

# Treatment Decision in the Management of Laryngeal Cancer: An Overview

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## Abstract

A spectrum of treatment plans and surgical procedures are available for management of laryngeal cancer. Transoral laser resection has proved an effective, minimally invasive and functionally satisfactory procedure for management of suitable T1 and T2 glottic cancers, and stage I-III supraglottic cancers. Introduction of chemoradiotherapy has also made great impact on the laryngeal preservation. The treatment of laryngeal cancer should be individualized according to the size and extent of the tumor, the age and physical condition of the patient, and the skill and experience of the surgeon with various treatment modalities and surgical procedures.

**Keywords:** Carcinoma larynx, CO<sub>2</sub> laser, Concurrent chemoradiation.

Two developments in the management of laryngeal cancer have had a significant impact on treatment decisions: These are:

- The transoral microlaryngoscopic CO<sub>2</sub> laser resection of early cancer and
- The addition of chemotherapy to radiation therapy in the treatment of advanced cancer. The former has led to more cases being offered the surgical treatment and the latter has resulted in a sizeable shift away from surgery. The following discussion details these shifts and also attempts to place in proper perspective the newer advances and the value of the time-tested earlier methods of treatment.

## Early Laryngeal Cancer (T<sub>1</sub>/T<sub>2</sub>)

Radiotherapy, open partial laryngectomy and transoral resection with the CO<sub>2</sub> laser are the main options for treatment of early laryngeal cancer.<sup>1-6</sup> Various considerations that influence the choice include: the site of the lesion, it's 'T' stage, 'N' stage, patient's profession, his age, general health and the expertise available.

## T<sub>1</sub> Glottic Cancer

Radiotherapy, open partial laryngectomy and transoral microlaryngeal laser surgery are all equally effective in controlling a T<sub>1</sub> glottic cancer.<sup>1,3</sup>

Radiotherapy offers the best quality of voice and is, therefore the preferred treatment option for professional voice users.<sup>5</sup> On the other end, radiotherapy is best avoided

in the very young, in those with verrucous cancers and where it has been used earlier in the head and neck region.<sup>7</sup> In these situations, and in those where some compromise in quality of voice is acceptable, surgery is the preferred option

In the surgical options, transoral laser resection is preferred to the open surgical procedures viz laryngofissure and cordectomy or vertical partial laryngectomy, because with transoral laser resection, hospitalization is avoided as also tracheostomy and nasogastric tube feeding.<sup>8,9,37</sup> The smooth postoperative course following transoral surgery makes the procedure feasible even in the elderly and in those with compromised lung functions.

The most important prerequisite for transoral laser surgery, however is good exposure of the lesion on suspension microlaryngoscopy. If the exposure is inadequate, it is best to perform an open partial laryngectomy or opt for radiotherapy.<sup>10-12</sup>

Hence, in the management of T<sub>1</sub> glottic cancer, open partial laryngectomy has an important, though limited role in situations where radiotherapy is either not feasible or is best avoided for reasons mentioned above and microlaryngoscopic exposure is inadequate.<sup>8,13</sup> The other situation where open partial laryngectomy is most useful is in the management of T<sub>1</sub> glottic cancer that is firmly impacted on the anterior commissure. Transoral resection of such a lesion is fraught with a high risk of recurrence, and so is treatment with radiotherapy. These lesions are best resected with open surgery, either frontal laryngectomy or frontolateral laryngectomy.<sup>10</sup>

## T<sub>2</sub> Glottic Cancer

Vertical partial laryngectomy is the treatment of choice in majority of T<sub>2</sub> glottic cancers.<sup>14</sup> It is feasible in cases where there is anterior commissure involvement and paraglottic space invasion. The procedure is well tolerated even in the elderly provided the arytenoid does not need to be resected. The voice remains somewhat hoarse, but is not breathy and most working individuals find it quite acceptable. The procedure is not feasible when there is significant supraglottic extension or bilateral involvement.<sup>15</sup>

Transoral resection with the CO<sub>2</sub> laser has a limited role in the management of T<sub>2</sub> glottic cancer.<sup>16</sup> It is only appropriate for lesions that are superficially infiltrative and do not involve the anterior commissure. A typical example is a glottic cancer extending posteriorly and superiorly onto the mucosa of the arytenoid. Under the magnification of the operating microscope, adequate resection is performed preserving the arytenoid cartilage. This maintains the posterior glottic bulk, thereby preventing the problem of aspiration and also resulting in better quality of voice. Adequate visualization on suspension microlaryngoscopy is an important prerequisite for undertaking transoral resection.<sup>17</sup>

For T<sub>2</sub> glottic cancer with bilateral involvement or when there is considerable supraglottic extension, the options for treatment are chemoradiation versus supracricoid partial laryngectomy.

