

The Outcome Of Subtotal Laryngectomy With Epiglottic Reconstruction

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Abstract

Background: Laryngeal cancer is multifactorial disease, and management of it is surrounded with plenty of controversies. Laryngeal cancer more commonly affects men than women (5.8 vs 1.2 cases per 100,000 respectively). Different types of treatment of various subsets of laryngeal cancer with comparable loco-regional control and survival rates are available.

Patients and Methods: During our study 42 patients were diagnosed laryngeal cancer, exposed subtotal laryngectomy with epiglottic reconstruction from January 2012 to September 2015 at National ENT Hospital of Vietnam.

Results and Conclusions: After subtotal laryngectomy 39 patients were in favorable condition. We revealed that 41 of 42 patients had no complications in a 3-year period after surgery. Of 42 patients in 38 were fixed stable remission after surgery in 5-year period. That indicates high-level recovery after laryngectomy. So, the subtotal laryngectomy with epiglottic reconstruction allows the restoration of the larynx's function.

Keywords: cancer, reconstruction, recovery, remission, surgery, throat.

Introduction

Laryngeal cancer is an oncologic disorder, and its prognosis depends on establishing appropriate preventive and diagnostic measures[1]. Laryngeal cancer is a type of malignancy occurring from the larynx. Larynx is anatomically divided into three regions including the supraglottic larynx (epiglottis, false vocal cords, ventricles, aryepiglottic folds and arytenoids), the glottis (true vocal cords and the anterior and posterior commissures) and the subglottic region [2]. Laryngeal cancer more commonly affects men than women (5.8 vs 1.2 cases per 100,000 respectively) [3]. Unfortunately, the 5-year survival rate of laryngeal cancer has decreased over the past 40 years, from 66% to 63% [4].

The biggest part of larynx malignancies (up to 98%) are well-differentiated squamous cell carcinomas, whilst chondrosarcomas and leiomyosarcomas. Melanomas take part only for 2%–5% of all types of laryngeal cancers [5]. Among squamous cell carcinomas, the well and moderately differentiated forms slightly prevailed. The majority of laryngeal cancer cases originate from the glottic region (up to 66%), followed by the supraglottic area (about 30%), while transglottic and subglottic tumors are less often [6]. The most common symptoms of laryngeal cancer include: hoarseness, sore throat, dysphagia, painful swallowing, voice quality impairment, earache, cough and hemoptysis. In many cases the cancer has already deeply involved the vocal cords and spreads to regional lymphatics despite hoarseness develops early in patients with laryngeal malignancies. Primary tumor volume, composite nodal volumes advanced age, performance status, grade and depth of invasion are significant predictors of unfavorable prognosis. Majority of patients are diagnosed at advanced stages (close to 75% at III or stage IV stage) unfortunately, especially those patients with supraglottic tumors, when there is no option for conservative treatment. The 5-year survival in treatable patients approximates 80% and 50% for glottic and supraglottic cancers respectively [7].

Numerous choices are available for treatment of various subsets of laryngeal cancer with comparable loco-regional control and survival rates. Glottic cancers diagnosed at an early stage (T1-T2) can be treated with radiotherapy or surgery. The main aim of treatment is tumor removing and maintaining of laryngeal functions: providing breathing conduction, pronunciation and ensuring the swallowing. Early-stage glottic carcinoma can be defined as a T1 or T2 tumor without nodal involvement or distant metastasis. The prognosis of early stage glottic carcinoma is benign, but treatment of such type of cancer remains controversial [8]. It emphasises the role of a multi-disciplinary team lead by an surgeon and comprising of a plastic surgeon, radiotherapist, medical oncologist, speech therapist and dietician to choose the modality that is most suitable to the patient's need and expectations. Proposed techniques include surgical and non – surgical (radiotherapy and chemotherapy) methods. Surgical methods in their turn are divided into endoscopic: Transoral Laser Microsurgery (TLM), Transoral Robotic Surgery (TORS), Coblation excision and open/external surgery: vertical partial laryngectomy, supraglottic laryngectomy, supracricoid laryngectomy [9].

In our study we had a goal to present results of using subtotal laryngectomy with epiglottic reconstruction treatment and comparison of different existing treatment methods of laryngeal cancer.

Patients and methods

42 The patients were diagnosed laryngeal cancer, had subtotal laryngectomy with epiglottic reconstruction (Figure 1).

The research was conducted from January 2012 to September 2015 at National ENT Hospital of Vietnam. All the procedures used in the work (manipulations, operating aids) were following the ethical standards of the responsible committee on human experiments (institutional) and the 1975 Helsinki Declaration, revised in 2000. All patients agreed to participate in the experiment and did not deny the results of the experiment, which will be presented in the given research paper.

