CASE REPORT

Vocal Rehabilitation in Post-Total Pharyngolaryngoesophagectomy Patient: Case Report

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Abstract

Introduction: Advanced esophageal tumors may extend to adjacent structures, and as a consequence, need more aggressive treatments as the total removal of the pharynx, larynx and esophagus. Traditionally, after a classic total laryngectomy, the possible forms of vocal rehabilitation are esophageal voice, tracheoesophageal prosthesis and electronic laryngeal prosthesis, the latter being the most indicated type of rehabilitation after the removal of the esophagus. Nonetheless, with neuronal plasticity and the adaptability of human functions,other structures can be used for vocal production.**Case report:** Participating in this study is a 61-year-old black male patient with a history of smoking and alcohol use since the age of 15 and visually impaired due to glaucoma 23 years earlier. The patient sought the Head and Neck Service due to a complaint of salivary incontinence and hiccup for eight years. The patient was diagnosed with spinocellular carcinoma of the esophagus (T4 N2 M0), undergoing a pharyngolaryngoesophagectomy with pharyngogastric anastomosis with bilateral modified radical neck dissection. The patient was referred to the Speech-Language Pathology Service presenting jejunostomy as an alternative feeding pathway and the presence of "voice" from the vibration of reconstructed tissue with the passage of air to the stomach. SLP therapy: There was resumed oral intake and the development of gastric voice through speech articulation training exercises similar to those used for the production of esophageal voice. The patient is currently producing simple sentences with plosive sounds and functional phrases. **Conclusion:** It was possible to observe from this clinical case that "gastric" voice can be developed as an alternative form of oral communication in patients with laryngeal and esophageal resections.

Keywords: carcinoma, esophageal neoplasms, laryngectomy, rehabilitation, voice.

INTRODUTION

Esophageal cancer is among the ten tumors most prevalent in Brazil and worldwide. The geographical pattern of esophageal cancer has striking variations and is greater than any other cancer. The region with the highest incidence is Asia (northern Iran, central Asian republics and in north-central China), with an incidence rate of 200/100,000, however, high rates are also observed in southeast and east Africa (Uganda, Zimbabwe, etc.), in South America (southeastern Brazil, Uruguay, Paraguay and northern Argentina) and in certain countries of Western Europe (especially France and Switzerland) according to population-based cancer registries and Altorki et al.[1]. Nonetheless, its incidence represents approximately 2% of all malignant tumors[2].

The main risk factors proven related to spinocellular-type esophageal cancer are alcohol and smoking. Another causative factor which has been questioned, but still unproven, is the excessive intake of hot food and beverages. It is more common among men with advanced age and black race[3].

Esophageal cancer is somewhat symptomatic in its early stages, so the diagnosis is usually realized late when this neoplasm is already in an advanced stage. During this stage, the main complaints of the patient are dysphagia and odynophagia.

The treatment of choice for this tumor type is surgery associated or not with radiotherapy and/or chemotherapy, as it offers better local control and greater 5-year

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survival[4]. Currently, with the introduction of new surgical and anesthetic techniques and greater care of the patient during and after surgery, there has been a reduction in the number of deaths of patients who have undergone esophagectomy[3].

However, due to the prevalence of locally advanced disease accompanied by lymph node metastasis being elevated at the time of diagnosis, a resection may not be restricted solely to the esophagus, but can also advance to neighboring structures as the larynx and the hypopharynx, bringing greater impact on the quality of life to these patients.

The patient who undergoes pharyngolaryngoesophagectomy presents loss of laryngeal voice, permanent stoma and alterations in alimentary profile and swallowing, thus necessitating speech-language pathology (SLP) therapies.

The rehabilitation of oral communication of patients undergoing total laryngectomy is traditionally performed by one of three ways: esophageal voice, adaptation of a tracheoesophageal prosthesis or use of an artificial (electronic) larynx. Patients who have already undergone resection of the larynx and also the esophagus, the best option theoretically would be the restoration of voice through the electronic laryngeal prosthesis[5].

Yet, due to neuronal plasticity and the adaptability of oral functions[6], the "neoesophagus" that can be represented by pharyngogastric anastomosis or reconstruction with the colon or jejunum, may in addition to assuming the role of food delivery, serve as a sound source for vocal production.

The literature has described this sound source as having been driven in patients who had undergone total esophagolaryngectomy by the creation of vocal fistulas or adaptation of tracheoesophageal prosthesis with the insertion of a shunt created between the trachea and the free flap (colon, jejunum) or graft (pectoralis major muscle) used for the reconstruction of the neoesophagus[7]. Benazzo et al.[8] presented the results of a vocal restoration from the adaptation of tracheoesophageal prosthesis associated with the SLP therapy of six patients who underwent pharyngolaryngoesophagectomy with jejunal free flap reconstruction, demonstrating that all patients presented low fundamental frequency, jitter, shimmer, extremely elevated noise to harmonic ratio and lower maximum phonatory time than when compared to patients with tracheoesophageal prosthesis subjected only to total laryngectomy. Speech intelligibility was considered good in four of the six patients.

