



Successful endoscopic closure of chronic nonmalignant tracheoesophageal fistula by use of a novel circumfistular endoscopic submucosal dissection and ligation strategy

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Tracheoesophageal fistula (TEF), an abnormal connection between the trachea and the esophagus, can arise from both malignant and nonmalignant conditions. The nonmalignant causes include trauma, intubation, and chronic infections. There are also cases of congenital TEFs that have rarely been described in adults.¹ Currently, surgical interventions are rarely performed on nonmalignant TEFs because of invasiveness, adverse-event risks, and technical difficulties.² Endoscopic approaches have become more and more applied in recent years. However, these reported endoscopic strategies may involve issues of uncertain effect, potential risk of perforation, the use of corrosive materials, or expensive devices such as metal stents and the over-the-scope clip system.³⁻⁶ So far there is no standard endoscopic treatment for nonmalignant TEFs. Here we described the successful closure of a chronic, nonmalignant TEF by a novel circumfistular endoscopic submucosal dissection and ligation (CESDL) strategy.

A 41-year-old woman presented with a 2-year history of choking after drinking and eating. Preoperative CT, contrast esophagography, and esophagoscopy demonstrated a TEF from a diverticulum on the right wall of the

upper esophagus (23 cm lateral to the mouth) to the upper lobe apex of the right lung (Fig. 1). No evidence of malignancy was observed, and the patient presented no history of trauma, surgery, intubation, foreign-body ingestion, recurrent pneumonias, or other inciting event and had not received any prior treatment. The CESDL procedures were performed as follows (Fig. 2; Video 1, available online at www.VideoGIE.org): (1) injection of normal saline solution premixed with 1:1,000,000 indigo carmine into the submucosal layer by an injection needle (Boston Scientific, Marlborough, Mass, USA), (2) circumferential incision of the mucosa at about 1.5 cm lateral to the fistula with a Dual Knife (Olympus, Tokyo, Japan), (3) submucosal dissection until about 0.5 cm lateral to the fistula, (4) destruction of the mucosa surface by argon plasma coagulation, (5) ligation of the remaining tissues by an endoloop snare (Olympus), and (6) sealing the de-epithelialized mucosa by hemoclips (Micro-tech, Nanjing, China). A double-lumen endotracheal tube was used to provide 1-lung ventilation. Bronchoscopy was performed immediately postoperatively to clean off secretions and effusion liquids in the lung. Antibiotics were used 1 day before and 2 days

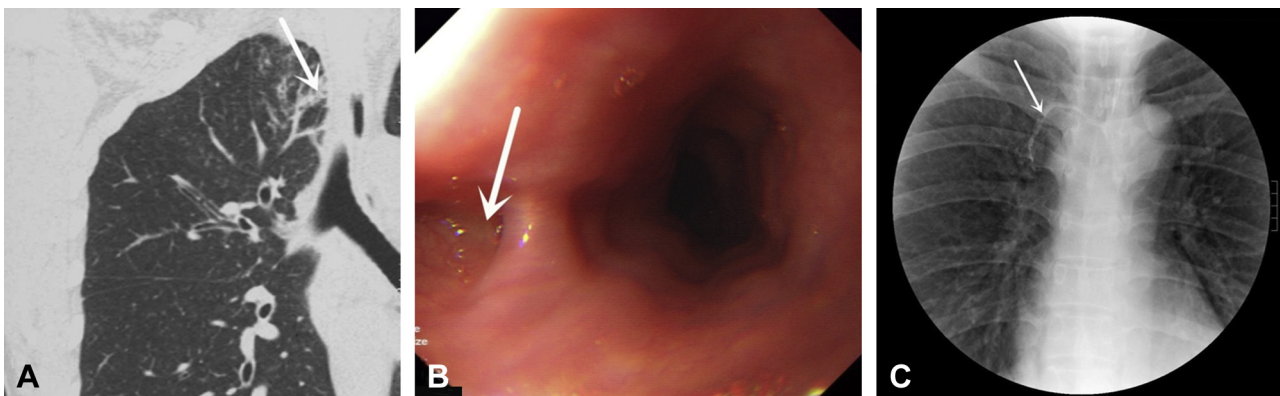


Figure 1. Preoperative examinations. **A**, Pulmonary CT view showing a tracheoesophageal fistula in the right upper-lobe apex. **B**, Esophagoscopy view showing a diverticulum at the right wall of the esophagus (23 cm lateral to the mouth). **C**, Contrast esophagography demonstrating a tracheoesophageal fistula.

Written transcript of the video audio is available online at www.VideoGIE.org.

