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Transoral laser microsurgery for recurrence after primary radiotherapy of early glottic cancer

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Abstract

Objective: To analyze oncological results of transoral laser microsurgery (TLM) on recurrent early glottic cancer after primary radiotherapy.
Methods: The records of 53 patients treated by TLM for early (rTis–rT2) and advanced (rT3, rT4) recurrence after curative radiotherapy were retrospectively analyzed. Data on loco-regional control, overall survival, and disease specific survival were calculated by the Kaplan–Meier method. The larynx preservation rates were given absolutely.
Results: Mean post-therapeutic follow-up time after TLM for patients alive was 87.9 months. Twenty-two patients (42%) were cured by the first TLM procedure, but one of them underwent total laryngectomy after TLM due to chondronecrosis without evidence of residual tumor. Thirty-one patients (58%) developed another recurrence after TLM. Ten of them were cured by further laser procedures alone. Therefore, in 31 patients (58%), local recurrences were successfully treated by TLM alone. In 20 patients, recurrences could not be controlled by TLM: 14 patients underwent salvage laryngectomy and six palliative treatment. Three- and five-year loco-regional control rates for all patients were 46.1 and 38.8%. Three- and five-year overall survival rates were 67.5 and 53.3%. The corresponding 3- and 5-year disease specific survival rates were 68.6%, each. There was no statistically significant difference in loco-regional control or survival between patients presenting initially with early and advanced recurrence. Further recurrence after the first TLM procedure was associated with a statistically significant decrease in 3- and 5-year overall (56.6% vs. 81.8% and 40.2% vs. 70.5%; $p = 0.03$) and disease specific (48.9% vs. 100%, each; $p = 0.001$) survival. Ultimate local control rate including repeated TLM and salvage laryngectomy was 77.4%.
Conclusions: Many patients with recurrent glottic carcinoma after primary radiotherapy can be cured by single or repeated TLM as an organ-preserving procedure. However, in case of failure after TLM for the first recurrence, salvage laryngectomy should be considered early as local control by further laser surgery is unfavorable.
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Keywords: Early glottic cancer; Primary radiotherapy; Treatment of recurrence; Transoral laser microsurgery

1. Introduction

Primary radiotherapy is a widely accepted treatment option in patients with early glottic cancer preserving favorable local control and good functional results. In case of recurrence, however, it cannot be repeated in most cases and surgery is reserved as a further treatment option. In this context, total laryngectomy is recommended for many patients as an oncologically safe salvage procedure but this means a reduced quality of life. Open partial laryngectomy procedures have been introduced as an organ-preserving salvage option for patients who experienced recurrence with limited (rT1–rT2) disease [1–7]. Despite satisfactory disease control, open partial laryngectomy procedures are expensive treatment options, including longer hospitalization, inconvenience, and morbidity due to tracheostomy and functional problems in many cases [8]. Furthermore, opening of the

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thyroid cartilage of a previously irradiated larynx favors severe postoperative complications, such as chondritis, chondronecrosis, and fistula.

In recent years, transoral CO_2 laser microsurgery (TLM) has been introduced as a minimally invasive and cost-effective treatment option not only for primary but also for recurrent treatment of early glottic cancer [9]. However, with regard to irradiation failure of early glottic cancer, up to now, the use of TLM for salvage has found limited application. In contrast to open partial laryngectomy procedures, the main advantage of TLM is that it is not necessary to open the larynx, thus minimizing the risk of subsequent chondronecrosis. Furthermore, TLM does not preclude its further use for another local recurrence.

The aim of this study was to evaluate TLM as a method of management of recurrent laryngeal carcinoma following failure of primary irradiation on a greater cohort of patients as there are only few reports on this subject in the literature. Endpoints of analysis were loco-regional control, overall survival, disease specific survival, and larynx preservation.

2. Patients and methods

Between November 1987 and July 2005, 76 patients presented with local or loco-regional recurrence of early glottic cancer at the Department of Otorhinolaryngology, University of Göttingen, Germany. All patients had undergone previous curative radiotherapy as the exclusive primary treatment modality. Mean dosage of irradiation was 63.1 Gy (range: 56–72 Gy). As irradiation had been performed outside our institution in all patients, we cannot provide any data on fractionation, target volume definition, or concomitant therapies. Total laryngectomy had been recommended for most cases especially with advanced local recurrence (rT3 and rT4), but the patients refused this procedure for the first recurrence. The routine preoperative examination comprised magnifying laryngoscopy and ultrasound of the neck in all patients. Chest radiographs were used for all patients in the diagnostic and staging procedures. Computed tomography with contrast medium or MRI scans of the head and neck were performed routinely if recurrent tumor in advanced stage had been assumed by magnifying laryngoscopy, but infrequently when there was evidence of early stage disease.

In six of the 76 patients (8%), total laryngectomy had to be performed due to deep extralaryngeal spread, gross infiltration of the thyroid or cricoid cartilage, and/or involvement of both arytenoids, as these conditions are not suitable for TLM. In another two patients (3%), external open partial laryngectomy was performed due to difficulties in endolaryngeal exposition of the tumor recurrence. The remaining 68 patients (89%) could be treated by TLM and, if necessary, uni- or bilateral neck dissection. Fifteen of the 68 patients treated by TLM (22%) were lost to follow-up.

All patients lost to follow-up, with treatment modalities other than TLM, and with total laryngectomy were excluded from our series. Thus, this study was based upon 53 patients treated by TLM for recurrent laryngeal disease. The median time to irradiation failure was 23 months, ranging from 3 to 218 months. Forty-five patients were male and eight patients were female. At the time of the first recurrence, the patients ranged in age from 36 to 92 years (median age, 67 years). Thirty-one of the 53 patients (58%) presented with early disease in the recurrent situation (1rpTis, 16rpT1, 14rpT2; all N0), whereas 22 patients (42%) had advanced local or loco-regional recurrence (17rpT3, 5rpT4a; 20N0, 2N+). Patients' characteristics are summarized in Table 1. The surgical procedures of TLM were similar as described by Steiner and Ambrosch [10] for early and advanced glottic cancer. The indications for TLM in the recurrent situation were glottic tumors with adequate endoscopic exposition but without infiltration of both arytenoids, without deep extralaryngeal spread, and without gross infiltration of thyroid and cricoid cartilage. On surgery, tumor-free excisions were ensured by frozen sections of the surgical margins if tumor borders were not clearly visible. Moreover, all margins were confirmed by permanent section in the

Table 1
Treatment characteristics of our 53 patients treated by TLM for local or loco-regional recurrence after primary radiotherapy of early glottic cancer.

Characteristic	No. of patients (%)
Gender	
Male	45 (85)
Female	8 (15)
T-status before primary radiotherapy	
Tis	6 (11)
T1	30 (57)
T2	17 (32)
rT-status as estimated by clinical examination at time of presentation for the first recurrence	
rcT1	45 (85)
rcT2	5 (9)
rcT3	1 (2)
rcT4	2 (4)
rT-status on TLM for the first recurrence	
rpTis	1 (2)
rpT1	16 (30)
rpT2	14 (27)
rpT3	17 (32)
rpT4	5 (9)
N-status at time of the first recurrence	
rN1	1 (2)
rN2a	
rN2b	1 (2)
rN2c	
rN3	
Anterior commissure involvement	
Yes	28 (53)
No	25 (47)
Histological grading	
1	3 (6)
2	46 (86)
3	4 (8)

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