Gastric conduit revision postesophagectomy: Management for a rare complication

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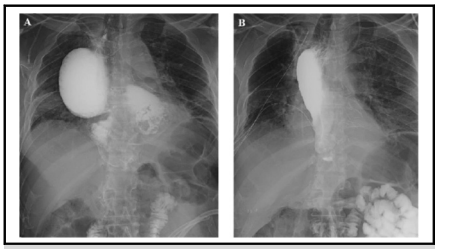
ABSTRACT

Objective: Severe postesophagectomy gastric conduit dysfunction refractory to standard endoscopic intervention is rare, with few published reports discussing timing, technique, or results of reoperation. This case series examines assessment and management of severe conduit dysfunction and details techniques for conduit revision.

Methods: We retrospectively reviewed patients who underwent esophagectomy between September 2008 and October 2015 and studied patients who underwent conduit revision.

Results: More than 400 patients underwent Ivor Lewis or transhiatal esophagectomies during this 7-year period. Eight patients underwent reoperation for conduit revision. The strategy for initial anastomosis and management of the pylorus were variable. Symptoms included dysphagia, delayed emptying, aspiration, and weight loss. Evaluation and management included esophagram, computed tomography, repeated esophagoscopy with pyloric intervention, and selective anastomotic dilation. Two patients also had associated paraconduit hiatal hernias. Average time to reoperation was 3.8 years (range 2 weeks to 6.5 years). All revisions were performed through a thoracotomy with either laparoscopy or laparotomy. Revisions were completed in 7 patients. Average length of stay was 9.9 days (range 4-21). Average follow up was 10.1 months (range 1-36). The completed revisions led to restoration of a regular diet with improved patient satisfaction.

Conclusions: Severe gastric conduit dysfunction after esophagectomy is rare. Symptoms, esophagram findings, and response to interventional esophagoscopy guide the decision to revise the conduit. Principles of conduit revision include reducing paraconduit hernias, reducing redundant conduit, tubularizing a dilated conduit, and ensuring adequate gastric drainage. Selective revision was performed with minimal morbidity and durable improvement in subjective symptoms of dysphagia and reflux. (J Thorac Cardiovasc Surg 2017;154:1450-8)



Esophagram (A) before and (B) after successful conduit revision with excellent emptying.

Central Message

In rare cases of severe conduit dysfunction, conduit revision can be performed selectively with minimal morbidity and durable symptom improvement.

Perspective

Severe postesophagectomy gastric conduit dysfunction is rare. Symptoms, imaging, and response to interventional esophagoscopy guide the decision to revise the conduit. Principles of revision include tubularization of redundant conduit and ensuring adequate gastric drainage. This case series outlines our management of conduit dysfunction and details techniques for conduit revision for symptom improvement.

See Editorial Commentaries pages 1459 and 1461.

Esophagectomy with reconstruction using a gastric conduit allows normal eating for many patients but produces significant gastrointestinal alterations. Delayed gastric emptying, gastric outlet obstruction, paraconduit hernias, and dumping syndrome are commonly observed complications of postesophagectomy.[1-8] Of these, impaired gastric emptying is the most common, with as many as 15% to 30% of patients experiencing dysphagia, postprandial fullness, nausea, and reflux. In extreme cases, patients suffer from aspiration and weight loss.

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The initial management of these patients aims to improve gastric emptying with pyloric dilation or botulinum toxin injection to the pylorus. Although such treatments lead to symptom reduction in the majority of patients, up to 5% of patients have persistent symptoms of severe conduit dysfunction.[4,8] Persistent symptoms in these patients can be associated with anatomic features such as a dilated and or redundant conduit, an inappropriately low esophageal-gastric anastomosis that promotes reflux, and pyloric dysfunction with or without associated herniation of other abdominal contents such as colon or small bowel. Medications that promote gastric motility may improve conduit motility in the immediate, routine, postoperative period, but there are no long-term data demonstrating safety and effectiveness, and there is no evidence that such medications are therapeutic in late and difficult cases of severe conduit dysfunction.[9,10] Datta and colleagues[11] described rescue pyloroplasty alone to address refractory delayed gastric emptying postesophagectomy, but only 9 of 13 (69%) patients had resolution of their symptoms. The implantation of gastric nerve stimulators has been proposed to address severe conduit dysfunction, but the application of this technology is limited and the durability is unknown.[12,13]

