

Salvage Laryngectomy following Organ Preservation Approaches

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Abstract

Laryngeal and hypopharyngeal cancers represent a distinct group with broad and varying spectrum of disease patterns. Although the contemporary concepts of conservation laryngeal surgery had shown promising results with good oncologic safety, they were not uniformly reproducible in terms of functional outcomes and, in addition, required surgical expertise. Despite the efficacy and oncologic safety of total laryngectomy, the procedure had fallen into disrepute owing to the permanent tracheal stoma, loss of laryngeal function and diminished quality of life. These led clinicians to look for alternate means of treatment which could permit organ preservation and at the same time preserve the quality of life without compromising survival.

Despite good outcomes with non surgical modalities, a select group of patients exist who fail to respond to these protocols and mandate some form of salvage treatment. Owing to the constantly evolving treatment paradigms, surgery is presently utilized as an optimal option in patients with T4 lesions, where the tumor has exited the confines of the larynx, or in the salvage setting for patients who have failed non surgical organ preservation protocols.

Key words: Laryngectomy; salvage; organ preservation

Introduction

Laryngeal and hypopharyngeal cancers represent a distinct group with broad and varying spectrum of disease patterns. Several factors such as extent of tumor, type of lesion (proliferative / infiltrative), nodal status, anterior commissure involvement, patient preference, compliance and expertise may need to be taken into consideration prior to selection of treatment modality.¹

Although the contemporary concepts of conservation laryngeal surgery had shown promising results with good oncologic safety, they were not uniformly reproducible in terms of functional outcomes and, in addition, required surgical expertise. Despite the efficacy and oncologic safety of total laryngectomy, the procedure had fallen into disrepute owing to the permanent tracheal stoma, loss of laryngeal function and diminished quality of life. These led clinicians to look for alternate means of treatment which could permit organ preservation and at the same time preserve the quality of life without compromising

survival. These factors put together have greatly influenced the use of radiation therapy with or without chemotherapy to be utilized as a preferred primary modality in the management of a vast majority of cancers of the larynx and hypopharynx except T4 lesions.

Emerging literature over the recent decades has supported the efficacy of radiotherapy to be comparable with surgery in terms of disease control and survival with excellent rates of laryngeal preservation as a single modality of treatment for early cancers. In addition, the VA study group, EORTC and the RTOG 91-11 further demonstrated the feasibility of non surgical organ preservation with the addition of chemotherapy to radiotherapy for locally advanced tumors. With control rates and outcomes comparable with total laryngectomy these studies resulted in a paradigm shift from surgery to chemo-radiation in the management of locally advanced, non T 4 cancers of the larynx and hypopharynx.

Interestingly, despite good outcomes with non surgical

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modalities, a select group of patients exist who fail to respond to these protocols and mandate some form of salvage treatment. Owing to the constantly evolving treatment paradigms, surgery is presently utilized as an optimal option in patients with T4 lesions, where the tumor has exited the confines of the larynx, or in the salvage setting for patients who have failed non surgical organ preservation protocols.

Controversies and predicament

Despite promising data from several organ preservation trials, several questions remained unanswered in this forum on selection of these patients:

1. Would the organ preserved anatomically be viable functionally?
2. Could the data derived from carefully selected population in trials be generalised to random patient population?
3. Should T4 lesions be considered for organ preservation?
4. Are we able to identify the subset who mandate salvage surgery (Neck / Primary)?
5. Is survival truly uncompromised?
6. Treatment related morbidities – Have they been rundown?

Varying success rates have been reported with non surgical organ preservation protocols in the treatment of cancers of larynx and hypopharynx with 5-40% of patients mandating some form of salvage surgery. Total laryngectomy still continues to be the gold standard for salvage surgery.^{2,3} Considerable debate continues regarding the feasibility and success of conservative laryngeal surgery in the salvage setting, with recent trends showing promising results.^{4,5}

Role of Salvage Surgery

Total laryngectomy still continues to be the gold standard for salvage surgery following failures to organ preservation protocols. This is largely attributed to lack of overall consensus among the head neck surgeons on feasibility of conservative surgery due to factors such as 1) late recognition of recurrence post RT due to changes in tissues like erythema, edema or scarring. 2) multicentric pattern of tumour recurrence⁶ 3) lack of stringent criteria for choosing suitable cases for conservative laryngeal surgery.

Several factors need to be taken into consideration prior to embarking on salvage surgery such as: site/subsite involved, clinical and radiological staging, type of treatment (RT / CT+RT) and functional assessment.

