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CASE REPORT | ESOPHAGUS

Iatrogenic Esophagopleural Fistula After the Management of Acute Variceal Hemorrhage With Minnesota Tube Placement

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ABSTRACT

An esophagopleural fistula (EPF) is a rare condition. EPFs are typically of spontaneous, iatrogenic, or neoplastic origin. A 50-year-old man with hepatitis C and alcoholic cirrhosis presented with a history of recurrent variceal hemorrhage requiring esophageal banding, Minnesota tube placement, and a transjugular intrahepatic portosystemic shunt. His hospital course after esophageal perforation and EPF was complicated by acute respiratory failure and empyema, necessitating intubation and thoracostomy tube placement. To the best of our knowledge, this is the first reported case of EPF secondary to Minnesota tube placement. The EPF completely healed after endoscopic repair.

INTRODUCTION

An esophagopleural fistula (EPF) is a rare condition characterized by an abnormal connection between the esophagus and the pleural space due to an esophageal perforation or tumor invasion.[1,2] Some of the etiologies include prior pneumonectomy, esophageal foreign body, and sequelae related to malignancies of the esophagus, lung, and mediastinum.[2,3] Clinical manifestations are nonspecific and include fever, subcutaneous emphysema, dyspnea, and pleural effusions.[2] Leakage of digestive contents into the sterile space of the mediastinum and pleura can lead to local response, including acute mediastinitis and pneumonia or systemic response, including sepsis and related shock.[4] Because of these clinical sequelae and, in particular, the esophageal perforation and empyema, EPF is associated with high morbidity and mortality.[5,6] Imaging is critical in the diagnosis of EPF. Contrast esophagram and computed tomography (CT) are the most commonly used modalities. During contrast swallow examination, the diagnosis is readily made when the enteric contrast is identified extending into the pleural space.[7] Given the excellent spatial resolution, CT may be of use in the precise localization of the fistula.[4] If conventional surgical intervention is not undertaken, EPF may be treated endoscopically with the use of endoscopic clips, stents, sutures, cardiac septal occlusion devices, adhesives, or vacuum therapy.[8]

CASE REPORT

A 50-year-old man with a medical history of hepatitis C and alcoholic cirrhosis developed an iatrogenic EPF after Minnesota tube placement for refractory variceal bleeding. The patient initially presented to an outside institution with hematemesis and was found to have an acute variceal hemorrhage, which responded to subsequent banding. In the following 2 months, however, the patient was readmitted for recurrent variceal hemorrhage, necessitating additional banding. Ultimately, Minnesota tube placement was undertaken before a planned transjugular intrahepatic portosystemic shunt procedure. Postprocedural imaging demonstrated incorrect positioning of the Minnesota tube, although the specific insufflation parameters were unfortunately not available to our institution for review (Figure 1). His postoperative hospital course was then complicated by acute hypoxic respiratory failure and left empyema, requiring intubation and chest tube placement, respectively. Pleural fluid cultures were positive for vancomycin-sensitive *Enterococcus faecium* and *Candida albicans*.

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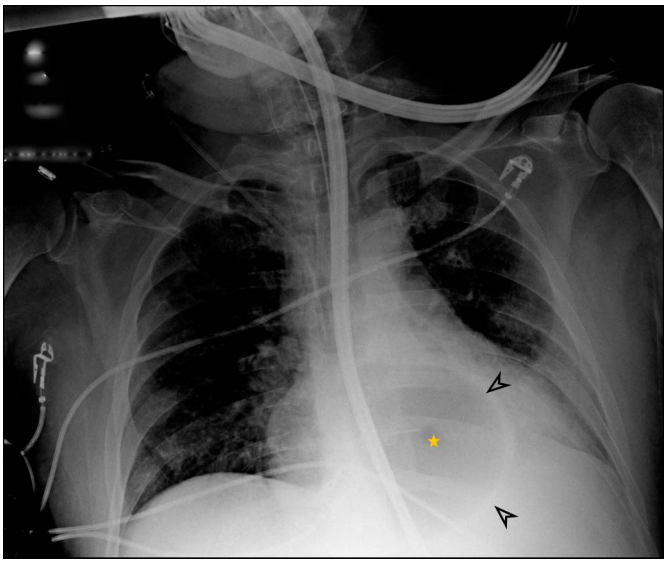

Figure 1. Postprocedural thoracic radiograph at the outside institution demonstrates insufflation of the gastric balloon at the level of the distal esophagus (yellow star). Arrowheads point at the insufflated balloon.

