Anastomotic Leakage Following Esophagectomy

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KEYWORDS

• Anastomotic leaks • Esophagectomy • Esophagogastrostomy
• Esophageal stents • Esophageal cancer

KEY POINTS

- Anastomotic leaks following esophagectomy remain a major source of morbidity.
- Esophagogastric anastomotic leaks are associated with a spectrum of clinical presentations, leading to multiple treatment options tailored to the specific needs.
- Systemic, local, and technical factors may contribute to the cause of leaks following esophagectomy with esophagogastrostomy.
- Esophageal stenting has been successful at managing a significant number of anastomotic leaks following esophagectomy and has decreased the need for reoperation.
- When reoperation is necessary to treat an esophagogastric anastomotic leak, techniques to maintain esophagogastric continuity should be considered and usually are successful.

INTRODUCTION

Esophagectomy is a major surgical procedure with the potential for significant perioperative morbidity and mortality. Recent data suggest that the number of esophagectomies performed in the United States is increasing at an annual rate of 4%, with approximately 18,000 cases in 2013.[1] Anastomotic leakage following esophageal resection and reconstruction has been one of the most common, feared, morbid, and potentially mortal complications faced by the patient and esophageal surgeon. Such leaks have been associated not only with the septic sequelae of mediastinitis, peritonitis, or cervical wound infection, but also with the development of atrial fibrillation, pneumonia, respiratory failure, and the need for reoperation or reintubation, leading to increased length of stay in the hospital and the risk of postoperative death.[2,3] Mortality has been reported in up to 20% of patients when an anastomotic leak has occurred, although this percentage seems to be decreasing.[4,5] An overall leak rate of 12% was reported from a collective review of series from the 1980s,[6] with cervical anastomoses being associated with a higher incidence of leak (10%–25%) than those performed in the chest (<10%).[7–12] A literature review from 1995 found postesophagectomy leak rates of 30% when reconstruction was performed via primary esophagogastrostomy, depending on how vigorously the diagnosis of a leak was pursued and how it was defined.[13] Contemporary reports do not reveal a sharp decline in anastomotic leak rates compared with the results from past decades. A recent analysis of the Society of Thoracic Surgeons General Thoracic Database found an overall leak rate of 10.6% among 7595 esophagectomies, with rates of 12.3% and 9.3% for cervical and intrathoracic anastomoses, respectively.[14]

A leak can lead to significant sequelae not only in the early postoperative period, but also in the long term because of the potential for a

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subsequent anastomotic stricture leading to dysphagia. Given the frequency and morbidity of anastomotic leaks, an understanding of their cause and predisposing factors, techniques for prevention, and management principles are of primary importance to the surgical team. Anastomotic leakage can occur following foregut reconstruction with any of the commonly used conduits, including stomach, colon, or jejunum. Because the stomach is the most frequent esophageal substitute, this article is limited to data concerning esophagogastric anastomotic leaks. Many of the principles underlying the cause and treatment of such leaks, however, can be extrapolated to other esophageal replacement organs.

DIAGNOSIS

Issues fundamental to the understanding of esophagogastric anastomotic leaks, their clinical relevance, and their optimal management strategy are the manner in which they are detected (**Box 1**) and how they are defined (**Box 2**). Leaks often first present with postoperative fever or leukocytosis. The surgeon must have a high index of suspicion for an anastomotic disruption whenever the patient demonstrates a septic decline in the early postoperative period. In cases of a cervical anastomosis, the development of erythema, induration, or fluctuance along the neck incision may be a harbinger of an underlying leak. For either cervical or intrathoracic anastomoses, the presence of bile, enteric content, saliva, or air in a surgically placed drain adjacent to the site signifies a likely anastomotic breakdown. In such cases, the diagnosis may be obvious, although the underlying contributors may require further investigation. The development of a new pleural effusion within the first days following esophagectomy, especially if in the vicinity of an intrathoracic anastomosis, should be considered a leak until proved otherwise, realizing that other causes, such as chylothorax, are in the differential diagnosis.

Contrast esophagography has been a commonly used test for the detection of anastomotic or conduit leakage following esophagectomy. In addition to providing an assessment of anastomotic integrity, the study provides information on the contour and emptying of the esophageal replacement conduit and the integrity and patency of a pyloroplasty, if performed. The examination is most commonly ordered on postoperative day 5 to 7, because that is the time period during which most leaks are likely to develop.

Box 1
Methods to diagnose esophageal leak

- Clinical signs and symptoms
- Contrast esophagogram
- Flexible upper endoscopy
- Computed tomography scan (with or without oral contrast)
- Analysis of amylase level in drain fluid
- Measurement of serum C-reactive protein

Box 2
Grading of esophagogastric anastomotic leaks

- Grade I: Radiologically or endoscopically detected without clinical signs
- Grade II: Minor leak
- Grade III: Major leak with overt sepsis
- Grade IV: Gastric conduit necrosis

The traditional approach has been to commence the study using a water-soluble contrast agent, such as Gastrografin (diatrizoate meglumine and diatrizoate sodium solution; Bracco Diagnostics Inc, Monroe Township, NJ) out of fear that leaked barium could exacerbate cervical, mediastinal, pleural, or abdominal sepsis. Gastrografin, however, can cause a severe chemical pneumonitis if aspirated. Extreme caution is necessary in the postesophagectomy setting to prevent aspiration. This patient cohort is often elderly may have neck swelling when a cervical incision has been performed, and may have vocal cord dysfunction from recent intubation or iatrogenic recurrent laryngeal nerve injury during surgery, each factor adversely affecting swallowing function. An esophagogram may not be feasible in the patient who is septic, intubated, or otherwise unable to swallow oral contrast. A normal study with a water-soluble agent should be followed with thin barium to improve the sensitivity for detection of a leak.[15] Even a negative barium study does not exclude a leak, however, because a false-negative rate of 57% has been reported.[16]

Given the limitations, risks, and inaccuracies associated with contrast esophagography, other methods for assessing esophagogastric anastomotic integrity have been advocated. Computed tomography with or without orally administered contrast allows visualization of the neck, thorax, and abdomen on a single examination, and facilitates not only detection of an anastomotic leak, but also helps determine the extent and location of extraluminal fluid collections in need of drainage.

Some surgeons have advocated routine use of postoperative flexible esophagogastroduodenoscopy as an alternative to radiographs. Endoscopy avoids the need for orally administered contrast