Salvage Versus Primary Laryngectomy: Is There Still an Increased Risk for Postoperative Complications?

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Background

Head and neck cancer is the seventh most common cancer worldwide, with laryngeal cancer accounting for nearly one-fifth of U.S. cases, most often related to tobacco use or HPV.[1] Total laryngectomy, performed either as a primary treatment for advanced disease or as salvage after failed therapies, is a lifesaving procedure but carries substantial morbidity. While advances in speech and swallow rehabilitation, particularly tracheoesophageal voice prostheses (TEPs), have improved quality of life, these devices and the surgery itself remain associated with complications such as fistulas, surgical site infections, and prosthesis leakage or extrusion. Notably, salvage laryngectomies carry higher risks of postoperative and TEP-related complications compared to primary procedures.[2] This study evaluates whether complication rates differ significantly between primary and salvage laryngectomies.

Objectives

We hypothesize that salvage laryngectomy patients experience higher rates of postoperative complications, particularly tracheoesophageal prosthesis (TEP)–related issues, compared to primary laryngectomy patients. The objective of this study was to compare complication rates between primary and salvage laryngectomy groups, focusing on TEP complications, fistula formation, surgical site infection, and communication outcomes.

Methods

We included 107 patients who underwent total laryngectomy at the University of Oklahoma Health Sciences Center between 1998 and October 2024. Patients were stratified into primary (n = 68) and salvage (n = 39) laryngectomy groups, with cases reviewed by a multidisciplinary tumor board. Exclusion criteria were non-primary/salvage laryngectomy or insufficient chart data. Outcomes assessed included TEP complications (e.g., leakage, dislodgement, phonation issues), fistula development, surgical site infection, and primary communication method. Tumor stage, prior radiotherapy/chemoradiotherapy, and demographic data were also collected.

Descriptive statistics, along with a Chi-Square test and Fischer's test, were used for data analysis via SPSS 26. Significant and near significant findings were analyzed using multivariate analysis

Results

In this study, 107 patients undergoing total laryngectomy between 1998 and October 2024 were included for analysis with 68 patients undergoing primary laryngectomies and 39 patients undergoing salvage laryngectomies (demographic data listed in Table 1).

When stratifying based off primary versus salvage laryngectomy, those who underwent a salvage laryngectomy were not statistically more likely to develop a fistula (p=0.171), with an OR of 0.98. However, those same patients were more likely to develop a TEP complication post-operatively (p=0.042), with no statistically significant bearing on surgical site infection (p=0.308) or primary means of communication (p=0.094).

Age	**Race**	**BMI**
Age range 38 - 72	91/107 white	27/107 underweight
Average age: 48	12/107 black	51/107normal
Sex	4/107 other	21/107 overweight
77/107 male		11/107 obese
30/107 female		5/107 morbid
		2/107unknown

Table 1. Demographic data

Discussion

We found that salvage laryngectomy patients were significantly more likely to experience postoperative TEP complications, while rates of fistula development, surgical site infection, and communication outcomes were not significantly different compared to primary laryngectomy. These findings align with prior literature suggesting higher complication risks in salvage procedures, likely related to irradiated tissue, impaired wound healing, and altered anatomy. Clinically, this highlights the need for careful preoperative planning, close postoperative surveillance, and multidisciplinary care to optimize outcomes for salvage patients.

Limitations include the retrospective, single-institution design, small sample size, and limited diversity of the study population, which may restrict generalizability. Future multicenter, prospective studies with larger cohorts are needed to confirm these findings and explore targeted strategies—such as modified surgical techniques or tailored postoperative protocols—to reduce TEP complications and improve long-term quality of life.

Conclusions

Salvage laryngectomy patients are at an increased risk of developing post-operative TEP complications.

Figure 1. TEP

Figure 2. TEP with fistula

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