

Otolaryngology -- Head and Neck Surgery

<http://oto.sagepub.com/>

Oncologic Outcomes after Supracricoid Partial Laryngectomy

Isabel Sánchez-Cuadrado, Alejandro Castro, Ricardo Bernáldez, Antonio Del Palacio and Javier Gavilán

Otolaryngology -- Head and Neck Surgery 2011 144: 910 originally published online 1 March 2011

DOI: 10.1177/0194599811400368

The online version of this article can be found at:

<http://oto.sagepub.com/content/144/6/910>

Published by:



<http://www.sagepublications.com>

On behalf of:



AMERICAN ACADEMY OF
OTOLARYNGOLOGY-
HEAD AND NECK SURGERY

FOUNDATION

[American Academy of Otolaryngology- Head and Neck Surgery](http://www.aao-hns.org)

Additional services and information for *Otolaryngology -- Head and Neck Surgery* can be found at:

Email Alerts: <http://oto.sagepub.com/cgi/alerts>

Subscriptions: <http://oto.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Oncological Outcomes after Supracricoid Partial Laryngectomy

Isabel Sánchez-Cuadrado, MD¹, Alejandro Castro, MD¹, Ricardo Bernáldez, MD¹, Antonio Del Palacio, MD¹, and Javier Gavilán, MD¹

Otolaryngology—
 Head and Neck Surgery
 144(6) 910–914
 © American Academy of
 Otolaryngology—Head and Neck
 Surgery Foundation 2011
 Reprints and permission:
sagepub.com/journalsPermissions.nav
 DOI: 10.1177/0194599811400368
<http://otojournal.org>



No sponsorships or competing interests have been disclosed for this article.

Abstract

Objective. To review the oncologic outcomes of a series of supracricoid partial laryngectomy.

Design. Case series with chart review.

Setting. La Paz University Hospital, Madrid, Spain.

Patients. Forty-one patients with glottic or supraglottic squamous cell carcinoma who underwent supracricoid partial laryngectomy between 1998 and 2008 at the authors' institution.

Main Outcome Measure. Local control rate, specific-disease survival rate, and overall survival rate.

Results. All patients were male, with a mean age of 56 years (range, 38–71 years). Forty-one percent of tumors were classified as locally advanced carcinomas (T3–T4). Thirty-three patients (80%) underwent supracricoid laryngectomy with cricothyroidopiglotomy. Epiglottis was resected in the remaining 8 patients. One patient died in the immediate postoperative period because of cardiac tamponade, 6 developed pneumonia, 2 had a postoperative bleeding that required reintervention, and 2 developed pharyngocutaneous fistula. The median follow-up period was 43 months. More than 85% of the patients completed more than 2 years of follow-up. Five-year actuarial local control rate was 80%, being 92% for T1–T2 tumors and 67% for locally advanced tumors. Thirty-five patients (85%) preserved their larynx. The 6 patients who underwent total laryngectomy had a local recurrence or a regional recurrence that infiltrated the larynx. No laryngectomy was performed for functional reasons.

Conclusion. Supracricoid partial laryngectomy is an oncologically safe procedure to preserve laryngeal functions in selected patients with glottic and supraglottic carcinomas.

Keywords

supracricoid partial laryngectomy, laryngeal cancer, survival

Received July 13, 2010; revised December 20, 2010; accepted January 24, 2011.

Several options are available to treat laryngeal cancer. The debate between surgical and nonsurgical oncologists is still in the forefront.^{1,2} Social importance of larynx functions leads to preserve them whenever it is possible. Organ preservation strategies based in a combination of chemotherapy and radiotherapy (RT) are reported to achieve similar oncologic outcomes to surgery but at the cost of notable toxic effects.^{2–4} Moreover, in tumors that infiltrate the cartilages of the larynx or in bulky tumors, oncologic results of chemoradiation protocols are not as good as after surgery, and functional results are also poor.^{4–6}

In the past decades, the surgical treatment of laryngeal cancer has moved from radical (total laryngectomy [TL]) toward more conservative surgical techniques (partial laryngectomies) in selected patients. Local control and survival rates are similar.^{1,7,8} The most important advantage of partial laryngectomy is function preservation (normal way of speech and swallowing and the lack of a permanent tracheostoma) leading to a better quality of life.^{9–11}

One of these conservative procedures is the supracricoid partial laryngectomy (SCPL) first described by Majer and Rieder in 1959¹² and modified by Piquet et al in 1974.¹³ The resection includes both true and false vocal cords, paraglottic space, and the entire thyroid cartilage in block. If needed, it may include the epiglottis and the pre-epiglottic space or one entire arytenoid. Resection of both structures in the same patient (epiglottis and arytenoid) is not recommended because of high risk of aspiration. The reconstruction is performed by 3 sutures that tuck the cricoid up tightly to the hyoid bone in the cricothyroidopexy (CHP) or cricothyroidopiglotomy (CHEP) if the epiglottis is preserved and sutured. Preservation of the recurrent laryngeal and the hypoglossal nerves is absolutely essential to ensure swallowing.

