

Case Report

Anterolateral Thigh (ALT) Free Flap for Esophagoplasty to Treat Esophageal Fibrotic Stenosis Almost 40 Years After Radiotherapy

Nocini R¹, Fior A², Lonardi F^{2*}, Sacchetto L¹, Marchioni D¹, Giacomuzzi S³ Molteni G¹

¹Section of Otorhinolaryngology, Department of Surgical Sciences, University of Verona, Italy

²Section of Dentistry and Maxillofacial Surgery, Department of Surgical Sciences, University of Verona, Italy

³General and Upper GI Surgery Division, Department of Surgical Sciences, University of Verona, Italy

***Corresponding author:** Lonardi F, Section of Dentistry and Maxillofacial Surgery, Department of Surgical Sciences, Pediatrics and Gynecology, University of Verona, Verona, Italy. Tel: +39 0458124251; Email: feblon@hotmail.it

Citation: Nocini R, Fior A, Lonardi F, Sacchetto L, Marchioni D, et al. (2020) Anterolateral Thigh (ALT) Free Flap for Esophagoplasty to Treat Esophageal Fibrotic Stenosis Almost 40 Years After Radiotherapy. Ann Case Report 14: 313. DOI: 10.29011/2574-7754/100313

Received Date: 15 January, 2020; **Accepted Date:** 26 February, 2020; **Published Date:** 02 March, 2020

Abstract

Dysphagia is a condition that can severely influence the quality of life of patients affected. It can be caused by disorders of motility, stroke, radiotherapy, masses, and surgery in the cervical region. There are several treatment options that range from conservative treatments (such as esophageal expansion, rehabilitation, nasogastric tube, temporary Percutaneous Endoscopic Gastrostomy (PEG)) to more aggressive treatments (such as esophagoplasty, definitive PEG). It is possible to treat patients with different approaches but it is generally recommended to start with conservative treatment and, if necessary, repeat it; however, the results are not always acceptable for the patient and more aggressive treatments may be required. We present an unusual case of a patient with a long clinical history, who had undergone both medical treatment and surgery on several occasions, but still complained of dysphagia. Finally, with his symptoms still persisting after total laryngectomy, he underwent a partial esophagectomy with reconstruction using an Anterolateral Thigh (ALT) free flap.

Keywords: Dysphagia; Esophagectomy; Free Flap; Microsurgery; Outcomes of Multiple Reconstructions

Introduction

Dysphagia severely decreases the quality of life of patients affected, forcing them to divide caloric intake over multiple meals and/or causing discomfort when eating. Causes of dysphagia are many: disorders of motility (primary, like achalasia or secondary to stroke), radiotherapy, masses, and surgery in the cervical region [1-4]. Treatment options are also many. Although removal of the primary cause is generally recommended, this is not always possible. Conservative treatments such as esophageal expansion, rehabilitation, nasogastric tube, and temporary Percutaneous Endoscopic Gastrostomy (PEG) are less invasive and better tolerated; however, at times, more aggressive treatments, such as esophagoplasty or definitive PEG may be required [5, 6]. Treatment must be tailored according to the condition of the patient and his/her expectations.

There are several possible ways to treat dysphagia: initially, conservative first-line treatments such as rehabilitation are recommended; second-line treatments are more invasive and include esophageal expansion or stenting, and should be reserved for more severe cases or patients unfit for surgery [5-8]. Third-line treatments such as esophagoplasty should be considered in special cases. When the main problem is pharyngoesophageal stenosis resistant to treatment, resection of the stenotic tract and subsequent reconstruction may be required. There are many options for reconstruction of the hypopharynx and esophageal region, but the treatment must be tailored to the patient taking into account the objective of the surgery, and the patient's expectations and comorbidities if present (reconstruction of the hypopharynx after surgical treatment of squamous cell carcinoma + use of a tubed gastro-omental free flap for reconstruction of the hypopharynx and cervical esophagus after total laryngopharyngectomy) [9, 10]. These treatments are widely used in oncologic surgery and should only be considered to treat dysphagia in selected cases with multiple previous failed treatments [11-20].

Case Report

A man aged 61 was referred to our center with persistent dysphagia. He had a history of squamous cell carcinoma of the larynx, which was treated with partial laryngectomy and radiotherapy (70 Gy) in 1980. In 1999, the patient complained of dyspnea, the first side effect of radiotherapy. This was resistant to treatment so he underwent a permanent tracheostomy. After tracheostomy, he complained of dysphagia, for which he underwent surgical Percutaneous Endoscopic Gastrostomy (PEG) in 2003 and started rehabilitation which allowed the PEG to be removed in 2006, although at that time, the patient still had moderate dysphagia for liquids. At the beginning of 2018, the patient underwent a total laryngectomy because of severe perichondritis and laryngeal post-actinic candidiasis resistant to antifungals, and with a reconstruction using a right pectoralis flap. In December 2018, he also started sessions of esophageal expansion; however, after almost 1 year of treatment, the symptoms of dysphagia were still present.

