



## Endoscopic management of an esophagomediastinal fistula arising from a cervical esophageal diverticulum after blunt chest trauma

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Esophagomediastinal fistula (EMF) is a rare but serious adverse event after trauma or chest surgery. The exact pathophysiologic mechanism is unclear but is presumed to be associated with compressive injury to the esophagus, with subsequent ischemia and inflammation leading to fistula formation.<sup>1,2</sup> Prompt recognition is crucial because a delay in management increases morbidity and mortality. In this video ([Video 1](#), available online at [www.VideoGIE.org](http://www.VideoGIE.org)), we present a case of an EMF arising from a cervical esophageal diverticulum after blunt chest trauma and surgery.

A 39-year-old woman was admitted to the hospital after sustaining blunt trauma to the chest and abdomen in a motor vehicle accident. CT revealed extensive subcutaneous emphysema in the chest wall, pneumomediastinum, and bilateral pneumothoraces ([Fig. 1](#)). She underwent bilateral chest tube placement but required repeat thoracotomy, lung decortication, and mechanical pleurodesis in the setting of a moderate-sized right multiloculated empyema.

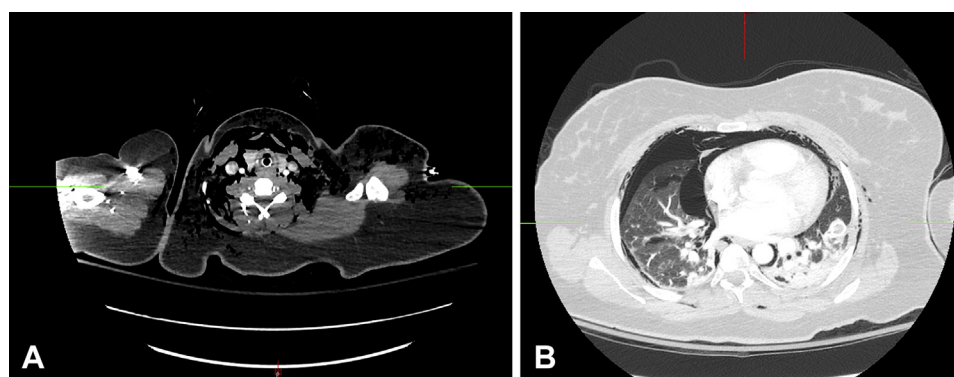
Upon discharge, the patient continued to experience progressive dysphagia and coughing. Speech pathology evaluation did not show aspiration, but a limited esophagram identified a cervical esophageal diverticulum. Because of recurrent fevers, a CT chest film was obtained, which showed a posterior mediastinal abscess ([Fig. 2](#)). Abscess drainage revealed polymicrobial growth, raising suspicion of an EMF. Repeat esophagram demonstrated contrast pooling within the diverticulum and extravasation into the

abscess cavity ([Fig. 3](#)). The patient declined surgery and was referred for endoscopic evaluation.

EGD demonstrated a 2-cm diverticulum in the cervical esophagus with a 2-mm fistulous opening at the base of the diverticulum ([Fig. 4](#)). After a multidisciplinary discussion with the patient, the joint plan was to proceed with flexible endoscopic diverticulotomy to improve dysphagia,<sup>3</sup> limit pooling of contents within the diverticulum, and thereby promote fistula healing. Given the proximal location of the fistula, stent placement or endoscopic closure with clips/suturing would have been challenging and poorly



**Figure 2.** CT demonstrating a posterior mediastinal abscess (*arrow*).



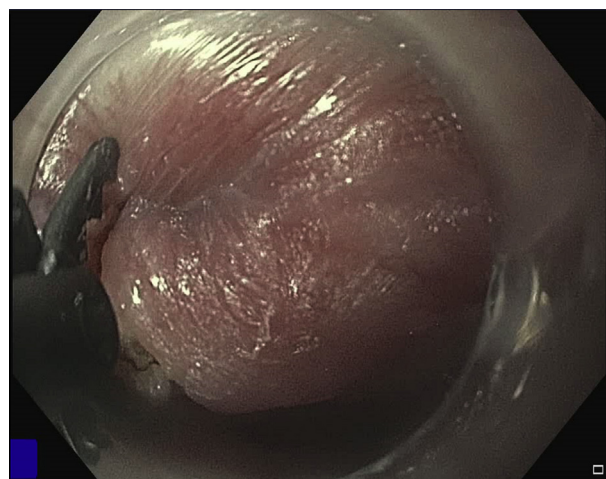
**Figure 1.** CT revealing extensive subcutaneous emphysema, pneumomediastinum (**A**), and pneumoperitoneum (**B**) after blunt trauma to the chest and abdomen in a motor vehicle accident.



