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CASE REPORT | ENDOSCOPY

Esophageal Perforation Successfully Treated With EVT

Kavea Panneerselvam, MD[1], Ronald Samuel, MD[2], and Robert J. Sealock, MD[2]

[1]*Baylor College of Medicine, Department of Medicine, Houston, Texas*
[2]*Baylor College of Medicine, Department of Medicine, Division of Gastroenterology, Hepatology and Nutrition, Houston, Texas*

ABSTRACT

Esophageal perforation is rare and carries high morbidity and mortality. A high degree of suspicion is needed for timely diagnosis and treatment. A 54-year-old man presented with fever and confusion. Imaging revealed air in the hepatic inferior vena cava and concern for a fistula between the distal esophagus and the inferior vena cava. An upper endoscopic evaluation revealed a dental floss pick penetrating the distal esophagus. The foreign body was removed, and endoluminal vacuum therapy was used to close the perforation. Endoluminal vacuum therapy is an emerging therapy to treat full-thickness gastrointestinal injuries.

INTRODUCTION

Esophageal perforation is a rare but potentially fatal problem with mortality as high as 31%.[1–3] The most common causes of esophageal perforation are iatrogenic, spontaneous, and foreign body ingestion with each contributing 52%, 24%, and 17%, respectively.[1] The presentation is often nonspecific with symptoms, such as nausea, vomiting, and epigastric pain, thereby requiring a high index of clinical suspicion to result in timely diagnosis and management. Several therapeutic modalities are available to treat esophageal perforation, including primary surgical repair, surgical resection of the defect, endoscopic stents, endoscopic suturing, and endoluminal vacuum therapy (EVT). We present an unusual cause of esophageal perforation treated with EVT.

CASE REPORT

A 54-year-old man with a history of schizophrenia and homelessness presented to the hospital with fevers, chills, and confusion. Initial examination revealed fever (102.1° F), tachycardia (112 BPM), scleral icterus, and mild tenderness to palpation in the right upper quadrant of the abdomen. Laboratory values showed leukocytosis (40 K/μL), hemoglobin of 11.3 g/dL, elevated aminotransferases (aspartate transaminase 338 U/L and alanine transaminase 207 U/L) along with elevated alkaline phosphatase (175 U/L), and total bilirubin (7.7 mg/dL). Abdominal computed tomography revealed air in the hepatic portion of the inferior vena cava (IVC) with a fistulous connection between the distal esophagus and the proximal hepatic IVC along with a hepatic abscess (Figure 1).

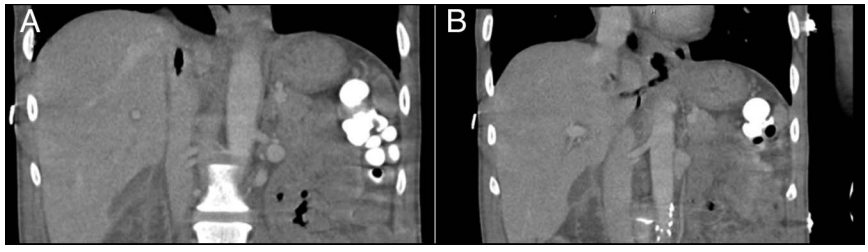

Figure 1. Abdominal computed tomography showing (A) air and (B) a fistulous tract between the distal esophagus near the gastroesophageal junction and the proximal hepatic IVC. IVC, inferior vena cava

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Correspondence: Kavea Panneerselvam, MD (kavea.panneerselvam@bcm.edu).

