



Tracheobronchial and Pulmonary Airway

The Trachea

- The trachea is the conduit that allows air passage from the larynx to the lungs and also allows clearance of secretions from the lower airways. The adult trachea is approximately 10 cm in adult females and 12 cm in adult males and extends from the cricoid cartilage to the mainstem bronchi at the carina.¹ The trachea is oval-shaped, supported by C-shaped rings anteriorly and laterally, and connected by a soft membranous wall posteriorly. In the adult male, the normal tracheal diameter is approximately 2.3 x 1.8 cm, and in the adult female, it measures approximately 2.0 x 1.4 cm. ²The upper or proximal 1/3 of the trachea lies in the neck while the lower, or distal 2/3 of the trachea lie in the chest.

Associated Structures

- The esophagus, or the conduit connecting the pharynx to the stomach, lies posteriorly (behind) and to the left of the trachea. As such, esophageal abnormalities can affect the trachea. Likewise, the thyroid gland sits just anterior to the cervical trachea and enlargement of the thyroid gland can compress the trachea, leading to dyspnea symptoms. The distal trachea can be affected by the pushing effect of increased pressure from the lungs.

The Bronchi

- At the distal end of the trachea, or carina, the trachea divides into the right and left mainstem bronchi, the conduits to the two lungs. The right mainstem bronchus is more in line with the trachea - 25 degrees versus 45 degrees on the left. Therefore, aspirated foreign bodies are more likely to fall to the right bronchi. The right mainstem bronchus gives off branches to the three lobes of the right lung - superior, inferior, and middle. The left mainstem bronchus branches into the left upper and lower lobar bronchi.

The Lining

- The tracheobronchial tree is lined with respiratory epithelium, a type of tissue that allows mucus to move up and out of the tracheobronchial tree, keeping the airway clean. Interspersed in the respiratory epithelium are goblet cells that make mucus. The continuous production and movement of mucus is very important for keeping the airway clean and clear.

References:

Bronchology by Marshall E Smith and Mark R Elstad, Ch 18, In Ballenger's Otorhinolaryngology Head and Neck Surgery, 18th Edition. eds. Snow JB, Wackym PA. People's Medical Publishing House, Shelton CT, 2016.

Grillo HC. Anatomy of the Trachea. Surgery of the Trachea and Bronchi. ed. Grillo HC, BC Decker, Hamilton ON, 2004.