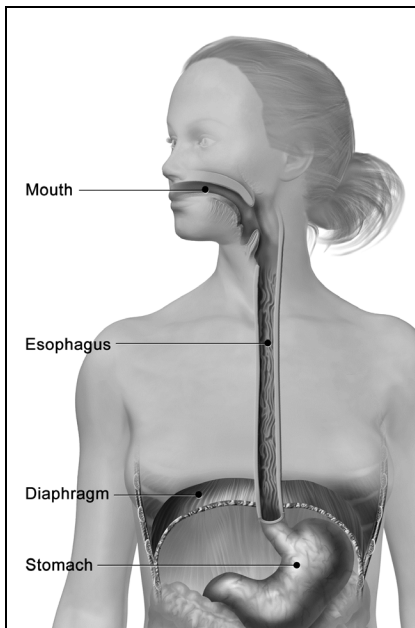


Esophageal Cancer

What it is and how it is treated

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The parts of the digestive system include the mouth, esophagus, diaphragm, and stomach.

The Esophagus

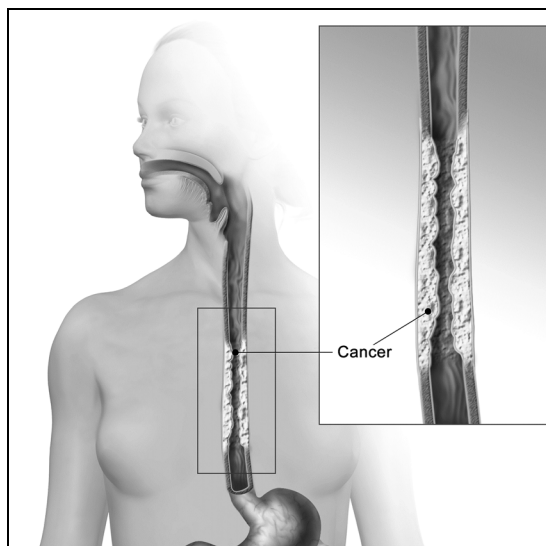
The *esophagus* is a tube about 10 inches long. It runs from the throat to the stomach. It has many layers of tissues that work together to move food and liquids to the stomach.

Thin, flat *squamous cells* line the inside of the esophagus. Under those cells is a layer of *epithelial cells*. Under that layer is *submucosal tissue*, which keeps the esophagus moist. Thick muscles under that tissue contract in waves (*peristalsis*) to move food down the esophagus.

Types of Esophageal Cancer

Carcinoma is a cancer that starts in skin cells or in the tissues of body organs. Usually, esophageal cancer either occurs as carcinoma in the squamous cells or in the epithelial cells. Cancer that occurs in the squamous cells is called *squamous cell carcinoma*, and cancer in the epithelial cells is called *adenocarcinoma*.

Adenocarcinoma tumors usually grow near the bottom of the esophagus, close to where the esophagus meets the stomach. Squamous cell cancer can grow anywhere in the esophagus, but it occurs most often in the upper and middle esophagus. Esophageal cancer is the 3rd most common cancer of the digestive tract, after colon and stomach cancer.



Cancer of the esophagus

What are the symptoms of esophageal cancer?

Esophageal cancer often affects a person's ability to swallow. Symptoms include:

- Painful swallowing (*odynophagia*)
- Problems swallowing (*dysphagia*)

These can start as minor problems that slowly get worse. A person might start to eat softer foods or to chew food longer than usual and not be aware that their discomfort might be a sign of cancer. As symptoms get worse, they might eat less and lose weight because of their discomfort. *Anemia* (low red blood cell count) might also occur.

Other possible symptoms of esophageal cancer are:

- Heartburn and indigestion
- Chronic cough
- Vomiting blood
- Pain behind the breastbone
- A hoarse or gravelly voice

Potential Problems

These problems are linked to esophageal cancer:

- A growing tumor could make it harder to swallow over time. The tumor could also block food from getting to the stomach. This often leads the person to eat less, which causes weight loss and related problems. If the tumor cannot be easily removed, your doctor might place a *stent* (tube) in your esophagus to hold it open.
- A tumor could create a hole called a *fistula* in your esophagus. Food and liquid could flow into your *trachea* (windpipe) through this hole. This would lead to coughing and *aspiration pneumonia* (when food or liquid goes into the lungs). If this happens, surgery is needed to close the fistula or to insert a stent.
- Esophageal tumors can also *metastasize*, or spread cancer to the other organs and tissues.

