Optimal Treatment for Early Glottic Carcinoma

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Abstract

The management of early glottic cancer has evolved significantly over the past two decades, with transoral laser microsurgery and radiotherapy emerging as the two favored modalities of treatment. Although the role of open partial conservative surgery has reduced, but there are still some specific indications. The preference of one modality over another has generated a lot of debate and continues to be controversial. As the survival outcomes are similar in all the modalities, we need to consider factors like professional needs, quality of life, vocal function and cost-effectiveness as regards the modality to be preferred. This manuscript aims at a comprehensive overview of the literature comparing all the treatment modalities.

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Open conservative laryngeal surgery (CLS), transoral laser microsurgery (TOLMS) and radiotherapy are valid and effective options for treating Tis, T1, and T2 glottic lesions. Although the evidence favoring any of the single modality to another is globally low level, but there is considerable shift towards trans-oral laser microsurgery. Subjective selection bias and opinion affect the decision making. The opportunity for CLS and TOLMS depend on the experience and expertise of the surgical oncology specialists. Three important tumor factors have significant influence on decision making in early glottic cancer: T-stage, true vocal cord mobility and involvement of anterior commissure (AC). Main treatment goal in early laryngeal cancer is to optimize local control, while optimizing preservation of function and hence quality of life. For achieving this goal, a careful initial clinical evaluation is very important. The clinical examination is most often performed using fiberoptic or rigid endoscopy to assess the extent of lesion and laryngeal mobility, which is the main issue in treatment of early glottic cancer. Laryngeal mobility was the only predictor of minor thyroid cartilage invasion treated with conservative laryngeal surgery and for early-stage to mid stage tumors involving the AC [1,2]. AC must be thoroughly evaluated clinically, as the approach and outcomes differ with the disease extent to this critical site. Subglottic extension and proximity of the tumor to the cricoid cartilage must be ascertained in view of organ-preservation surgery, in which a stable cricoid is essentially preserved. Evaluation under general anesthesia with 30 degree angled rigid endoscope helps in assessing AC and subglottic extension. Initial workup should include CT and/or MRI of the larynx especially if there is AC or subglottic extension on laryngoscopy. Guidelines are not generally useful and do not provide detail for selection of optimal treatment modality for particular patient. To optimize patient outcome, current evidence must be combined with experience of the multidisciplinary team managing these patients. Emphasis should be on an honest and open discussion regarding all of the aspects of different treatment options.

Optimal Management of In Situ Glottic Cancer (Tis)

Vocal fold stripping with cold instruments or transoral laser microsurgery are preferred modalities of treatment. Higher incidence of local recurrence has been reported after vocal fold stripping, but these can be efficiently managed with repeat surgery especially TOLMS [3]. Involvement of the AC by the disease in Tis is a significant factor for lowering local control [4]. Available expertise plays an important role in deciding the treatment of choice for Tis. Due to lack of expertise in TOLMS or vocal fold stripping, some centers use radiotherapy. But it should be kept in mind that radiation therapy cannot be repeated and it should be used only after other modalities have failed or have not given desired outcome.

Optimal Management of Mid-Vocal Cord T1a Cancer

Both TOLMS and radiation are effective modalities of treatment for T1a as there is no significant difference in local control or larynx preservation [5]. Open CLS has been replaced by TOLMS due to its low morbidity [6]. Factors determining choice of treatment are cost, treatment availability, expertise and professional need for good voice quality. TOLMS is a single-day treatment that may be done as day-case procedure. Swallowing difficulty is minimal and patient may return to work quickly. Above all these benefits, there is no need for a temporary tracheostomy in the postoperative period. But it requires a laser and a surgical team with expertise and experience in this type of minimally invasive surgery and may not be available at all centers. The main limitation for trans-oral laser microsurgery is inadequate exposure on suspension microlaryngoscopy. The conditions which limit the exposure of the glottis are trismus, protruding teeth, anatomical variations of the upper and lower jaw, bulky tongue, cervical spondylosis, and previous surgery or radiotherapy to the neck. These cases are treated with either open conservative laryngeal surgery or radiotherapy depending on age. Open conservative laryngeal surgery should be given preference in younger patients. Radiation therapy has better voice quality preservation; however, conflicting reports do exist, with some authors reporting better voice quality with transoral laser microsurgery [7]. Final voice quality may be determined by other factors such as tumor volume or depth of tumor invasion, rather than the treatment modality selected. Also one should keep in mind that approximately 21% of the patients with early laryngeal cancer treated by radiation therapy may develop a second primary in head and neck region and radiotherapy should be kept in reserve for such a recurrence [8].

