Completion Total Laryngectomy Ten Years After Near Total Laryngectomy for Radiorecurrent Cancer of the Glottis

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Abstract

Near total laryngectomy (NTL) is a safe alternative to total laryngectomy in salvaging lateralized radiation failures. A 65-year-old gentleman with radiorecurrent T1 vocal cord cancer was salvaged successfully by NTL. Ten years later, he presented with a strained shunt speech which was treated judiciously, with the aid of a positron emission tomography (PET) scan, by a (completion) total laryngectomy (TL), bilateral selective neck dissection, and pharyngeal resurfacing with pectoralis major myocutaneous (PMMC) flap. The patient is on close follow-up after the second salvage procedure, for 20 months without any locoregional disease recurrence. A high index of suspicion can clinch the diagnosis of a post-NTL recurrence in a disease-free patient on follow-up because of the excellent speech preservation and aspiration-free swallowing that is possible which can only be altered if the patient develops a recurrence or second primary.

Keywords Salvage surgery · Near total laryngectomy · Total laryngectomy with pharyngeal resurfacing

Introduction

Near total laryngectomy (NTL) is an oncologically safe procedure for post-radiotherapy recurrences of larynx and hypopharynx where the disease is predominantly limited to one half of the larynx. An early diagnosis of a disease recurrence or a second primary is clinically possible because of the preservation of speech and aspiration-free swallowing after an NTL, which can only be altered if the patient develops a recurrence or second primary.

A unique case report of a gentleman who was surgically salvaged twice for radiorecurrent cancer (second primary) of an early cancer of the larynx is presented. Strained shunt speech was the ominous symptom that helped us to suspect a late second primary inside the shunt 10 years down the line of follow-up after the initial salvage NTL. The plausible explanations of events and the factors behind the overall favorable outcome of the patient are discussed.

Case Report

A 65-year-old diabetic and hypertensive gentleman who was treated for vocal cord cancer (well-differentiated squamous cell carcinoma) with radical radiotherapy elsewhere presented to us with recurrence 4 years later. The lesion was on the right vocal cord at the anterior 2/3. The arytenoid, interarytenoid area, pre-epiglottic space, and subglottis were assessed to be free of disease. After a preoperative counselling to the patient and his care givers regarding the need for a total laryngectomy with a possibility of near total laryngectomy as an alternative, he underwent a near total laryngectomy with an ipsilateral hemithyroidectomy which was pathologically staged as pT1NoMo. Subsequently, he had a good voice (shunt speech) and he was on regular follow-up for the next 10 years after which the speech became strained. With a high index of suspicion for recurrence, flexible laryngoscopy showed a suspicious lesion 2 × 1 cm in size along the post-pharyngeal wall/neopharynx corresponding to the shunt opening, the biopsy of which only revealed hyperplastic squamous epithelium. A contrast enhanced CT scan revealed a heterogeneous enhancing lesion at the tracheopharyngeal shunt at level of the cricoarytenoid joint measuring 20 × 7.5 mm with a right paratracheal node (Fig. 1). Further, a PET CT scan (Fig. 2a, b) almost confirmed the lesion as a recurrence with an uptake of 19.84 SUV at the shunt and 6.18 at the right paratracheal node. In addition, a left level 2 node with an uptake of 6.93 SUV was

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Fig. 1 Contrast enhanced axial section of the neck showing the site of second primary

also picked up. A completion (total) laryngectomy with bilateral neck dissection (including the central compartment) with pectoralis major myocutaneous flap resurfacing of the remnant pharynx was done and histopathological examination revealed an ulceroproliferative lesion of $2 \times 1 \times 3.5$ cm within the shunt reported as well-differentiated squamous cell carcinoma, near the cricopharyngeal mucosa without metastasis in any of the nodes. The patient is on close follow-up since the past 20 months without any locoregional disease recurrence and he is now on esophageal voice training.

Discussion

Surgery is currently considered the treatment of choice for recurrence or failure after radiotherapy (salvage surgery) or as an upfront option for very advanced tumors with penetration of the laryngeal cartilages. The recurrence rates for T1 glottis treated with RT is 5–10% and that for T2 glottis is 20–40% [1]. Radio recurrent disease may present as persistent submucosal edema and it is often multifocal and hence understaged [2]. The mechanism of spread in primary case of laryngeal cancer is in a concentric fashion; whereas in a recurrence, it has a multifocal nest of tumor cells, dissociated tumor cells, and perineural

spread [3]. Sandulache et al. [4] retrospectively reviewed 218 patients undergoing salvage TL at the University of Texas MD Anderson Cancer Center between the years 1994 and 2014. They concluded that disease-free interval following EBRT for primary disease was a major factor influencing both disease recurrence and overall survival. Among patients with disease-free interval greater than 5 years, only 8% developed recurrence following STL and 2-year overall survival was approximately 80%. It may be possible that many of these patients with disease-free interval beyond 5 years represent those with second primary laryngeal cancers in contrast to true recurrences, which most probably explains the improved survival in these patients. The delayed recurrence would potentially portend a less aggressive tumor biology.