What causes esophageal cancer?

We do not know the exact causes of esophageal cancer. But, studies link the disease with these risk factors:

- People who are born as male are nearly 3 times more likely than people who are born as female to get esophageal cancer.

- The disease is 3 times higher among blacks than whites.
- The rate of esophageal cancer rises after age 50.
- Tobacco use (cigarettes, cigars, and chewing tobacco) and alcohol use often increase the risk of developing cancer, especially squamous cell carcinoma.
- Obesity is linked with adenocarcinoma because it is linked with *gastroesophageal reflux* (GERD).
- *Barrett's esophagus*, a condition linked with long-term GERD, occurs when cells *mutate* (change) and become more like those in the stomach and intestine. Barrett's esophagus is a major warning sign of adenocarcinoma.
- People who have had head or neck cancers, or who are infected with the human *papillomavirus*, are at greater risk of developing esophageal cancer.
- Injury to the esophagus can cause scarring and damage to the cells of the esophagus. This damage is linked with higher risk of cancer.

How is esophageal cancer diagnosed?

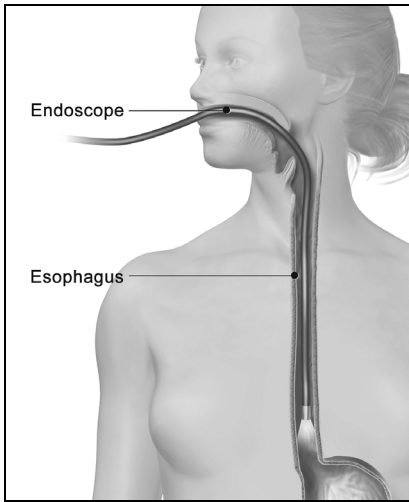
Based on a person's symptoms of pain or trouble swallowing, a doctor will do a physical exam, ask questions to get a detailed medical history, and learn about the patient's possible risks, such as tobacco use or alcohol use. The exam might include these tests:

- *Flexible endoscopy* (see below)
- Chest X-ray
- Blood tests
- *Barium swallow* (see next page)

Flexible Endoscopy

For this test, you will be *sedated* (given medicine to make you sleepy and relaxed). A tube called an *endoscope* is inserted into your mouth or nose and down into your esophagus. The tube has a light and a tiny camera on the end that takes close-up images of esophageal tissue. These images are projected onto a video monitor in the exam room.

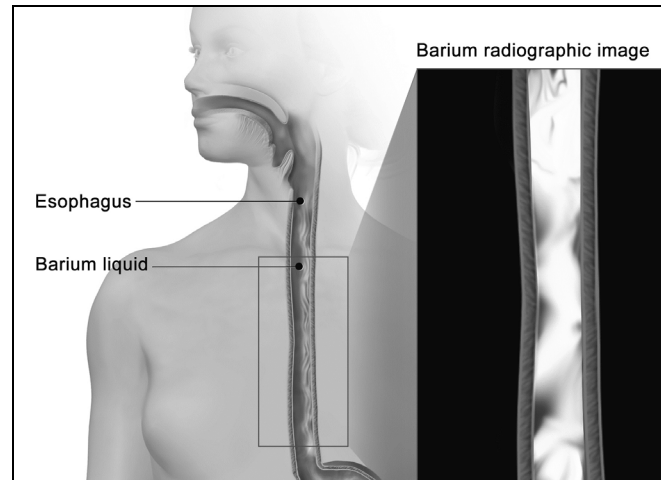
An endoscopy gives the best information about the health of your esophagus. It shows signs of reflux, such as *esophagitis* (irritation in the esophagus). It also shows tissues that may have cancer. A tissue sample can be taken (*biopsied*) and examined in the lab to confirm a cancer diagnosis.