Indications for the SCPL are glottic tumors that affect 1 or both vocal cords as well as supraglottic cancers that invade or extend into the glottic level. In some cases, it may

¹La Paz University Hospital, Madrid, Spain

Corresponding Author:

Isabel Sánchez-Cuadrado, MD, Paseo de la Castellana 261, 28046 Madrid, Spain

Email: iscuadrado@gmail.com

be difficult to distinguish a glottic carcinoma from a supraglottic carcinoma when it becomes transglottic. Cancers with vocal cord fixation, but preserving arytenoid morbidity, with or without superficial invasion of 1 arytenoid, might be considered suitable for this operation.^{14,15}

Limits of the resection include wide invasion of the base of the tongue that force to a resection closer than 1 cm from the V-shaped groove, as it can lead to swallowing difficulties due to incomplete neoglottic closure. The extension to interarytenoid space, subglottic extent of tumor reaching the superior border of the cricoid cartilage, massive pre-epiglottic space invasion affecting the hyoid bone, or extralaryngeal spread also contraindicate SCPL.

Preoperative evaluation is very important, as patients with poor pulmonary function or other medical conditions are not candidates for this technique. Other factors such as occupation or patient expectations should be taken into account.^{1,14}

In summary, SCPL is a partial laryngectomy technique that allows safe resection of selected T1-T3 glottic or supraglottic tumors. The objective of this study is to review the oncologic outcomes of patients who underwent SCPL at our department.

Patients and Methods

A retrospective review of the medical records of every patient who underwent SCPL between 1998 and December 2005 was performed. Twenty-seven patients were identified during that period. From January 2006 until October 2008, 14 patients were prospectively included in the study. Thus, a total of 41 patients were studied. No patient was excluded.

The study was approved by the Research Ethics Board of La Paz University Hospital. Data concerning demographics, tumor evaluation, surgery, and follow-up were collected. Oncologic outcomes were measured by the Kaplan-Meier method, including the 3- and 5-year local control rate, disease-specific survival rate, and overall survival rate. SPSS software was used for the analysis (SPSS Inc, an IBM Company, Chicago, Illinois).

Results

Patient Population

Forty-one patients with squamous cell carcinoma of the larynx underwent SCPL. All of them were men, and their ages at the time of surgery ranged from 38 to 71 years.

Data concerning demographics, tumor evaluation, surgery, and postoperative period are summarized in **Table 1**. The type of SCPL was based on tumor localization and extension. Eight of the 11 patients with arytenoid resection had vocal cord paralysis at preoperative evaluation. Concerning the complications, 1 postoperative death was due to a cardiac tamponade, 2 fistulas were developed before decannulation and feeding (both were resolved by dressing), and the 6 patients who developed pneumonia during the postoperative period were treated with antibiotics and resolved in few days.

Staging was established according to the American Joint Committee for Cancer classification and is summarized in **Table 2**. No distant metastases were observed at diagnosis.

Seventeen patients (41%) had simultaneous neck dissection: bilateral functional neck dissection was performed in 15 cases (8 supraglottic tumor, 5 glottic tumors with vocal cord palsy, and 2 glottic tumors with supraglottic invasion), ipsilateral functional neck dissection was performed in 1 case (T3N0 glottic), and functional neck dissection plus contralateral modified radical neck dissection was performed in another case (T3N3 supraglottic). Adjuvant RT was used in 2 patients with extracapsular spread of the neck disease.

During the course of the operation, a temporary tracheostomy was always performed, and a nasogastric feeding tube was inserted. The nasogastric tube was removed after a median of 18 days (range, 7-608 days). Because of postoperative aspiration, 1 patient required a temporary percutaneous gastrostomy, which was removed on the 608th postoperative day. Forty of 41 patients (97%) were decannulated after a median of 14 days (range, 7-88 days). One patient could not be decannulated because of fibrous laryngeal stenosis despite 5 endoscopic laser resections.

Oncologic Outcomes

Follow-up after surgery varied from 12 months to 10 years, with a median of 5 years. This time was measured from the date of the laryngectomy until the date of the last contact or death.

