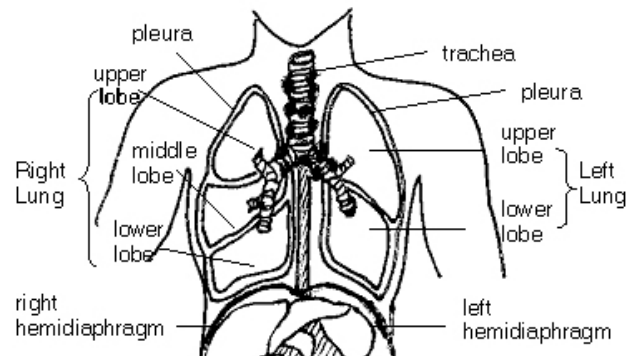


## Malignant Pleural Mesothelioma

### What is malignant pleural mesothelioma?

Malignant pleural mesothelioma is a rare cancer that affects the pleura of the lungs. The pleura is made up of two thin layers of membrane that surround the entire surface of the lung including the areas between the lobes. Cancer that starts in the pleura can spread to other parts of the body.

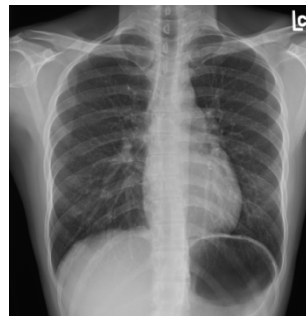


Basic Lung and Pleural Anatomy

### What are the symptoms of malignant pleural mesothelioma?

In patients with malignant pleural mesothelioma fluid builds up in the space between the two layers of membrane, causing the lung to collapse. Symptoms include:

- Shortness of breath
- Decreased energy/increased tiredness
- Decreased appetite
- Night sweats
- Pain anywhere along the rib cage, back, shoulder or upper abdomen



Normal Chest X-ray



Chest X-ray of a Mesothelioma Patient

### Who is at risk for malignant pleural mesothelioma?

People who have been exposed to asbestos are at greater risk for developing mesothelioma. In fact, 50 to 80 percent of mesothelioma patients say they had been exposed to asbestos.

Asbestos is the name of a group of minerals that can be separated into thin threads and woven together. Asbestos has been widely used in many industrial products, including cement, roof shingles, textiles and insulation. It is also used in the mining, milling, heating and construction industries. When tiny particles of asbestos float in the air, especially during the manufacturing process, they may be inhaled and swallowed. This can lead to serious health conditions in addition to mesothelioma, such as increasing the risk of cancers of the lung, larynx and kidney, as well as causing asbestosis (a noncancerous, chronic lung ailment).

It may take as long as 20 to 40 years after exposure to asbestos for symptoms of mesothelioma to develop.

Family members and others living with asbestos workers may also have an increased risk of developing mesothelioma. This is from asbestos dust coming home on the clothing and hair of the worker.

Smoking does not appear to increase the risk of mesothelioma. However, smoking plus asbestos exposure greatly increases a person's risk of developing cancer in the lung's airways.

Some people who develop mesothelioma say they do not recall being exposed to asbestos. Experts believe there may be a link between mesothelioma and a particular virus that accidentally got into some polio vaccines between 1955 and 1963.

## **How is malignant pleural mesothelioma diagnosed?**

Because the symptoms of malignant pleural mesothelioma are similar to those of many other health conditions, the disease can be difficult to diagnose. Diagnosis may include a:

- Review of your medical history, including any asbestos exposure
- Complete medical exam, including chest x-rays and lung function tests
- CT scan (a series of detailed pictures of areas inside the body, taken from different angles) or MRI (a procedure that uses radio waves and a powerful magnet linked to a computer to create detailed images)
- Needle biopsy or drainage of pleural fluid for analysis
- Surgical biopsy (the surgical removal of tissue for examination under a microscope)

## What is staging?

The word “staging” describes the extent of the cancer. When the stage of your cancer is known, your doctor can plan your treatment. The staging system for mesothelioma is likely to be revised over the next few years, but the staging system that is currently favored, was developed by the International Mesothelioma Interest Group (IMIG) in 1995.

## How is malignant pleural mesothelioma treated?

Treatment for malignant pleural mesothelioma may include surgery, radiation therapy and chemotherapy. Sometimes these treatments are combined.

