



What is Esophageal Cancer?

The esophagus is a hollow, muscular tube, about 10 inches long which connects the throat to the stomach. When a person swallows, the walls of the esophagus contract to push food down into the stomach. Esophageal cancer (also called esophagus cancer) begins when cells divide, unregulated by the normal processes that decide cell growth and death, and eventually form tumors.

Cancer of the esophagus begins in the inner layer of the esophageal wall and grows outward. If it spreads through the esophageal wall (called metastasis) it can invade lymph nodes, blood vessels in the chest, and other nearby organs. Esophageal cancer can also spread to the lungs, liver, stomach and other parts of the body.

There are two types of esophageal cancer:

- **Squamous cell carcinoma:** Squamous cell carcinomas arise in squamous cells that line the esophagus. These cancers usually develop in the upper and middle part of the esophagus.
- **Adenocarcinoma:** Adenocarcinomas begin in the glandular tissue in the lower part of the esophagus. Treatment is similar for both types.

As we well know, there are many kinds of cancer; unfortunately they all come about because of the out-of-control growth of abnormal cells.

Cancer of the esophagus is also called esophageal cancer. Each year, about 11,000 Americans find out they have cancer of the esophagus. Cancer can develop in any part of the esophagus. If the cancer spreads outside the esophagus, it usually shows up in nearby lymph nodes (sometimes called lymph glands). In many cases, the cancer also spreads to the windpipe, the large blood vessels in the chest, and other nearby organs. Esophageal cancer can also spread to the lungs, liver, stomach, and other parts of the body.

Cancer that spreads is the same disease and has the same name as the original (primary) cancer. When cancer of the esophagus spreads, it is called metastatic esophageal cancer.

What causes cancer of the esophagus?

Cancer of the esophagus is fairly common in some parts of the world. But in the United States, this disease accounts for only about 1 percent of all cancers.

The exact causes of cancer of the esophagus are not known. Researchers are trying to solve this problem. The more they can find out about what causes this disease, the better the chance of finding ways to prevent it.

Studies in the United States show that esophageal cancer is found mainly in people over age 55. It affects men about twice as often as women, and it is more common in black people than in white people. Why one person gets esophageal cancer and another doesn't cannot be explained.

It is established that no one can "catch" esophageal cancer from another person. Cancer is not contagious.

Also, it is known that certain risk factors increase a person's chance of getting esophageal cancer. In the United States, smoking and excessive use of alcohol are the major risk factors for this disease. Heavy users of both alcohol and tobacco are much more likely to develop esophageal cancer than are people who do not drink or smoke.

Cutting down on the use of alcohol reduces the chance of getting esophageal cancer, as well as cancers of the mouth, throat, and larynx. By not smoking, people can lower their risk of cancers of the esophagus, lung, mouth, throat, larynx, bladder, and pancreas. Also, it is very important to know that people who develop cancer due to smoking are at risk of getting a second cancer. Most doctors urge esophageal cancer patients to stop smoking to cut down the risk of a new cancer and to reduce other problems, such as coughing.

The risk of cancer of the esophagus is also increased by long-term irritation of esophageal tissues. Tissue at the bottom of the esophagus can become irritated if the contents of the stomach frequently "back up" into the esophagus, a problem known as reflux. When cells in the irritated part of the esophagus change and begin to resemble the cells that line the stomach, doctors call this condition Barrett's esophagus. In some cases, Barrett's esophagus leads to esophageal cancer.

Other kinds of irritation or damage to the lining of the esophagus can also increase the risk of cancer. For example, people who have swallowed lye or other caustic substances have a higher-than-average risk because these substances damage esophageal tissue.

Poor nutrition is another factor that can increase a person's risk of esophageal cancer. Scientists are not sure exactly how diet changes the risk of developing this disease, but they think that it is important to have a well-balanced diet that includes generous amounts of fruits and vegetables.

Often, patients with esophageal cancer have no clear risk factors. In most cases, the disease is probably the result of several factors (known or unknown) acting together.

People who think they might be at increased risk for cancer of the esophagus should discuss this concern with their doctor. The doctor may be able to suggest ways to reduce the risk and can suggest an appropriate schedule of checkups.