Age distribution among patients was: 4.8% less than 40 years, 23.8% of patients 40-50 years, 50% - 50-60 years and 21.4% more than 60 years. Biggest part of patients (73.8%) – had T2 tumor stage. Only 4 patients had decompensated T3 stage of larynx cancer (Table 1).

Results and Discussion

Traditionally, the treatment for laryngeal cancer included total laryngectomy and radiotherapy either used alone or in combination. The last three decades have seen significant technological advances in

voice rehabilitation, delivery of radiation as well as development and popularisation of conservative surgical techniques. This has allowed the focus to shift to 'organ preservation.' Maintenance of quality of life and minimizing adverse effects is now considered an important therapeutic goal irrespective of the stage of disease and the choice of treatment modality [10].

In our study, we have revealed 31 patients had intact arytenoid cartilage while 11 patients undergo arythenoidectomy. Only 2.4% of surgeried patients had complications because of controlled into operational bleeding. And 21.4 % of patients (n=9) were exposed to radiation after surgery. After subtotal laryngectomy 39 patients were in favorable condition. 2 patients had excessive mucous membrane, and one - difficult decannulation. One patient had lung metastasis and another one had cervical lymph node metastasis after surgery (Table 2).

Early laryngeal cancer is characterized by low tumor volume and a low incidence of metastatic neck disease. Consequently, the chances of cure are extremely good by the main treatment options – radiotherapy, transoral laser microsurgery, or open partial laryngeal surgery. There is not enough sufficient evidence to determine which of the treatment options is most effective for the treatment of early glottic carcinoma. Radiotherapy and transoral laser microsurgery are accepted treatment options for T1a–T2a glottic carcinoma [11]. The supraglottis has a rich lymphatic supply and, as a result, the risk of nodal disease is significantly higher for T1–T2 supraglottic cancers than for T1–T2 glottic cancers. Thus, even in the absence of clinical or radiological evidence of nodal involvement, elective treatment of at least bilateral lymph node levels II and III – either with RT or selective neck dissection – is recommended. Radiotherapy, transoral laser microsurgery, and transoral robotic surgery are reasonable treatment options for T1–T2 supraglottic carcinoma [12].

We revealed that 41 of 42 patients have no complications in 3-year period after surgery and 38 of 42 patients were still in remission in 5-year period after surgery. That indicates of high level recovery after laryngectomy.

For laryngeal cancer T1 and T2 N0, the rate of local control after radiotherapy varies from 75 to 85% in case the patient has a relapse often requires surgical removal of the entire larynx. Radiation treatment is difficult for large-volume tumors, can cause cartilage necrosis, also for neck lymph nodes. High cost is also a bas side of radiation therapy. A variety of partial laryngectomy and reconstruction techniques have been proposed. Choice depends on extension and location of the lesion as well as on preferences at each surgical center. The most widely used procedures are vertical hemilaryngectomy and supracricoid laryngectomy [13-14].

Transoral co2 laser microsurgery

Transoral co2 laser microsurgery (TLM) represents is characterized by less invasive, more precise, more functional surgery, acceptable voice quality, lower morbidity, better quality of life, avoidance of tracheostomy, shorter periods of hospitalization, low costs. TLM has evolved as an optimal therapy for laryngeal cancer [15]. Laser microsurgery is the method of choice for the treatment of early glottic cancer with regard to oncologic, functional, and economic aspects. The role of laser microsurgery in the treatment of laryngeal carcinomas with vocal cord impairment or fixation cannot yet be definitively assessed on the basis of the current literature. One of the significant advantages of TLM surgery is that it often reserves XRT as a second option before proceeding to total laryngectomy for patients who recur after initial surgery [12, 16]. Open surgery for T2 tumor is indicated for cases where the tumor is not fully revealed under microsurgery. Successful conservation surgery for early stage tumor relies on two basic principles: preservation of the cricoid cartilage is necessary for maintaining integrity of the airway. Failure to preserve the cricoid cartilage will result in narrowing of the subglottic airway and can result in

subsequent tracheostomy dependence; to create a safe airway, a single cricoarytenoid complex must be preserved. The cricoarytenoid complex is made up of a single arytenoid, an intact cricoid, and the full complement of muscles and innervation (recurrent laryngeal nerve) to maintain function [17]. There are three meta-analyses and one systematic review comparing the local control after transoral laser therapy vs. radiotherapy of T1 and T2 carcinomas of the vocal folds. In summary, those four papers do not show a significant difference of the local control after transoral laser surgery and radiotherapy [18-19].

