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Anterior commissure laryngeal neoplasm endoscopic management

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Abstract

The CO_2 laser surgery represents a treatment method of laryngeal bicordal and anterior commissure glottic cancer T1b, T2, N0. In Department of ENT, Timisoara, Romania, during 1.01.2001–31.12.2011 were analyzed 781 files from patients with laryngeal neoplasm. One hundred twenty-seven patients presented the tumor that involved both vocal cords and anterior commissure, stages T1b, T2 and T3. Therapeutic options included CO_2 laser microsurgical excision for 55 (43.30%) patients, frontolateral hemilaryngectomy for 16 (12.59%) patients, total laryngectomy for 42 (33.07%) patients, radiotherapy for 10 (7.87%) patients, and four (3.14%) patients, initially, refused any treatment modality. Endoscopic laser CO_2 microsurgery was the primary and solitary management for curative resection of the glottic cancer. All operations were performed under general anesthesia with orotracheal intubations. The mean follow-up was 58 months, with the range between 36 to 84 months. Suspended microlaryngoscopy with CO_2 laser surgery has been performed in 43 (33.85%) patients staged T1bN0Mx and 12 (9.44%) patients staged T2N0Mx. In five (9.09%) patients, we encountered local recurrences. The endoscopic CO_2 laser surgery is in our view the elective and preferable surgical method in laryngeal glottic cancer stage T1b and T2 for cure, with oncological and functional results superior to those of conventional surgical procedures.

Keywords: glottic cancer, CO_2 laser, suspended microlaryngoscopy, curative resection.

Introduction

Head and neck squamous cell carcinoma represents the sixth incidence of all tumors. The treatment of laryngeal neoplasm tries to remove the cancer completely and to preserve respiration, phonation and deglutition, very important functions of human beings. These goals are difficult to be achieved especially when laryngeal cancer involves the anterior commissure, being known that one of the weakest resistance point in the invasiveness of the laryngeal carcinoma is the anterior neck mid-portion. This portion of the human body has a particular anatomy, with intimal contact between anterior vocal cords, anterior tendon and thyroid cartilage, without any muscular bundles between vocal cords and thyroid cartilage that could limit the invasiveness of the laryngeal cancer. Even if, in the last decades, there were many attempts to propose an optimal treatment for these cancers, there were no improvements regarding mortality in the last 30 years with all the actual diagnostic and therapeutic advantages [1].

Glottic cancer in initial stages (T1, T2N0) might be approached by endoscopic CO_2 laser surgery.

Glottic carcinoma represents the most frequent laryngeal cancer (60%). Early symptoms address the patients to the doctors. Glottic region has an important role in submucosal and lymphatic regional nodal extension limitation [2]. Treatment of glottic cancer involving anterior commissure still raises numerous controversies. Stage I and II might benefit from singular treatment (endoscopic CO_2 laser surgery or frontolateral hemilaryngectomy) or radiotherapy. The role of endoscopic CO_2 laser surgery is still unclear whether anterior commissure involvement may have an important role in worsening the patient prognosis. Potential benefits of radiotherapy are related to a better voice, especially in stage T2 [3]. For T3 and T4 tumors, there are three therapeutic plans that offer superior local control rate: frontolateral hemilaryngectomy or total laryngectomy, with or without neck dissection, radiotherapy followed by salvage surgery [4].

The aim of this work was to describe the oncological and functional results in patients with anterior commissure laryngeal neoplasm treated endoscopically with CO_2 laser and to highlight the benefits and the limitations of using CO_2 laser surgery at these patients.

Patients, Materials and Methods

In Department of ENT, Timişoara, Romania, we analyzed patient's files during the period 1.01.2001–31.12.2011. Out of 781 patients with laryngeal neoplasm, 127 patients presented the tumor, which involved both vocal cords and anterior commissure, stages T1b, T2 and T3.