Healthy Cells vs. Cancer Cells

Healthy cells are like a cat. They need structure to determine the size of bones and shape of the body, tail and whiskers. The DNA in genes and chromosomes determine this. They need energy to play and prowl and sustain life. This is derived from chemicals in food. Cats need a system to deliver chemicals (food nutrients like amino acids, carbohydrates, fats, vitamins and minerals) to all parts of their body. These are the blood vessels. Growth factors take a kitten into a lazy old cat, all the while helping it to function normally.

The body and its cells are mostly made up of protein. The building blocks of proteins are substances called amino acids that in the form of enzymes and hormones literally control every chemical reaction within the cells. When these are modified, different messages are sent to a complex control system that can alter their function. There are twenty different kinds of amino acids that are essential to life. Twelve of these can be synthesized within the body however; eight must be supplied by the daily diet.

Structure	
Normal Cells	Cancer Cells
DNA in genes and chromosomes go about their business in a normal way.	Cancer cells develop a different DNA or gene structure or acquire abnormal numbers of chromosomes.
Cells divide in an orderly way to produce more cells only when the body needs them.	Cells continue to be created without control or order. If not needed, a mass of tissue is formed which is called a tumor.
Energy	
Normal Cells	Cancer Cells
Cells derive 70% of their energy from a system called the "Krebs Cycle."	Cells have a defective "Krebs Cycle" and derive little or no energy from it.
Cells derive only 20% of their energy from a system called "Glycolysis."	Cancer cells derive almost all their energy from "Glycolysis."
Cells derive most of their energy with the use of oxygen.	Cells derive most of their energy in the absence of oxygen.
Blood Vessels	
Normal Cells	Cancer Cells
Cells have a built-in blood vessel system.	Cells do not have a built-in blood vessel system. They require more of certain amino acids to grow.
Growth Factors	
Normal Cells	Cancer Cells
While similar to cancer cells, the amount of them is more in balance to produce a more normal level of activity.	These cells have over produced, require more chemicals (food) and are over active.
Functions	
Normal Cells	Cancer Cells
The enzymes and hormones go about business in a normal balanced manner.	The enzymes and hormones are either over active or under active.
Tumors are Different	
Benign	Malignant

Benign tumors are not cancerous. They do not invade nearby tissues nor spread to other parts of the body. They can be removed and are not a threat to life.	Malignant tumors are cancerous. They can invade and damage nearby tissues and organs and they can break away and enter the blood stream to form new tumors in other parts of the body. The spread of cancer is called metastasis.
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What are symptoms of cancer of the esophagus?

Very small tumors in the esophagus usually do not cause symptoms. As the tumor grows, the most common symptom is difficulty in swallowing. The person may have a feeling of fullness, pressure, or burning as food goes down the esophagus. Also, it may feel as if food gets stuck behind the breastbone. Problems with swallowing may come and go. At first, they may be noticed mainly when the person eats meat, bread, or coarse foods, such as raw vegetables. As the tumor grows larger and the pathway to the stomach becomes narrower, other foods, even liquids, can be hard to swallow, and swallowing may be painful. Cancer of the esophagus can also cause indigestion, heartburn, vomiting, and frequent choking on food. Because of these problems, weight loss is common.

Sometimes a tumor in the esophagus causes coughing and hoarseness. It can also cause pain behind the breastbone or in the throat.

Any of these symptoms may be caused by cancer or by other, less serious health problems. People with symptoms like these often see a gastroenterologist, a doctor who specializes in diseases of the digestive tract.

Tests used to Detect Esophageal Cancer

The process used to find out if cancer cells have spread within the esophagus or to other parts of the body is called staging. The information gathered from the staging process determines the stage of the disease. It is important to know the stage in order to plan treatment. The following tests and procedures may be used in the staging process:

- **Bronchoscopy:** A procedure to look inside the trachea and large airways in the lung for abnormal areas. A bronchoscope (a thin, lighted tube) is inserted through the nose or mouth into the trachea and lungs. Tissue samples may be taken for biopsy.
- **Chest x-ray:** An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.
- **Laryngoscopy:** A procedure in which the doctor examines the larynx (voice box) with a mirror or with a laryngoscope (a thin, lighted tube).
- **CT scan (CAT scan):** A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. The pictures are made by a computer linked to an x-ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This test is also called computed tomography, computerized tomography, or computerized axial tomography.

