Journal of Plastic, Reconstructive & Aesthetic Surgery (2009) 62, 1367–1373

JPRAS
An International Journal of Surgical Reconstruction
www.JPRASurg.com

Gastro-omental free flap in the reconstruction of the unfavourable hypopharyngeal defects: A functional assessment

Karim A. Chahine [a], Philippe Chaffanjon [b,c], Georges Bettega [d], Jacques Lebeau [c,d], Emile Reyt [a,c], Christian A. Righini [a,c,e,*]

[a] Department of ENT-HNS, University Medical Center of Grenoble, Grenoble, France
[b] Department of Thoracic Surgery, University Medical Center of Grenoble, Grenoble, France
[c] Joseph Fournier University, Grenoble, France
[d] Department of Maxillofacial Surgery, University Medical Center of Grenoble, Grenoble, France
[e] Inserm 823, Albert Bonniot Research Institute, Grenoble, France

Received 29 March 2008; accepted 29 May 2008

KEYWORDS
Gastro-omental flap;
Free flap;
Hypopharynx;
Upper digestive tract reconstruction;
Functional results

Summary *Background:* Reconstruction flaps following major head and neck cancer surgery should consider the state of tissue at the recipient site. This study presents the cumulative experience of the use of the gastro-omental free flap (GOFF) for pharyngeal reconstruction in cases with unfavourable recipient site conditions.
Methods: The GOFF reconstruction procedure and postoperative follow-up are described in details, and the functional results are analysed retrospectively.
Results: Fifteen patients underwent GOFF reconstruction. Previous treatments included radiotherapy, chemotherapy and surgery. Postoperatively, two patients (13%) developed partial flap necrosis, and four (27%) patients developed fistula and flap stenosis. On the functional level, eight (53%) patients developed oesophageal speech at different levels of audibility, and all patients developed oral alimentation ranging from a mixed diet with supplements to a regular oral diet.
Conclusions: The GOFF is characterised by multiple survival advantages that favour its use in the presence of inhospitable recipient site conditions.

* Corresponding author. Address: Centre Hospitalier Universitaire de Grenoble, BP 217 – 38043 Grenoble Cedex 09, France. Tel.: +33 4 76 76 56 56; fax: +33 4 76 76 56 15.
E-mail address: crighini@chu-grenoble.fr (C.A. Righini).

The primary role of oncologic surgery is the curative resection of tumours. Locally advanced tumours of the upper aero-digestive tract may require large resections incorporating mucosa, skin and muscle. Subsequent

1748-6815/$ - see front matter © 2009 British Association of Plastic, Reconstructive and Aesthetic Surgeons. Published by Elsevier Ltd. All rights reserved.
doi:10.1016/j.bjps.2008.05.042

reconstruction and rehabilitation is required and should lead to an optimal functional and cosmetic result. The type of reconstruction employed is dictated by the location and size of the defect, and every attempt should be made to replace like tissue with like tissue. The ideal reconstructive modality should be performed as a single-stage procedure with minimum donor-site morbidity.

Since the early 1990s, the use of microvascular free tissue transfer, namely radial forearm free flap, antero-lateral thigh free flap, jejunum free flap and gastro-omental free flap, became one of the primary reconstructive modalities in head and neck surgery. Free tissue transfer allows for single-stage reconstruction and more donor-site options relating to size and thickness. In addition, prior radiation did not affect flap survival.[1,2]

Amongst the various options of aero-digestive tract reconstructive free flap, the gastro-omental flap has particular functional characteristics promoting its suitability in the reconstruction of large cervical defects. The gastric mucosa provides a thin, pliable tissue with a smooth, mucus-secreting surface. The omental portion can be used to provide an appropriate amount of bulk and to protect the carotid.

The gastro-omental free flap was introduced by Papachristou and Fortner in 1979 following success in pharyngo-oesophageal reconstruction in dogs.[3] The first case of human gastro-omental reconstruction was published by Baudet in 1979.[4]

Following those pioneering experiences, several authors have reported satisfactory results following the use of the gastro-omental free flap in the reconstruction of the hypopharynx and cervical oesophagus.[5–8] Nevertheless, experience is still lacking on the long term functional results following reconstruction with the GOFF. The literature review to date reveals an accumulation of only 29 cases with the absence of any real functional evaluation.