Surgical revision has been used to address anatomic features associated with severe conduit dysfunction. Kent and colleagues[8] described revision in 21 patients symptomatic with a redundant conduit. Through a combined thoracic and abdominal approach, the conduits were mobilized in the chest, reduced into the abdomen, and sutured to the diaphragm. All but 2 (9%) revisional operations were completed minimally invasively with a success rate of 65%. A more extensive surgical approach that uses Roux-en-Y reconstruction has been described to address reflux esophagitis both preemptively, as a primary reconstructive technique, and in the reoperative setting.[14,15] D'Journo and colleagues[14] described a small series of 4 patients who underwent conversion of a standard gastric conduit to a Roux-en-Y reconstruction for severe conduit dysfunction. Only 2 of 4 (50%) patients had resolution of symptoms despite the drawbacks of significant morbidity and length of stay.[14,15]

Literature is sparse on how to best address severe postesophagectomy conduit dysfunction. Uncertainty exists regarding when and how to intervene, if and when to reoperate, and ultimately what operation to perform. This case series aims to share experiences and stimulate investigation by discussing the assessment and management of severe conduit dysfunction after esophagectomy and detailing our techniques for conduit revision for symptom relief.

METHODS

Patient Selection

We retrospectively reviewed patients who underwent conduit revision between September 2008 and October 2015 at our institutions. Washington University's Institutional Review Board approved the study. We excluded patients who underwent isolated repair of paraconduit hernias in the presence of an adequately performing gastric pull-up.

Esophagectomy Technique

Patients underwent the workup appropriate for their diagnosis. In the setting of esophageal cancer, diagnosis, staging, and neoadjuvant therapy followed guidelines outlined by the Society of Thoracic Surgeons and National Comprehensive Cancer Network.[16,17] Both open and minimally invasive transhiatal and Ivor Lewis esophagectomies were performed during the study period. Treatment of the pylorus varied by surgeon, ranging from no treatment to botulinum toxin injection, pyloroplasty, or pyloromyotomy. The gastric conduit was tubularized to a width of 4 to 5 cm. The diaphragmatic crura were not reapproximated routinely after the esophagus was mobilized. The abdominal portion of the conduit was not tacked routinely to the diaphragm.

Initial Management

Postesophagectomy patients were followed in thoracic surgery clinic by the operating surgeon. Computed tomography scans were performed for oncologic surveillance in patients with a diagnosis of esophageal cancer. Symptoms suggestive of conduit dysfunction were evaluated in a stepwise manner but not according to any predetermined protocol. Flexible esophagoscopy commonly was performed to assess the presence of an anastomotic stenosis, retained food in the conduit, pyloric stenosis, and mucosal abnormalities such as anastomotic ulcer or recurrent cancer. Suspected gastric outlet obstruction was addressed with pneumatic dilation of the pylorus to 20 mm, the rare use of botulinum toxin injection 200 units in 8 mL total divided into 4 quadrants, or both. If a tight anastomosis was a concern, pneumatic dilation of the anastomosis also was performed. For patients with persistent symptoms despite dilation procedures, additional imaging was pursued. An esophagram often was obtained to assess conduit dynamics and shape, location of the pylorus, and the speed of emptying into the duodenum. Computed tomography of the chest, abdomen, and pelvis was obtained to evaluate the remainder of the anatomy around the reconstruction and any extrinsic factors that may be contributing to symptoms.

Conduit revision was indicated for patients with persistent symptoms refractory to initial management strategies and anatomic features amenable to surgical correction such as a dilated and or redundant conduit, a relatively low and or stenotic esophageal-gastric anastomosis, with or without an associated paraconduit hernia. Specific risks discussed with the patients preoperatively included but were not limited to bleeding, infection, pain, recurrent or persistent symptoms, enteric leak, chyle leak, phrenic nerve injury, aspiration, and conduit injury that could require a subsequent staged surgery to maintain the ability to eat. Nutrition was optimized before elective conduit revision, and patients completed antibiotics as indicated for aspiration pneumonia.

Surgical Technique

Patients were encouraged to have a thoracic epidural for analgesia. General anesthesia was administered, and patients were intubated with a double-lumen tube. Special care was taken to minimize the risk of aspiration on induction. Fiberoptic esophagoscopy was performed to empty the redundant conduit. All reoperations in this series started in the chest with a posterolateral thoracotomy either left or right. Bilateral posterolateral thoracotomies were performed rarely to safely mobilize the conduit. Attempts were made to reuse previous thoracotomy incisions. The inferior rib was shingled frequently to improve exposure. The conduit was mobilized from the anastomosis to the diaphragm, with care taken to avoid injury to the conduit blood supply and the phrenic nerve. Associated transverse colon hernias were dissected free and reduced. If indicated, the esophagogastric anastomosis was revised with an end-to-end anastomosis