Notwithstanding, no reports were found in the literature regarding voice production from neoesophagus spontaneously, i.e. without the use of facilitators as vocal fistulas or tracheoesophageal prosthesis in such patients. For this reason, the objective of this work was to present the speech-language therapy clinical evolution of a patient who had undergone total pharyngolaryngoesophagectomy in respect to the acquisition of new vocal qualities as a facilitator of oral communication.

CASE REPORT

Participating in this study was a 61-year-old (DOB 6/13/1947) black male, married, elementary education level, with a history of a daily frequency of smoking and alcohol use since the age of 15, equine farrier, visually impaired due to glaucoma 23 years earlier and resident of the city of São Paulo, Brazil.

In July 2008, the patient was evaluated by the Head and Neck Service of Instituto do Câncer Arnaldo Vieira de Carvalho (ICAVC) due to complaint of sialorrhea and hiccup for 8 years. Clinical exam diagnosed a tumor with cervical esophagus as primary site. The anatomopathologic results of the laringotraqueal biopsy revealed: squamous cell carcinoma (SCC) of the pharyngoesophageal transition, ulcerated, measuring 6.8 x 4.0 cm infiltrated until pharyngeal and esophageal soft tissues. Surgical treatment was indicated.

On 8 July 2008, the patient received preoperative orientation from the entire ICAVC multidisciplinary team, including the SLP service that performed orientation regarding the use of the nasoenteral tube, tracheotomy and postsurgical rehabilitation of oral communication. On 15 July 2008, the patient underwent pharyngolaryngoesophagectomy with pharyngogastric anastomosis with level II, III and IV bilateral cervical secretion, preserving internal jugular vein due to an esophageal carcinoma with surgical staging T4 N2c M0.

The patient returned to the SLP service on 14 August 2008 for speech therapy assessment. The patient was using a tracheotomy and jejunostomy as an alternative feeding pathway. In the swallowing assessment with food of a liquid-pasty and liquid consistency colored with blue liquid dye, there was an absence of clinical signs of fistula between the trachea and surgical reconstruction. The oral motor sensory system presented preserved sensitivity, tone and mobility, mild facial edema and reduced mobility of the shoulder girdle.

The finding of this SLP assessment was the presence of asystematic "voice" produced by vibration of the neoesophageal walls reconstructed from the pharyngogastric anastomosis due to the passage of air in this region. This sound produced is similar to esophageal voice directed to the oral cavity, being articulate and enabling oral communication. Emissions presented extremely low maximum phonation time, instability, reduced loudness and low pitch with loss of speech intelligibility.

The patient in question immediately started SLP therapy with orientation about tracheostomy, the oral intake of foods (mixed diet) to promote the removal of

jejunostomy and the training of oromyofunctional exercises for articulation of speech sounds with the production of gastric voice, similar to esophageal voice, with the prescription of one session of speech-language therapy per week.

The patient returned to the SLP service only on 2 October 2008 due to financial difficulties with transport. Swallowing assessment was carried out with foods of liquid, pasty and solid consistencies. Once more, signs of cough and dyspnea, which would indicate the presence of fistula, were not observed. The patient also denied food stasis, reflux of foods or other discomfort. Thus, the exclusive oral intake of food was suggested. On the same date, the patient underwent jejunostomy removal and was oriented by the Nutrition service in relation to oral diet.

On 7 October 2008, the patient was given continuity to train for vocal production similar to esophageal voice, stimulating gastric voice through the repetition of voiceless plosive phonemes /p/, /t/ and /k/ associated with vowels. The patient presented asystematic emissions with low pitch, reduced loudness and reduced fluency. The patient was oriented as to performing the same training at home.

On 12 December 2008, the patient returned to the SLP service performing asystematic production of voiceless plosive phonemes. Having been added to the training were the voiced plosive phonemes /b/, /d/ and /*g*/ and functional phrases. Once more, the patient could not give weekly continuity to SLP therapy, returning only on 17 February 2009. On that date, the work of cervical relaxation and articulation exercises were reinforced with the goal of amplifying neck mobility and improving the articulation of speech sounds favoring the intelligibility of speech.

The patient, visually impaired and living in the extreme southern outskirts of the city of São Paulo, presented locomotion difficulty from using urban public transportation; thus, the family rented a car for each scheduled consultation at the hospital, making weekly transport expensive. For this reason, the patient could not give continuity to SLP therapy nor complete postoperative radiotherapy.