The patient was re-evaluated for the treatment of dysphagia, and in consideration of the multiple failed treatments and the persistent stenosis of the hypopharynx which caused the dysphagia, the only remaining option was resection of the stenotic tract and

its reconstruction. Cervicotomy was performed on the scar from previous surgery. The cutaneous flap included the pectoralis major flap which was positioned in previous surgery; the tissue was markedly fibrotic as a result of radiotherapy and multiple interventions. Anatomic dissection was performed, and carotid arteries, jugular veins, lingual, X, XI and XII nerves were identified and preserved. The hypopharynx and esophagus were isolated and the stenotic tract, which extended roughly from the posterior part of the tongue as far as the upper tract of the esophagus, was identified and excised.

A 20x9 cm Anterolateral Thigh (ALT) flap was harvested from the left limb and was shaped into a 3 cm diameter tube of appropriate length for the pharyngoesophageal bypass. The flap was positioned and shaped to reconstruct the pharynx and the proximal part of the esophagus, around a previously positioned gastric-nose tube. A microvascular anastomosis was performed as follows: an end-to-end anastomosis with the right facial artery using non-resorbable monofilament 9/0 stitches and an end-to-end anastomosis with a ramus from the jugular vein using non-resorbable monofilament 8/0 stitches. The fascia was sutured to provide more protection for the proximal and distal anastomosis of the neopharynx. The excised portion was sent for final histologic evaluation (Figure 1).



Figure 1: Resection of the stenotic tract and its reconstruction: **a)** resection of the pharyngoesophageal stenosis; **b)** preparation of the ALT free flap for harvesting; **c)** in setting of the ALT free flap; **d)** fascia lata sutured over the anastomosis.

The patient was hospitalized for 26 days. During the recovery period, he worked with a specialist speech therapist and started eating without problems after 18 days. There were no complications at the donor site during the hospital stay. After the surgery, a small dehiscence was seen on the left laterocervical wound; it was treated with a semi-compressive dressing and resolved within 10 days. The final histological exam after surgery was negative for neoplastic recurrence. A radiographic study using Diatrizoate 17 days after surgery showed a good result for the lumen of the neo-esophagus and, more importantly, did not show any fistulas there (Figure 2).



Figure 2: Postoperative X-ray: progression of Gastrografin (diatrizoate meglumine and diatrizoate sodium solution) along the pharynx and neo-esophagus (from left to right) 17 days after surgery.

Discussion

There are several different ways to treat dysphagia; however, in this case, the patient had already undergone both conservative options (temporary PEG and rehabilitation in 1999) and more invasive options (laryngectomy with reconstruction and esophageal expansion in 2018) with insufficient improvement in quality of life. Earlier radiotherapy caused marked fibrosis which initiated the symptoms of dysphagia, influenced the outcomes of the esophageal expansion and in the end, almost 40 years after the radiotherapy, led to perichondritis and post-actinic candidiasis. In addition, multiple surgical procedures caused more fibrosis and anatomical alterations which may have worsened the dysphagia. Many authors have discussed the possible treatments for dysphagia; however, there are no guidelines for cases such as this one which have been operated multiple times; moreover, this case represents an additional challenge due to the altered anatomy and post-actinic fibrosis.

After several failed esophageal expansions and prolonged rehabilitation without success, a radical option was considered: resection of the stenotic tract and subsequent reconstruction. According to the recent literature, laryngo-esophageal reconstruction has many options [8-21]. In our case, a multidisciplinary group was formed which evaluated many possible approaches to the surgical challenge. A free jejunal flap was considered because of the absence of an external donor site; however, due to the high morbidity of the donor site, and as it required a longer and more complex surgical procedure, it was later discarded. A radial flap (Chinese flap) was also an option, but due to the poorer esthetic outcomes compared to an ALT flap and the extent of the reconstruction required for this operation, it was also discarded.

The Thoracodorsal Artery Perforator (TDAP) flap and scapular flap were also considered; however, due to the prone stance required for surgery which would lengthen the operation and the morbidity of the donor site, both options were excluded.

The ALT free flap has the advantage of being thin and easily shapeable to reconstruct the pharynx and esophagus. Moreover, it has a low morbidity and a very good esthetic outcome on the donor site, therefore it was deemed the best option. The ALT free flap could represent a viable treatment option in cases of pharyngo-esophagectomy, but it should not be recommended as a first- or second-line therapy for dysphagia; however, it can be useful to treat dysphagia in patients with several comorbidities and in whom other conservative treatments have been unsuccessful.

Acknowledgments

This work did not receive any specific funding or grant in any form.

Conflict of Interest

All authors have no conflict of interest to declare.