Thoracic CT performed 10 days after incorrect tube placement demonstrated a large esophageal defect with associated left pleural collection and paraesophageal gas, compatible with distal esophageal perforation (Figure 2). The patient had progressive output from his thoracostomy tube. Esophageal perforation remained the principal diagnostic consideration, and the patient was transferred to our institution for further management. At our institution, a water-soluble contrast esophagram confirmed a large esophageal leak with spillage of contrast into the left pleural space (Figure 3). Subsequent unenhanced thoracoabdominal CT confirmed a fistulous connection between the esophagus and the left pleural space (Figure 4). Endoscopic evaluation revealed the presence of food debris within the esophageal disruption, treated with lavage, debridement, evacuation, and placement of dual esophageal stents.[9] An enteric tube was placed for tube feeds. Despite these interventions, the tube feed material was found within the pleural drain (Figure 5). Subsequent endoscopy demonstrated proximal migration of the esophageal stent, requiring stent removal, endoscopic suturing, and placement of a nasojejunal feeding tube (Figure 6). Despite these

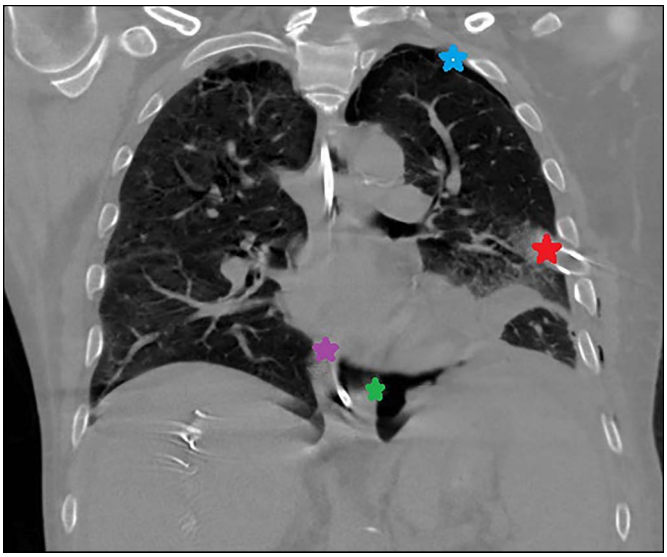

Figure 2. Postprocedural thoracic computed tomography (CT) performed at the outside institution demonstrates a large defect at the left aspect of the distal esophagus (green star). Note the small pneumothorax (blue star) with thoracostomy (red star) and nasojejunal (purple star) tubes in place.

