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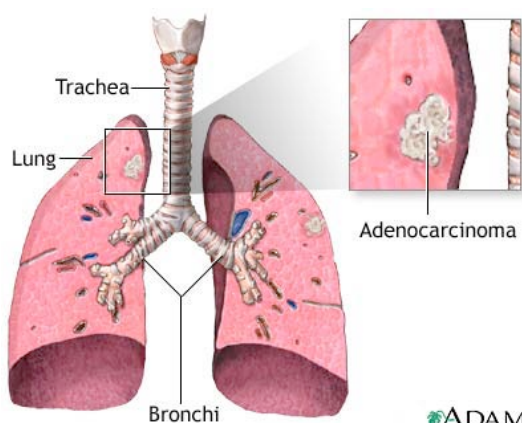
General, Thoracic  
Vascular, Cancer  
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### Lung Cancer

#### What is cancer of the lung?



Cancer of the lung, like all cancers, results from an abnormality in the body's basic unit of life, the cell. Normally, the body maintains a system of checks and balances on cell growth so that cells divide to produce new cells only when needed. Disruption of this system of checks and balances on cell growth results in an uncontrolled division and proliferation of cells that eventually forms a mass known as a tumor.

Tumors can be **benign or malignant**. When we speak of "cancer," we refer to those tumors that are considered malignant. Benign tumors can usually be removed and do not spread to other parts of the body. Malignant tumors, on the other hand, grow aggressively and can invade other tissues of the body, allowing entry of tumor cells into the bloodstream or lymphatic system which spread the tumor to other sites in the body. This process of spread is termed **metastasis**. Since lung cancer tends to spread, or metastasize, very early in its course, it is a very life-threatening cancer and one of the most difficult cancers to treat.

#### What causes lung cancer?

**Smoking** is by far the primary risk factor for lung cancer. Ninety percent of lung cancers arise as a result of tobacco use. The risk of lung cancer increases with the number of cigarettes smoked over time. Among those who smoke two or more packs of cigarettes per day, one in seven will die of lung cancer. Certain people may have a genetic predisposition to cancer. Even if you do not smoke, you may be exposed to smoke through your environment. Several workplace substances have also been associated with an increased risk for lung cancer, including arsenic, asbestos, beryllium, silica, radon, etc. Also, patients who do not have normal lungs but have COPD are at increased risk of developing lung cancer.

#### What is staging of lung cancer?

The stage of a tumor **refers to the extent to which a cancer has spread in the body**. Staging involves both evaluation of a tumor's **size** as well as the presence or absence of **metastases** in

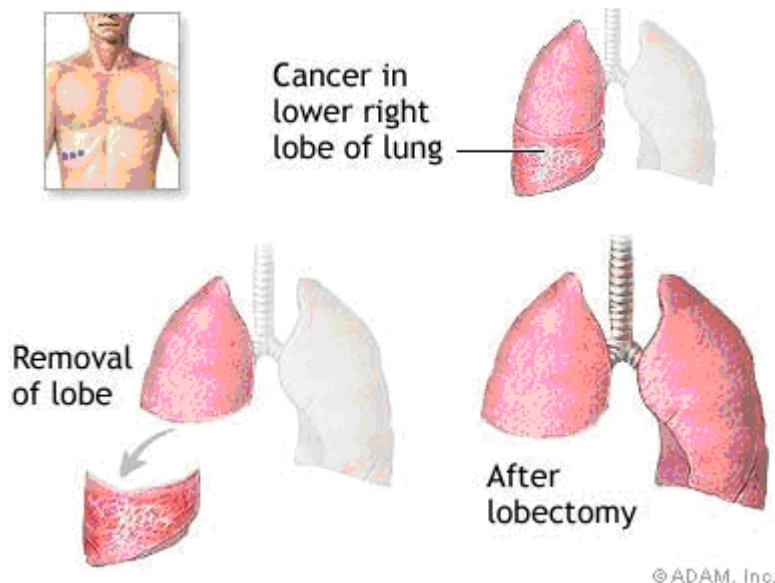
the lymph nodes or in other organs. Staging is important for determining how a particular tumor should be treated, since lung cancer therapies are geared toward specific tumor stages. Staging of a tumor is also critical in estimating the prognosis of a given patient, with higher-stage tumors generally having a worse prognosis than lower-stage tumors. Doctors may use several tests to accurately stage a lung cancer, including laboratory (blood chemistry) tests, x-rays, CT scans, PET scans, bone scans, and MRI scans. Lung cancers are assigned a stage from I to IV in order of severity. Ultimately, surgery may change or confirm staging results depending on operative findings and microscopic examination of the tumor and lymph nodes after they are removed.

## How is lung cancer treated?

Treatment for lung cancer can involve **surgical removal** of tumor, chemotherapy, or radiation therapy, as well as combinations of these methods. The decision about which treatments will be appropriate for a given individual must take into account the localization and extent of the tumor as well as the overall health status of the patient. Surgery represents the best chance of curing lung cancer; however, most patients with lung cancer are not considered surgical candidates because the tumor has spread outside the confines of surgical resection at the time of diagnosis. For those with lung cancer confined to the lung, surgical removal provides the best treatment option.