**Figure 3.** Esophagram. Oral contrast administration reveals pooling within a cervical diverticulum (*single arrow*) and extravasation through the esophagomediastinal fistula (*asterisk*) posterior to the esophagus (*double arrow*).

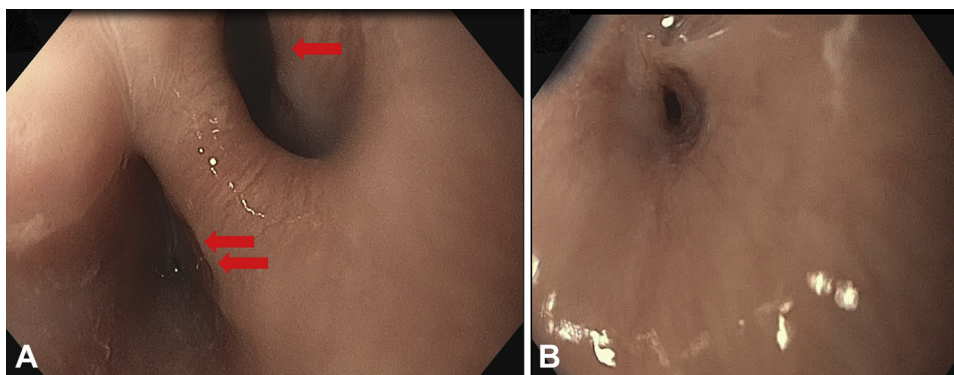
tolerated.<sup>4</sup> As such, we opted to close the fistula with endoscopic application of fibrin sealant, as previously reported in the literature.<sup>5</sup>

EGD was performed with the patient under general anesthesia. The location of the fistulous opening was marked using argon plasma coagulation (ERBE Electromedizin, Tubingen, Germany). Endoscopic diverticulotomy septum was performed with a 3.5-mm scissor-type electro-surgical knife (Clutch Cutter; Fujifilm Endoscopy, Wayne, NJ, USA;

