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Long-segment supercharged jejunal interposition for salvage oesophageal reconstruction: A complex case

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Abstract

Jejunal interposition is an established but infrequently performed option for oesophageal reconstruction, typically reserved for cases where gastric or colonic conduits are unavailable or unsuitable. Microvascular "supercharging" involves the creation of additional arterial and venous anastomoses to augment conduit perfusion, enhance vascular reliability, and permit greater conduit length in complex long-segment salvage reconstruction. We report a multi-level difficult case of a 71-year-old man who underwent supercharged jejunal interposition one year after failed 2-stage oesophagectomy, complicated by anastomotic leak and tracheoesophageal fistula requiring conduit resection and cervical oesophagostomy. Preoperative CT angiography demonstrated concerns regarding colonic marginal arterial perfusion. A substernal jejunal flap based on the second and third arcades was raised with microvascular anastomosis to the transverse cervical artery and internal jugular vein. Postoperative pneumonia, atrial fibrillation, and a delayed cervical leak were managed conservatively. At nine months, the patient tolerated a soft-to-normal diet with stable weight. Supercharged jejunal interposition is a feasible salvage option in selected patients within experienced multidisciplinary centres.

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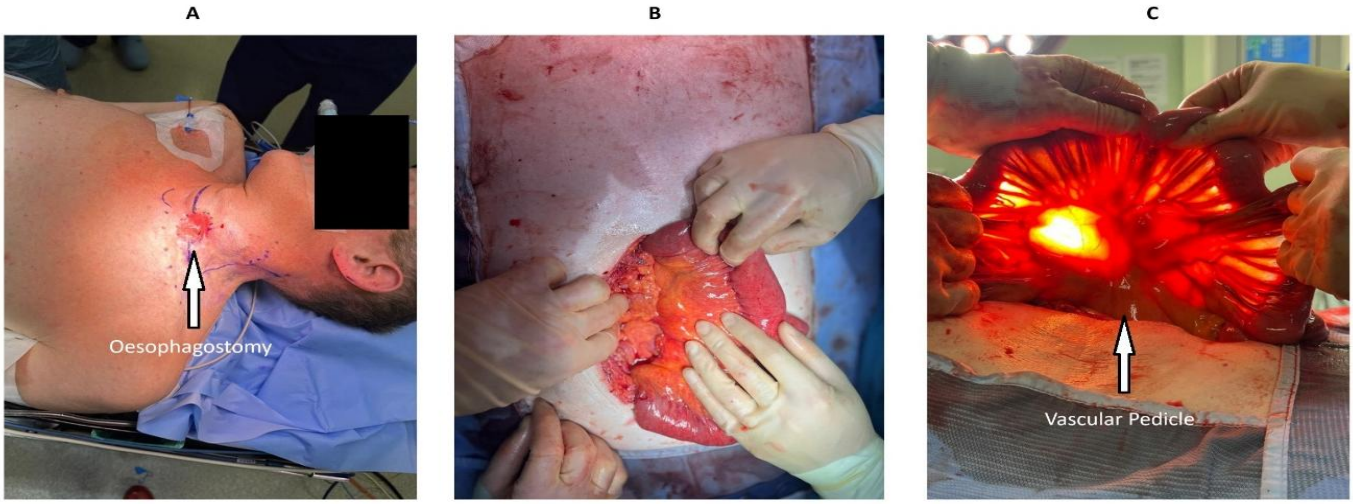
Introduction

Jejunal interposition remains a valuable alternative conduit for oesophageal reconstruction when gastric or colonic options are unavailable. Although historically described as early as 1946, it is now most frequently used in cervical or proximal oesophageal reconstruction and less commonly for long segment replacement[1,2]

Salvage reconstruction following conduit necrosis or failure is particularly challenging, especially after prior chemoradiotherapy and major upper abdominal surgery [3,4].

Compared with colonic interposition, jejunal reconstruction requires fewer anastomoses in Roux-en-Y configuration and provides intrinsic peristalsis, potentially improving bolus transit[5–7]. However, concerns regarding vascular reliability and length have limited its wider adoption. Microvascular "supercharging" involves additional arterial and venous anastomoses to enhance conduit perfusion, extend reach in long-segment reconstruction, and reduce the risk of ischaemia [7,8]. We present a complex case of long-segment supercharged jejunal interposition for complex salvage reconstruction, underscoring the technical aspect and the difficult decision-making in procedure selection and post-operative care.

Figure 1: Neck incision and Abdominal Visualisation of the Jejunal Arcades.



Case Report

A 71-year-old man was referred 12 months after a hybrid two-stage oesophagectomy for distal oesophageal adenocarcinoma (ypT3N1M0) following neoadjuvant chemoradiotherapy. His postoperative course was complicated by an anastomotic leak and tracheoesophageal fistula within 2 weeks of his index surgery, requiring emergency thoracoabdominal reoperation, gastric conduit resection, airway repair with intercostal muscle flap, near-total gastrectomy, and formation of a left cervical oesophagostomy with feeding jejunostomy.