- **Endoscopic ultrasound (EUS):** A procedure in which an endoscope (a thin, lighted tube) is inserted into the body. The endoscope is used to bounce high-energy sound waves (ultrasound) off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram. This procedure is also called endosonography.
- **Thoracoscopy:** A surgical procedure to look at the organs inside the chest to check for abnormal areas. An incision (cut) is made between two ribs and a thoracoscope (a thin, lighted tube) is inserted into the chest. Tissue samples and lymph nodes may be removed for biopsy. In some cases, this procedure may be used to remove portions of the esophagus or lung.
- **Laparoscopy:** A surgical procedure to look at the organs inside the abdomen to check for signs of disease. Small incisions (cuts) are made in the wall of the abdomen, and a laparoscope (a thin, lighted tube) is inserted into one of the incisions. Other instruments may be inserted through the same or other incisions to perform procedures such as removing organs or taking tissue samples for biopsy.
- **PET scan (positron emission tomography scan):** A procedure to find malignant tumor cells in the body. A small amount of radionuclide glucose (sugar) is injected into a vein. The PET scanner rotates around the body and makes a picture of where glucose is being used in the body. Malignant tumor cells show up brighter in the picture because they are more active and take up more glucose than normal cells. The use of PET for staging esophageal cancer is being studied in clinical trials.

How is Cancer of the Esophagus Diagnosed?

To find the cause of any of these symptoms, the doctor asks about the patient's personal and family medical history and does a complete physical exam. In addition to checking general signs of health, the doctor usually orders x-rays and other tests.

An esophagram (also called a barium swallow) is a series of x-rays of the esophagus. To prepare for this test, the patient drinks a barium solution. The barium, which shows up on x-rays, coats the inside of the esophagus. The esophagram shows changes in the shape of the esophagus. The doctor can also use a special x-ray machine called a fluoroscope to watch the barium move down the esophagus to the stomach as the patient swallows.

Most patients also have a test called esophagoscopy. For this procedure, the patient's throat is sprayed with a local anesthetic to reduce discomfort and gagging. The doctor then passes a thin, flexible, lighted instrument called an endoscope through the mouth and down the throat into the esophagus. The scope lets the doctor see the lining of the esophagus and the place where the esophagus joins the stomach. If an abnormal area is found, the doctor does a biopsy (removal of a small amount of tissue through the endoscopy). Also, cells can be brushed or washed from the walls of the esophagus through the scope. A pathologist examines the samples under a microscope to see whether cancer is present.

If cancer is found, the pathologist can tell what type of cancer it is. Cancer that occurs in the middle or upper part of the esophagus is usually squamous cell carcinoma. When cancer develops at the lower end of the esophagus, near the stomach, it is usually

adenocarcinoma. (Carcinoma is another name for cancer in the lining of tissues.)

If the pathologist finds esophageal cancer, the patient's doctor needs to know the stage, or extent, of the disease. Staging is a careful attempt to find out what parts of the body are affected by the cancer.

Treatment decisions depend on these findings. Staging usually involves a physical exam, with special attention to the neck and chest, blood tests, additional x-rays, and other tests. The results show whether the cancer is just in the esophagus or has spread.

The doctor usually order CT (or CAT) scans of the chest and upper abdomen. During a CT scan, many x-rays are taken and a computer combines them to create detailed pictures. Some patients also have an MRI scan, which produces pictures using a huge magnet linked to a computer.

The doctor uses special instruments to check the organs near the esophagus. For example, the doctor can look through a laryngoscope to see whether the cancer has spread to the larynx (voice box). A bronchoscope lets the doctor see into the trachea and bronchi (airways that lead into the lungs).

If lymph nodes near the esophagus are enlarged, the surgeon may perform a biopsy to find out whether they contain cancer cells. Sometimes, the surgeon also removes samples of other tissues in the area to see whether the cancer has spread.

How is cancer of the esophagus treated?

