nasal passages with the esophagus). This test may be done in addition to esophageal pH monitoring if you have *laryngeal* (throat) or respiratory disorders. It will help your doctors decide if surgery will help your GERD.
Impedance

Substances besides stomach acid can also back up into the esophagus. This may be why medicines that lower stomach acid do not help some patients who have symptoms of GERD.

The impedance test measures how well an electric current flows between 2 electrodes. During this test, many pairs of electrodes are placed inside your esophagus through a wire, just like the pH wire. These electrodes measure how material moves through your esophagus. This helps determine if your symptoms may be caused by nonacid reflux. Impedance also helps us know whether or not your GERD may be helped by surgery.

Upper Gastrointestinal Series (Barium Swallow)

X-rays show both the anatomy of your esophagus and stomach and how they relate to your diaphragm. These images may show a short esophagus, strictures (narrowing), or a hiatal or paraesophageal hernia. These findings will help your doctor determine what types of surgery may help your GERD symptoms.

A barium swallow study

Laryngoscopy

Like an endoscopy, a laryngoscopy can show if your larynx has been damaged by stomach acid. This test is done by a laryngologist (a doctor who specializes in diagnosing and treating larynx disorders). It can show if you have erythema (inflammation), ulcers, swelling, or nodules. All of these are lesions that may or may not be related to your GERD. A lesion is a change in an organ that is caused by disease or injury.

Laryngologists work directly with us to help diagnose and manage patients with these disorders.
How is GERD treated?
At first, doctors most often prescribe changes in diet and lifestyle to treat GERD symptoms. Medicine may also be used to reduce the potential for acid to reflux into the esophagus. Surgery may be advised if these things do not work or become less effective over time.

Diet
• Keep your weight in the normal range.
• Eat fewer fatty, fried, and spicy foods.
• Avoid foods such as peppers and onions that can make your GERD worse.
• Limit the amount of citrus, chocolate, and caffeine in your diet.

See our handout, “Managing Reflux,” for more information about dietary guidelines when you have GERD.

Lifestyle
• Exercise if you are overweight.
• Eat smaller meals.
• Eat your last meal at least 2 to 3 hours before you go to bed.
• Raise the head of your bed and use a pillow to raise your head above your chest level while sleeping.

Medicines
Your doctor may prescribe medicines to help reduce your stomach acid. These medicines either neutralize the acid or keep your stomach from producing them.

• **Proton pump inhibitors** (Prilosec, Prevacid) are used when GERD symptoms are moderate to severe. They are strong prescription drugs that suppress the secretion and release of stomach acids.

• **Antacids** (prescription or over-the-counter, such as TUMS) are used to help control mild to moderate heartburn. These medicines neutralize stomach acid. But, because the stomach needs acid to work properly, taking antacids too often can affect how well you digest food. They can also cause diarrhea and other side effects.

• **Histamine type 2 receptors** (Zantac, Pepcid, Tagament) work well for mild, occasional reflux. These medicines block histamine, a hormone in the body that causes stomach cells to create acid. These are not as strong as Proton Pump Inhibitors.
• **Mucosal protective agents** (alginic acid and sucralfate suspension) are gels or foams that coat the mucous lining in the esophagus, protecting it from refluxed acid.

**Surgery for GERD**

Sometimes, medicines or other treatments alone do not relieve GERD. If your GERD is caused by problems in the anatomy or mechanics of your esophagus or related structures, your doctor may advise surgery.

For anti-reflux surgery to be effective, it must address:

• Muscle function of the LES
• Position of the LES in the abdomen
• Strength of the connection between the LES and the esophageal hiatus
• Hiatal hernia

But, there may be times when surgery may not be advised if you have symptoms that are not usually linked with GERD. Some of these symptoms are abdominal pain, bloating, and nausea.

If you have these symptoms, you may not have GERD. This is why the Center for Esophageal and Gastric Surgery does a full diagnosis, as described earlier, for GERD.

**Nissen Fundoplication Surgery**

A surgery called *Nissen fundoplication* has been used for a long time with excellent and consistent results in treating GERD. It is the most common form of fundoplication surgery that is done in the world today.

In this procedure, the surgeon wraps the top part of the stomach around the esophagus. This keeps stomach acid from flowing back up into the esophagus.