Flexible endoscopy

Barium Swallow

For this test, you will swallow a liquid that contains barium. As you swallow, your doctor will use a *fluoroscope* to watch the fluid as it goes through your esophagus and into your stomach. Fluoroscope images are like X-rays. They will show how evenly the barium coats your esophagus. This could help your doctor know how severe your disease is.



Barium swallow

If your doctor finds cancer or believes you may have cancer, you will likely have other tests that will give more information. These will help your doctor diagnose and treat you. These tests include:

- *Computed tomography (CT) scans*
- *Positron emission tomography (PET) scans*
- *Endoscopic ultrasound imaging*

All of these tests provide images of your esophagus, but in different ways. A *bronchoscopy* may also be done to learn whether cancer is also in your trachea.

How is esophageal cancer treated?

We can treat esophageal cancer, but we may not be able to cure it. Some doctors believe that a 3-year survival after treatment may lead to a greater chance of long-term survival.

Esophageal cancer may be treated with surgical *resection* (removing part of the esophagus), along with chemotherapy or radiation therapy, or both. Patients who are treated soon after the cancer starts tend to do better. But, by the time patients have trouble

swallowing, the cancer often is well-developed. This makes chances for a cure much smaller.

The esophagus is very wide, and a tumor may not be noticed until it is big enough to block food. A tumor this large is much more serious. By this time, cancer may also have spread to other body tissues, such as lymph nodes. Only 15% to 30% of patients (15 to 30 patients out of 100) are still alive 5 years after their treatment.

The type of treatment your doctor advises will depend on:

- Where the tumor is found in the esophagus
- Whether the tumor has gone into nearby structures
- Whether cancer has spread to lymph nodes or other organs
- Your symptoms and overall health

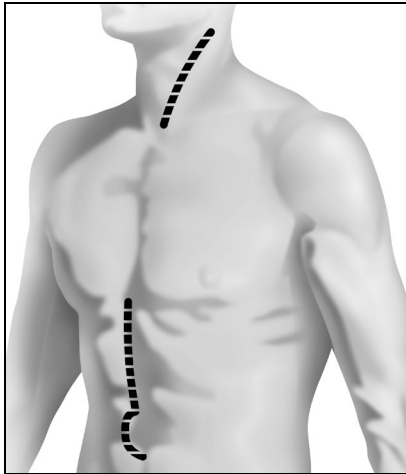
Types of Treatment

- Esophageal cancer is often treated with an *esophagectomy*. In this surgery, part or all of the esophagus is removed.
- Radiation and chemotherapy are also used in treatment. Chemotherapy that is given before surgery may lead to a longer survival for patients who have cancer that can be operated on.
- *Radiofrequency ablation* is often used to treat people who have Barrett's esophagus and pre-cancerous changes (*dysplasia*). It uses heat to destroy cancer cells. Barrett's esophagus can develop from long-term GERD, and it leads to cancer in 1 out of 200 people who have it.

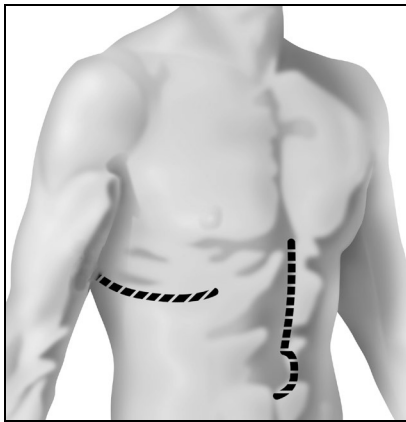
Esophagectomy Surgery

An esophagectomy is done to remove diseased portions of your esophagus, lymph nodes, and nearby soft tissues. There are many ways to do this surgery. The surgery method your doctor will use depends mainly on where your tumor is located.