Treatment for esophageal cancer depends on a number of factors. Among these are the exact location, size, and extent of the tumor, and the type of cancer cells. The doctor also considers the person's age and general health to develop a treatment plan to fit each person's needs.

The patient's doctor may want to discuss the case with other doctors who treat cancer of the esophagus. Also, the patient may want to talk with the doctor about taking part in a research study of new treatment methods. Such studies, called clinical trials, are designed to improve cancer treatment.

Many patients want to learn all they can about their disease and their treatment choices so they can take an active part in decisions about their medical care. People with cancer have many questions and concerns about their health. The doctor is the best one to answer them. Most patients want to know the extent of their cancer, how it will be treated, how successful the treatment is likely to be, and how much it will cost.

Many people find it helpful to make a list of questions before they see the doctor. Taking notes can make it easier to remember what the doctor says. Some patients also find that it helps to have a family member or friend with them when they talk to the doctor, either to take part in the discussion or just to listen.

There is a lot to learn about cancer and its treatment. Patients should not feel that they need to understand everything the first time they hear it. They will have many chances to ask the doctor to explain things that are not clear.

The Following Stages are Used for Esophageal Cancer:

Stage 0 (Carcinoma in Situ)

In stage 0, cancer is found only in the innermost layer of cells lining the esophagus. Stage 0 is also called carcinoma in situ.

Stage I

In stage I, cancer has spread beyond the innermost layer of cells to the next layer of tissue in the wall of the esophagus.

Stage II

Stage II esophageal cancer is divided into stage IIA and stage IIB, depending on where the cancer has spread.

- Stage IIA: Cancer has spread to the layer of esophageal muscle or to the outer wall of the esophagus.
- Stage IIB: Cancer may have spread to any of the first three layers of the esophagus and to nearby lymph nodes.

Stage III

In stage III, cancer has spread to the outer wall of the esophagus and may have spread to tissues or lymph nodes near the esophagus.

Stage IV

Stage IV esophageal cancer is divided into stage IVA and stage IVB, depending on where the cancer has spread.

- Stage IVA: Cancer has spread to nearby or distant lymph nodes.
- Stage IVB: Cancer has spread to distant lymph nodes and/or organs in other parts of the body.

Stage 0 Esophageal Cancer (Carcinoma in Situ)

Treatment of stage 0 esophageal cancer (carcinoma in situ) is usually surgery.

Stage I Esophageal Cancer

Treatment of stage I esophageal cancer may include the following:

- Surgery.
- Clinical trials of chemotherapy plus radiation therapy, with or without surgery.
- Clinical trials of new therapies used before or after surgery.

This summary section refers to specific treatments under study in clinical trials, but it may not mention every new treatment being studied.

Stage II Esophageal Cancer

Treatment of stage II esophageal cancer may include the following:

- Surgery.
- Clinical trials of chemotherapy plus radiation therapy, with or without surgery.
- Clinical trials of new therapies used before or after surgery.

This summary section refers to specific treatments under study in clinical trials, but it may not mention every new treatment being studied.

Stage III Esophageal Cancer

Treatment of stage III esophageal cancer may include the following:

- Surgery.
- Clinical trials of chemotherapy plus radiation therapy, with or without surgery.
- Clinical trials of new therapies used before or after surgery.

This summary section refers to specific treatments under study in clinical trials, but it may not mention every new treatment being studied.

Stage IV Esophageal Cancer

Treatment of stage IV esophageal cancer may include the following:

- External or internal radiation therapy as palliative therapy to relieve symptoms and improve quality of life.
- Laser surgery or electrocoagulation as palliative therapy to relieve symptoms and improve quality of life.
- Chemotherapy.
- Clinical trials of chemotherapy.

Treatment Methods

Cancer of the esophagus usually cannot be cured unless it is found in the earliest stages, before it has begun to spread. Unfortunately, early esophageal cancer causes few symptoms, and the disease is usually advanced when the diagnosis is made. However, advanced esophageal cancer can be treated and symptoms can be relieved.

Esophageal cancer is usually treated with surgery, radiation therapy (also called radiotherapy), or chemotherapy. The doctor may use just one treatment method or combine them, depending on the patient's needs.