Both these treatments have a high rate of complications and the choice is not easy. The postoperative course following supracricoid partial laryngectomy can be quite stormy due to the problem of aspiration and it is therefore not an option to be considered in the elderly or those with compromised lung functions. Also, the quality of voice following supracricoid laryngectomy is very harsh and sometimes breathy and most working individuals will feel handicapped with such quality of voice. Thus, in the vast majority of bilateral T<sub>2</sub> glottic cancers or the T<sub>2</sub> bulky glotto-supraglottic cancers, chemoradiation is the preferred treatment. Severe mucositis is the main complication necessitating nutritional support to enable the completion of treatment.<sup>18-21</sup>

## T<sub>1</sub>/T<sub>2</sub> Supraglottic Cancer

The treatment of choice for early supraglottic cancer is transoral microlaryngeal resection with the CO<sub>2</sub> laser.<sup>22</sup> The procedure has several advantages over the open supraglottic

partial laryngectomy which it has nearly completely replaced completely. Presence of cervical lymph node metastasis does not preclude transoral surgery for the primary.<sup>23,24</sup> In fact, it further strengthens the case for surgical treatment. Transoral resection of the primary, followed by an appropriate neck dissection, is the best approach for treating an early primary with cervical node metastasis.<sup>23,24</sup>

Adequate exposure of the tumor on suspension microlaryngoscopy is the most important prerequisite before undertaking the transoral resection.<sup>24,32</sup> If exposure of the lesion is inadequate, the options are to do an open supra-glottic partial laryngectomy or to treat with radiotherapy or with chemoradiation.<sup>25-30</sup>

Surgery is preferred in the young where one wants to avoid radiation, if possible. It is also the preferred option in the presence of cervical lymph node metastasis.<sup>23,24</sup> Because of the problem of aspiration, open surgery is feasible only in those who are fit and where pulmonary functions are not compromised.

Radiotherapy and chemoradiotherapy are the treatment options only in cases where transoral surgery is not possible because of inadequate exposure and open surgery is not advisable due to the problem of aspiration.<sup>25,26</sup> Radiotherapy alone is adequate for small lesions (T<sub>1</sub>). Chemoradiation is more effective but also toxic.<sup>31</sup> It is preferred over RT alone, in more bulky tumors (T<sub>2</sub>) and for a lesion in the infrahyoid supraglottis where the tendency for pre-epiglottic space invasion is very high.

## Advanced Laryngeal Cancer (T<sub>3</sub> / T<sub>4a</sub>)

Voice conservation surgery is feasible only in a small subset of cases of advanced laryngeal cancer. In the vast majority of advanced cancers, chemoradiotherapy versus total laryngectomy followed by radiotherapy are the two main options available for treatment.<sup>33,38-41</sup>

The extent of invasion of laryngeal framework is a major factor in determining the choice between these two options of treatment. For transglottic disease with fixity of the hemilarynx but with an intact laryngeal framework (T<sub>3</sub>), chemoradiotherapy has become the mainstay of treatment and has largely replaced total laryngectomy. However, when there is gross cartilage erosion or extralaryngeal spread (T<sub>4</sub>), the treatment of choice continues to be surgery followed by radiotherapy.<sup>34</sup>

In the presence of a large, mobile, metastatic cervical lymph node, surgery followed by radiotherapy is more

effective than chemoradiotherapy in controlling the disease.<sup>35,36</sup>

Elderly patients and patients whose general condition is poor, tolerate laryngectomy much better than chemoradiotherapy because of the very high toxicity of the latter.

Concurrent chemoradiotherapy has been shown to be more effective than sequential treatment. However, it is also very toxic and patients need supportive care often with a percutaneous feeding gastrostomy to ensure adequate nourishment and enable completion of the entire treatment.<sup>42,47</sup>

If chemoradiotherapy fails to control the disease, surgical salvage in almost all cases will have to be with total laryngectomy. No form of voice conservation surgery is likely to be feasible after intensive treatment with chemoradiotherapy. This can be a disadvantage in those cases where voice conservation surgery was feasible upfront and yet concurrent chemoradiotherapy was opted for, but failed.

It is for this reason that an alternative treatment plan viz sequential chemoradiotherapy is suggested in a select subset of patients of advanced laryngeal cancer where voice conservation surgery is possible but nonsurgical plan is preferred.

According to this plan, the patient receives two cycles of neoadjuvant chemotherapy whereafter the response is assessed. Those who respond poorly are excluded from the chemoradiotherapy plan and instead go for surgery. The ones with a good response go on to have radiotherapy or concurrent chemoradiotherapy.<sup>33,48</sup>

## CONCLUSION

In the management of early cancer of the larynx, radiotherapy, open partial laryngectomy and transoral laser surgery are the three main treatment options. Current trend is clearly in favor of transoral laser surgery which has largely though not completely replaced the open partial laryngectomy procedures, and to a certain extent has also taken over from radiation therapy. All the three modalities, however, are important with one or the other most useful in specific situations.

In advanced laryngeal cancer, there is a shift from total laryngectomy plus postoperative radiotherapy, to organ preserving chemoradiotherapy mainly for T<sub>3</sub> tumors. For T<sub>4</sub> tumors however, surgery followed by postoperative radiotherapy continues to be the treatment of choice. Concurrent chemoradiotherapy is superior to sequential

chemoradiotherapy. However, the latter is preferred in instances where voice conservation surgery is feasible so that if the response to anterior chemotherapy is poor, the plan for radiotherapy is abandoned and voice conserving surgery resorted too.

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