

Functional Anatomy and Oncologic Barriers of the Larynx



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KEYWORDS

• Larynx • Tumor • Barriers • Facilitator • Inflammation

KEY POINTS

- Supraglottic development is distinct from glottic and subglottic development, which partially explains the metastatic behavior of laryngeal carcinoma.
- Dense connective tissues and elastic fibers provide anatomic barriers within the larynx.
- Ossified cartilage and interruptions in the perichondrium create vulnerable points to tumor spread.
- Tumor spread is not purely mechanical.
- Tumor stimulates the host to activate enzymes that break down the body's natural barriers to invasion.

INTRODUCTION

A thorough knowledge of laryngeal anatomy, embryology, and biology can help us understand the barriers and facilitators of tumor spread within the larynx.

LARYNGEAL ANATOMY

Laryngeal Regions

The larynx is divided into 3 regions (supraglottis, glottis, and subglottis). The supraglottis is subdivided into 5 segments (suprahypoid epiglottis, infrahypoid epiglottis, laryngeal surface of the aryepiglottic folds, arytenoids, and false vocal cords). A horizontal plane through the lateral margin of the ventricle marks the inferior extent of the supraglottis. Below this plane marks the beginning of the glottis. The glottis is composed of the true vocal folds and the space between them, which is called the rima glottidis. The true

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vocal folds include the epithelium, superficial lamina propria, vocal ligament (intermediate and deep lamina propria), and the vocalis muscle. The glottis extends from the anterior commissure, the junction of the vocal folds and vocal ligaments with the thyroid cartilage, to the vocal process of the arytenoid cartilage. The glottis continues in the caudal direction for a distance of approximately 1 cm. The subglottis begins at the inferior border of the glottis and continues caudally to the inferior border of the cricoid cartilage.¹

Borders of the Larynx

The superior surfaces of the epiglottis and aryepiglottic folds correspond to the cranial boundary of the larynx. The lingual surfaces of the suprahyoid epiglottis and the hyoepiglottic ligament form the anterosuperior limit of the larynx and form the roof of the preepiglottic space. The anterior border of the larynx is bounded to the thyrohyoid membrane and thyroid cartilage at the level of the supraglottis, the thyroid cartilage at the level of the glottis, and the cricothyroid membrane and cricoid cartilage at the level of the subglottis.¹ The inferior edge of the cricoid cartilage marks the inferior limit of the larynx. The laryngeal surfaces of the aryepiglottic folds and arytenoid cartilages mark the lateral and posterolateral borders of the larynx. The interarytenoid space and the posterior wall of the cricoid ring mark the posterior border of the larynx. The lateral surfaces of the aryepiglottic folds are not part of the larynx. They belong to the pyriform sinus, which is a subdivision of the hypopharynx.²

Laryngeal Spaces

The laryngeal aperture is the superior laryngeal inlet and is bounded by the epiglottis anteriorly, the aryepiglottic folds laterally, and the interarytenoid space posteriorly. The larynx openly communicates with the pharynx at the superior and posterosuperior laryngeal aperture. Caudal to the laryngeal aperture is the laryngeal vestibule, which corresponds to the space between the laryngeal aperture and the vestibular folds (false vocal folds). The laryngeal vestibule is bounded anteriorly by the epiglottis and laterally by the aryepiglottic folds. The laryngeal ventricle, also referred to as Morgagni sinus, is the space between the vestibular folds (false vocal folds) superiorly and the true vocal folds inferiorly. At the anterior roof of the ventricle lies a pouchlike structure called the saccule, which functions to lubricate the ipsilateral vocal fold. The lateral most aspect of the ventricle is the embryologic fusion point of the buccopharyngeal and the tracheobronchial primordium, which marks the border between the supraglottis and glottis. The glottic opening is called the rima glottidis. The rima glottidis is divided into the intermembranous space between the true vocal folds and the intercartilaginous space between the vocal processes of the arytenoids. The rima glottidis is the narrowest part of the laryngeal cavity.

Potential Spaces

The preepiglottic space is a potential space immediately in front of the epiglottis and is bound by the hyoepiglottic ligament (superior), the thyrohyoid membrane and the lamina of the thyroid cartilage (anterior), and the thyroepiglottic ligament (inferior). This potential space is composed of adipose tissue and is devoid of lymph nodes. The anterior aspect of the laryngeal saccule extends from the laryngeal ventricle into the preepiglottic space. The preepiglottic space extends slightly beyond the lateral margins of the epiglottis often referred to as horseshoe shaped. Therefore, the term *periepiglottic* space is a slightly more accurate description of this region.³ The caudal part of the periepiglottic space is subdivided into 1 median region and 2 lateral regions. The median region is immediately anterior to the epiglottis. The 2 lateral subdivisions

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