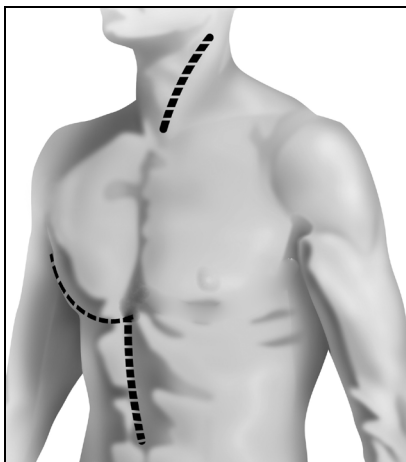
The types of incisions used in this surgery are described on the next few pages.



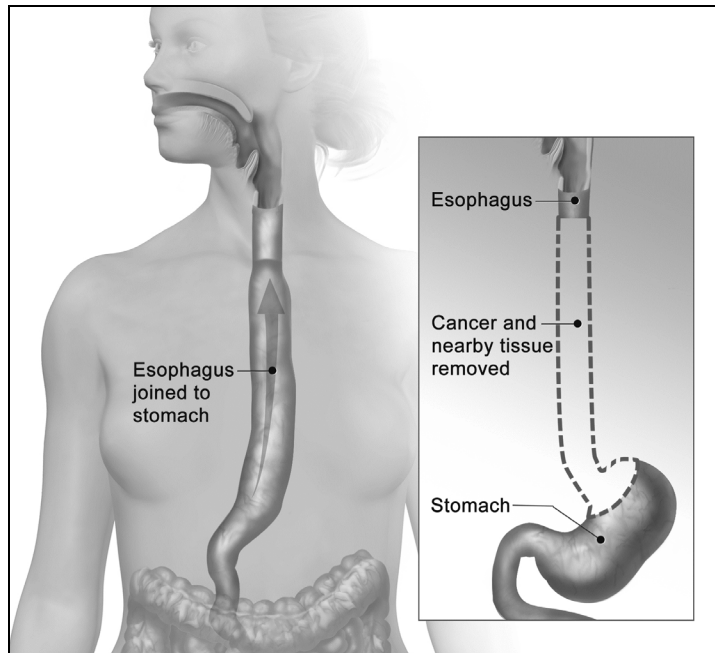
Incisions for a transhiatal esophagectomy



Incisions for an Ivor Lewis esophagectomy



Incisions for a total esophagectomy



Esophagectomy

Types of Incisions

Transhiatal Esophagectomy

In this operation, incisions are made in your neck and belly. Most of your esophagus is removed through these incisions. Not making an incision through your chest wall and not deflating your lung may result in fewer lung problems such as pneumonia.

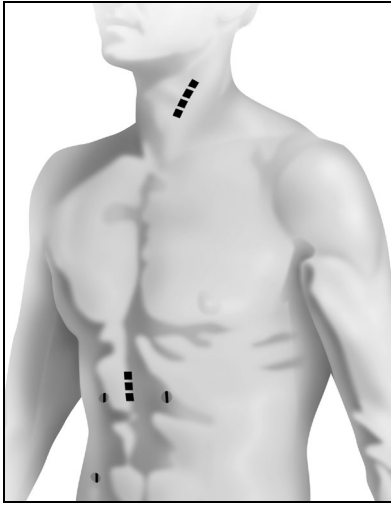
Usually in this surgery, the stomach is attached to the esophagus in the neck. Sometimes, the colon is used instead of the stomach.

Ivor Lewis Esophagectomy

In this operation, surgery is done through 1 incision in your belly and 1 incision in your chest. The lower half of the esophagus is removed. The stomach is then attached to the upper esophagus in the chest.

Total Esophagectomy

This surgery is usually needed when there are large tumors in the middle of the esophagus. Incisions are made in 3 places: your belly, chest, and neck. Your esophagus is separated from other chest structures and organs through these incisions.



Incisions for minimally invasive surgery

Minimally Invasive Surgery

Most patients who have esophageal cancer are able to have *minimally invasive* surgery for their treatment. We specialize in this method at University of Washington Medical Center. In minimally invasive surgery, special tiny tools are used. This means that some of the surgical incisions may be 1 cm or less (less than ½ inch).