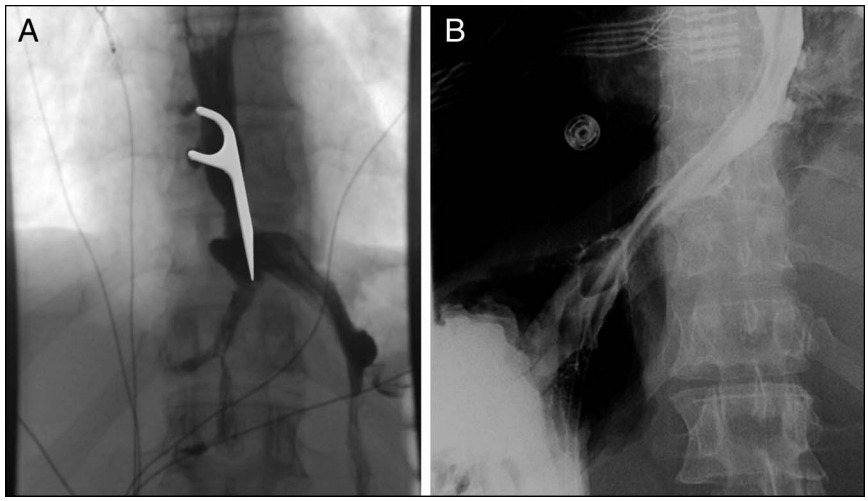

Figure 2. (A) Initial esophagram showing 2 diverticula along the right border of the distal esophagus and a focal outpouching of contrast arising from the gastroesophageal junction at the level of the diaphragmatic crus with a linear tract that extends inferiorly into the right before splitting into 2 tracts. An image of a dental pick is overlaid on the image for a representation of how we believe these defects were created. (B) Esophagram performed after the perforation healed, confirming no contrast extravasation.

Blood cultures had a growth of multiple organisms, including *Streptococcus mitis*, *Streptococcus salivarius*, and *Granulicatella adiacens*. He was started on broad-spectrum antibiotics.

An esophagram showed linear extravasation of contrast at the level of the diaphragmatic crus without evidence of extension into the IVC, along with 2 esophageal diverticula (Figure 2).

