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Original article

Role of supracricoid partial laryngectomy with cricohyoidoepiglottopexy in glottic carcinoma with anterior commissure involvement

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ABSTRACT

Objectives: To analyze oncologic and functional outcomes after supracricoid laryngectomy with cricohyoidoepiglottopexy (SCL-CHEP) in glottic carcinoma with anterior commissure (AC) involvement, to determine predictive factors, and to compare results with those reported for other therapeutic strategies.
Material and methods: A retrospective analysis included all patients who underwent SCL-CHEP for glottic squamous cell carcinoma with anterior commissure involvement in our institution, between 2000 and 2014. Swallowing function was evaluated on the DOSS (Dysphagia Outcomes and Severity Scale).
Results: Fifty-three patients were included. Three-year overall, cause-specific and recurrence-free survival rates were 86, 95 and 80%, respectively. There were 5 cases of local recurrence (9%), all treated by total laryngectomy. Smoking was the only predictive factor of recurrence-free survival ($P = 0.02$). Mean DOSS score was 5.5 ± 0.9. DOSS scores ≥ 6 (normal oral feeding) were recovered by 59% of patients. T-stage ≥ 2 was the only predictive factor for DOSS score ($P = 0.04$).
Conclusion: In glottic carcinoma with anterior commissure involvement, SCL with CHEP provided a local control rate of more than 90%, which is higher than reported with endoscopic surgery or external radiotherapy. However, contrary to LSC, salvage of local recurrence can often be obtained by conservative treatments after endoscopic surgery. Therefore, total-laryngectomy-free survival rates after SCL-CHEP and endoscopic surgery are finally comparable.

1. Introduction

External radiation therapy and CO_2 laser endoscopic surgery are the two most widely used treatment strategies in early-stage (T1-T2) glottic carcinoma [1–5]; partial open laryngeal surgery has greatly decreased over the last 20 years [6], but still has a role to play, especially in case of anterior commissure involvement [7,8], which constitutes the main limitation to good tumor exposure in endoscopy [9–11]. Moreover, whichever the option – endoscopy or radiation – local control is considerably impaired by anterior commissure involvement [4,10,12]. One reason for this is the proximity of cartilage at the anterior commissure, leading to frequent involvement of the thyroid cartilage even in apparently limited tumor [8].

Various partial laryngectomy techniques are available, but supracricoid laryngectomy (SCL) with cricohyoidoepiglottopexy (CHEP) is one of the most widely used in glottic carcinoma with anterior commissure involvement [7,13].

The aims of the present study were to analyze oncologic and functional results of SCL-CHEP in glottic carcinoma with anterior commissure involvement, and determine predictive factors. This analysis reopens the discussion of the place of SCL-CHEP within the therapeutic armamentarium for these tumors, with respect to endoscopic surgery or radiation therapy.

2. Material and methods

2.1. Population

A retrospective study included all patients undergoing SCL-CHEP for glottic squamous-cell carcinoma with anterior commissure involvement in our institution between 2000 and 2014. All patients received and signed a written consent form.

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Comorbidities were assessed on the American Society of Anesthesiologists (ASA) score. Tumor staging used the 2009 tumor/node/metastasis (TNM) classification of the American Joint Committee on Cancer (AJCC).

2.2. Data and main criteria

Analysis of computerized patient files harvested the following clinical and histologic data: age, gender, ASA score, specimen pathology data, postoperative complications, tumor recurrence, mortality and cause of death, and swallowing and phonation quality at 1 year's follow-up.

Swallowing was assessed according to false passage (Pearson classification) and the Dysphagia Outcomes and Severity Scale (DOSS) [14]. DOSS is widely used internationally, assessing dysphagia severity on 7 grades. Grades 6 and 7 correspond to unrestricted oral feeding; grades 1 and 2 require enteral feeding (1, total; 2, partial); and grades 3 to 5 are intermediate situations in which oral feeding is feasible without enteral feeding but limited to certain textures, adapted food and vigilance on the part of the patient.

Phonation was graded as: 3 – normal or nearly normal; 2 – slightly impaired, with slight fatigue but without need of repetition; 1 – moderately impaired, with problematic fatigue and need of repetition, but intelligible; 0 – severely impaired or impossible, and unintelligible.

2.3. Statistical analyses

Overall, specific and recurrence-free survival was estimated following Kaplan-Meier.