In some cases, the patient is referred to doctors who specialize in different kinds of cancer treatment. Often, specialists work together as a team to plan and carry out the patient's care. The medical team may include a gastroenterologist, surgeon, oncologist (cancer specialist), radiation oncologist, nurse, dietitian, and social worker.

Surgery is often part of the treatment plan. Many patients with esophageal cancer have an operation called esophagectomy. Generally, the surgeon removes the tumor along with a portion of the esophagus, nearby lymph nodes, and other tissue in the area. Usually, it is possible to connect the stomach to the remaining part of the esophagus. In a few cases, the surgeon forms a new passageway from the throat to the stomach, using tissue from another part of the digestive tract (such as the colon) to replace the esophagus.

If a tumor blocks the esophagus but cannot be removed, the surgeon may be able to create a bypass, a new pathway to the stomach. In some cases, the surgeon can dilate (widen) the esophagus. This procedure may have to be repeated as the tumor grows. Sometimes, the doctor puts a tube into the esophagus to keep it open. Recently, some surgeons have used a laser to destroy cancerous tissue and relieve blockages.

Radiation therapy is the use of high-energy rays to damage cancer cells and stop them from growing. Like surgery, radiation therapy is local therapy; it affects cells only in the treated area. Radiation therapy can be used to shrink a tumor before surgery or to destroy cancer cells that may remain in the area after surgery. Radiation may also be used instead of surgery, especially if the size or location of the tumor would make an operation difficult. In some cases, radiation therapy is recommended for patients who cannot have surgery for other health reasons. Even if the tumor cannot be removed by surgery or destroyed entirely by radiation therapy, radiation therapy can still help relieve pain and make swallowing easier.

In radiation therapy for esophageal cancer, the energy usually comes from a machine outside the body (external radiation). Some patients also need treatment with radioactive materials placed in the tumor (implant radiation). Usually, patients receive external radiation therapy 5 days a week for several weeks. Most patients can stay at home and go to the hospital or clinic each day for this treatment. For implant radiation, patients must stay in the hospital for a short time. More information about radiation therapy can be found in the National Cancer Institute booklet *Radiation Therapy and You*.

Chemotherapy is the use of drugs to kill cancer cells. The doctor may suggest one drug or a combination of drugs. Chemotherapy may be used alone or combined with radiation therapy to shrink a tumor before surgery or to destroy cancer cells that remain in the body after surgery. Chemotherapy may also be used if surgery is not possible and for patients whose cancer returns after surgery or radiation therapy.

Most anticancer drugs for esophageal cancer are given by injection into a vein or muscle. Some may be taken by mouth. Chemotherapy is systemic therapy, meaning that the drugs travel through the bloodstream and can reach cancer cells all over the body. Often, the drugs are given in cycles: a treatment period followed by a rest period, then another treatment and rest period, and so on. Many patients have their chemotherapy as outpatients at the hospital, in the doctor's office, or at home. Depending on the drugs, the treatment plan, and the patient's general health, a hospital stay may be needed.

The most common signs of esophageal cancer are painful or difficult swallowing and weight loss.

These and other symptoms may be caused by esophageal cancer or by other conditions. A doctor should be consulted if any of the following problems occur:

- Painful or difficult swallowing.
- Weight loss.
- Pain behind the breastbone.
- Hoarseness and cough.
- Indigestion and heartburn.

Tests Used to Detect and Diagnose Esophageal Cancer.

The following tests and procedures may be used:

- **Chest x-ray:** An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.
- **Barium swallow:** A series of x-rays of the esophagus and stomach. The patient drinks a liquid that contains barium (a silver-white metallic compound). The liquid coats the esophagus and x-rays are taken. This procedure is also called an upper GI series.
- **Esophagoscopy:** A procedure to look inside the esophagus to check for abnormal areas. An esophagoscope (a thin, lighted tube) is inserted through the mouth or nose and down the throat into the esophagus. Tissue samples may be taken for biopsy.
- **Biopsy:** The removal of cells or tissues so they can be viewed under a microscope to check for signs of cancer. The biopsy is usually done during an esophagoscopy. Sometimes a biopsy shows changes in the esophagus that are not cancer but may lead to cancer.