Locoregional recurrence occurred as first-time relapse site in 10 patients (25%): 4 patients exclusively at the primary site, 4 cases at neck lymph nodes, and 2 patients at both sites. Thus, 6 of the recurrences were located at the primary site. TL was performed in 6 of the 10 recurrences: 4 of them following local relapse and the other 2 following regional recurrence that infiltrated the larynx.

RT was used for recurrence in 8 patients. Three of the patients presented a local relapse: it was treated with only RT in 2 cases as the recurrence was limited and the function was still preserved; the other patient had already lost laryngeal function, and a TL followed by adjuvant RT was employed. The remaining 5 patients presented a locoregional recurrence: 4 of them underwent surgery and adjuvant RT (in 2 cases, the larynx was removed as it was attached to the tumor), and the other patient presented an inoperable regional recurrence and received RT as palliation.

No chemotherapy was administered.

At the time of the study, 14 of these patients (34%) had died. Eight patients (19%) died of causes that were not related to laryngeal carcinoma, and 6 patients (15%) died of the disease. Of the 6 deaths related to disease, 3 occurred in patients with local recurrence and the remaining 3 in patients with regional recurrence.

Actuarial analysis of the 3- and 5-year local control rate, specific-disease survival rate, and overall rate is summarized at **Table 3**. The analyzed data curves are shown in **Figures 1, 2, and 3**.

Table 1. Baseline Characteristics of All SCPL Patients Evaluated for Oncologic Outcomes

Characteristic	SCPL Patients
No.	41
Median age, y	57
Male gender	41 (100%)
Tumor site	
Glottis	32 (78%)
Supraglottis	9 (22%)
Surgery	
CHEP	33 (80%)
Arytenoid resection	11 (27%)
CHP	8 (20%)
Complications	
Fistula	2 (5%)
Bleeding	2 (5%)
Pneumonia	6 (15%)
Death	1 (2%)
Radiation therapy	
None	31 (75%)
Adjuvant	2 (5%)
Recurrence	8 (20%)

Abbreviations: CHEP, cricothyroidoepiglottopexy; CHP, cricothyroidopexy; SCPL, supracricoid partial laryngectomy.

Thirty-five of 41 patients (85%) were alive with a functioning larynx after the follow-up period. TL was always performed for oncologic reasons.

Elderly Patients

Five patients in our series were older than 65 years at diagnosis. During the postoperative period, only 1 of these patients had a complication. This was a case of pneumonia that was resolved. All of the patients but 1, who died for another reason, are still alive with a functioning larynx.

Discussion

The main treatment goal for patients with laryngeal cancer is to propose the best oncologic treatment with the least functional consequences. TL allows good oncologic results but carries a definitive tracheostomy and the loss of laryngeal voice. SCPL is a fascinating alternative to TL in the treatment of selected laryngeal carcinomas, including

Table 2. Staging Tumors after Supracricoid Partial Laryngectomy

	T1a	T1b	T2	T3	
Glottic	3	8	7	12	N0
				1	N1
			1		N2
Supraglottic			5	2	N0
					N1
				1	N2
				1	N3
Total	3	8	13	17	41

locally advanced tumors, being conservative of laryngeal functions.

As a procedure designed for the treatment of the primary site, local control rate must be used to evaluate the results of SPCL. In our series, these results compare to those reported for TL.

In patients with selected locally advanced endolaryngeal carcinomas classified as T3 to T4, SCPL also reduces the indications for TL without decreasing local control.⁸ Our series corroborates such a statement with the achievement of 67% 5-year actuarial local control and a laryngeal preservation rate of 71%.

SCPL has more extensive indications compared with other partial laryngectomies. Chevalier et al¹⁵ showed that the motilities of the vocal cord and arytenoid should be studied separately since there is sometimes apparent vocal cord fixation with some motion at the arytenoid that does not contraindicate surgery. In our series, 8 arytenoids of CHEP patients were removed for this reason.

Our series is relatively small due to the strict selection criteria used. T1-T3 strictly supraglottic tumors are usually resected with horizontal supraglottic laryngectomy. Concerning glottic cancers, patients staged as T1a are usually treated with transoral laser cordectomy. The 3 pT1a patients included in this study had been classified as cT1b. No T4 tumor was included, as wide invasion of the tongue base or extralaryngeal spread are considered contraindications for this technique.