Patient records

In tertiary referral cancer centers, it is not uncommon to note that patients referred after initial treatment failure sometimes lack pre treatment details such as staging (Tx, Nx), or accurate mapping of tumor site (involvement of anterior commissure and subglottis). Prior documentation of the staging and geographical mapping of the tumor is vital when contemplating salvage conservative surgery and may also have a bearing on the management of the neck in the salvage setting. It is also well documented that patients with involvement of subsites such as the anterior commissure and subglottis may most likely end up with total laryngectomy.⁴ Thus patient chart mandates a complete description of the site, subsite, cord mobility, neck node status, as these may have an important bearing in salvage setting.

Radiotherapy and Salvage surgery

Accelerated repopulation of tumor cells has been of concern with recent clinical studies on cell kinetics showing increasing local failures that have been attributed to tumor under dosage or prolongation of overall treatment time.⁷ Involvement of subsites such as anterior commissure may further add to the poor local control.⁷ In addition, hyperfractionated and accelerated schedules have shown better local control rates.⁸ Hence treatment details of the primary organ preservation protocol should include radiotherapy technique, fields, total dose, number of fractions, chemotherapy schedule advocated and total treatment time. Pharyngo cutaneous fistulas have been found to be higher following radiotherapy with an incidence of up to 30% as reported in outcome analysis of RTOG 91-11.

Functional assessment prior to organ preservation

Majority of our patients present to us at an advanced stage and need tracheostomy at some time point either prior or during their treatment. Tracheostomy has been considered a poor prognostic marker that portends an inferior survival and places a higher risk of local recurrence.⁹ Airway compromise has also been a strong indicator against non surgical organ preservation by various investigators.¹⁰⁻¹² This group represents patients with either bulky disease or fixed cords and may be poor candidates for non surgical organ preservation, as they already present with organ dysfunction.

Aspiration can be present in more than 30% of these patients, with asymptomatic aspiration rates even higher. Total laryngectomy continues to be the most

widely utilized surgery in this group.

In patients with pyriform fossa lesions presenting with dysphagia similarly represents a heterogenous group with comprised organ function. Stirtures rates as high as 20% have been reported in this set of patients. Hence functional assessment prior to advocating organ preservation is paramount.

Salvage neck surgery

Management of the neck in patients undergoing salvage laryngeal surgery has been an area of considerable debate with opinions varying no neck dissections to bilateral neck clearance.^{13,14} Neck dissections in early glottic cancers that have failed RT is generally not recommended.¹⁵ However, in supraglottic or hypopharyngeal malignancies it may be mandatory to perform a bilateral neck dissection in view of the high incidence of nodal metastasis.

Prior radiotherapy, tracheostomy, and concurrent neck dissection are known to increase the risk of complication in the salvage setting.

Conservation salvage laryngeal surgery

Stringent criteria need to be advocated in selecting cases suitable for conservative laryngeal surgery. Previous publications have put forward certain absolute contraindications such as arytenoids fixation, interarytenoid invasion, extensive preepiglottic space involvement, exolaryngeal spread. In addition to the above certain prerequisites that aid a favorable outcome are good pulmonary compliance, vocal cord mobility preserved; supraglottic extension not beyond the lateral sinus of morgagni.¹⁶⁻²¹ A vast majority of these criteria would also be generally applicable prior to conservative surgery in the primary setting.

Conservation laryngeal surgery in the study published by Ganly et al was 49% and Holsinger et al 31.5%. The rates of salvage conservation laryngeal surgery at our centers are much lower (<10%, unpublished). The main attributes for the lower rates is in addition to the above mentioned criteria have been factors such as: 1) Lack of details pertaining to pre treatment staging, 2) Advanced age making patients poor candidates for salvage (median age in our study was 55 yrs), owing to poor pulmonary compliance⁴, 3) Presence of tracheostomy (relative contraindication), 4) Compliance for follow up, 5) Involvement of anterior commissure.

Lack of pre treatment tumor mapping and staging is an adverse factor as emphasized by Shah et al¹⁶, consequently, stressing on the importance of accurate

tumor mapping prior to initial therapy.

Hence although conservative laryngeal surgery is a definitive alternative in salvage setting with good outcomes, a meticulous selection of candidates is mandatory to ensure optimal results.

Conclusion

Salvage laryngectomy is a definite option for patients who fail treatment with non surgical organ preservation protocols. Pretreatment staging, accurate mapping of the disease subsites, advanced age, tracheostomy, anterior commissure as well as compliance for follow up are imperative when embarking on salvage conservative laryngeal surgery. Role of neck dissection is mainly limited to patients with positive nodes prior to treatment. Voice outcomes following salvage laryngectomy are comparable with patients undergoing primary laryngectomy.