Subtotal laryngectomy with epiglottic reconstruction

Laryngeal reconstructive resection (Mayer-Piquet surgery) was first reported in 1974 (subtotal laryngectomy with CHEP). Surgery includes cutting cartilage, 2 false and true vocal cords, paraglottic space, conserving at least one arytenoid. The technique most commonly used for T2 glottic cancer (supracricoid partial laryngectomy or subtotal laryngectomy) (Figure 2).

Must be noted the limitations of conservative surgery:

- the general condition of the patient,
- the tumor invades up or down the glottis,
- aspiration.

Partial front lateral laryngectomy with epiglottic reconstruction is for early stage laryngeal cancer T1 (Vertical partial laryngectomy). Can be cut more cartilage on the affected site. Paraglottic space will be removed. One arytenoid can be removed (if necessary).

Currently can be for T2 laryngeal cancer and selective T3 (Subtotal laryngectomy with epiglottoplasty). Surgery to keep the larynx function after cutting near the entire larynx [20]. SCPL with CHEP is an important option for laryngeal surgical preservation, especially for tumours with anterior commissure involvement and/or subglottic extension less than 5 mm. It allows adequate disease control and good functional results as long as the indications are well respected and the surgical techniques are mastered [21-22]. STL is the ultimate option of the OPHLs with the widest resection limits, and it can be used in selected tumors (such as those with subglottic extension) for which the SCL method is not suitable. The purpose of STL is to provide a wide laryngeal resection while avoiding permanent tracheostomy and by preserving the phonation, protection, and respiration functions [23-24].

Conclusion

For patients who fail nonsurgical organ-preservation techniques, salvage surgery often represents just viable option for cure. Although studies have demonstrated some success with conservation techniques, more commonly, total laryngectomy is the mainstay of salvage. Patients who have significant pulmonary compromise, extensive comorbidity, or are at high risk for aspiration are poor candidates for open conservation procedures. These patients should be treated with total laryngectomy.

The subtotal laryngectomy with epiglottic reconstruction allows the restoration of the larynx's function. Indicate mainly to T2 stage. It have to take an important place in laryngeal cancer treatment.

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Tables

Table1. Distribution of patients by tumor size

Tumor stage according to Tumour Node Metastasis	Patients count, persons	The patient's range in %
T1b*	7	16.7%
T2**	31	73.8%
T3***	4	9.5%

* the cancer is between 1 cm and 2 cm across
 ** the cancer is between 3 cm and 5 cm across
 *** the cancer is between 5 cm and 7 cm across

Table 2. Cancer recurrence after surgery

The complications after surgery	Patients count, n = 42	
	Total count, persons	The patient's range in %
Local recurrence	1	2.38
Cervical Lymph node metastasis	1	2.38
Lung metastasis	1	2.38

Figures

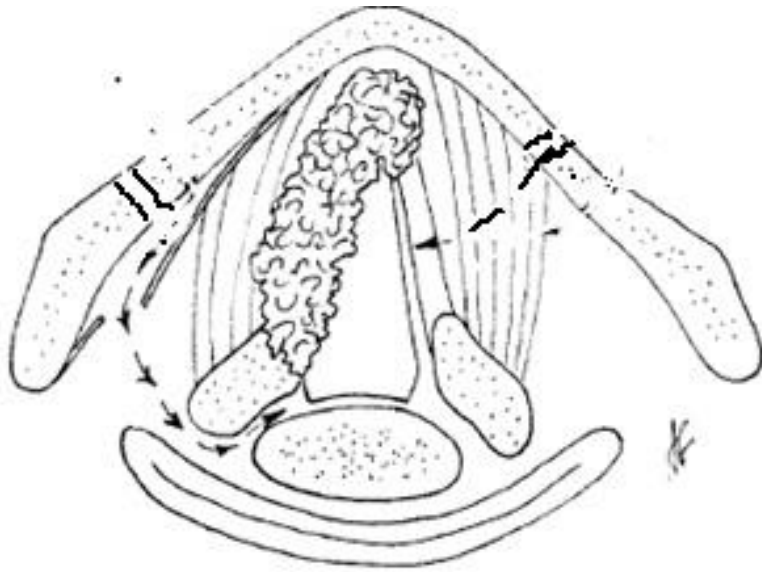


Figure 1. Subtotal laryngectomy with epiglottic reconstruction technique



Figure 2. The surgery technic: epiglottic flap is fixed to cricoid with multiple interrupted sutures.