It is generally regarded that radiation treatment induces inflammatory changes resulting in fibrotic changes in tissue that makes the clinical evaluation of recurrent disease difficult because of post-therapeutic edema, erythema, and changes in laryngeal mobility [5]. Consequently, the clinical assessment of recurrence by endoscopic examination and imaging has a diagnostic accuracy of around 38%, with 10% of the tumors overstaged and 52% understaged [3]. Diagnosis of recurrent disease is therefore based on clinical suspicion, CT scan findings, and endoscopy with biopsy, although biopsy should be cautiously taken from a post-irradiated larynx because of the risk of chondritis and chondroradionecrosis. These facts often lead to late discovery of the recurrence, leaving many patients who are eligible for surgical salvage with the final option of a total laryngectomy [6]. Multiple studies have shown that PET/CT is superior to conventional anatomic imaging in assessment of tumor response to treatment and detection of residual tumor. This modality has been aiding the surgeon in selecting the appropriate patient for salvage surgery after chemoradiation [7].

Salvage TL is indicated for chemoradiation, radiation, or partial laryngeal surgical failures. Weber et al. in their outcome study on salvage laryngectomy reported that 16% of patients treated with concurrent chemoradiation and 31% of patients treated with radiotherapy alone required salvage surgery [8, 9]. Salvage TL can be technically more difficult

Fig. 2 a, b 18 FDG PET CT images depicting the lesion (cursor) with uptake (SUV—19.84)

and carries a higher postoperative complication rate. Although role of conservation surgery in salvage setting is well described, its application is very often limited due to locally advanced nature of the disease, ill-defined margins, and potential islands of tumor throughout the irradiated field [10]. Ever since Bruce Pearson established the technique of NTL in 1985 [10], its feasibility has been studied worldwide. Pearson's own series of 225 near total laryngectomies published in 1998 showed a 20% recurrence among those taken for post-radiation salvage ($n = 21$) [11] among whom five patients developed recurrence at the shunt. Of the eight local recurrences, only two were salvaged by total laryngectomy.

In an extensive series by Pradhan et al. [12], although NTL was feasible as a salvage procedure after prior radiotherapy, the complication rate was marginally higher. Fifteen (10.8%) cases were taken up as salvage procedures. Thirteen (86.6%) cases had uneventful postoperative recovery. Two patients had a major pharyngeal leak ultimately leading to death in 1 and loss of the voice shunt in the other. Thirteen patients were alive and disease-free and 1 died as a result of cancer. They concluded that NTL can be considered as a salvage procedure after radiation therapy failure, but caution must be exercised at case selection. Not only should the interarytenoid and retroarytenoid tissues be free of disease, they should also be supple and free of post-radiation edema and the cricoid cartilage should be essentially free of tumor invasion.

The role of elective neck dissection in a salvage setting is quite unclear. While some authors have illustrated improved survival outcomes with elective neck dissection [13], others have demonstrated no benefit [4, 14]. Patients with no clinical or radiographic neck disease generally do not require a neck dissection as most patients who are radiologically staged N0 are unlikely to harbor occult nodal disease, and those with N1 disease who are treated with definitive chemoradiotherapy require a neck dissection for incomplete clinical response and it is arguably needed for patients with N2 or N3 disease who are treated with definitive chemoradiotherapy [15].

Higher complications in patients undergoing a salvage TL as compared to the patients subjected to conservation laryngeal procedure have been observed by Holsinger et al. [16] in contrast to the findings by Ganly et al. [1] As the extent of resection in an NTL is almost identical to TL, it is unlikely to carry a higher incidence of complications except for an occasional shunt breakdown necessitating a completion laryngectomy, although there are no direct (level 1) comparisons in literature [17]. Adjuvant re-irradiation with or without chemotherapy is a potential option following STL but relatively few patients undergo re-irradiation in practice due to morbidity/toxicity and equivocal impact on survival [18]. Liberal usage of vascular flaps has a potential to mitigate incidences and severity of pharyngocutaneous fistulae which is the most common troublesome complication of TL and NTL [19].

Conclusion

NTL provided the patient with a serviceable speech without the need for regular maintenance as compared to a TEP for 10 years. Subsequently, it was possible to diagnose and salvage a late shunt recurrence with careful consideration of reconstructing the neopharynx with a flap owing to the paucity of pharyngeal mucosa which was used up to fashion the tracheopharyngeal shunt during the previous NTL. Furthermore, we believe that the initial salvage attempt with a carefully executed NTL helped us in an early clinical detection of a recurrence in the shunt of the NTL because a (late) neopharyngeal recurrence of a STL would have taken a longer time to present with the symptom of dysphagia.

The current report is unique because the patient received the benefits of survival, speech preservation, and mitigation of complications and morbidity associated with an initial NTL and subsequent salvage of a late (shunt) recurrence with a (completion) TL and pharyngeal resurfacing with a pectoralis major myocutaneous (PMMC) flap.

Authors' Contribution 1st author (Additional Professor) performed the surgeries and prepared the manuscript.

2nd author (Clinical Fellow) compiled the data performed the literature search and assisted in the preparation of the manuscript.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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