This surgery is called:

- *Thoracoscopy* when the incisions are in the chest
- *Laparoscopy* when the incisions are in the belly

In standard *open surgery*, a large incision is made in the belly. In minimally invasive surgery, about 5 small incisions are made. Each one is 5 mm to 10 mm long (less than ¼ inch to ½ inch). Your surgeon will insert tiny instruments and a fiber-optic camera through these incisions.

There are many benefits to minimally invasive surgery. You will most likely have less pain, a faster recovery, and fewer problems with your incisions. Your surgeon will talk with you about this type of surgery and whether it is right for you.

Surgery Risks

A major problem that can occur with this surgery is leakage where the esophagus is cut and reattached.

Other less severe problems of this surgery are:

- *Atrial fibrillation* (irregular heartbeat)
- *Pneumonia* (lung infection)
- Lung collapse
- Bowel obstruction (blockage)
- Vocal cord *paralysis* and long-term hoarseness (if a nerve in a vocal cord is damaged during surgery)

Risks of any surgery are:

- Bleeding
- Infection
- Bad reactions to anesthesia



During your surgery, a tiny camera will take images of the inside of your body and project them onto a monitor. This helps your surgeons see the areas being worked on.

What to Expect Before Your Surgery

First Clinic Visit

When you see us in clinic before surgery, a resident doctor or fellow will ask about your medical history and do a brief physical exam. These doctors and your surgeon will look at the results of your tests and talk about your treatment. Your surgeon will then meet with you to talk about what treatment options are best for you.

Tests

You may have these tests before surgery:

- Barium swallow – to show images of your esophagus on X-ray (see page 5)
- Blood tests
- *Electrocardiogram* (ECG) – to measure your heart activity
- *Pulmonary function* tests – to measure the volume of air in your lungs when you breathe
- *Computed tomography* (CT) scan – an X-ray test that takes detailed pictures of your body
- *Endoscopy*– to look at the inside of your esophagus (see pages 4 and 5)
- *Positron emission tomography* (PET) scan – an X-ray test that will show any tumors (“hot spots”) in your cells

How to Prepare for Your Surgery

2 Weeks Before

- **Walk at least 1 mile every day** for 2 weeks before your surgery. This will help make your lungs strong and help prevent pneumonia.
- **Use the *incentive spirometer* every day before your surgery.** This is a device you breathe into to exercise your lungs. We will teach you how to use it at your clinic visit before your surgery. It is important for you to do this. Using the incentive spirometer will help prevent pneumonia and other problems.

To use the incentive spirometer, hold your mouth over the tube and inhale. Your breath will raise a small ball and exercise your lungs. Inhaling more deeply will make the ball stay up longer. Deep breaths exercise your lungs more than shallow breaths.

- You will visit our Pre-Anesthesia Clinic before your surgery. They will review your regular medicines with you and tell you what medicines you should or should not take the day of your surgery. If you are taking blood thinners (*anticoagulants*, such as Coumadin), aspirin, or Plavix, ask when you should stop these medicines before surgery.

1 Week Before

- For 1 week before your surgery, do **not** take aspirin, ibuprofen (Advil, Motrin) or naproxen (Aleve, Naprosyn) **unless** you are taking them for a specific medical condition. If you are unsure about whether or not to take these medicines, please call the clinic.

2 Days Before

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

The Day Before Surgery

- **Reminder Call:** A staff person 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 the call Friday afternoon.

The staff person will remind you:

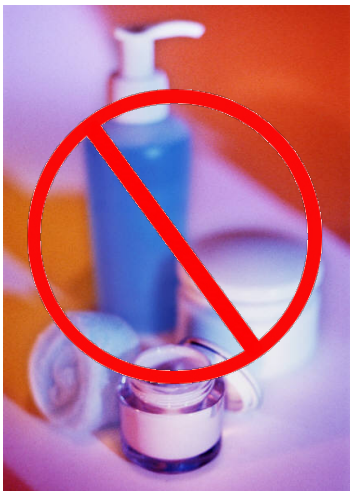
- When to arrive at the hospital
- Where to check in
- What medicines to take and not take on the day of your surgery
- **Fasting Guidelines:** Most patients are told **not** to eat or drink anything after midnight the night before your surgery. When the Pre-Anesthesia Clinic calls you the day before your surgery, they will tell you when to stop drinking fluids, based on the time of your 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 well from the neck down, especially around the area of your surgery.



