

## Survival after Salvage Total Laryngectomy: The Influence of Previous Treatment

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### Abstract

**Purpose:** To compare the complications and survival rate after different treatment modalities of advanced laryngopharyngeal cancer.

**Methods:** Retrospective study included 619 advanced laryngopharyngeal carcinoma, treated with either primary total laryngectomy (PTL), or salvage (STL) after partial laryngectomy, radio, chemoradiotherapy. Complications and survival rate were documented.

**Results:** Five years disease free survival rate amounted 60.9% for PTL, 54.3% for STL after partial laryngectomy, 50% for STL after radiotherapy and 43.8% for STL after chemoradiotherapy. Histologically positive neck was highly significantly associated with worse prognosis, much more than recurrence within larynx.

**Conclusion:** PTL gives the best survival rate with low complications for advanced laryngopharyngeal squamous cell carcinoma. Complications and survival rate of STL significantly depend on previous treatment of laryngopharyngeal cancer.

**Keywords:** Laryngopharyngeal cancer; Laryngectomy; Survival; Radiotherapy

### Introduction

During the latest 20 years chemoradiotherapy became popular treatment of laryngeal carcinoma promising preservation of larynx and its function. However, despite multidisciplinary treatment modalities advanced squamous cell carcinoma affecting larynx and laryngopharynx often demands radical surgery, either primary total laryngectomy (PTL), or salvage laryngectomy after failure of previous treatment (STL).

In advanced stages recurrences are frequent, survival is decreased, and quality of life is reduced, leading to bad prognosis. Also, salvage surgery is accompanied by higher complication rate, and worse survival rate [1-4].

Studies that analyse the influence of previous treatment on the survival after STL are scant. So, we conducted a retrospective study to compare the survival rate for STL for recurrences after previous partial laryngectomy, radiotherapy, and chemoradiotherapy.

### Methods

This retrospective study included 665 total laryngectomies performed in the period between 1991 and 2010 for advanced squamous cell carcinoma of the larynx and laryngopharynx. Overall 619 patients were adequately followed up, and their histories were analyzed. PRT was offered to all patients with advanced cancer, and it was undertaken in 442 patients. Patients that refused surgery, or had surgical contraindications were treated by radiotherapy, or

chemoradiotherapy (for any nodal affection documented using computed tomography).

Salvage surgery was performed in 35 patients after previous partial laryngectomy, in 78 after initial radiotherapy (60 Gy to 70 Gy), and in 64 patients after chemoradiotherapy (cisplatin+5-fluorouracil). Postoperative clinical examination was performed every 3 months during 5 years. Complications, residual and recurrent disease, and disease free survival rate were documented.

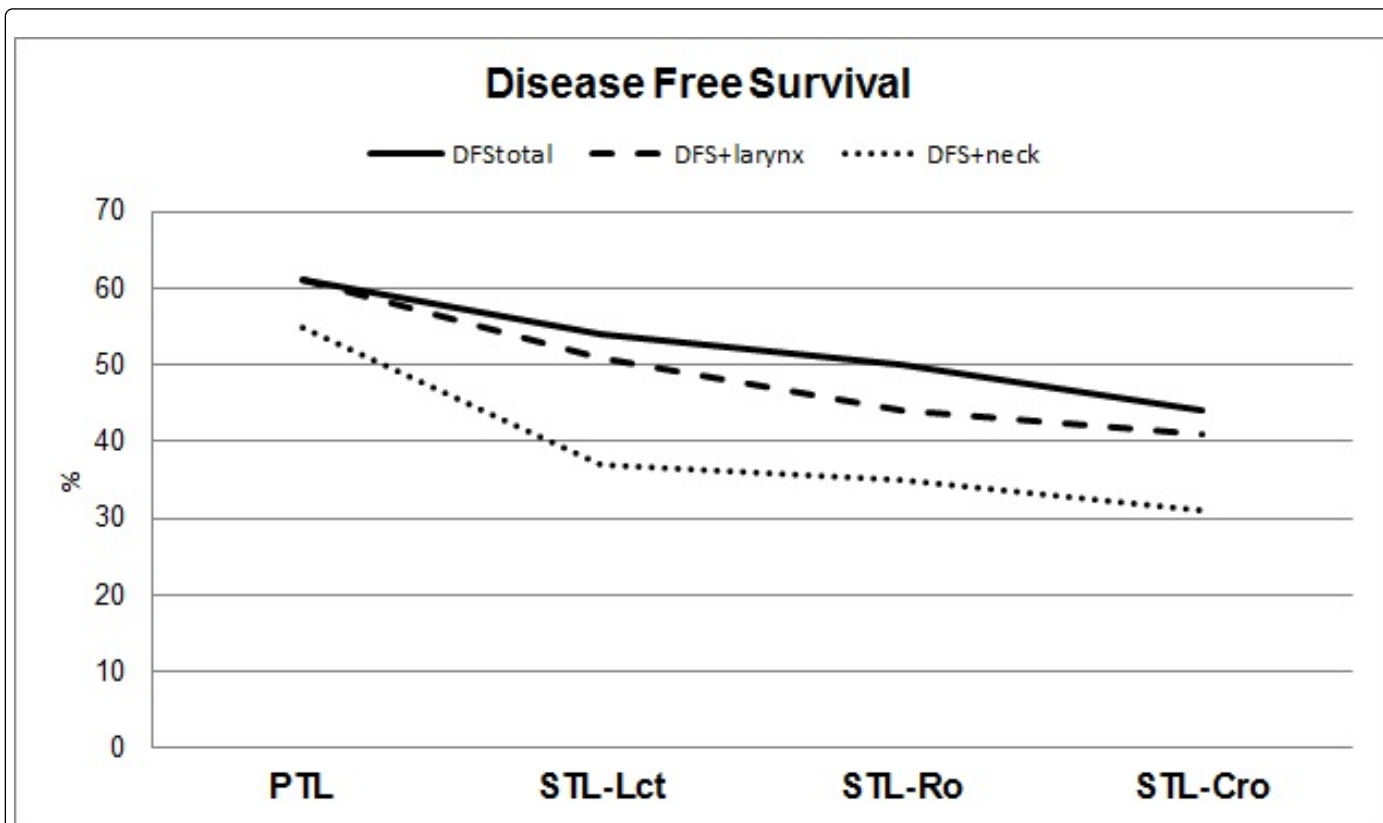
Disease free survival was calculated using the Kaplan-Meier method from the time of initiation of therapy to the time of progression, death, or last follow up. All statistical analyses were performed using SPSS version 12 (SPSS Inc., Chicago, IL, USA). Chi square test was used to investigate the differences between the groups of the patients (p value less than 0.05 denoted the presence of a statistically significant difference).