The choice of treatment depends on the location and stage of the cancer and the age and general health of the patient. However, most patients who have been cancer-free for a long time had surgery as part of their treatment.

If the cancer is found in a larger part of the pleura but has not spread outside the chest cavity, Baptist MD Anderson Cancer Center offers a surgical procedure called an **extrapleural pneumonectomy (or pleuropneumonectomy)**.

In an extrapleural pneumonectomy, the entire lung, pleura, diaphragm and part of the lining around the heart on the side of the cancer are removed. The diaphragm and heart lining are reconstructed.

### Before Surgery

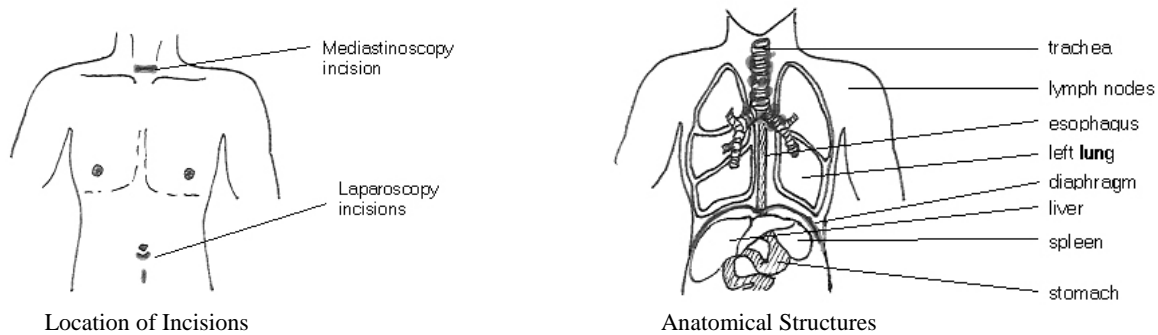
Before an extrapleural pneumonectomy is done, you will undergo a number of pre-operative tests (see chart below). This will give your surgeon information about your general health and show the size, location, and extent of the tumor. The testing process can seem long, but it is necessary so your surgeon can make the best decisions for you.

<b>Pulmonary Function Test</b>	This test measures the amount of air moving into and out of the lungs. It measures breathing and the ability to get oxygen into the blood. The test consists of various breathing exercises and blood tests.
<b>Xenon Regional Lung Study</b>	A xenon test will show how well air (ventilation) and blood (perfusion) are distributed in each of your lungs. Test results will help the doctor decide how your lungs may tolerate surgery, drugs, or other procedures.
<b>Electrocardiogram (ECG or EKG)</b>	This test tells the doctor about the size of the heart, its ability to pace itself (beat regularly), and if you have ever had a heart attack.
<b>Echocardiogram</b>	This is an ultrasound of the heart that provides information about the health of the heart valves and certain blood vessels.

<b>Cardiac Nuclear Stress Test</b>	This test shows how well blood flows to your heart and if you have any blockages in your arteries. If this test indicates a problem, you will have a cardiac catheterization to measure how severe the blockage is.
<b>Consultation with a Cardiologist</b>	A heart specialist (cardiologist) can help determine your general health and risk for a major operation.
<b>Chest x-ray</b>	An x-ray of the structures inside the chest is taken. It provides information about the pleura, lungs, heart and ribcage.
<b>Computerized Tomography (CT) Scan of the Chest</b>	A CT scan of the chest provides detailed information about the size, location and extent of the tumor; the size and location of nearby lymph nodes, and anything unusual about the lungs.
<b>Positron Emission Tomography (PET) Scan</b>	A PET scan helps find if cancer cells have spread to other parts of your body. During a PET scan, a small amount of radioactive glucose (sugar) is injected into a vein, and a scanner is used to take detailed pictures, showing where cancer cells are.

If the results from the above tests are favorable, the next step is to determine whether the tumor has spread to the lymph nodes in the chest or grown through the diaphragm and into the abdomen. This is accomplished by doing 3 separate outpatient surgical procedures.