We have previously published a report of six cases with a short postoperative follow-up precluding the possibility of postoperative functional assessment.[9]

The purpose of this study is to assess the postoperative outcome and evaluate the long-term functional result following reconstruction with the GOFF of patients with inhospitable recipient sites. The patients' pre-operative medical risk factors, relevant technical steps of the procedure, as well as the post-operative follow-up are described and discussed in relation to their effect on the functional outcome.

Materials and methods

This is a retrospective study of 15 cases treated at our University Medical Center between 1994 and 2007. All patients, except for one, had been managed for an existing lesion of the upper aero-digestive tract. One patient underwent gastro-omental free flap reconstruction after necrosis and abscess formation in a jejunum free flap, performed 10 days earlier, for the management of pharyngeal stenosis that developed as a complication of pharyngo-laryngectomy and radiation therapy.

Patients underwent pre-operative panendoscopy and biopsy, neck and chest CT scan, and abdominal ultrasound examination. None of the patients had a secondary lesion or distant metastasis detected on pre-operative imaging. The procedures were performed by a team of head and neck surgeons and abdominal surgeons. Except for patient number 8, all patients underwent total phayngo-larngectomy with bilateral neck dissection followed by reconstruction using a GOFF.

The patients were prepped and draped in the usual fashion at both the cervical and abdominal operative sites. Both surgical teams operated simultaneously. While the head and neck surgical team performed the cervical resection and prepared the recipient vessels, the abdominal surgical team harvested the gastro-omental free flap. The abdominal surgery was performed through a supra-umbilical midline laparotomy incision, the omentum was mobilised from the colon, and the right gastro-epiploic vessels identified (Figure 1A,B). The gastric graft was harvested from the greater curvature of the stomach proximal to the antrum using a GIA stapler[9] (Figure 1C). The free flap was handled delicately to avoid encroachment of the pylorus and the gastro-oesophageal junction. In cases where a feeding gastrostomy tube was previously installed, the gastrostomy tube was removed along with a ring of tissue at the site of inlet and the defect was closed appropriately. The length of resection was in accordance with the measured length of the cervical pharyngo-oesophageal defect (Figure 2A). The resulting gastro-omental flap was kept pedicled to the right gastro-epiploic vessels until the recipient site was fully prepared for tissue transplantation (Figure 2B). A feeding jejunostomy was performed for early post-operative alimentation. The tubed GOFF was then transferred to the recipient cervical site and the ends were trimmed to the appropriate size of the recipient oro-pharyngeal and oesophageal ends. Following irrigation with a heparin solution through the arterial pedicle (Figure 1D), the flap was fixed to the oro-pharyngeal and oesophageal ends using double plane interrupted sutures Dexon (4/0) on the mucosal plane and Prolene (3/0) on the adventitial-muscular plane (Figure 2C). The tubed gastric graft was fixed under minimal tension to assume a more linear form. Vascular anastomosis was performed using Prolene (9/0) under magnifying glass vision. Recipient site arteries were the superior thyroid artery in six cases, lingual artery in four cases, facial artery in three cases and external carotid artery in two cases. Free flap veins were anastomosed to the internal jugular vein in nine cases and the thyro-lingo-facial venous trunk in six cases.

The adjoining omental graft was used, fashioned and sutured in place in a way to fill the bulk of the anterior cervical soft tissue deficit, to cover and protect the major vessels, and to cover the reconstructed area in order to decrease the risk of fistula formation (Figure 2D). In case of cervical skin resection, part of the omental free flap was used to replace the cutaneous deficit. Part of the omental free flap was always kept uncovered by skin to be used as an indicator of the viability of the transplanted tissue. Closure was done with the neck extended in order to avoid constriction of the omental flap and tension was prevented by keeping part of the omentum uncovered with skin. This helped avoiding pressure stricture of the gastro-epiploic pedicle. In cases where skin resection was needed, a partial thickness skin graft was applied at post-operative day 21