Nissen fundoplication surgery:

• Increases the pressure of the LES when it is at rest
• Restores the proper angle for the esophagus to enter the stomach

A one-way “flap valve” is created to that food goes down and prevents reflux acid from backing up. If a hiatal hernia is involved in causing your GERD, your surgeon will also:

• Reduce the size of the hernia
• Narrow your hiatus back to normal size
• Possibly reinforce this closure with a natural (*biologic*) mesh to strengthen the closure
Success Rates

- At UWMC, a Nissen fundoplication is successful for more than 90% of patients (90 out of 100) with common GERD symptoms such as heartburn, regurgitation, and dysphagia.
- The surgery is successful about 70% of the time (in 70 patients out of 100) for patients whose GERD symptoms involve their airway, even when medicines have not been successful.

Minimally Invasive Surgery

Nissen fundoplication is done with a laparoscopic method instead of the traditional open surgery where a large incision is made in your abdomen. Laparoscopic surgery is a minimally invasive surgery.

In laparoscopic surgery, several tiny incisions are made in your abdomen. Your surgeon will insert tiny instruments and a fiber-optic camera through these incisions.

Laparoscopic surgery creates less scarring and involves a shorter recovery time than open surgery. You can expect to go home in 1 or 2 days instead of 4 or 5 days with open surgery.

These drawings show the different incisions used in open surgery and laparoscopic surgery:

- One long incision is used in open fundoplication surgery
- Several tiny incisions are used in laparoscopic fundoplication surgery
Preparing for Surgery

- **Medicines:** 1 week before your surgery **DO NOT** take aspirin, ibuprofen (Advil, Motrin) or naproxen (Aleve, Naprosyn) **unless** you are taking it for a specific health condition. If you are unsure whether you should stop taking it, please call the clinic.

- **Shaving:** 2 days before your surgery, do **not** shave any part of your body that you do not usually shave every day. If you usually shave near your surgical site, **stop shaving that area 2 days before your surgery.**

- **Reminder call:** A staff member from the Pre-Anesthesia Clinic will call you between 2 and 5 p.m. the day before your surgery. If your surgery is on a Monday, you will receive a call Friday afternoon.

  The Pre-Anesthesia staff will remind you:
  - What time you should arrive at the hospital
  - Where you should check in
  - What your pre-surgery instructions are, including what medicines to take the day of surgery

- **Fasting:** Do **not** eat or drink anything after midnight the night before your surgery. The Pre-Anesthesia nurse may change your liquid restrictions based on the time your surgery is scheduled to start.

- **Pre-surgery showers:** Both the night before and the morning of surgery, shower or bathe using Chlorhexidine Gluconate soap:
  - Do **NOT** use this special soap on your face or hair. Use your regular soap and shampoo for these areas.
  - Wash thoroughly from your neck down, especially around the area of your surgery.

Day of Surgery

- Do **NOT** put on makeup, deodorant, lotions, hair products, or fragrances.

- Do **NOT** wear contact lenses. Wear your glasses instead.

- **Remove** all jewelry.

- Wear loose clothing that will be easy to take off and comfortable to wear home.

- **Arrive early.** Please leave home early and plan to arrive ahead of your scheduled check-in time. Allow for traffic and the chance that operations scheduled before yours may end early.
Bring these items with you on the day of surgery:

- **List of your current medicines**, including their exact doses and when you last took them
- **Photo ID**
- **Insurance and pharmacy cards**
- **Co-payments** for discharge medicines

If you have these items, also bring:

- Copies of your **advance health care directive** and/or **durable power of attorney for health care**. They will be placed in your medical record.
- Your **CPAP machine**, if you use it for sleep apnea.

**Arriving at the Hospital**

- You will check in and sign admission forms.
- Different members of your health care team will ask you your name, date of birth, and what procedure you will be having done. We usually ask these questions many times for your safety.
- You will be covered with a heating blanket to keep your body warm. This will help reduce your risk of infection.
- You will have an **intravenous line** (IV) placed.
- You will receive an injection in your abdomen to help prevent blood clots.
- When these steps are done and the operating room is ready, your anesthesia provider will transport you back to the operating room.
- Expect your surgery to take about 2 to 3 hours.

**After Surgery**

**In the Recovery Room**

- You will spend about 2 hours in the recovery room waking up after surgery.
- Nurses in the recovery room will monitor your pain level and give you medicine to make you comfortable.
- Your family may be able to visit you in the recovery room. This depends on your situation and the care of other patients in the recovery room.
• When you wake up, you will have:
  - An **oxygen mask** over your face to supply extra oxygen. You will be switched to nasal prongs (oxygen under your nose) when your lungs are ready.
  - **Inflatable stockings** called *sequential compression devices* (SCDs) on your legs. These stockings squeeze your legs off and on to improve blood flow. This helps keep blood clots from forming.
  - A **urinary catheter** in your bladder. This allows us to monitor your urine output during and after your surgery. The catheter will be removed early the next morning.