The following possible factors for oncologic and functional results were analyzed: gender, age ($\geq$ vs. < 70 years), comorbidity (ASA $\geq$ vs. < 3), smoking ($\geq$ vs. < 10 pack-years), alcohol abuse ($\geq$ vs. < 3 units pure alcohol per day on average), clinical T stage ($\geq$ vs. < 2), histologic T stage ($\geq$ vs. < 2), histologic involvement of subglottic or thyroid cartilage, vascular embolism, perineural invasion, arytenoid unit resection, positive resection margins, and postoperative radiation or radio-chemotherapy.

Oncologic results were assessed on univariate analysis by log-rank tests and on multivariate analysis by Cox models. For functional results, univariate analysis used Chi^2 tests confirmed by Fisher exact tests, and multivariate analysis under logistic regression models. Variables showing $P \leq 0.05$ on univariate analysis were included in multivariate analysis; multivariate analysis was not implemented if no more than 1 variable was significant on univariate analysis.

All statistical tests were performed by an experienced biostatistician, using R.2.10.1 software under Windows. Tests were 2-tailed, with the significance threshold set at 5%.

3. Results

3.1. Patient data

Fifty-three patients (all male; mean age, 63.3 ± 9.0 years) were included.

Table 1 shows the main clinical data.

Pathologic analysis of the specimen found positive margins in 3 cases. Table 2 shows pathology data.

3.2. Postoperative course

The tracheotomy cannula was withdrawn at a median 11 days (range, 6–73 days), and the nasogastric tube at a median 20 days (range, 8–120 days). Median hospital stay was 21 days (range, 10–76 days).

Table 1
Clinical data for the 53 patients.

Characteristics	Number of cases (n = 53)	Percentages
Gender: male/female	53/0	100/0
Age: < 70/> 70 years	40/13	75/25
ASA score: 1/2/3	8/33/12	15/62/23
Smoking: < 10/≥ 10 pack-years	6/47	11/89
Alcohol: < 3/≥ 3 units per day	27/26	51/49
T stage: T1/T2/T3	38/11/4	72/21/8
N stage: 0/1/2–3	51/2/0	96/4/0
Neck dissection: no/ipsilateral/bilateral	38/7/8	71/14/15
Number of conserved arytenoids: 1/2	8/45	15/85
Postoperative treatment: 0/RT/RTCT	50/1/2	94/2/4

RT: radiation therapy; RTCT: concomitant radiation chemo-therapy.

Table 2
Pathology specimen, data.

Histologic data	Number of cases (n = 53)	Percentages
Positive margins	3	6
Perineural invasion	2	4
Vascular emboli	2	4
Histologic T stage: 1/2/3	37/10/6	70/19/11
Histologic N stage: x/0/≥ 1	38/15/0	72/28/0
Subglottic involvement	3	6
Thyroid cartilage involvement	2	4

Table 3
Oncologic results.

Survival[a]	Overall	Specific	Recurrence-free
2 years	94	100	89
3 years	86	95	80
5 years	86	95	75

[a] Kaplan-Meier estimate.

The local postoperative complications rate was 28% (15 patients out of 53: 10 hematomas/hemorrhages and 5 surgical site infections). The general postoperative complications rate was 21% (11 patients out of 53), the most frequent being pneumopathy (n = 5). One patient died of myocardial infarction on postoperative day 1 (postoperative mortality = 2%).

3.3. Oncologic results

Median follow-up was 3.4 years. Table 3 shows 2-, 3- and 5-year overall, specific and recurrence-free survival; Fig. 1 shows overall and recurrence-free survival curves. Five patients had local recurrence (9%) at a mean 27 months, with cervical lymph-node recurrence in 4 cases; there were no cases of isolated lymph-node recurrence without local recurrence. Total laryngectomy with neck dissection was performed in the 5 patients with local recurrence. There were no cases of metastatic recurrence. At last follow-up, 8 patients had died, including 3 from progression of the laryngeal cancer. Smoking (> 10 pack-years, active or former) was the only significant factor for overall (P = 0.01), specific (P = 0.02) or recurrence-free survival (P = 0.02); none of the other factors listed in the Material and methods section had significant impact.

3.4. Functional results

Functional results were assessed at 12 months in 51 patients (1 patient deceased during postoperative course, and 1 lost to follow-up). Table 4 shows swallowing and phonation results. Mean DOSS score was 5.5 ± 0.9, with 59% of patients achieving DOSS ≥ 6 (normal oral feeding). Two patients (4%) had long-term enteral feeding,

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