Walk at least 1 mile every day for 2 weeks before your surgery. This will help make your lungs strong and help prevent pneumonia.

Day of Surgery

- Do **not** wear makeup, deodorant, lotions, hair products, or scents.
- Do **not** wear contact lenses. If needed, wear your glasses instead.
- Remove all jewelry and piercings.
- 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 time for traffic and the chance that operations scheduled before yours 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**
 - **Your insurance and pharmacy cards**
 - **Co-payments** for medicines
- If you have these items, also bring:
 - A copy of your **advance health care directive** and/or **durable power of attorney for healthcare**. We will add these to your medical record.
 - Your **CPAP machine**, if you use it for sleep apnea.



On the day of your surgery, do **not** put on makeup, deodorant, lotions, hair products, or fragrances.

Arriving at the Hospital

- You will check in and sign admission forms at your check-in location.
- Different members of your care team will ask you your name, date of birth, and what procedure you will be having done. We will ask these questions many times for your own safety.
- After you check into the hospital, you will be brought to the Pre-op holding area.
- We will cover you with a heating blanket to keep your body warm. Studies show that this will help reduce your risk of infection.
- You will have an *intravenous line* (IV) placed.
- You will receive an injection in your belly to prevent blood clots.
- You may have an epidural catheter placed in your back to help with pain control during and after the operation.

- When these steps are done and the operating room (OR) is ready, your anesthesia provider will take you to the OR.
- Once you are in the OR, we will give you *general anesthesia*. This medicine will make you sleep.

What to Expect After Surgery

In the Recovery Room or ICU

You will wake up in the recovery room or in the Intensive Care Unit (ICU). Some patients go straight to the ICU after surgery.

When you wake up, you may have some or all of these devices:

- A **breathing tube** and **ventilator**, until your doctor is sure that you can breathe on your own. You may need sedation if the breathing tube and ventilator need to stay in overnight. Less than 10% of patients (fewer than 10 out of 100) need to use the tube and ventilator overnight.
- An **epidural catheter**. Your anesthesia provider will place this small tube in your back before surgery. You will receive pain medicine through this catheter to numb the area where your incisions are made.
- A **nasal gastric** (NG) tube will be inserted through your nose into your stomach. This device keeps air out of your stomach. This helps keep you from throwing up, protects the new esophagus suture line and allows you to heal. This tube stays in place for 2 to 3 days.
- A **feeding tube** is placed into your intestines. This tube may be used to provide nutrition, if needed. It will stay in place for up to 6 weeks. It will be removed at a follow-up clinic visit.
- A **drain** in your neck, which is placed around the suture line where your esophagus was connected to the stomach. This drain is usually removed 5 to 6 days after surgery.
- **Chest tubes** are rarely used by our surgeons. These tubes remove blood that collects inside your body after surgery. They also re-inflate your lungs. If they are used, they will be placed through your skin on both sides of your chest.
- An **oxygen mask** over your face to give you extra oxygen. You will be switched to **nasal prongs** (oxygen under your nose) when your lungs are ready.



When you wake up after surgery, you may have an oxygen mask over your face to give you extra oxygen.

- **Inflatable leg wraps** called *sequential compression devices* (SCDs). These wraps squeeze your legs from time to time to improve blood flow. This helps keep blood clots from forming.
- A **urinary catheter** placed in your bladder. This allowed us to monitor your urine output during your surgery. It will stay in place for about 3 to 5 days so that we can monitor your urine output after surgery.

Pain Control

Nurses in the recovery room or ICU will monitor your pain level. They will give you medicine to make you comfortable.

Visitors

Your family may be able to visit you in the recovery room. This depends on your situation and the care needs of other patients in the recovery room.

Transfer to ICU

If you went to the recovery room after surgery, you will be transferred to an ICU about 2 hours later. You will spend your first night after surgery in the ICU. The ICU nurses will know what your recovery needs are.