References

1. Schlottmann F, Neto RML, Herbella FAM, Patti MG (2018) Esophageal achalasia: pathophysiology, clinical presentation, and diagnostic evaluation. *Am Surg* 84: 467-472.
2. Wilkinson G, Sasegbon A, Smith CJ, Rothwell J, Bath PM, et al. (2020) An exploration of the application of noninvasive cerebellar stimulation in the neuro-rehabilitation of dysphagia after stroke (EXCITES) protocol. *J Stroke Cerebrovasc Dis* 29: 104586.
3. King SN, Dunlap NE, Tennant PA, Pitts T (2016) Pathophysiology of radiation-induced dysphagia in head and neck cancer. *Dysphagia* 31: 339-351.
4. Hong SA, LaGorio L, Husian I (2020) Post-tonsillectomy dysphagia secondary to glossopharyngeal nerve injury. *BMJ Case Rep* 13: e232657.
5. Cantemir S and Laubert A (2017) Diagnosis and treatment of dysphagia. *HNO* 65: 347-356.
6. Shigematsu T, Fujishima I (2015) Dysphagia and swallowing rehabilitation. *Brain Nerve* 67:169-182.

7. Carnaby GD, LaGorio L, Silliman S, Cray M (2019) Exercise-based swallowing intervention (McNeill Dysphagia Therapy) with adjunctive NMES to treat dysphagia post-stroke: A double-blind placebo-controlled trial. *J Oral Rehabil* Dec 27.
8. Lam YH, Chan A, Lau J, Lee D, Ng E, et al. (1999) Self-expandable metal stents for malignant dysphagia. *Aust N Z J Surg* 69: 668-671.
9. Chu PY, Chang SY (2009) Reconstruction of the hypopharynx after surgical treatment of squamous cell carcinoma. *J Chin Med Assoc* 72: 351-355.
10. Righini CA, Bettega G, Lequeux T, Chaffanjeon P, Lebeau J, et al. (2005) Use of tubed gastro-omental free flap for hypopharynx and cervical esophagus reconstruction after total laryngo-pharyngectomy. *Eur Arch Otorhinolaryngol* 262: 36-367.
11. Larrañaga JJ, Boccalatte LA, Picco PI, Cavadas D, Figari MF (2019) Treatment for postchemoradiotherapy hypopharyngeal stenosis: Pharyngoesophageal bypass using an anterolateral thigh flap-A case report. *Microsurgery* 39: 543-547.
12. Chen HC, Ciudad P, Chen SH, Agko M (2018) Thirty-five years of single surgeon experience in the reconstruction of esophagus and voice with free ileocolon flap following total pharyngolaryngectomy. *J Surg Oncol* 117: 459-468.
13. Piazza C, Del Bon F, Paderno A, Grammatica A, Montalto N, et al. (2017) Fasciocutaneous free flaps for reconstruction of hypopharyngeal defects. *Laryngoscope* 127: 2731-2737.
14. Zelken JA, Kang CJ, Huang SF, Liao CT, Tsao CK (2017) Refinements in flap design and inset for pharyngoesophageal reconstruction with free thigh flaps. *Microsurgery* 37: 112-118.
15. López F, Obeso S, Camporro D, Fueyo A, Suárez C, et al. (2013) Outcomes following pharyngolaryngectomy with fasciocutaneous free flap reconstruction and salivary bypass tube. *Laryngoscope* 123: 591-596.
16. Piazza C, Taglietti V, Nicolai P (2012) Reconstructive options after total laryngectomy with subtotal or circumferential hypopharyngectomy and cervical esophagectomy. *Curr Opin Otolaryngol Head Neck Surg* 20:77-88.
17. Tan NC, Shih HS, Chen CC, Chen YC, Lin PY, et al. (2012) Distal skin paddle as a monitor for buried anterolateral thigh flap in pharyngoesophageal reconstruction. *Oral Oncol* 48: 249-252.
18. Tan NC, Yeh MC, Shih HS, Nebres RP, Yang JCS, et al. (2011) Single free anterolateral thigh flap for simultaneous reconstruction of composite hypopharyngeal and external neck skin defect after head and neck cancer ablation. *Microsurgery* 31: 524-528.
19. Lewin JS, Barringer DA, May AH, Gillenwater AM, Arnold KA, et al. (2005) Functional outcomes after circumferential pharyngoesophageal reconstruction. *Laryngoscope* 115:1266-1271.
20. HuangTCT, Cheng HT (2019) ALT vs. Jejunum: Have we found the ideal flap for circumferential pharyngoesophageal reconstruction? A meta-analysis of comparative studies. *J Plast Reconstr Aesthet Surg* 72: 335-354.
21. Mura F, Bertino G, Occhini A, Benazzo M (2013) Surgical treatment of hypopharyngeal cancer: a review of the literature and proposal for a decisional flow-chart. *Acta Otorhinolaryngol Ital* 33: 299-306.