Optimal Management of T2 Glottic Cancer

T2 lesions may have either normal or impaired vocal cord mobility. All the three treatment modalities like open CLS, TOLMS, or radiation therapy have been used to treat T2 lesions with normal vocal cord mobility with reported initial local control rates ranging...
from 84% to 95% [9-15]. No significant difference in local control or survival has been seen on comparing open CLS or TOLMS and radiation therapy [16-19]. T2 tumors with impaired vocal fold mobility have local control rates lower than with normal mobility, whether the treatment is radiation therapy, TOLMS, or open CLS [9,15,17,20-23]. Local control rates falling as low as 50% has been reported. Tumors with impaired vocal fold mobility are at higher risk of minor cartilage invasion, which is often missed on pre-therapeutic CT evaluation [2]. All T2 tumors with normal vocal cord mobility are not same. Peretti et al [13] in their study divided clinically T2 lesions into five subgroups depending on tumor extension. Subgroup I, or pT2 with lateral supraglottic extension; II, or pT2 with lateral subglottic extension; III, or pT2 with supracoarillar and/or subcommissural extension; IV, or pT2 with deep vocal muscle infiltration; and V, or pT3, for superior and/or inferior paraglottic space invasion lateral to the thyroarytenoid muscle not detected before operation by computed tomographic scan. Tumors with deep extension into the paraglottic space had a much lower rate of local control, disease-free survival, and larynx preservation than more superficial T2 tumors. Significant subglottic extension is not only contraindicative to the conservative procedures but also has higher risk of paratracheal node metastases [22]. Globally, the use of open surgery has been declining, as TOLMS has taken over as the main surgical approach, but this does not mean that open surgery is not a legitimate option. The evidence shows high rates of local control and preservation of a functional larynx with open surgery, in experienced hands for selected patients [19,23,24]. For tumors with impaired vocal fold mobility, organ-preservation surgery is generally preferable to radiation therapy alone, but there are currently no data comparing surgery with combined modality therapy (concurent chemoradiation) for these tumors.

**Optimal Management for Tumors T1b or T2 Glottic Cancer Involving the Anterior Commissure**

Significance of AC involvement in early-stage tumors is that local control has been reported to be lesser than in cases where AC is free, whether treated surgically or with radiation therapy [25-29]. Although one of the studies found that the subgroup of ‘purely’ AC tumors responded better to radiation therapy initially, but that final local control after salvage was worse as compared with initial surgery [30]. There are no studies directly comparing open CLS for AC tumors with TOLMS for comparable tumors, and thus the choice of surgical approach is not evidence based, although, again, current tendencies are in favor of the TOLMS, because of evidence of lower morbidity as compared with open surgery as described above [31,32]. Extreme caution is taken while performing trans-oral laser microsurgery for T2 lesion with AC involvement. Exposure and tumor visualization are absolutely necessary. Surgeon should have no hesitation to convert into an open CLS in case cartilage erosion is suspected during procedure. For T2 glottic cancer with deep infiltration of AC open CLS should be the treatment of choice [20]. The supracricoid partial laryngectomy with crico-hyoido-epiglottotomy (SCPL-CHEP) and the fronto-lateral vertical partial laryngectomy (VPL) are the procedures of choice. SCPL – CHEP is probably the best modality of all because of local control rate greater than 90% [12,33]. Patient age, lung function and voice demands must be considered before choosing SCPL [12,34]. VPL on the other hand is well tolerated even in patients with advanced age or comorbidity COPD. Quality of voice is reasonably better than SCPL [35]. There is a local disease failure in around 25% of patients necessitating salvage treatment with radiotherapy or total laryngectomy. Finally, precise staging of the cartilage is important, but difficult, given the low sensitivity of CT for early-stage tumors involving the AC.

**Optimal Management of the Neck for T1-2 N0 Glottic Cancer**

Elective treatment of the neck is not recommended as nodal recurrence rates for early-stage glottic carcinoma are in the range of 4%-10% [36-38]. Wierzbiacka et al [39] found metastatic Delphian nodes in 7.5% of patients with T1b or T2 cancers with AC involvement treated with supracricoid partial laryngectomy. Delphian node involvement was a significant prognostic factor for locoregional failure, lower larynx preservation, and lower overall survival. Elective treatment of the neck does not improve regional control or disease-free survival and therefore the current practice of not treating the neck electively is favored.

**References**