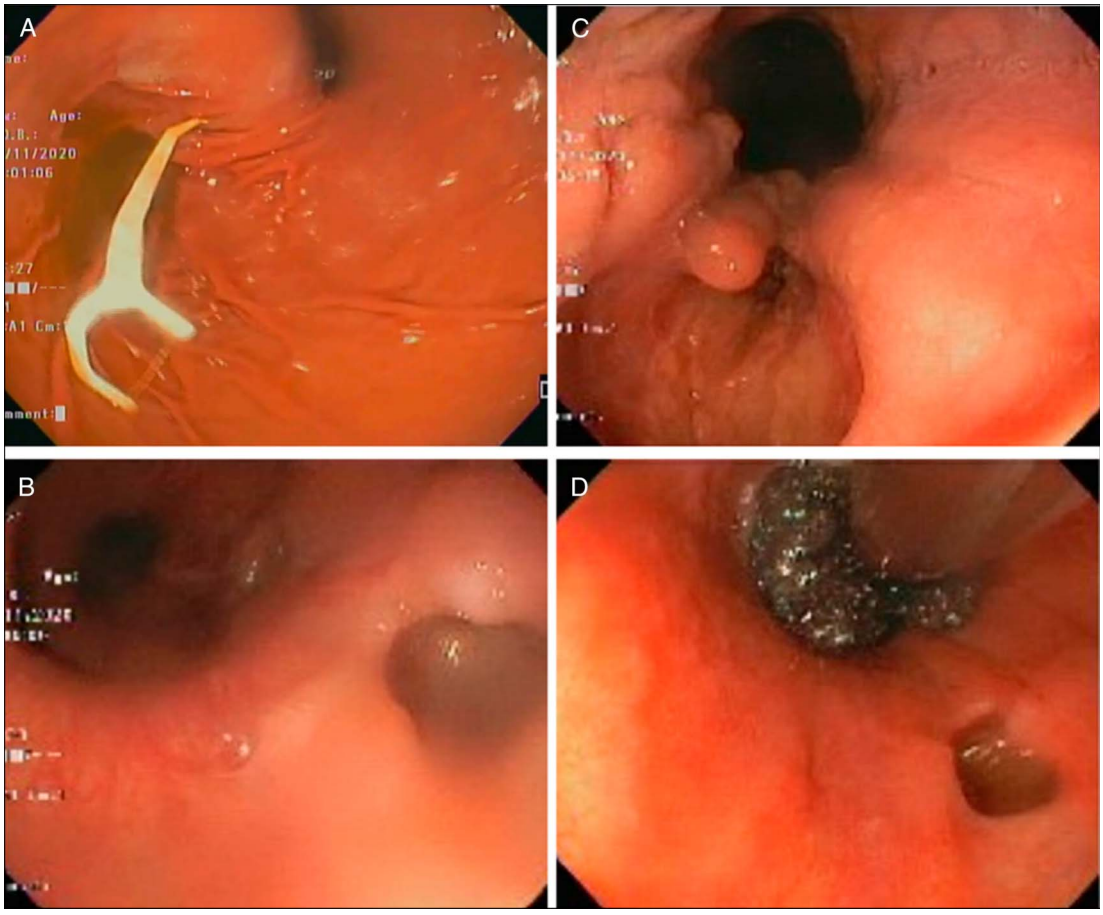

Figure 3. Esophagogastroduodenoscopy showing (A) the dental pick that has been pushed from the esophagus into the stomach, (B) the 2 diverticula, (C) the penetrating ulcer, and (D) the endoluminal vacuum overlying the penetrating ulcer.

Figure 4. The proximal and distal ends of the wound vacuum sponge are secured to the distal end of an 18 French nasogastric tube using sutures.

Esophagogastroduodenoscopy (EGD) was urgently performed revealing a dental floss pick lodged in the distal esophagus and a bottle cap in the stomach. A large penetrating ulcer was identified at the gastroesophageal junction where the pointed tip of the dental floss pick had previously resided (Figure 3). The contrast was injected into the esophagus under fluoroscopy and was seen to be pooling along the superior aspect of the liver, confirming a perforation. The 2 foreign bodies were endoscopically removed. An endoscopic vacuum was constructed at the bedside using an 18 French nasogastric tube. The wound vacuum sponge was affixed to the end of the nasogastric tube and was secured to the tube using a suture. The sponge was then trimmed to size to fit the distal esophagus. It was placed within the distal esophageal lumen at the level of the perforation, and negative pressure (175 mm Hg) was applied using a wound vacuum pump (Figure 3). The fully constructed endoluminal sponge apparatus is shown in Figure 4.

The endoscopic wound vacuum was exchanged every 3–7 days for a total of 4 exchanges each with a progressive decrease in size of the perforation and the development of granulation tissue. During this time, the patient was fed continuously using a postpyloric nasogastric tube that was placed during EGD. An EGD on hospital day 29 revealed that his perforation had healed. This was confirmed through esophagram in which no further contrast extravasation was seen (Figure 2). The patient was able to return to a solid diet and had no further complications.

DISCUSSION

Various therapeutic modalities have been used for patients presenting with esophageal perforation, including endoscopic, surgical, and conservative approaches. Although surgery has traditionally been considered the standard of care, endoscopic modalities are becoming more widely used and have shown improved outcomes.[4] Endoscopic options include clips, stents, endoscopic suturing, and EVT.[5]

Negative pressure wound therapy is commonly used for superficial wounds to promote secondary intention but is less commonly used for gastrointestinal perforations. EVT was initially adopted for the closure of colonic anastomotic leaks.[6] In 2008, it was adapted for use in upper gastrointestinal postsurgical leaks by Wedemeyer.[7] A case series in 2015 with 35 patients showed that EVT may be more successful than esophageal stenting in treating anastomotic leaks after esophagectomy.[8] In 2013, a large single-center retrospective analysis of 336 patients showed that EVT had a significant survival benefit over other modalities with 12% mortality for EVT and 50% and 83% for surgical repair and stenting, respectively.[4] With EVT, the median time to healing is 11–29 days with sponge exchanges every 2–4 days.[9] Reported complications include sponge dislocation, sponge detachment, and stricture formation.[7,9]

EVT can be used in the management of esophageal leaks and perforations and may be superior compared with traditional means of closure, although randomized trials are lacking. EVT is time and labor intensive requiring frequent endoscopy with sponge exchanges. However, given the survival benefit, low complication risk, and high success rate, EVT may become an initial treatment option for patients with esophageal and other luminal perforations.

DISCLOSURES

Author contributions: K. Panneerselvam reviewed the literature, wrote, and approved the final manuscript. R. Samuel edited the manuscript and revised the manuscript for intellectual content. R. J. Sealock provided the images, edited the manuscript, and is the article guarantor.

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Informed consent could not be obtained from the patient despite several attempts. All identifying information has been removed from this case report to protect patient privacy.

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