Successful management of oesophageal conduit necrosis by a single-stage reconstruction with the pedicled pectoralis major myocutaneous flap†

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INTRODUCTION

Oesophageal conduit necrosis is one of the most life-threatening complications of oesophageal surgery. Without early diagnosis and expeditious management, this complication would be associated with a high mortality rate. Aggressive surgical interventions are required, and the subsequent reversal oesophageal discontinuity is very challenging [1]. An option for both cervical-oesophageal reconstruction and neck wound closure has been limited and less successful. We used a pedicled pectoralis major myocutaneous flap (PMMF) to reconstruct cervical oesophagus and close the neck wound in a single stage procedure.

CASE REPORT

A 46-year old female patient attempted to commit suicide by swallowing lye, which resulted in complete necrosis of the oesophagus and stomach mucosa. She underwent a total gastrectomy, transhiatal oesophagectomy and creation of an oesphago-cutaneous fistula. Three months later, this patient was readmitted and had a descending colon interpositional graft placed in the substernal prepericardial orientation (extended left colon interposition, with the ascending branch of the left colic artery as a supplying vessel). The proximal anastomosis (based on the origin of the vascular pedicle of the colon conduit) was a colo jejunal anastomosis as part of a Roux-en-Y loop of jejunum. Meanwhile, a prophylactic resection of the left sternal-clavicular joint was performed to widen the thoracic inlet. Unfortunately, she developed severe symptoms of sepsis in the postoperative course, and subsequent endoscopic findings confirmed that the proximal 5 cm of the colon conduit was necrotic. The necrotic tissue was resected. The colon was not removed entirely as it was viable. The most proximal colon was left as a mucous fistula. The expanse between the oesophageal split fistula and the colonic mucous fistula was covered with a negative pressure wound therapy dressing (KCI, USA). Eventually the bed of the wound became epithelialized with skin epithelium after frequent negative pressure wound therapy dressings. At this point, she also had a 7 × 3 cm open wound over her left lower neck.

After she underwent a redo-cervical end-oesophagostomy (oesophago-cutaneous fistula), the plastic surgery service was consulted for reconstruction of her cervical oesophagus and neck wound closure (Fig. 1A). The left pedicled PMMF was selected for a single-stage reconstruction by the plastic surgeon. An 8 × 5 cm skin paddle of the flap (Fig. 1B) was designed after turnover to reconstruct cervical oesophagus and close the neck wound in a single stage procedure.

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and also off the pectoralis minor muscle (Fig. 1C). Once the adequate de-epithelization of the skin around the neck wound was performed, the flap was then turned over so that the skin side of it was facing to the anterior portion of the cervical oesophagus and sewn in place with interrupted 3-0 Vicryl sutures. When the repair of the anterior portion of cervical oesophagus was completed, the muscle portion of the flap was then sutured to the adjacent skin edges as a second layer closure. A split-thickness skin graft was harvested from the left lateral thigh and placed over the muscle, such that the neck wound was then completely closed (Fig. 1D).

Figure 1: (A) The patient had cervical-oesophageal discontinuity due to the colon conduit necrosis. (B) An 8 × 5 cm skin paddle was designed above her left breast. (C) A pedicled PMMF was elevated off the chest wall. (D) The PMMF was turned over to reconstruct the cervical oesophagus and to close the neck wound; a split-thickness skin graft was then placed on the muscle portion of PMMF. PMMF: pectoralis major myocutaneous flap.

Figure 2: (A) The figure demonstrates how the left PMMF was turned over to reconstruct the cervical-oesophageal defect; the major blood supply of the PMMF is shown on the opposite side (a) pectoral branch of the thoraco-acromial artery, which is the first part of axillary artery. (b) Internal thoracic artery. (B) The cross-sectional view of the reconstructed cervical oesophagus and the neck wound closure.
Postoperatively, the patient did well with the exception of a small leak from the cervical-oesophageal anastomosis. She was treated conservatively and was discharged home uneventfully on postoperative day 22. During the follow-up, the success of her oesophageal reconstruction was confirmed by a swallow test. The patient was followed for 2 years after reconstruction, and was tolerating soft solid foods (see Supplementary material, Fig. S1). The patient did require episodic endoscopic dilatations for recurrent anastomotic stricture and some dysphagia. Unfortunately, because of social reasons, the patient became lost to the follow-up.

**DISCUSSION**

Oesophageal conduit necrosis is a severe and emergent complication. The colon graft necrosis is considered even more dangerous than stomach [1]. We used a pedicled PMMF not only to restore the cervical-oesophageal colon conduit but also to reconstruct a neck wound in a single-stage operation.

Compared with fasciocutaneous free flaps such as radial forearm and anterolateral thigh, our method is an innovative and effective local reconstruction option without the need for free tissue transfer (Fig. 2). In addition to its location on the chest being adjacent to the lesion, a major advantage of the PMMF is its ease of harvesting, with reduced operative time. Therefore, no microsurgical training and specialized instrument are required [2]. On the other hand, PMMF has a fairly good reliability. According to a recent thorough literature review, it has a ≤2% total flap failure rate (versus ≤5% for free flaps) [3]. Its perioperative mortality is <1% [2]. The PMMF also has its own blood supply: Rikimaru et al. [4] have confirmed that the pectoral branch of the thoraco-acromial artery (first part of axillary artery) is the major feeding vascular pedicle.

The main limitation of PMMF is the bulkiness and rigidity of the entire flap including adipose layer and the skin [2, 3]. In our case, we used the split-thickness skin graft that was placed over the muscle portion of the flap, and the follow-up showed no sign of bulkiness or rigidity. Our report showed the PMMF can be used successfully for one-stage reconstruction of anterior cervical-oesophageal defect and neck wound without the need for free tissue transfer.

**SUPPLEMENTARY MATERIAL**

Supplementary material is available at ICVTS online.

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Conflict of interest: none declared.

**REFERENCES**