Surgical complications such as postoperative bleeding and pharyngocutaneous fistula were noted, each one in 2 patients (5%) in our series. Both fistulae were controlled by

Table 3. Kaplan-Meier Analysis for the Whole Population, Divided into Locally Early and Advanced Tumors

	Local Control, %		Disease-Specific Survival, %		Overall Survival, %	
	3 y	5 y	3 y	5 y	3 y	5 y
T1-T2	100	92	89	89	78	78
T3	67	67	100	64	81	52
Total population	86	80	93	81	79	69

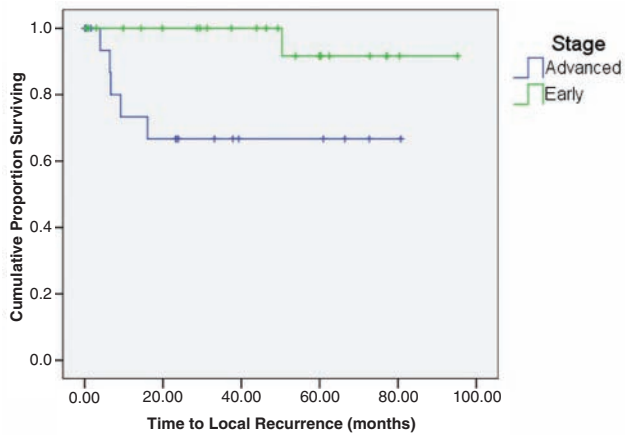


Figure 1. Kaplan-Meier analysis of local control rate in patients with early and advanced tumors (T1-T2 vs T3 disease).

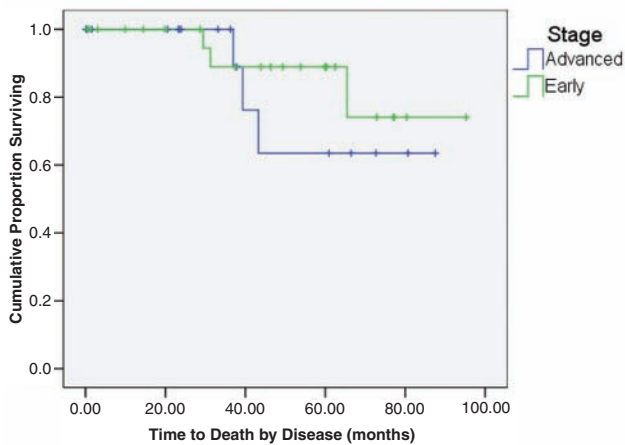


Figure 2. Kaplan-Meier analysis of disease-specific survival in patients with early and advanced disease.

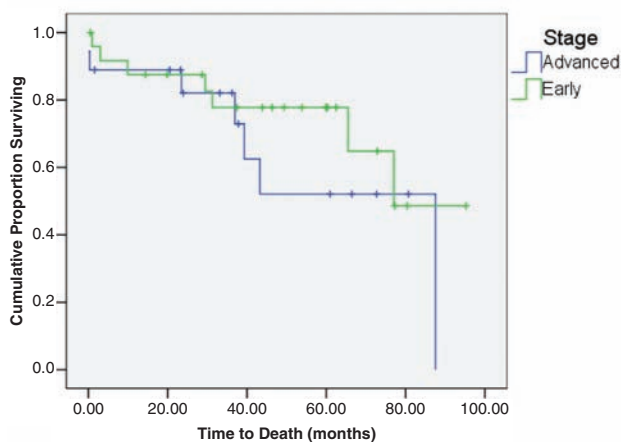


Figure 3. Kaplan-Meier analysis of overall survival in patients with early and advanced disease.

compressive dressing. One patient (2%) died in the immediate postoperative period, and death was not related to the surgical technique. Such rates are lower than the rates achieved after total laryngectomy.

With regard to respiration, decannulation was obtained in all patients but one. Some impairment of swallowing was present at the beginning of oral feeding, but all patients managed finally to eat without severe aspirations.¹⁶ Aspiration is common in the immediate postoperative period of SCPL. Most cases have subclinical aspiration, and the risk of pneumonia is increased when compared with TL (15% in our series). However, none of our patients had a severe pulmonary infection, as pulmonary function was strictly considered during the preoperative evaluation.

Our elderly patient’s results can also be compared with those in the literature.¹⁷ Despite that aging impairs pharyngolaryngeal motility and feeling, restricting pulmonary function, only 1 of our elderly patients had a postoperative pneumonia from aspiration. Thus, age by itself should not be considered a contraindication to SCPL.

At our department, more than 50 laryngeal cancer patients undergo surgery every year. Since the introduction of SCPL, more than 500 patients underwent laryngeal cancer surgery. Our SCPL series is relatively small due to the strict preoperative patient selection criteria.