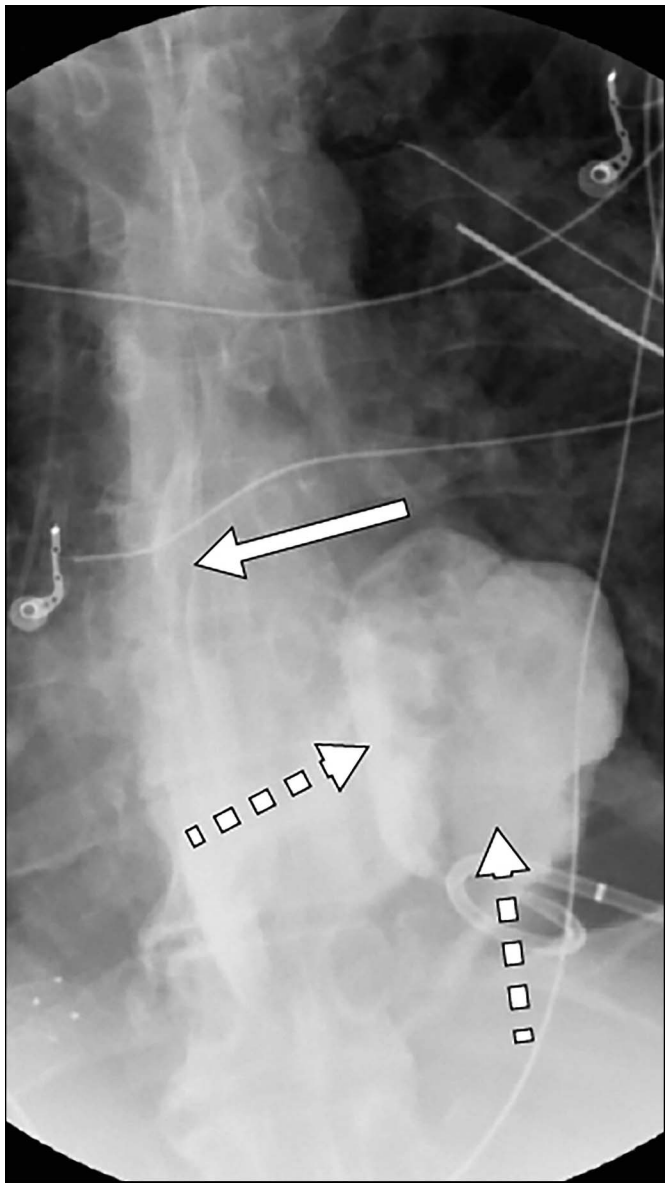

Figure 3. Initial water-soluble esophagram demonstrates large distal esophageal leak with contrast spilling into the left thorax, likely within the left pleural space (white dashed arrows). The mid to distal esophagus proximal to the fistula is opacified by contrast (white solid line).

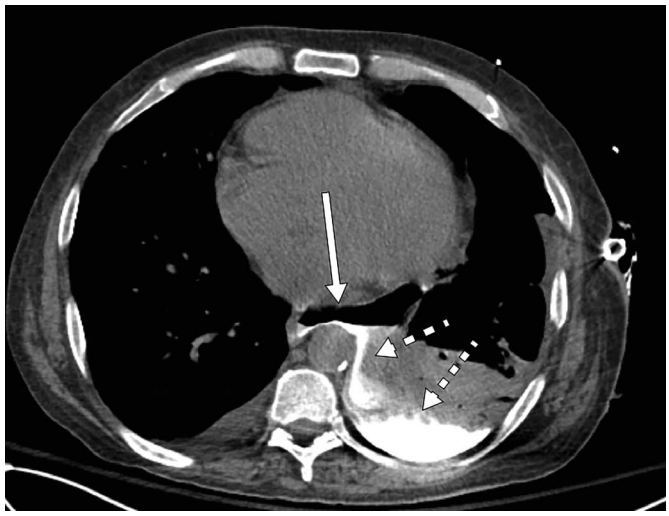

Figure 4. Initial thoracoabdominal computed tomography (CT) without contrast demonstrates fistulous connection between the esophagus and the left pleural space (white solid arrow) with abundant spillage of oral contrast into the left pleural space (white dashed arrows).

interventions, the leak persisted, and another endoscopic stent was placed. Unfortunately, the patient was not a surgical candidate for esophageal disruption because of multiple comorbidities. With time, the patient began to improve clinically and was eventually discharged. At the 3-month follow-up, the patient's EPF had resolved and his stent was subsequently removed.

DISCUSSION

EPF is a rare complication of iatrogenic trauma.[7] Only 191 adult cases of EPF have been reported from 1980 to 2016, and of these 191 cases, only 8 were secondary to iatrogenic causes (excluding the postpneumonectomy setting).[2] Given the nonspecific findings of EPF, a high degree of suspicion is warranted, particularly if fever, dyspnea, and hypoxia are identified in the setting of a recent esophageal procedure.[1]