**On the Nursing Unit**

• **Medicines:** All your medicines will be crushed or in liquid form.

• **Breathing exercises:** You will be given a device call an **incentive spirometer** to help you exercise your lungs. **It is important to exercise your lungs to prevent complications such as pneumonia.**

  Using the incentive spirometer will help prevent pneumonia and other serious problems. **It is very important to use it.** To use the incentive spirometer:
  - Hold your mouth around the tube and inhale. Your breath will raise a small ball.
  - Inhaling more deeply will make the ball stay up longer. Deep breathing exercises your lungs more than shallow breaths.

• **Activity:** It is important for you to get up and try to walk, even in the evening of your surgery. Your nurse will help you the first few times to make sure you are steady on your feet. **Please ask your nurse to help you walk. Do not wait to be asked.**

• **Diet:** A dietitian will visit you the day after surgery to talk about the diet you will need to follow when you leave the hospital.

• **Family and friends:** Family and friends can be important to your recovery. They can help by doing things that make your stay more comfortable, such as fluffing your pillow, getting you a glass of water, or finding your remote control.

**Going Home**

If you live more than a 2-hour drive from the hospital, we recommend that you stay in the Seattle area an extra 1 or 2 nights after you leave the hospital. This rest time will help your recovery. You will also be close by in case any problems develop.
Diet and Nutrition
Your diet will start with liquids and then progress to a soft diet for 4 to 6 weeks after your surgery. This diet will help keep food from getting stuck in the area where the surgery was done. If you have any questions about your diet, read the information booklet that the dietitian gave you before you left the hospital or call the dietitian or your surgery team.

Medicines
You cannot swallow whole pills for 4 weeks after your operation. You will go home with liquid medicines or pills that can be crushed. This includes your pain medicine and anti-nausea medicine.

Incision Care
You may remove your outer bandage in 48 hours. Leave the white tape (called Steri-Strips) in place. You may remove the Steri-Strips in 1 week.

Showering
You may shower the day after surgery. The dressings on your incision will repel the water. Do not take a bath, sit in a hot tub, or go swimming for 4 weeks after your surgery.

Activity
- Do not lift anything over 10 pounds for 6 weeks after your surgery.
- Avoid activities that make you contract your abdominal muscles.
- It is important to walk. You should walk 3 to 4 times every day. Slowly increase how far you go.

Sexual Activity
- Avoid sexual activity for 2 weeks after your surgery.
- Once you resume sexual activity, continue to follow the other activity restrictions listed above under “Activity.”

Driving
Do not drive for at least 2 weeks after your surgery. Before you resume driving, you should be:
- Off all of your pain medicine
- Able to easily move and quickly apply brakes if needed
Questions?

Your questions are important. Call your doctor or health care provider if you have questions or concerns.

Weekdays from 8 a.m. to 4 p.m., call the Nurse Line for the Surgical Specialties Clinic at 206-598-4477.

After hours and on weekends and holidays, call 206-598-6190 and ask for the Resident on call for Surgery to be paged.

Call your surgeon if you have a fever higher than 100.5 °F (38 °C).

When to Call Your Surgeon

Call your surgeon if you have:

- A fever higher than 100.5 °F (38 °C)
- Shaking or chills
- Difficulty getting food or liquids down
- Nausea or vomiting that will not go away or keeps getting worse
- Abdominal or chest pain that keeps getting worse
- Any signs of infection in your incision:
  - Redness
  - Swelling
  - Foul-smelling drainage

If you are calling:

- Weekdays between 8 a.m. and 4 p.m.: Call the Nurse Line for the Surgical Specialties Clinic at 206-598-4477.
- After hours, on weekends and holidays: Call 206-598-6190 and ask for the resident on call for Surgery to be paged.

Follow-up Care

Short-term Follow-up

We would like to see you back in the clinic 2 to 3 weeks after you leave the hospital. When you get home, please call our Patient Care Coordinator at 206-598-4547 to schedule your appointment.

If you live more than 2 hours away, please ask your surgeon if you need to have this follow-up appointment. It will depend on your specific situation.

Long-term Follow-up

Your long-term follow-up appointment should be about 6 months after your surgery. This visit is important to determine the success of your surgery and to see if you need any other treatment.

At this visit, you may have these tests:

- 24-hour pH monitoring
- Upper gastrointestinal barium X-rays