Recovering in Your Hospital Room

The next morning, if your doctors feel that you are ready, you will be transferred to a regular room in the hospital.

Pain Control

Your nurses, anesthesiologist, and doctor will work with you to make sure your pain is under control. The medicine you receive through the epidural catheter will numb the area of your surgery. This will allow you to take deep breaths.

The epidural catheter will most likely be removed when you can start taking pain medicine by mouth. As you recover, your pain will lessen.

Medicines

All of your medicines will be crushed or in liquid form.

Preventing Pneumonia

After surgery, you must exercise your lungs so that you do not get pneumonia. You will be taught several ways to help clear secretions (mucus) from your lungs.



Your nurse will show you how to use the incentive spirometer to exercise your lungs.

- We will give you an **incentive spirometer** to help you exercise your lungs. Use this device the same way you did before surgery to avoid problems such as pneumonia. Use your incentive spirometer 10 times or more every hour that you are awake.
- **Coughing and deep breathing** will also clear secretions. To help ease any pain that may occur with coughing and deep breathing, we will teach you to hug a pillow across your incision. Splinting your incision will help decrease your pain.

Activity

It is important for you to get up and walk as soon as you can after 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. Do not wait to be asked if you need help.**

Family and Friends

Family and friends are very important to your recovery. Besides keeping you company, they can help keep you comfortable by 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 advise you to stay in the Seattle area for 5 to 7 days **after** you leave the hospital. This rest time will help your recovery. You will also be close by in case any problems develop.

Medicines

You cannot swallow whole pills for 4 weeks after your surgery.

You will go home with liquid medicines or pills that can be crushed. This includes your pain medicine and anti-nausea medicine.

Incision Care

Your incisions may have pieces of white tape (Steri-Strips) in place. These will fall off on their own in about a week.

Showering

- You may shower with the Steri-Strips in place. Just dab the tape with a towel when you dry off.
- Do **not** take a bath, sit in a hot tub, go swimming, or immerse your body in water for 4 weeks after your surgery.

Activity

- Do **not** lift anything over 10 pounds for 6 weeks after your surgery. (A gallon of water weighs almost 9 pounds.)
- Avoid activities that make you contract your belly 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, keep following the other restrictions listed under “Activity.”

Driving

Do **not** drive for at least 4 weeks after your surgery. Before you resume driving, you should:

- Be off all of your pain medicine a
- Be able to easily move and quickly apply brakes as needed

Diet and Nutrition

- About 5 days after surgery, most patients begin a clear liquid diet. When your doctor feels you are ready, you will progress to a soft diet.
- You will eat soft foods for 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 handout “Esophagectomy Diet” that your dietitian gave you before you left the hospital. Or, call your dietitian or your surgery team.

When to Call Your Surgeon

Call your surgeon if you have:

- A fever higher than 100.5°F (38°C)
- Shaking or chills
- Trouble swallowing food or liquids
- Nausea or vomiting that will not go away or is getting worse
- Belly or chest pain that is getting worse



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

- Any sign of infection in your incision:
 - Redness
 - Swelling
 - Drainage that smells bad

If you call:

- Weekdays between 8 a.m. and 4 p.m.: Call the Surgical Specialties Nurse Advice Line at **206.598-4477**.
- After hours and on weekends and holidays: Call **206.598.6190** and ask to page the resident on call for Surgery.

Follow-up Visits

Follow-up at 2 to 3 Weeks

You will need to come to the clinic for a follow-up visit 2 to 3 weeks after your surgery. 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 from the clinic, please ask your surgeon if you need to have this follow-up appointment.

Follow-up at 6 Months

You will need to come to the clinic again **6 months** after your surgery. This visit is important. Your doctors want to know if your surgery was a success and if you need any other treatment.

Please call our Patient Care Coordinator at 206.598.4547 to schedule your 6-month follow-up visit.

Questions?

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

Weekdays 8 a.m. to 4 p.m., call the Center for Esophageal and Gastric Surgery at 206.598.4477.

After hours and on weekends and holidays, call 206.598.6190 and ask to page the Resident on call for Surgery.