### Results

No significant difference was found for analyzed treatment groups for age, sex, smoking and drinking habits, and TNM stage. Patients treated by primary radio and chemoradiotherapy had more comorbidities. Contrary to this, primary total laryngectomy gave significantly less complications (infection, fistula, and difficult swallowing), than for salvage surgery.

Previous chemoradiotherapy caused the highest rate of complications. Nonsurgical primary treatment of laryngopharyngeal localization was accompanied by significantly more complications, than for only laryngeal affection (Tables 1 and 2, Figure 1).

Five years disease free survival rate amounted 60.9% for PTL, 54.3% for STL after partial laryngectomy, 50.0% for STL after radiotherapy, and 43.8% for STL after chemoradiotherapy. Histologically positive neck was highly significantly associated with worse prognosis, much more than recurrence within larynx (Tables 1 and 2, Figure 1).



**Figure 1:** Overall five years' disease free survival rate for advanced laryngeal and laryngopharyngeal carcinoma (histogram). PTL=Primary Total Laryngectomy; STL-Lct=Salvage After Partial Laryngectomy; STL-Ro=Salvage After Radiotherapy; STL-CRo=Salvage After Chemoradiotherapy; DFS Total=Disease Free Survival for All Patients; DFS+Larynx=Disease Free Survival with Recurrence Affecting Larynx; DFS+Neck=Disease Free Survival with Recurrence Affecting Neck.

Parameter	PTL (No. 384)		STL-Lct (No. 24)		STL-Ro (No. 47)		STL-CRo (No. 39)	
	No.	%	No.	%	No.	%	No.	%
Reconstruction	0	0.0	3	12.5*	4	8.5*	6	15.4*
Infection	69	18.0	10	41.7*	13	27.7*	19	48.7*
Fistula	55	14.3	6	25.0*	9	19.1	14	35.9*
Diff. swallow.	25	6.5	10	41.7*	16	34.0*	14	35.9*
DFS total	238	68.0	14	58.3*	25	53.2*	18	46.1*
DFS+Larynx	238	68.0	14	58.3*	24	51.1*	17	43.6*
DFS+Neck	216	56.3	10	41.7*	19	40.4*	15	38.5*

PTL=Primary Total Laryngectomy; STL-Lct=Salvage After Partial Laryngectomy; STL-Ro=Salvage After Radiotherapy; STL-CRo=Salvage After Chemoradiotherapy; DFS=Disease Free Survival; DFS+Larynx=Disease Free Survival with Affected Larynx; DFS+Neck=Disease Free Survival with Affected Neck; \*=significantly different from PTL.

**Table 1:** Complications and five years disease free survival rate after treatment of advanced laryngeal carcinoma.

Parameter	PTL (No. 58)		STL-Lct (No. 11)		STL-Ro (No. 31)		STL-CRo (No. 25)	
	No.	%	No.	%	No.	%	No.	%
Reconstruction	6	10.3	6	54.5*	10	32.3*	11	44.0*
Infection	12	20.7	5	45.5*	14	45.2*	18	72.0*
Fistula	10	17.2	4	36.4*	9	29.0	15	60.0*
Diff. swallow.	6	10.3	4	36.4*	7	22.6*	8	32.0*
DFS total	31	53.4	5	45.5*	14	45.2*	10	40.0*
DFS+Larynx	31	53.4	4	36.4*	10	32.2*	9	36.0*
DFS+Neck	25	43.1	3	27.3*	8	25.8*	5	20.0*

PTL=Primary Total Laryngectomy; STL-Lct=Salvage After Partial Laryngectomy; STL-Ro=Salvage After Radiotherapy; STL-CRo=Salvage After Chemoradiotherapy; DFS=Disease Free Survival; DFS+Larynx=Disease Free Survival with Affected Larynx; DFS+Neck=Disease Free Survival with Affected Neck; \*=significantly different from PTL.