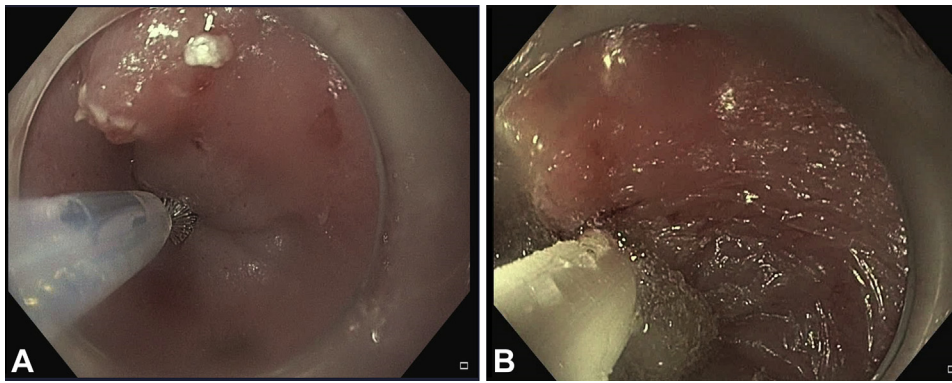


**Figure 5.** Endoscopic diverticulotomy using a scissor-type electro-surgical knife.

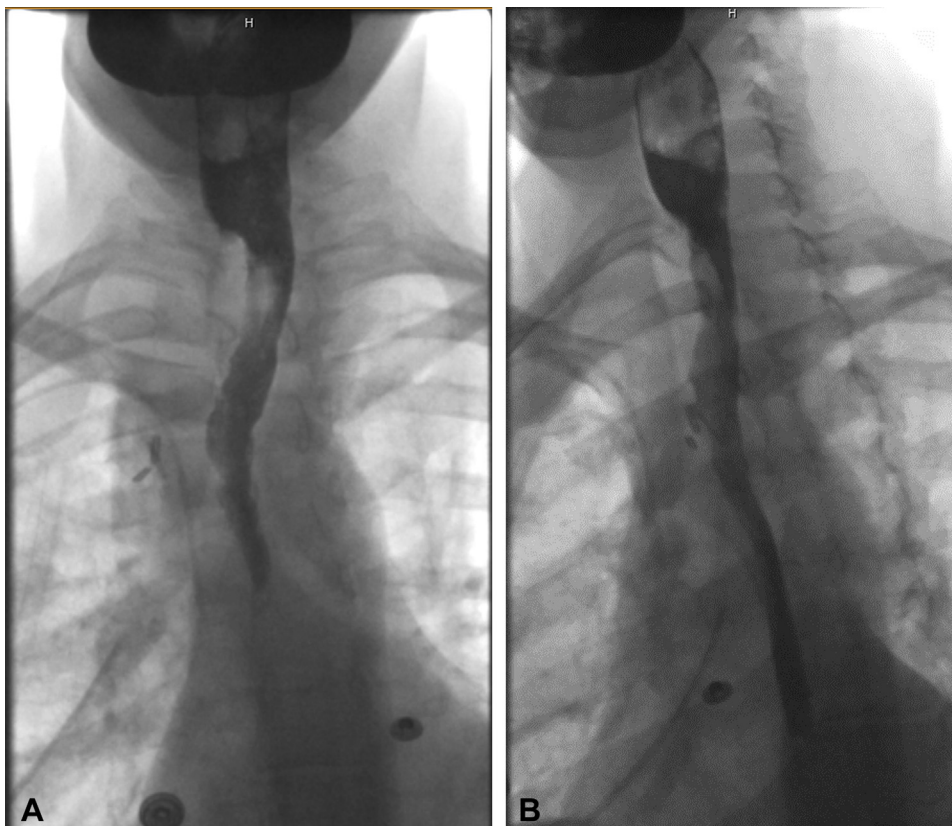
VIO 300D, Endocut mode Q, effect 1, duration 4, interval 1, ERBE Electromedizin) (Fig. 5). The myotomy was extended toward the base of the diverticulum along the axis of the fistulous opening. Redundant tissue at the myotomy edges was trimmed using a snare (Cook Medical, Bloomington, Ind, USA), and 2 endoscopic clips (Resolution 360; Boston Scientific, Marlborough, Mass, USA) were placed at the base of the diverticulotomy. A cytology brush (Cook Medical) was used to abrade the fistula and promote granulation tissue.<sup>6</sup> After this, a 5-mL syringe containing the viscous fibrin sealant (FloSeal; Baxter, Deerfield, Ill, USA)<sup>7,8</sup> was attached to a 10F biliary pushing catheter (Cook Medical), which was used to inject the gel under pressure (Fig. 6). There were no postprocedural adverse events. Esophagram at 6-week follow-up confirmed adequate EMF closure with no contrast extravasation into the mediastinum (Fig. 7). The patient continued to tolerate intake by mouth without symptoms at the 8-week clinic follow-up.



**Figure 4. A,** Endoscopic view of the esophageal lumen (*single arrow*) and the cervical diverticulum (*double arrow*). **B,** Endoscopic view of the 2-mm fistulous opening at the base of the diverticulum.



**Figure 6.** **A**, Endoscopic view of abrasion of fistulous tract to promote granulation tissue using a cytology brush. **B**, Endoscopic injection of the hemostatic matrix fibrin sealant into the fistula using a 10F pushing catheter.



**Figure 7.** Follow-up esophagram at 6 weeks showing successful endoscopic flexible diverticulotomy and resolution of esophagomediastinal fistula on both anteroposterior (**A**) and lateral (**B**) views.

EMF is a rare serious adverse event that can occur after blunt chest trauma and surgery. In this video ([Video 1](#), available online at [www.VideoGIE.org](http://www.VideoGIE.org)), we demonstrate the successful endoscopic treatment of an EMF arising from a cervical diverticulum by performing flexible endoscopic diverticulotomy followed by fistula closure with injection of a fibrin sealant. Our case illustrates the expanding role of endoscopy as a minimally invasive alternative to surgery in these challenging cases.

## DISCLOSURE

*Dr Draganov is a consultant for Olympus, Lumendi, Boston Scientific, Cook Medical, and Microtech. Dr Yang is a consultant for Steris, Boston Scientific, and Lumendi. All other authors disclosed no financial relationships.*

*Abbreviation: EMF, esophagomediastinal fistula.*



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<https://doi.org/10.1016/j.vgje.2020.06.011>

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