As with other cancers, therapy may be prescribed that is intended to be curative (removal or eradication of a cancer) or palliative (measures that are unable to cure a cancer but can reduce growth rate of the tumor, pain and suffering).

**Surgery:** Surgical removal of the tumor is generally performed for limited-stage lung cancer and is the treatment of choice for cancer that has not spread beyond the lung. About 10%-35% of lung cancers can be removed surgically, but removal does not always result in a cure, since the tumors may already have spread (microscopically) and can recur at a later time. Surgery may not be possible if the cancer is too close to the trachea or if the person has other serious conditions (such as severe heart or lung disease) that would limit their ability to tolerate an operation. The surgical procedure chosen depends upon the size and location of the tumor. Surgeons must enter the chest cavity to remove the tumor, and may perform a **wedge resection** of the lung (removal of a portion of one lobe), a **lobectomy** (removal of one lobe), or a **pneumectomy** (removal of an entire lung). Lymph nodes in the region of the lungs are also removed.



Surgery for lung cancer is a major surgical procedure that requires general anesthesia, hospitalization and follow-up care for weeks to months.

### **Can You Remove Part of/ or an Entire Lung?**

Most of us have enough lung tissue that if we had an operation to remove one or a portion of one lung, we could still breathe and maintain our quality of life. However, many patients with lung cancer are previous smokers and some of these patients may have decreased lung function due to damage caused by cigarette smoke. Although many patients have quit smoking up to several decades before developing a lung problem or lung cancer, the damage done by the smoke never goes away. The majority of patients who develop lung cancer are not current smokers.

How much of the lung that can be removed and maintain a patient's quality of life is a very important question. Surgeons will usually use a number of tests including some of the following: pulmonary function studies, ventilation perfusion scan, and a six-minute walk test, to determine the impact of any type of chest surgery on a patient's breathing after going through such an operation. With this information, your surgeon may be able to calculate how much lung tissue you can afford to do without, if necessary. Most people who have lung surgery do not need to be on oxygen for the rest of their life; however, most patients are placed on it temporarily around the time of their operation.

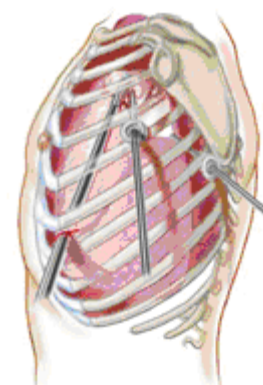
**Radiation:** Radiation therapy uses high-energy x-rays to kill dividing cancer cells. Radiation therapy may be given as curative therapy, palliative therapy, or as adjuvant therapy to surgery or chemotherapy. Radiation therapy can be given if a person refuses surgery, if a tumor has spread to areas such as the lymph nodes or other organs making surgical removal impossible, or if a person has other conditions that make them too ill to undergo major surgery. Radiation therapy generally only shrinks a tumor or limits its growth when given as a sole therapy, yet in 10%-15% of people it leads to long-term remission and palliation of the cancer. Combining radiation therapy with chemotherapy can further increase the chances of survival when chemotherapy is administered. External radiation therapy can generally be carried out on an outpatient basis. A person who has severe lung disease in addition to a lung cancer may not be able to receive radiotherapy to the lung.

**Chemotherapy:** Chemotherapy refers to the administration of drugs that stop the growth of cancer cells by killing them or preventing them from dividing. Chemotherapy may be given alone, as an adjuvant to surgical therapy, or in combination with radiotherapy. Chemotherapy may be given as pills, as an intravenous infusion, or as a combination of the two. Chemotherapy treatments are usually given in an outpatient setting. A combination of drugs is given in a series of treatments, called cycles, over a period of weeks to months, with breaks in between cycles. The side effects of chemotherapy vary according to the dosage and combination of drugs used and may also vary from individual to individual.

### **Minimally Invasive Surgery for Lung Cancer**

Video-assisted thoracoscopic surgery (VATS), which is a form of minimally invasive surgery for early lung cancer, has been shown to be as effective as open surgery with a low risk of complications and high survival rates when performed by experienced thoracic surgeons.

The shorter recovery time and hospitalization together with reduced pain and improved quality of life associate with this technique have been documented over the past decade; still, it is currently used in only about



five percent of the 40,000 lobectomies performed each year in the United States.

In a study published in the February 2006 issue of The Annals of Thoracic Surgery, researchers show that thoracoscopic surgery (VATS) can achieve the same results as open lung surgery.

Instead of making an eight- to 10-inch incision, as is done in a typical thoracotomy, VATS requires only three small incisions through which instruments and a thoracoscope are placed. A camera lens at the tip of the scope feeds high-resolution images to a video monitor, providing the surgeon with a detailed, magnified view of the surgical site. A segment, lobe or entire lung can be removed, depending on the patient's condition and the extent of the cancer. Your surgeon at Rocky Mountain Surgical Associates will discuss with you whether or not you are a candidate for this procedure.

For more information about lung cancer, visit these websites:

[www.cancer.gov/cancerinfo/wyntk/lung](http://www.cancer.gov/cancerinfo/wyntk/lung)

[www.cancerindex.org/clinks21.htm](http://www.cancerindex.org/clinks21.htm)

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