Therapeutic options included CO_2 laser microsurgical excision in 55 (43.30%) patients, frontolateral hemilaryngectomy in 16 patients (12.59%), total laryngectomy in 42 (33.07%) patients, radiotherapy in 10 (7.87%) patients, and four (3.14%) patients, initially, refused any treatment modality.

The patient selection was performed using clinic, videoendoscopic and imagistic methods.

Endoscopic CO_2 laser microsurgery has been applied as primary and singular treatment modality. We used general anesthesia with orotracheal intubations and suspended microlaryngoscopy in all patients. Endoscopic CO_2 laser microsurgery selection and inclusion criteria were: glottic primary tumor, T criteria; macroscopic aspect – exophytic type; localization in anterior, medium and posterior 1/3, or entire vocal cord, but without involvement of arytenoids vocal process; supraglottic extension limited to the ventricle floor or subglottic extension below 5 mm in the area of anterior commissure; vocal cord mobility normal or diminished; lymph nodes, N criteria – lack of lymph nodes metastases, N0 (assessed by clinic and sonography exam); access to endoscopic and videomicrolaryngoscopic exam.

The rigorous patient selection, evaluation and oncological follow-up have been performed using video-endoscopic and imagistic exams [computed tomography (CT), magnetic resonance imaging (MRI) and sonography].

The tissue specimens were obtained by incisional biopsy, fixed in 4% buffered formalin (*v/v*), embedded in paraffin and prepared through classically histological technique. For diagnostic purpose, 3 μm serial sections were initially stained with Hematoxylin and Eosin (HE).

Results

All the patients were males. Age distribution revealed a high incidence in the fifth and sixth decade of life 51–60 years, 22 (40%) cases and 61–70 years, 45 (50.9%) patients. Mean age was 63 years old.

The diagnosis based on HE staining revealed the following types: squamous cell carcinoma (46 cases), malignant papilloma (seven cases) and adenoid cystic carcinoma (two cases) (Figures 1 and 2).

According with the grade of the tumor, there were classified as well differentiated laryngeal carcinoma – G1 stage (26 cases), moderately differentiated – G2 stage (18 cases) and poorly differentiated – G3 stage (11 cases).

Suspended microlaryngoscopy with CO_2 laser surgery has been performed in 43 (33.85%) patients staged T1bN0Mx and 12 (9.44%) patients staged T2N0Mx (Figures 3 and 4).

CT and MRI were performed with the intent of accurate evaluation of cartilage, pre-epiglottic space, subglottic and extralaryngeal involvement. MRI offered us reliable information regarding soft tissues, especially in case of lymph nodes involvement in obese or previously neck-operated patients. The mean follow-up was 58 months, with a range between 36 to 84 months.

Tracheotomy was not necessary in any case. Severe aspiration syndrome did not appear. Local edema was mild in four (7.27%) patients. We did not encountered and thyroid cartilage necrosis or perichondritis.

In the study group, we obtained healing, without any local or regional signs of recurrence in 90.9% of cases (50 patients) (Figure 5). Endolaryngeal local recurrence appeared in 9.09% of the cases (five patients). Two (3.63%) patients were in stage T1bN0Mx, with local recurrences at six and 12 months, respectively, and three (5.45%) patients were in stage II, T2N0Mx, with local recurrences at two, three and five months respectively. Salvage treatment consisted in endoscopic partial vertical CO_2 laser surgery in one (0.78%) stage I patient, T1bN0Mx (with recurrence at six months) and in two (1.57%) patients stage T2N0Mx (with recurrences at two and five months postoperative respectively). In the one (0.78%) second stage I patient, T1bN0Mx, with local recurrence at 12 months postoperative, we indicated subglottic total laryngectomy with neck dissection. The last patient (0.78%), stage II, T2N0Mx, which had recurrence at three months postoperative, opted for postoperative radiotherapy.

The difference between tumor recurrence and post-radiotherapy complications represented a challenge, extremely difficult to assess by clinic or imagistic exams.