DISCUSSION

Esophageal cancer represents a major challenge in treatment due to high mortality and operative morbidity[9]. However, according to Pinto et al.[3], surgery remains the standard treatment for patients with resectable disease and no clinical contraindication. The authors also affirm that currently a reduction in operative mortality with esophagectomy is occurring due to a better selection of patients for whom surgery is indicated as well as an increased level of surgical team specialization and attention that revolves around pre-and postoperative care. Despite being submitted to an extremely extensive surgery, the patient presented in this clinical case postoperative evolution without complications, such as wound dehiscence or presence of anastomotic fistula, which are common in this type of treatment.

The great challenge, still without a doubt, in relation to esophageal cancer is its early diagnosis that improves the patient's prognosis and also avoids more aggressive therapeutic treatment, but is necessary for the curative treatment of the patient, as a pharyngolaryngoesophagectomy.

Total laryngectomy alone leads to anatomical, functional and psychosocial sequelae, and when associated with esophagectomy, can also bring alterations in the alimentary profile and in swallowing, causing great change in the quality of life[10]. In this clinical case, the patient after two and a half months was already able to feed exclusively by oral pathway and with all consistencies, this aspect being extremely important not only from the nutritional point of view, but also social.

Another aspect emphasized in the SLP therapy of this patient was the rehabilitation of oral communication. The most recommended option for the cases of larynx and esophagus removal would be artificial (electronic) larynx, which consists of a cylinder with a resonant membrane operated by electric cell or battery, which when in contact with the neck region produces a vibration which, while having sound modified by articulators, produces speech. The main disadvantages of this type of communication are monotonic vocal quality that is robotic and the cost of the prothesis[5], characterizing the main reason for the relative low acceptance that this method has, along with patients who ultimately use it as a support, especially when they do not obtain success with other speech rehabilitation methods. On the other hand, the advantage of this type of communication is the facilitation of oral communication quickly and with good speech intelligibility.

Mendenhall et al.[11] demonstrated that the rehabilitation of voice in 173 patients with advanced carcinoma of the larynx and hypopharynx after total laryngectomy associated with radiotherapy was achieved in 50% of patients through electronic laryngeal prosthesis, 27% through tracheoesophageal prosthesis and 3% through esophageal voice, while the rest of patients remained without oral communication.

In the international literature, most patients undergoing esophagopharyngolaryngectotny with reconstruction through free flap or graft receive the adaption of vocal prosthesis as a means of oral communication[8,12]. In Brazil, this procedure is unusual due to the high cost of tracheoesophageal prosthesis.

The cases in which the adaptation of tracheoesophageal prosthesis is performed, a success rate of up to 94% can be reached, however, most users present complications at some level of diverse natures[13].

In the first SLP therapy, in a spontaneous and asystematic way, the patient began to produce voice from the gastric tissue used in pharyngogastric anastomosis. For this

reason, the goal of SLP therapy was to assist the patient in the development of this type of voice, which was called gastric voice. For this, the same therapeutic strategies for the acquisition of esophageal voice were used.

Physiologically, esophageal voice is produced when the individual introduces air through the mouth until it reaches the superior portion of the esophagus, then being expelled and modified by resonators and articulators. There are two different methods for producing this type of alaryngeal communication, which are swallowing or consonant injection of air into the esophagus. What differs in these methods is how air is introduced into the esophagus, but the mechanism of vibration and voice production is equal for both. The choice of a particular method will depend on the ease to learn the subject, with some individuals opting to use the two methods during speech.

Thus, the patient gradually began to communicate orally through gastric voice, demonstrating that cancer patients can use various forms of social support and coping strategies for the condition of illness, this flexibility has a positive aspect, since, if a given resource does not achieve the desired goal, another will be mobilized to this end. The patient who has diversified relations to receive emotional, cognitive and material help to face difficult situations[14] and calls upon various behaviors with functions revolving around the adaptation to the context will obtain greater success in the management, control or reduction of the stress event and will have a greater sense of self--effectiveness to deal with these situations[15].

Unfortunately, due to socioeconomic problems that are commonly faced by head and neck cancer patients treated under the Brazilian Unified Health Care System, this patient was unable to appear at our institution again, compromising SLP and oncological treatment.

This clinical case served to illustrate that SLP therapy is an indisputable ally in the adaptation of stomatognathic functions, even in cases of extensive resections, since the natural adaptation of an active organ became possible for the production of gastric voice, as the possibility of verbalization can be used whenever the patient wants to orally communicate.

CONCLUSION

According to the above, it can be said that the SLP clinical assessment is a fundamental tool for the diagnosis, planning and forecasting of SLP therapy.

When it comes to complex cases, the possibilities of SLP rehabilitation, as well as the quality of life of patients, should be minutely considered since our scientific knowledge is evolving rapidly, aiding in the salvage of the best potential offered by human physiology, where electronic laryngeal voice or even esophageal is expected to be able to work with gastric voice.

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