

Contemporary Surgical Management of Early Glottic Cancer



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KEYWORDS

- Larynx • Glottis • Squamous cell carcinoma • Transoral laser surgery
- Conservation laryngeal surgery • Organ preservation

KEY POINTS

- Transoral laser microsurgery (TLM) is the main surgical treatment modality for T1-T2 glottic squamous cell carcinoma.
- The European Laryngological Society classifications for transoral laser resection should be used to describe the extent of TLM resection.
- Thyroid cartilage invasion is rare and T2 tumors with decreased vocal fold mobility have a higher risk for occult cartilage invasion.
- Local control rates are lower for T1 lesions with tumors infiltrating the anterior commissure and for T2 lesions with decreased vocal fold motion, whether treated with TLM or open surgery.
- For tumors staged cN0, no prophylactic treatment of the neck is currently recommended.

INTRODUCTION

Early glottic squamous cell carcinoma—Tis, T1a, T1b, and T2¹—carries a relatively good prognosis, whether treated surgically or nonsurgically with radiation therapy (RT). Epidemiologically, these tumors continue to be related to tobacco consumption and only exceptionally to human papillomavirus infection compared with oropharyngeal cancers.² Surveillance, Epidemiology, and End Results data from the United States show that the incidence of laryngeal cancer has been decreasing by an average

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of 2.5% per year in the twenty-first century, with decreasing death rates (<http://seer.cancer.gov/statfacts/html/laryn.html>).

The main goal of conservation surgery is to optimize local control to avoid total laryngectomy. With optimum local control, overall survival is related to N stage, metastases, second primaries, and comorbidity. Due to the generally favorable outcomes of T1-T2 glottic tumors treated with different modalities, morbidity, voice quality, quality of life, and cost are issues to be considered when choosing a treatment modality for these early-stage tumors. This article covers the oncologic results related to surgical management of early glottic cancer, with voice quality covered in an article by Hartl DM and colleagues elsewhere in this issue.

PATIENT EVALUATION

The clinical and radiologic work-up for patients with glottic cancer is discussed in an article elsewhere in this issue. Particular attention should be given, however, to the evaluation of vocal fold mobility—normal, diminished, or fixed—due to the prognostic significance of this factor and the influence it may have on the surgical (or nonsurgical) treatment choice.^{3,4} Vocal fold mobility may be decreased (and the tumor classified then as T2) due to a bulky tumor but also due to paraglottic space invasion or invasion of the cricoarytenoid joint.⁵ Imaging is required to determine these deeper tumor extensions. These early-stage tumors have a low rate of thyroid cartilage invasion, but tumors with decreased vocal fold mobility have a higher risk of occult cartilage invasion.⁶ Laryngeal tumors are amenable to conservation surgery if the tumor can be resected with free margins (R0) while conserving 2 essential entities:

- The functional integrity of the cricoid cartilage must be intact, keeping in mind that resection of the anterior arch is possible without destabilizing the cricoid ring. An unstable cricoid cartilage leads to laryngeal stenosis and permanent tracheostomy. The cricoid ring is the only complete cartilaginous ring in the airway and must be preserved in conservation surgery to prevent postoperative stenosis. Cricoid cartilage invasion is always a contraindication to conservation laryngeal surgery due to the impossibility of obtaining sufficient margins while maintaining a patent airway postoperatively.⁷ Tumors with anterior subglottic extension sparing the upper edge of the cricoid cartilage can be treated with conservation laryngeal surgery, and anterior subglottic extension up to, but not invading, the cricoid cartilage may be amenable to supracricoid partial laryngectomy with tracheohyoidoepiglottopexy (discussed later). Posteriorly, the cricoid cartilage is situated closely below the level of the vocal folds (a few millimeters), so that posterior tumors reaching the upper border of the cricoid cartilage are generally a contraindication to conservation laryngeal surgery.
- At least 1 cricoarytenoid unit, comprised of the cricoid, an arytenoid cartilage, the cricoarytenoid joint and muscles, and the corresponding recurrent laryngeal nerve, must be preserved to preserve the sphincteric function of the larynx during swallowing, to avoid aspiration that can lead to pneumonia and death. The sphincteric function of the larynx (or neolarynx) also serves as the voice generator, with the mucosa generating sound waves.

Individual patients must also meet certain requirements for conservation laryngeal surgery, be it by transoral resection or open surgery. Comorbidities and tolerance of general anesthesia must be evaluated. Pulmonary function testing is recommended if open surgery or extended resection (arytenoid) is planned, and the risk of postoperative aspiration requires that patients have sufficient pulmonary reserve to withstand

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