Phonatory results were good in 25 (45.45%) patients due to neocord formation and satisfactory in 12 (21.81%) patients, staged T1b. In the rest of the 18 (32.72%) cases, eight patients staged T1b and 10 patients staged T2, which underwent cordectomy with anterior 1/3 contralateral vocal cord cordectomy and anterior commissure resection, the phonatory results were poor. Survival rates at 36 and 60 months were similar, around 98.18%.

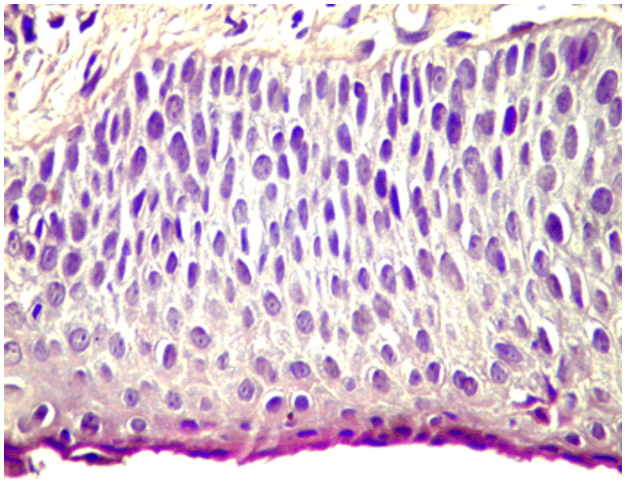

Figure 1 – ***Squamous metaplasia with partial keratinization and focal parakeratosis area in a squamous cell carcinoma patient, G2 stage (HE staining, ×400).***

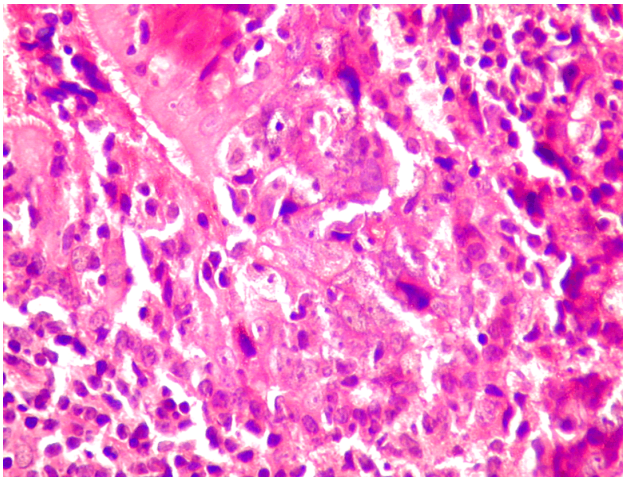

Figure 2 – ***Squamous cell carcinoma, G3 stage (HE staining, ×400).***

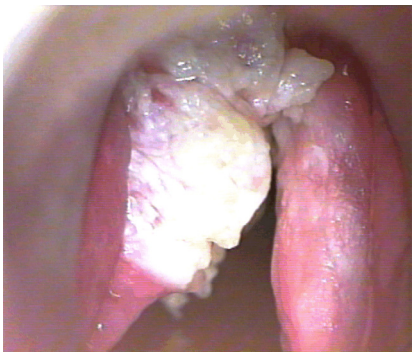

Figure 3 – ***Suspended microlaryngoscopy – T1b glottic tumor involving anterior commissure and anterior 2/3 of the left vocal cord and anterior 1/3 of the right vocal cord.***

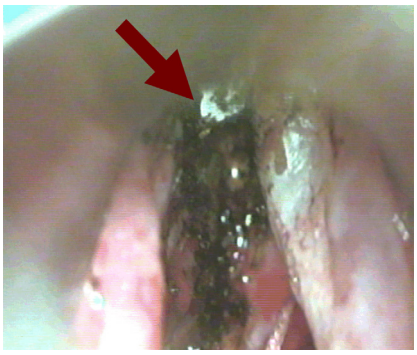

Figure 4 – ***Suspended microlaryngoscopy – CO_2 laser tumor excision was performed removing left vocal cord, anterior commissure (arrow) and anterior 1/3 right vocal cord).***