**Table 2:** Complications and five years disease free survival rate after treatment of advanced laryngopharyngeal carcinoma.

## Discussion

Multi-institutional studies in the United States encouraged organ preservation strategy for the management of the primary site in head and neck squamous cell carcinoma. Preservation of larynx means larynx in place, no residual tumor, and also no tracheotomy and no feeding tube. Preservation of function is more important than just anatomic integrity of the larynx [5-8].

Higher survival rates for laryngeal cancer were confirmed after primary laryngectomy, and organ preservation strategy resulted in decrease of global survival for laryngeal cancer from 66% to 63% in the last years [1,4]. Radiotherapy for laryngeal cancer produces more frequent fistulas especially when bigger fields and doses were used. Also, chemotherapy was a single factor for complications, such as impaired healing, infection, dehiscence and fistula, with higher rates when radiotherapy is added [9-11].

A systematic review of the literature that included 50 studies with 3292 patients after STL documented overall complication rate in 67.5%, and pharyngocutaneous fistula had incidence of 28.9% [9-11]. Five years disease free survival rate in this study depended significantly on: advanced clinical disease stage, tumor localization, early recurrence and previous therapy. Compared to STL, primary radical surgery produced the best survival rates, with fewer complications.

This implies that chemoradiotherapy as initial treatment option for advanced laryngopharyngeal cancer should be offered when surgery is contraindicated, and also knowing complications and survival rate compared to primary surgery. Early diagnosis and better initial radio- and chemotherapeutical modalities are needed. The strength of the study is a relatively big number of treated patients, and comparison of PTL and STL, while weakness is its retrospective nature.

## Conclusion

Primary total laryngectomy (PTL) for advanced laryngopharyngeal carcinoma is associated with less complications and better disease free survival rate than salvage surgery (STL). Previous treatment (partial

laryngectomy, radio, or chemoradiotherapy) was significant factor for complications and survival rate.

## References

- Lefebvre JL (2009) Surgery for Laryngopharyngeal SCC in the Era of Organ Preservation. *Clin Exp Otorhinolaryngol* 2: 159-163.
- Hoffman HT, Porter K, Karnell LH, Cooper JS, Weber RS, et al. (2006) Laryngeal Cancer in the United States: Changes in Demographics, Patterns of Care, and Survival. *Laryngoscope* 116: 1-13.
- Olsen KD (2010) Reexamining the Treatment of Advanced Laryngeal Cancer. *Head Neck* 32: 1-7.
- Weber RS, Berkey BA, Forastiere A, Cooper J, Maor M, et al. (2003) Outcome of Salvage Total Laryngectomy following Organ Preservation Therapy. *Arch Otolaryngol Head Neck Surg* 129: 44-49.
- Stoeckli SJ, Pawlik AB, Lipp M, Huber A, Schmid S (2000) Salvage Surgery after Failure of Nonsurgical Therapy for Carcinoma of the Larynx and Hypopharynx. *Arch Otolaryngol Head Neck Surg* 126: 1473-1477.
- Herranz J, Sarandeses A, Fernandez MF, Barro CV, Vidal JM, et al. (2000) Complications after Laryngectomy in Nonradiated Laryngeal and Hypopharyngeal Carcinomas. *Otolaryngol Head Neck Surg* 122: 892-898.
- Cavalot AL, Gervasio CF, Nazionale G, Nazionale G, Albera R, et al. (2000) Pharyngocutaneous Fistula as a Complication of Total Laryngectomy: Review of the Literature and Analysis of Case Records. *Otolaryngol Head Neck Surg* 123: 587-592.
- Morgan JE, Breau RL, Suen JY, Hanna EY (2007) Surgical Wound Complications after Intensive Chemoradiotherapy for Advanced Squamous Cell Carcinoma of the Head and Neck. *Arch Otolaryngol Head Neck Surg* 133: 10-14.
- Hasan Z, Dwivedi RC, Gunaratne DA, Virk SA, Palme CE, et al. (2006) Systematic review and meta-analysis of the complications of salvage total laryngectomy. *Eur J Surg Oncol* 43: 42-51.
- Sandulache VC, Vandelaar LJ, Skinner HD, Cata J, Hutcheson K, et al. (2016) Salvage total laryngectomy after external-beam radiotherapy: A 20-year experience. *Head Neck* 38: E1962-E1968.
- Delgado IL, Ayora JR, Britze OA, Lopez IG, Guirado TM, et al. (2014) Salvage surgery for locoregional recurrences of advanced pharyngolaryngeal squamous cell carcinoma after organ preservation failure. *Acta Otorhinolaryngol Ital* 34: 382-388.