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Review

Recent improvements in the management of esophageal anastomotic leak after surgery for cancer

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Abstract

Anastomotic leakage following total gastrectomy or esophagectomy is a significant complication that considerably increases postoperative mortality. The location of the anastomosis together with the anatomy of the esophagus explains the severity of this complication. Surgical knowledge should include general and specific predictive factors of leakage to avoid any technical-related cause of leakage.

Clinical presentations may vary from minimally symptomatic to life-threatening situations. Investigations should be undertaken as soon as the diagnosis is suspected because delay greatly worsens the prognosis. CT scans with oral contrast and low insufflation early endoscopy are the preferred diagnostic tools and can also aid in therapeutic procedures.

Communication and multidisciplinary teamwork are the cornerstones of treatment. When the leak occurs early with acute and important sepsis, the recommendation is surgical treatment. On the contrary, if the leak is late, non-symptomatic or minimally symptomatic, conservative management with intensive surveillance could be proposed. When the situation is in between these two extremes, endoscopic treatment is often proposed.

Based on a review of the literature and experience from high volume centers, in this educational review, we present the incidence, predictive factors, clinical presentations, diagnostic tools, management, and therapeutic algorithms for anastomotic leaks following elective esophagectomy and total gastrectomy for cancer.

Keywords: Surgery; Esophagus; Stomach; Anastomotic leak; Review

Introduction

Esophageal anastomotic leak (EAL) after esophagectomy or total gastrectomy is a severe complication, responsible for increase postoperative mortality. EAL following esophagectomy is associated with a 3 times higher death risk than for patients without EAL,[1] and mortality can reach up to 60%.[2] Similarly, mortality rates after EAL following total gastrectomy vary from 19 to 62%, and EAL is the leading cause of mortality-related death after such procedures.[3,4] Occurrence of postoperative EAL negatively impacts other aspects of postoperative outcomes. It

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increases the median length of hospital stay,[2,5] the delay before oral feeding,[2] the risk of anastomotic stricture, and the risk of re-operation up to 60%.[1] Finally, some authors have described a negative association between the occurrence of EAL and recurrence and long-term survival for esophago-gastric cancers,[6,7] negatively impacting quality of life.[8]

The aim of the present educational review was to highlight recent improvements in the management of esogastric and esojejunal AL after surgery for cancer. Based on the most recent published data and surgical expertise, we analyze incidence, predictors, clinical presentations, diagnostic tools, treatments and preventive strategies related to EAL. Algorithms are proposed to summarize the therapeutic alternatives according to local and general conditions.

Incidence

EAL remains one of the most devastating complications after esophagectomy and gastrectomy, with a wide range of reported incidences from 0 to 35% after esophagectomy[9] and from 2.7% to 12.3% after total gastrectomy.[3,10]

Important variations in the literature may be explained by the different cohort sizes, the definition used, the time of evaluation (in-hospital, 30 days, or 90 days post-surgery),[1,2,11–13] and location of the anastomosis. After esophagectomy, estimated incidence of EAL is higher when the anastomosis is located in the neck, with EAL rates from 4.8% to 53%, compared with 1.6%–16.1% in the thorax.[12,14–17]

Known predictive factors

Identification of predictive factors of EAL is of crucial importance to anticipate the risk of EAL, leading to optimized surgical procedures and to tailored postoperative surveillance. Known predictive factors of EAL are listed in Table 1.

Clinical presentations

Clinical presentations may reflect different situations according to the defect size, the way the EAL is contained or drained and the degree of sepsis. Patient's medical

Table 1
Predictive factors of esophageal anastomotic leak (EAL).

Local predictors	Anatomy	Difficult anastomosis due to its thoracic/hiatal location Absence of serosal layer: imperative need for the suture to involve full thickness of the mucosal and muscular layers of the esophagus Presence of a thoracic negative pressure system close to the anastomosis
	Technical points	2 randomized controlled trials suggested that performing a pyloroplasty (*vs.* no pyloroplasty) or a hand sewn anastomosis (*vs.* mechanical) does not impact the risk of EAL following esophagectomy[18,19] Following total gastrectomy, some data suggest that the type of anastomosis does not impact the risk of EAL in this context[20]
	Resection margins	Invaded margins are associated with a higher risk of EAL,[21] but not R1 resection after propensity score matching in a large European series following esophagectomy[22] Following total gastrectomy, studies provide similar data[23]
	Vascular local factors	Local ischemia, venous hold-up, defaults in tissue oximetry promotes EAL.[24–26] Manipulation of gastric pull-up or jejunal loop should be undertaken with caution
Technical predictors	Technical errors	Traction, compression or twist, incorrect number of stitches, proximity of the end of the gastric conduit or jejunal loop to a staple line, presence of a rigid drain close to the anastomosis, incomplete donuts in the case of mechanical anastomosis[2] Muscular section should be shifted from 1 cm above because of retraction of the esophagus after sectioning of half the length[27] (critical necessity of a full thickness suture in the esophagus)
	Location of anastomosis	Cervical anastomoses have 5 times greater risk of EAL when compared to thoracic anastomoses[28] (longer gastric conduit, increased risk of tension, risk of compression at the junction between the thorax and the neck)
General predictors	Demographics	Age by itself not reported to be associated with increased risk of EAL[1,30,31] High American Society of Anaesthesiologists[7]
	Medical condition	Diabetes with HbA1c $\geq$ 7.0%, chronic renal failure[23] Use of steroids, obesity, smoking[29]
Tumor predictors	Neoadjuvant CT/RCT	For esophagus: no association with increased rate of EAL[1,12,32–35] with doses <55 Gy. Completely different after doses higher than 55 Gy[36] where data shows dramatic increased risk of EAL. For stomach: no data in favor of increased risk of EAL[37,38]
	TNM stage	No correlation reported with the risk of EAL[1]
Center volume	Low *vs.* high volume	Data suggests that procedures performed in low volume centers are associated with an increased risk of postoperative mortality, long-term death, and increased risk of EAL, and severe EAL[7,39–41]

EAL: Esophageal anastomotic leak, CT: chemotherapy, RCT: radiochemotherapy, Gy: Grays.

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