References

1. Pfister DG, Laurie SA, Weinstein GS et al. American society of clinical oncology clinical practice guideline for the use of larynx preservation strategies in the treatment of laryngeal cancer. *J Clin Oncol* 2006;24:3693-3704
2. McLaughlin MP, Parsons JT, Fein DA, et al. Salvage surgery after radiotherapy failure in T1-T2 squamous cell carcinoma of the glottic larynx. *Head Neck*.1996;18(3):229-35.
3. Stoeckli SJ, Pawlik AB, Lipp M et al. Salvage surgery after failure of nonsurgical therapy for carcinoma of the larynx and hypopharynx. *Arch Otolaryngol Head Neck Surg* 2000;126(12):1473-7.
4. Ganly I, Patel S, Matsuo J et al. Results of surgical salvage after failure of definitive radiation therapy for early stage squamous cell carcinomas of glottic larynx. *Arch Otolaryngol Head Neck Surg* 2006;132:59-66.
5. Holsinger CF, Funk E, Roberts DB et al. conservative surgery versus total laryngectomy for radiation failure in laryngeal cancer. *Head neck* 2006;28:779-84
6. Zbaren P, Nuyens M, Curschmann J et al. Histologic characteristics and tumor spread of recurrent glottic carcinomas: analysis on whole organ sections and comparison with tumor spread of primary glottic carcinomas. *Head Neck* 2007;29:26-32
7. Saarilahti K, Kajanti M, Lehtonen H et al. repopulation during radiotherapy for T1 glottic cancer. *Radiother. Oncol.* 1998;47:155-59.
8. Fu KK, Pajak TF, Trotti A, et al. Radiation therapy oncology group (RTOG) phase iii randomized study to compare hyperfractionation and two variants of accelerated fractionation to standard fractionation radiotherapy for head and neck squamous cell carcinomas: first report of RTOG 9003. *Int J Radiat ncol Biol Phys* 2000; 48:7-16.
9. Mackenzie R, Franssen E, Balogh J et al. The prognostic significance of tracheostomy in carcinoma of the larynx treated with radiotherapy and surgery for salvage. *Int J Radiat ncol Biol Phys* 1998; 41:43-51.
10. Croll GA, Gerritsen GJ, Tiwari RM, Snow GB. Primary radiotherapy with surgery in reserve for advanced laryngeal carcinoma. *Eur. J. Surg. Oncol.* 15:350 -356; 1989.
11. Karim AB, Kralendonk JH, Njo KH, Tierie AH, Hasman A. Radiation therapy for advanced (T3T4N0-N3) laryngeal carcinoma: the need for a change of strategy: a radiotherapeutic viewpoint. *Int. J. Radiat. Oncol. Biol. Phys.*13:1625-1633; 1987.
12. Mendenhall WM, Parsons JT, Stringer SP, Cassisi NJ, Million RR. Stage T3 squamous cell carcinoma of the glottic larynx: a comparison of laryngectomy and irradiation. *Int. J. Radiat. Oncol. Biol. Phys.* 23:725-732; 1992.

13. Farrag TY, Lin FR, Cummings CW et al. Neck management in patients undergoing post radiotherapy salvage laryngeal surgery for recurrent/persistent laryngeal cancer. *Laryngoscope* 2006;116:1864-6.
14. Yao M, Roebuck JC, Holsinger FC, Myers JN. Elective neck dissection during salvage laryngectomy. *Am J Otolaryngol* 2005;26:388-392.
15. Paydarfar JA, Birkmeyer NJ. Complications in Head and Neck Surgery A Meta-analysis of Postlaryngectomy Pharyngocutaneous Fistula. *Complications in Head and Neck Surgery. Arch Otolaryngol Head Neck Surg.* 2006;132:67-72
16. Shah JP, Loree TR, Kowalski L. Conservation surgery for radiation failure carcinoma of the glottic larynx. *Head Neck.* 1990;12:326-331.
17. Biller HF, Barnhill FR Jr, Ogura JN, Perez CA. Hemilaryngectomy following radiation failure for carcinoma of the vocal cords. *Laryngoscope.* 1970;80:249-253.
18. Pellini R, Manciocco V, Spriano G. Functional Outcome of Supracricoid Partial Laryngectomy with Cricohyoidopexy Radiation Failure vs Previously Untreated Cases. *Arch Otolaryngol Head Neck Surg.* 2006;132:1221-1225
19. Ogura JH, Marks JE, Freeman RB. Results of conservation surgery for cancers of the supraglottis and pyriform sinus. *Laryngoscope* 1980;90:591-600.
20. Laccourreye O, Weinstein G, Naudo P, Cauchois R, Laccourreye H, Brasnu D. Supracricoid partial laryngectomy after failed laryngeal radiation therapy. *Laryngoscope* 1996;106:495-498.
21. Rodriguez-Cuevas S, Labastida S, Gonzalez D, Briseno N, Cortes H. Partial laryngectomy as salvage surgery for radiation failures in T1-T2 laryngeal cancer. *Head Neck* 1998;20:630-633.

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