Mohit Chawla (right) is one of the few fully trained interventional pulmonologists in the world. He and others at Memorial Sloan Kettering are leaders in developing new, minimally invasive techniques for managing tumors that develop in the chest.

The trachea (windpipe) is the airway that extends downward from the larynx (voice box) and branches into two airways that lead to the lungs, called the left and right bronchi. Each bronchi divides into smaller tubes in a pattern that resembles an upside-down tree, with the trachea as the tree trunk. The trachea can be felt in the front of the neck.

Several types of malignant (cancerous) and benign (noncancerous) tracheal diseases include tracheal and bronchial tumors, tracheal stenosis, and tracheobronchomalacia.

Tracheal & Bronchial Tumors

Tumors that arise in the trachea and bronchi are rare. The vast majority of tracheal and bronchial tumors in adults are malignant, but a few are benign.

People with tracheal and bronchial tumors may experience the following symptoms:

- shortness of breath or difficulty breathing
- coughing, sometimes with blood (known as hemoptysis)
- wheezing
- stridor, a high-pitched musical sound that occurs as the breath is drawn in, which is caused by a blockage in the airways

Those with more advanced disease may experience difficulty swallowing (dysphagia) and hoarseness, which usually indicates that the cancer has grown beyond the trachea.

Some tracheal and bronchial tumors develop when cancer in another part of the body metastasizes (spreads) to the trachea or bronchi. This is called metastatic disease.

Types of Cancerous Tracheal and Bronchial Tumors

Several types of cancerous tracheal and bronchial tumors include:

Squamous Cell Carcinoma

This is the most common type of tracheal tumor. It is a fast-growing cancer that usually develops in the lower portion of the trachea. Squamous cell carcinoma often penetrates the wall of the airway as it grows, which can cause ulcers and bleeding in the trachea. This is more common in men than in women, and smoking is the main risk factor.

Adenoid Cystic Carcinoma

These slow-growing tumors eventually close off the airway as they progress, but are less likely to penetrate the wall of the trachea. Adenoid cystic carcinomas are found in equal numbers among men and women between the ages of 40 and 60. Unlike squamous cell carcinoma, smoking is not a risk factor for this type of cancer.

Carcinoid Tumors

These slow-growing tumors are more likely to develop in the bronchi than the trachea. They arise from neuroendocrine cells, which produce hormones such as serotonin. Carcinoid tumors can occur at any age, but are most commonly found in people between the ages of 40 and 60.

Types of Noncancerous Tracheal and Bronchial Tumors

Noncancerous tracheal and bronchial tumors have symptoms similar to those of cancerous tumors. Types of noncancerous tumors include:

Papillomas

The most common type of benign tracheal tumor in children, papillomas are cauliflower-like tumors thought to be caused by the human papillomavirus (HPV). These tumors can also transform into squamous cell carcinoma. Papillomatosis refers to multiple papilloma tumors.

Chondromas

These firm nodules form from cartilage. Though rare, chondromas can occur in the larynx (voice box) or trachea, and most commonly affect middle-aged men.

Hemangiomas

This type of benign tracheal tumor involves an abnormal buildup of blood vessels in the trachea.

Tracheal Stenosis

Tracheal stenosis, which includes subglottic stenosis, is a narrowing or constriction of the trachea. Most cases of tracheal stenosis develop when scar tissue develops in a person's trachea due to prolonged intubation — when a breathing tube is inserted into the trachea to help maintain breathing during a medical procedure — or from a tracheostomy, which is a surgery to create an opening in the neck to access the trachea.

Tracheal stenosis can also develop from a number of other causes, including: external injury to the throat; a benign or malignant tumor pressing on the trachea; certain autoimmune disorders (polychondritis, sarcoidosis, papillomatosis, amyloidosis, and Wegener's granulomatosis); and infections. It can also develop as a side effect when radiation therapy is used to treat a tumor in the head or neck.

Symptoms of tracheal stenosis can include:

- shortness of breath or difficulty breathing
- coughing, sometimes with blood (known as hemoptysis)
- wheezing
- stridor, a high-pitched musical sound that occurs as the breath is drawn in, which is caused by a blockage in the airways
- frequent or recurrent respiratory infections

Because tracheal stenosis can develop slowly, early signs and symptoms may be mistaken for a variety of other disorders, including difficult-to-treat asthma in an adult.

Tracheobronchomalacia

Tracheobronchomalacia is a condition that occurs when the airways collapse during breathing or coughing. Symptoms most commonly include coughing, wheezing, shortness of breath, difficulty clearing phlegm, and repeated respiratory infections, such as pneumonia or bronchitis.

Most cases of tracheobronchomalacia develop from a type of lung disease called chronic obstructive pulmonary disease (COPD). Usually caused by smoking cigarettes, COPD involves permanent damage to tissues in the lungs. People with COPD have breathing problems that tend to get worse over time. Emphysema and chronic bronchitis are two types of COPD.

Other causes of tracheobronchomalacia include:

- repeated infections
- injury after prolonged intubation, when a breathing tube is inserted into the trachea to help maintain breathing during a medical procedure
- injury from a tracheostomy, which is a surgery to create an opening in the neck to access the trachea
- tumors or blood vessels pressing on the windpipe
- chronic inflammation

In addition, some individuals are born with a very rare form of tracheobronchomalacia called tracheobronchomegaly (also known as giant trachea or Mounier-Kuhn syndrome). People with this condition have an abnormally wide or dilated trachea and bronchi and often have respiratory infections.

For unknown reasons, many people who have had a breathing tube inserted for a long period of time have developed tracheobronchomalacia. These people have trouble breathing or clearing phlegm when the ventilator is no longer being used. The insertion of a new breathing tube can relieve the symptoms, but is only a temporary solution to this complex problem.

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