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Optimal approach to the management of intrathoracic esophageal leak following esophagectomy: a systematic review

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Abstract

BACKGROUND: Recently, endoscopic interventions (eg, esophageal stenting) have been successfully used for the management of intrathoracic leak. The purpose of this systematic review was to assess the safety and efficacy of techniques used in the management of intrathoracic anastomotic leak.

DATA SOURCES: We performed a systematic review of MEDLINE, EMBASE, and PubMed to identify eligible studies analyzing management of intrathoracic esophageal leak following esophagectomy.

CONCLUSIONS: Intraoperative anastomotic drain placement was associated with earlier identification and resolution of anastomotic leak (mean 23.4 vs 80.7 days). In addition, reinforcement of the anastomosis with omentoplasty may reduce the incidence of anastomotic leak by nearly 50%. Endoscopic stent placement was associated with leak resolution in 72%; fatal complications were reported, however, and safety remains to be proven. Negative pressure therapy, a potentially useful tool, requires further study. If stenting and wound vacuum are used, undrained mediastinal contamination and persistent leak require surgical intervention.

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Esophagectomy is the mainstay of therapy in the management of patients with locoregionally advanced esophageal cancer, but carries significant risk of associated morbidity and mortality. The incidence of anastomotic leak varies widely in the current literature but has been reported to be up to 50%,[1] with mortality rates as high as 30% to 60%.[2–4] Compared with cervical anastomosis, intrathoracic anastomoses have a lower incidence of anastomotic leak and stricture rate. Presentation ranges from asymptomatic and clinically silent to overwhelming sepsis and death; patient prognosis after intrathoracic anastomotic leak depends on the extent of contamination and time interval to diagnosis. Regardless of the severity, the presence of an anastomotic leak following esophagectomy has a substantial impact on postoperative length of stay, overall morbidity, stricture formation, and dysphagia.[5,6]

The treatment of anastomotic leak remains controversial, as the indications for surgical, conservative, and endoscopic therapy remain non-standardized[7,8] Strategies described in the literature include conservative management (consisting

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of strict nil per oral, initiation of intravenous antibiotics, and drainage), early and late surgical exploration, endoscopic management with stenting, as well as prophylactic omental reinforcement. Determining the optimal therapy for such patients requires examining all available options as there are few retrospective and prospective studies comparing these techniques.

To determine the optimal management of intrathoracic anastomotic leak, we performed a systematic review of the literature analyzing endoscopic approaches to management and published outcomes. Specifically, we sought to determine: (1) whether intraoperative drain placement at the anastomosis impacts leak rate and/or duration; (2) whether reinforcement of the esophagogastric anastomosis after esophagectomy with omentoplasty reduces leak rate or the need for reintervention; and (3) the safety, efficacy, and indications for endoscopic interventions (stenting and negative pressure therapy) in leak management.

Data Sources

Eligible studies for inclusion were identified using a systematic search strategy (Table 1). Titles and abstracts of 465 articles were reviewed and all English language studies examining intrathoracic esophageal anastomotic leak after esophagectomy were identified for inclusion. Articles were excluded if they were published in abstract only, reported leaks predominately for operations other than esophagectomy and esophagogastric anastomosis, were case reports with less than 3 patients, or did not include anastomotic leak as a major focus of the article. Review articles other than systematic reviews and meta-analysis were also excluded. If more than one publication was found from the same institution, only the largest series was included. Because the outcomes of interest are leak resolution and leak-related mortality, articles that did not report success rate or mortality rate after use of a stent to treat anastomotic leaks were also excluded. To further limit the scope of the systematic review, we excluded articles focused on cervical anastomotic leaks, approach to anastomosis and leak, and ischemic preconditioning and leak. Additional references from article bibliographies were included as appropriate. A total of 51 articles were included in the final review.

Prophylactic management of anastomotic leak after esophagectomy: the role for intraoperative drain placement and pedicled omental reinforcement of the anastomosis

Because of the high mortality and morbidity associated with anastomotic leak, several authors have argued for the use of prophylactic interventions to reduce the impact and/or incidence of anastomotic leak. These include ischemic preconditioning, debates regarding the location (thoracic vs cervical) and approach to anastomosis (handsewn vs stapled), type of conduit (stomach, jejunum, or colon), intraoperative drain placement, and vascularized tissue reinforcement of the anastomosis at the time of initial operation. For this systematic review, we focused our question on whether intraoperative drain placement at the anastomosis impacts leak rate and/or duration and whether reinforcement of the esophagogastric anastomosis after esophagectomy with omentoplasty reduces leak rate or need for reintervention.

It is widely accepted that adequate drainage is a critical principles guiding management of anastomotic leak, with mortality rates as high as 80% in the setting of uncontrolled, inadequately drained leak.[9] Despite wide acceptance of the role for prophylactic intraoperative perianastomotic drain placement, the available literature analyzing the role for this approach is limited. Only 1 article was identified that focused on the role of intraoperatively placed drains in the evaluation and management of anastomotic leak. Tang et al, in a retrospective review of 414 patients who underwent esophagectomy with intrathoracic anastomosis, analyzed the

Table 1 Systematic literature search for management of anastomotic leaks

Search terms	Number of articles
1. 'esophagectomy' AND (anastomosis OR anastomotic) AND leak AND ('complication'/exp/mj OR complication) AND [humans]/lim AND [english]/lim AND [2000–2014]	326
2. 'esophagectomy'/exp AND ('anastomosis'/exp OR anastomotic) AND leak AND 'stent'/exp AND [humans]/lim AND [english]/lim AND [2000–2014]	70
3. 'esophagectomy'/exp AND ('anastomosis'/exp OR anastomotic) AND oment* AND [humans]/lim AND [english]/lim AND [2000–2014]	28
4. 'esophagus' AND ('resection'/exp/mj OR 'resection') AND 'anastomosis dehiscence'	98
Total number of articles	522
Total number after removal of duplicates	465
Final number after review for inclusion and exclusion criteria and addition of articles from review of references*	51

*Exclusion criteria: abstract only; operations other than esophagectomy; anastomotic leak not a major focus of article; not published in English; case reports with <3 patients; review articles other than systematic reviews and meta-analysis; other than esophagogastric anastomosis.

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