<b>Bronchoscopy</b>	A flexible telescope is inserted through your mouth and into your airway.
<b>Laparoscopy</b>	If your airway appears normal, the surgeon will insert a small, flexible telescope through incisions (surgical cuts) made above your navel to inspect the entire abdomen. Biopsies will be taken of anything that appears unusual and will be sent to pathology. A small amount of sterile water will be placed into your abdomen, swirled around, recollected and examined for cancer cells. If cancer cells are found, surgery will not be a treatment option. If the tumor has grown below the diaphragm, a mediastinoscopy will not be performed.
<b>Mediastinoscopy</b>	This procedure involves inserting both a telescope and operating instruments through incisions made just above where your breastbone and collarbones meet. This allows the surgeon to biopsy lymph nodes located around the windpipe. If cancer is found in the lymph nodes on the side opposite from where the tumor is, surgery will not be a treatment option.



The pathology results from these procedures will be available within three to five business days. If the results show no evidence that the tumor has spread to the lymph nodes in the middle of the chest or grown through the diaphragm and into the abdomen, then plans will be made to go ahead with the extrapleural pneumonectomy.

If you are scheduled for an extrapleural pneumonectomy, you will begin taking antibiotics 5 days before the surgery. This is meant to reduce your risk of pneumonia afterward. You will also have a pre-surgery visit, including a physical exam and a meeting with the anesthesiologist.

Patients who will undergo an extrapleural pneumonectomy must not have smoked for at least one month. Smoking may cause post-surgery pneumonia.

### **During Surgery**

During the extrapleural pneumonectomy, the surgeon will plan to remove the entire lung, pleura, diaphragm and lining of the heart on the diseased side. One or more ribs may also need to be removed. The diaphragm on the side of the tumor will be reconstructed with an artificial waterproof material; the lining around heart on the side of the tumor will be reconstructed using a mesh material. Your body will eventually absorb the mesh and create a fibrous layer in its place.

The operation generally takes 4-1/2 to 8 hours.

There is always the possibility that your surgeon will not be able to complete the operation. For example, this may happen if there are too many areas of the ribcage involved with the tumor. The tumor then cannot be safely removed and the operation will not continue.

### **After Your Surgery**

When you wake, you will notice a number of tubes and wires attached to your body. Many machines will be keeping track of your vital signs (heart rate, blood pressure, etc.). You will have:

- A chest tube in the lower rib cage to drain fluid and detect excessive bleeding or unusual air leakage
- A catheter (flexible tube inserted in your body) to collect your urine

- A catheter in your spine for pain relief. The catheter will be connected to a pump that will deliver pain medicines steadily; by touching a button, you will be able to give yourself an extra dose of medicine if necessary.
- An IV to give you fluid and medicine through a vein.
- A small catheter in the artery of your wrist. Blood drawn from this catheter provides a measurement of how much oxygen and carbon dioxide are in your blood.
- Tubing underneath your nose or a mask over your nose and mouth for extra oxygen.

Your heart rate, blood pressure and the oxygen level in your blood will also be monitored. You will have compression devices around your lower legs to prevent blood clots.

Recovery is a long process. In fact, the average hospital stay is about 2 weeks. You will be in the Surgical Intensive Care Unit for the first several days, then you will be moved to a regular inpatient hospital room on the thoracic floor, Purple 7.

Common problems after surgery include infection at the wound site (where you were cut), a mild case of pneumonia, irregular heartbeat, problems with bowel movements, and retaining fluids. Most of these problems get better with medicine after a few days. A small number of patients can have life-threatening complications such as acute respiratory distress syndrome (a serious pneumonia), heart attack or stroke.

### **Chemotherapy**

Over the years, there have been many chemotherapy trials (research studies that evaluate the effectiveness of single or combination chemotherapy drug treatments) for mesothelioma. Very few drugs, however, have shown promising results. Using chemotherapy drugs in combination with one another has had better results than using single chemotherapy drugs alone. For example, the combination of cisplatin and pemetrexed (Alimta<sup>®</sup>) has shown some encouraging results in the most current literature and is available at Baptist MD Anderson Cancer Center.

### **What kind of follow-up care should I expect?**

Follow-up care after treatment is important for making sure that any changes are found. This way, if your cancer returns or spreads, or if a new cancer develops, it can be treated as soon as possible. You will have follow-up visits with your surgical and radiation teams every 3 months for the first 2 years, then every 6 months for 2 more years. After that, you will have annual appointments. Follow-up visits may include physical exams, chest x-rays or lab tests. Be sure to tell your doctor or nurse about any health problems as soon as they occur.