In our opinion, oncologic strict selection combined with good pulmonary function is the key to satisfactory oncologic and functional results with a low complication rate in SCPL.

Conclusion

Supracricoid partial laryngectomy with CHEP or CHP is a valid alternative to TL when oncologic indications are correctly applied. It creates a functionally adequate neolarynx for respiration, phonation, and swallowing.

Our results collected over 10 years are comparable to those reported in literature, emphasizing that strict selection criteria lead to excellent local control and functional results with low morbidity.

Author Contributions

Isabel Sánchez-Cuadrado, corresponding author, design, analysis, revision, final approval; **Alejandro Castro**, design, revision, final approval; **Ricardo Bernáldez**, acquisition of data, revision, final approval; **Antonio Del Palacio**, acquisition of data, revision, final approval; **Javier Gavilán**, analysis, revision, final approval.

Disclosures

Competing interests: None.

Sponsorships: None.

Funding source: None.

References

1. Gallo A, Mancio V, Simonelli M, et al. Supracricoid partial laryngectomy in the treatment of laryngeal cancer: univariate

- and multivariate analysis of prognostic factors. *Arch Otolaryngol Head Neck Surg*. 2005;131:620-625.
2. Lefebvre JL. Laryngeal preservation in head and neck cancer: multidisciplinary approach. *Lancet Oncol*. 2006;7:747-755.
 3. Lefebvre JL, Rolland F, Tessler M, et al. Phase 3 randomized trial on larynx preservation comparing sequential vs alternating chemotherapy and radiotherapy. *J Natl Cancer Inst*. 2009;101:142-152.
 4. 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;24:3693-704.
 5. Fung K, Lyden TH, Lee J, et al. Voice and swallowing outcomes of an organ-preservation trial for advanced laryngeal cancer. *Int J Radiat Oncol Biol Phys*. 2005;63:1395-1399.
 6. Pellini R, Pichi B, Ruscito P, et al. Supracricoid partial laryngectomies after radiation failure: a multi-institutional series. *Head Neck*. 2008;30:372-379.
 7. Bron L, Pasche P, Brossard E, et al. Functional analysis after supracricoid partial laryngectomy with cricothyroidoepiglottomy. *Laryngoscope*. 2002;112:1289-1293.
 8. Weinstein GS, El-Sawy MM, Ruiz C, et al. Laryngeal preservation with supracricoid partial laryngectomy results in improved quality of life when compared with total laryngectomy. *Laryngoscope*. 2001;111:191-199.
 9. Gillespie MB, Brodsky MB, Day TA, et al. Swallowing-related quality of life after head and neck cancer treatment. *Laryngoscope*. 2004;114:1362-1367.
 10. Makeieff M, de la Breteque A, Guerrier B, et al. Voice handicap evaluation after supracricoid partial laryngectomy. *Laryngoscope*. 2009;119:746-750.
 11. Schindler A, Favero E, Nudo S, et al. Long-term voice and swallowing modifications after supracricoid laryngectomy: objective, subjective, and self-assessment data. *Am J Otolaryngol*. 2006;27:378-383.
 12. Majer H, Rieder A. Technique de la laryngectomie permettant de conserver la perméabilité respiratoire: la crico-hyoidopexie. *Ann Otolaryngol Chir Cervicofac*. 1959;91:677-683.
 13. Piquet JJ, Desaulty A, Decroix G. Crico-hyoido-epiglottopexy: surgical technic and functional results [in French]. *Ann Otolaryngol Chir Cervicofac*. 1974;91:681-686.
 14. Holsinger FC, Laccourreye O, Weinstein GS, et al. Technical refinements in the supracricoid partial laryngectomy to optimize functional outcomes. *J Am Coll Surg*. 2005;201:809-820.
 15. Chevalier D, Laccourreye O, Brasnu D, et al. Cricohyoidoepiglottopexy for glottic carcinoma with fixation or impaired motion of the true vocal cord: 5-year oncologic results with 112 patients. *Ann Otol Rhinol Laryngol*. 1997;106:364-369.
 16. Farrag TY, Koch WM, Cummings CW, et al. Supracricoid laryngectomy outcomes: the Johns Hopkins experience. *Laryngoscope*. 2007;117:129-132.
 17. Laccourreye O, Brasnu D, Perie S, et al. Supracricoid partial laryngectomies in the elderly: mortality, complications, and functional outcome. *Laryngoscope*. 1998;108:237-242.