Restaging CT demonstrated no recurrence. CT angiography showed intact colonic vasculature but poor marginal arterial enhancement, raising concern regarding colonic conduit reliability. After multidisciplinary discussion, long-segment jejunal interposition with microvascular supercharging was selected.

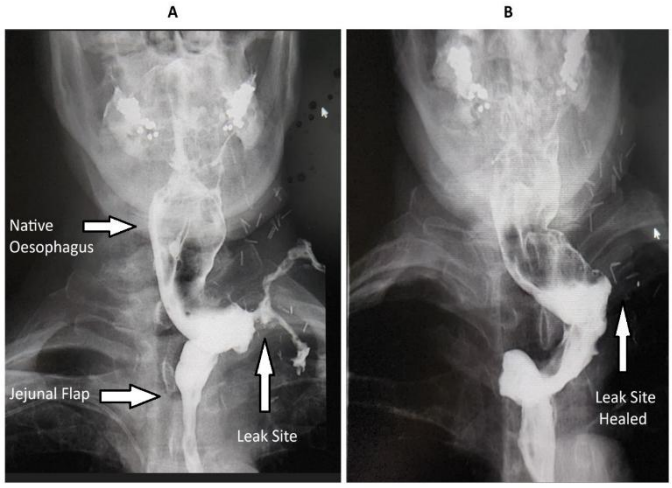
The patient underwent upper midline laparotomy and cervical exploration. Extensive adhesions were encountered at the right upper quadrant and duodenal stump. The second, third, and fourth jejunal arcades were identified (Figure 1). The jejunum was divided 20 cm distal to the feeding jejunostomy. The mesentery was divided between the second and third arcades to straighten the limb. The jejunal conduit was delivered to the neck via a substernal tunnel using a lubricated retrieval bag.

In the neck, bilateral subplatysmal flaps were raised and the cervical oesophagus mobilised. The transverse cervical artery and internal jugular vein were prepared. Partial medial clavicle and manubrial resection facilitated exposure and reduced vascular compression risk. End-to-end arterial and end-to-side venous microvascular anastomoses were performed using 9/0 Prolene. Heparinised saline was used to flush vessels prior to completion. Redundant bowel was resected, and oesophagojejunal anastomosis fashioned using interrupted 3/0 polydioxanone sutures. A skin monitoring window was created. A new feeding jejunostomy was placed in the Roux limb.

The patient was admitted to ICU. Enteral feeding commenced on postoperative day two. He developed pneumonia and atrial fibrillation on day five, treated with antibiotics and medical therapy. CT with oral contrast on day seven showed satisfactory conduit perfusion without leak. On day 10, a cervical salivary leak was confirmed radiologically. Conservative management included antibiotics, antifungals, nil by mouth, and jejunal feeding. Standard venous thromboembolism prophylaxis was continued for four weeks.

At six weeks, imaging confirmed leak resolution (Figure 2). Oral intake was gradually resumed. At six months, the patient tolerated a soft-to-normal diet with stable weight and satisfactory functional recovery.

Figure 2: Contrast Swallow showing anastomotic leak and then healing.



Discussion

Salvage oesophageal reconstruction after conduit failure presents significant technical challenges. In this case, colonic interposition was considered, but radiological and clinical concerns regarding marginal arterial perfusion and the requirement for multiple anastomoses influenced decision-making. Jejunal interposition offers fewer anastomoses and intrinsic peristalsis, potentially improving functional outcomes [6,7]. Other supercharged anastomoses exist, such as the radial forearm flap, but tend to only cover short segments and are utilized as a last resort [6].

Microvascular supercharging is meant to enhance vascular reliability and reduce ischaemic risk in long-segment reconstructions [8]. Selection of recipient vessels depends on local anatomy and prior surgery [5,9]; in this case, the transverse cervical artery was preferred due to cervical scarring and difficulty utilising usual vessels such as superior thyroid artery. Clavicular resection can be performed to improve exposure and reduced pressure on conduit.

While flap monitoring using a window, implantable Doppler, or externalized segments is highly sensitive for ischemia, it does not always predict anastomotic leaks, which may result from localized necrosis [8]. Colour duplex shows some promise to easier and more reliable monitoring which can make post operative care easier [8]. An observation window in the neck was allowed in our case for direct monitoring of jejunal flap perfusion as opposed to other methods to avoid invasive and more technically demanding options especially in the absence of reliable difference between these methods [10].

Reported anastomotic leak rates after jejunal reconstruction reach 37%, although graft loss is less common (approximately 11%) [7]. Functional outcomes are generally favourable, with most patients tolerating solid diet long term [3,7]. In our case, conservative management achieved leak resolution with good medium-term functional recovery.

This case not only describes an uncommon salvage post oesophagectomy but also reflect a complex decision-making process that had culminated in the selection of the appropriate conduit, vascular reconstruction and the management of post-operative complications. Supercharged jejunal interposition is a viable option and should be considered in complex salvage scenarios within experienced multidisciplinary centres with microvascular expertise.

Consent: Written informed consent for publication and images was obtained and is held by the authors.

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