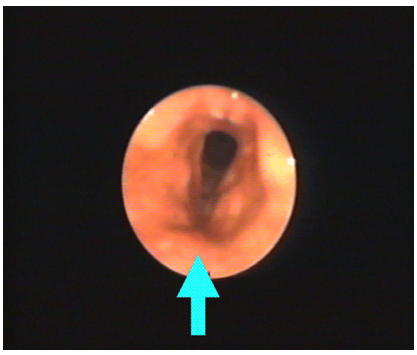

Figure 5 – ***Fiberoptic exam – follow-up after one year, no signs of recurrences in glottic region and at the anterior commissure level (arrow).***

Discussion

Larynx cancer represents an easy preventable pathology, being caused by alcohol and tobacco consumption. The incidence is variable according to geographic areas and human races [5–7].

The treatment of anterior commissure cancer creates controversies regarding which method is best: surgery or radiotherapy. Some authors advocate for primary radiotherapy, among other favor for partial laryngectomy as election therapeutic method [8].

It is difficult to obtain a maximum oncological efficacy by endoscopic CO_2 laser suspended microlaryngoscopy approach for anterior commissure cancer due to the lack of internal thyroid perichondrium at this level and due to cartilage vicinity. Most of the surgeons stress the fact that anterior commissure cancer represents the area with the high recurrence rate (approximately 70%), despite of therapeutic modality: radiotherapy, conventional partial surgery, endoscopic CO_2 laser microsurgery. Vertical partial endoscopic CO_2 laser microsurgery represents a convenient therapeutic alternative for T1a, T1b and T2 glottic cancers, with high oncological efficacy. The selection criteria and preoperative evaluation has to be accurate [9–11].

Therapeutic purpose is curative and laryngeal voice preservation. Specialty literature indicates that local control recurrence rates, laryngeal preservation and survival rates were similar in cases of endoscopic CO_2 laser resections, open partial laryngectomy and radiotherapy.

Endoscopic CO_2 laser microsurgery applied for glottic cancer presents some contraindications and oncological limits:

- T3 stage tumor, in which the vocal cord is immobile due to profound muscle infiltration;
- T4 stage with cartilaginous structures involvement: 30% contralateral vocal cord involvement and supraglottic extension (ventricular fold, Morgagni ventricle);
- subglottic extension 10 mm below the vocal cord free margin at the level of anterior commissure [12, 13].

Oncological radicality endoscopic CO_2 laser microsurgery indications were extended to carefully selected anterior commissure glottic tumors in stage T1b and T2, by Davis [14], Eckel & Thumfart [10], Motta *et al.* [15], Rudert [16] and Steiner & Ambrosch [17]. Moreover, Steiner [18] extended the indications of endoscopic CO_2 laser microsurgery to glottic tumors stage T3 (endolaryngeal involvement, hemilarynx immobile, without cartilaginous structures involvement assessed by clinic and imagistic exams).

Most of the surgeons stress the fact that anterior commissure cancer has up to 70% rate of recurrences, despite of the treatment method used.

Conclusions

The endoscopic CO_2 laser surgery is in our view the elective and preferable surgical method in laryngeal glottic cancer stage T1b and T2 for cure, with oncological and functional results superior to those of conventional surgical procedures. Endoscopic resections are used in cases of supraglottic, glottic and hypopharyngeal carcinoma for small lesions, heaving similar oncological rate to radiotherapy but with a short hospitalization, low cost and voice preservation. Anterior commissure resection represents a greater difficulty due to internal perichondrium lack and cartilage vicinity.

Conflict of interests

The authors declare that they have no conflict of interests.

Acknowledgments

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