Factors Affecting Prognosis and Treatment Options.

The prognosis (chance of recovery) and treatment options depend on the following:

- The stage of the cancer (whether it affects part of the esophagus, involves the whole esophagus, or has spread to other places in the body).
- The size of the tumor.
- The patient's general health.

When esophageal cancer is found very early, there is a better chance of recovery. Esophageal cancer is often in an advanced stage when it is diagnosed. At later stages, esophageal cancer can be treated but rarely can be cured. Taking part in one of the clinical trials being done to improve treatment should be considered. Information about ongoing clinical trials is available

What are the side effects of treatment for cancer of the esophagus?

The methods used to treat cancer are very powerful. It is hard to limit the effects of therapy so that only cancer cells are removed or destroyed. Because healthy cells also

may be damaged, treatment often causes unpleasant side effects.

The side effects of cancer treatment vary. They depend mainly on the type and extent of the treatment. Also, each person reacts differently. Attempts are made to plan the therapy to keep side effects to a minimum. Patients are carefully monitored so that any problems which occur can be addressed.

Surgery for cancer of the esophagus is a major operation. Patients who have had trouble eating and drinking may need intravenous (IV) feedings and fluids for several days before and after the operation. They may need antibiotics to prevent or treat infections. Patients are taught special coughing and breathing exercises to keep their lungs clear. Discomfort or pain after surgery can be controlled with medicine. Patients should feel free to discuss pain relief with the doctor.

Patients receiving radiation therapy may become tired as treatment continues. Resting as much as possible is important. It is also common for the skin in the treated area to become red or dry. The skin should be exposed to the air but protected from the sun, and the patients should avoid wearing clothes that rub the area. Good skin care is important at this time. The doctor may suggest certain kinds of soap, and patients should not use any lotion or cream on the skin without the doctor's advice. Radiation to the chest and neck can cause a dry, sore throat or a dry cough. Drinking extra liquids can be helpful, and doctors sometimes suggest cough medicine. If burning, tightness, or other pain makes it hard to swallow, the doctor may suggest a local anesthetic or soothing gargle for use before meals. Some patients find that antacids help relieve feelings of indigestion. A small number of patients feel short of breath during radiation therapy. The doctor may prescribe medicine to relieve this problem.

The side effects of chemotherapy depend on the drugs that are given. In general, anticancer drugs affect cells that divide rapidly. These include blood cells, which fight infection, cause the blood to clot, or carry oxygen to all parts of the body. When blood cells are affected by anticancer drugs, patients can have a lowered resistance to infection, bruise or bleed easily, and have less energy. Cells in hair follicles and cells that line the digestive tract also divide rapidly. Chemotherapy can therefore cause hair loss and other problems such as poor appetite, mouth sores, nausea, and vomiting. These side effects usually go away gradually after treatment stops.

The patient's weight is checked regularly because weight loss can be a serious problem for patients with cancer of the esophagus. Swallowing food can be difficult, and patients may not feel hungry if they are uncomfortable or tired. Yet, well-nourished patients generally feel better, have more energy, and are often better able to withstand the side effects of their treatment, so good nutrition is important. Patients with esophageal cancer are usually encouraged to have several small meals and snacks throughout the day, rather than to try to eat three large meals. It often helps to sit up for a while after eating, and the doctor may prescribe medicine to control nausea and vomiting and to relieve discomfort.

When swallowing is difficult, many patients can still manage soft, bland foods moistened with sauces or gravies. It can be helpful to prepare other foods in a blender. In addition, puddings, ice cream, and soups are nourishing and easy to swallow. Doctors, nurses, and dietitians may have other suggestions to help patients and their families choose foods that supply enough calories to control weight loss and enough protein to keep up

strength and rebuild normal tissues. For example, they may suggest liquid dietary supplements or milkshakes made with extra protein powder or dry milk for patients who cannot swallow solid foods.

The health care team can explain the effects of esophageal cancer and its treatment, and they can suggest ways to deal with them.

Source: A.P. John Institute for Cancer Research

When considering any type of complementary cancer treatment or alternative cancer treatment, always consult with your physician first, as possible interactions could reduce your treatment protocol's efficacy.