Management of esophageal perforation in the endoscopic era: Is operative repair still relevant?

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Background. *With the introduction of new treatment paradigms for esophageal perforation, the management of this highly morbid condition is evolving. We reviewed our experience to investigate the modern management and outcomes of esophageal perforations with a focus on operatively repaired patients.*

Methods. *A retrospective review of all esophageal perforations was conducted between August 2003 and January 2016.*

Results. *A total of 48 patients were identified, with iatrogenic injury in 19 (40%), spontaneous perforation in 18 (38%), and traumatic/foreign body causes in 11 (23%). The distal esophagus was the site of perforation in 63% of the patients, and the duration of time between perforation and treatment was <24 hours in 60%. Nonoperative management was employed in 18 (38%) and operative repair in 30 (primary operative repair = 20, drainage = 4, esophagectomy = 6). Iatrogenic and traumatic perforations were more likely to be treated nonoperatively (68%), while all spontaneous perforations were treated by operative intervention. There were no complications or mortalities in the nonoperative group and only a 5% reintervention rate. In the operative group, complications occurred in 10 (33%), reinterventions in 13 (43%), and mortality in 2 (7%) patients.*

Conclusion. *Our study highlights the importance of considering the etiology of a perforation when planning management and the success of nonoperative treatment with careful patient selection. In addition, operative repair in septic patients yielded excellent outcomes and should be the standard for comparison in future studies exploring endoscopic approaches. (Surgery 2016;160:1104-10.)*

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The rarity of esophageal perforations in combination with the gravity of its outcomes renders this condition difficult to diagnose in a timely manner and challenging to manage.[1] Historically, aggressive operative management has governed the treatment of this condition, but with endoscopic advances in recent years, the landscape of esophageal perforations is evolving rapidly with a change in etiologies, closer examination of predictive factors for outcomes, and a proliferation of novel therapies. The etiology of esophageal perforations is increasingly iatrogenic, accounting for up to 60% in most recent series; Boerhaave's syndrome accounts for 15–30% of patients, while trauma/foreign body ingestion and other causes make up the minority.[2]

As a result, iatrogenic perforations frequently are being managed nonoperatively, either completely conservatively using only antibiotics or by new endoscopic techniques. Such novel endoscopic strategies, including stents, endoluminal clipping of the size of the perforation, and so called "vacuum therapy," have all been applied in the context of esophageal perforations in small studies or case series. The diverse management options available have resulted in a challenging decision-making process for this rare and morbid condition, specifically calling into question the indication, timing, and implementation of operative management.

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Recent studies have attempted to identify key predictive aspects to guide treatment. Abbas et al[1] studied numerous factors in order to formulate the Pittsburgh perforation severity score, identifying age, clinical signs on presentation, containment of the leak, respiratory status, and underlying malignancy as contributing to increasing risk. In addition, time to diagnosis has been linked to unfavorable outcomes frequently, especially when the diagnosis is delayed for >24 hours in ill patients.[1,2] Recent retrospective studies have supported the factors identified by the Pittsburgh perforation score, further strengthening its use in predicting outcomes.[3] Because management strategies are diverse and esophageal perforations are a rare entity, study of this condition to formulate well-defined treatment guidelines based on published outcomes is challenging.

The objective of this study was to examine all patients with esophageal perforation managed at our major referral center from 2003–2016, exploring factors at presentation, management, and subsequent outcomes. Furthermore, we wanted to analyze the factors that favor successful nonoperative management and investigate the outcomes of our operative management that support primary repair without diversion.

METHODS

Patients and study base. We conducted a retrospective cohort study of all patients with esophageal perforations admitted to the McGill University Health Center over a 13-year period (August 2003–January 2016). Our exclusion criteria included anastomotic leak postesophagectomy, leaks after transesophageal resections (endoscopic mucosal resections, endoscopic submucosal dissection), and patients whose perforations were managed at other institutions and who were transferred to our center later in the course of their management.

Data collection for each patient included appropriate demographics, details of the esophageal perforation, treatment, and outcomes. Data collected included etiology, location and size of the perforation, and presence of underlying esophageal pathology. Causes of esophageal perforation were categorized as spontaneous, iatrogenic, or traumatic, which included foreign body perforations. Key presentation and diagnostic factors recorded included time from presentation to treatment, vital signs, laboratory parameters at presentation, and the radiologic/endoscopic method of diagnosis (computed tomography, barium swallow, endoscopy).

Esophageal perforation management. The mode of initial treatment (operative versus nonoperative management) was analyzed for each patient, including the need for reinterventions. Detailed operative parameters collected for the operative intervention group included the number of layers closed, use of a tissue buttress, and the insertion of a feeding jejunostomy.

Outcomes. The primary outcome analyzed was in-hospital or 30-day mortality (if discharged before 30 days). Secondary outcomes included complications as categorized by the Clavien-Dindo classification, reinterventions, total duration of stay, duration of stay in the intensive care unit (ICU), and oral intake at discharge.

Statistical analysis. Continuous variables are reported as medians (interquartile range) and were compared using the Wilcoxon rank sum test or Kruskal-Wallis test as appropriate. Categorical variables were compared using the Pearson χ^2 test. All statistical analysis was completed using STATA software (STATA14; StataCorp LP, College Station, TX).

Study ethics. This study was approved by the McGill University Health Center's Ethics Review Board (study number 15-029 MUHC).

RESULTS

Patient demographics and cohort characteristics. A total of 48 patients identified as having esophageal perforations between August 2003 and January 2016 met the inclusion criteria. Iatrogenic perforations occurred in 19 patients, spontaneous perforations occurred in 18, and traumatic or foreign body was the etiology in 11 patients. The median age at presentation was 59 years (interquartile range 48–73). Thirty-five (73%) patients were male.

Details of esophageal perforation. An underlying esophageal pathology was noted more frequently in the iatrogenic perforation group (68%) than in the spontaneous and traumatic group ($P = .001$) as shown in Table I. Malignancy was the most frequently identified pathology, occurring in 15% of the cohort, followed by benign stricture (8%), eosinophilic esophagitis (6%), esophageal diverticula (2%), and achalasia (2%). Squamous cell carcinoma was found in 5 patients, and esophageal adenocarcinoma and advanced thyroid cancer in 1 each.

Computed tomography scan was the most commonly used diagnostic tool across all perforation etiologies. Distal thoracic perforations accounted for 94% in the spontaneous group