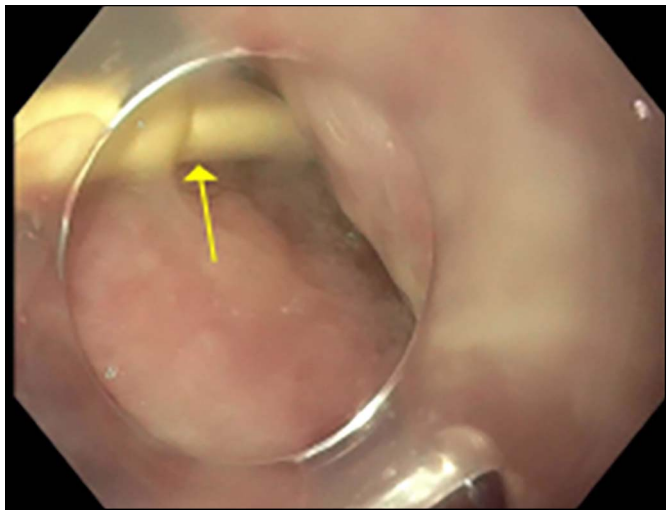

Figure 5. Initial endoscopy demonstrates the chest tube (yellow arrow) visualized through fistula.

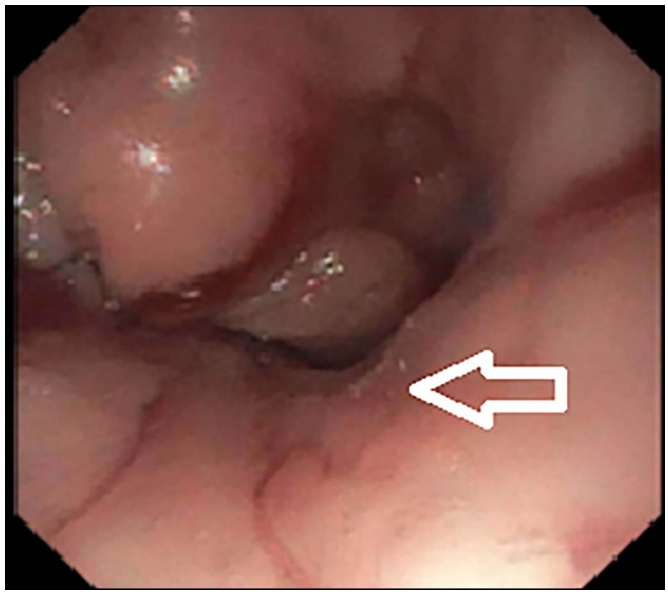

Figure 6. Subsequent endoscopy demonstrates closure after sutures (white arrow) were placed.

Because of recurrent variceal hemorrhage refractory to repeated banding, our patient with Child-Pugh B cirrhosis and MELD-Na 13 underwent Minnesota tube placement as a bridge therapy to a planned transjugular intrahepatic portosystemic shunt. Before balloon placement, the patient had no definable stigmata of esophageal injury. However, postprocedural imaging demonstrated incorrect positioning of the Minnesota tube, with the gastric balloon identified traversing the distal esophagus (Figure 1). The Minnesota tube was removed within 3 days of placement. Serial chest radiography demonstrated an evolving left pleural effusion and basilar airspace disease. Given these changes and related clinical decline, CT was undertaken 10 days after Minnesota tube placement, revealing a large distal esophageal tear (Figure 2). The hospital course was then complicated by acute respiratory failure and empyema, requiring intubation and chest tube placement, respectively. Assessment of the pleural fluid revealed microbial contamination compatible with digestive tract origin. It is possible that the combination of trauma with endoscopic instrumentation and compressive necrosis from placement of the Minnesota tube placement led to the esophageal perforation and subsequent EPF formation.

To the best of our knowledge, this is the first case of EPF secondary to Minnesota tube placement. Our experience demonstrates that EPF can be a potential complication of Minnesota tube placement. Acute hypoxic respiratory failure, rapidly evolving effusion, or infection after Minnesota tube placement should raise suspicion for EPF and warrants further investigation through contrast esophagram or CT examination.

DISCLOSURES

Author contributions: R. White wrote and approved the article. R. Lee and B. Shin reviewed the literature and revised the article for intellectual content. J. Birkholz edited the article 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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