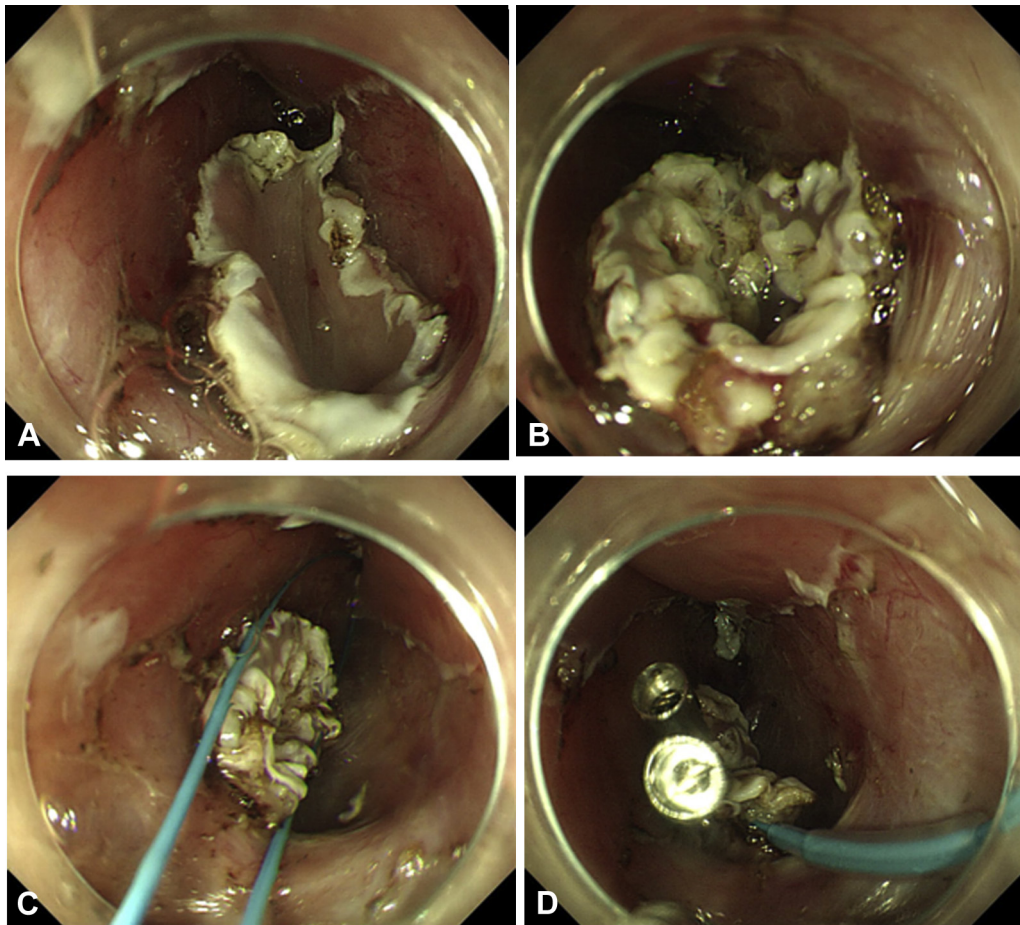


Figure 2. Circumfistular endoscopic submucosal dissection and ligation. **A**, Circumferential incision of the mucosa about 1.5 cm lateral to the fistula and submucosal dissection to about 0.5 cm lateral to the fistula. **B**, Destruction of the mucosa surface by argon plasma coagulation. **C**, Ligation of the remaining tissues by an endoloop snare. **D**, Sealing the destroyed mucosa with hemoclips.

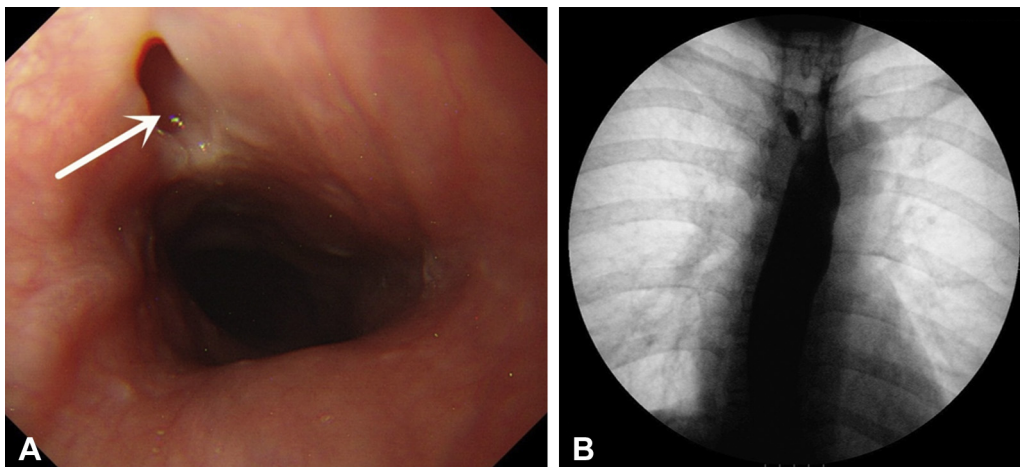


Figure 3. Follow-up examinations 3 months postoperatively. **A**, Surveillance endoscopic view showing satisfactory wound healing and successful closure of the fistula. **B**, Contrast esophagography showing no leakage of contrast agent.

after the operation to prevent potential infections. Feeding was allowed 48 hours postoperatively and advanced gradually.

The procedure time was 40 minutes, and the postoperative hospital stay was 3 days. No adverse event such as bleeding or perforation was observed. Surveillance endoscopy after 3 months showed satisfactory wound healing, and a contrast esophagography showed no leakage of contrast agent (Fig. 3).

This novel CESDL strategy can achieve complete closure of TEFs with common devices, easily performed operations, and rare risks of adverse events. It is applicable to patients in good condition who have nonmalignant, single, small TEFs (<5 mm), excluding severe local infections. Further studies are warranted to confirm the safety and efficacy of this procedure for these indications in the future.

DISCLOSURE

All authors disclosed no financial relationships relevant to this publication.

Abbreviations: CESDL, circumfistular endoscopic submucosal dissection and ligation; TEF, tracheoesophageal fistula.

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