Endoscopic closure of tracheoesophageal fistula with a novel dumbbell-shaped occluder

Tracheoesophageal fistula (TEF) is a challenging condition that is difficult to treat. Several reports have described successful TEF treatment with an Amplatzer occluder (AGA Medical Corporation, Plymouth, Minnesota, USA) [1, 2]. However, Daniel et al. reported the case of a benign gastrobronchial fistula patient who underwent treatment with the Amplatzer device and died of fatal hemoptysis [3]. Inspired by this case, we developed a new dumbbell-shaped occluder device [4]. Compared with the Amplatzer occluder, this device has no protrusions, which reduces the risk of bleeding; even if the patient coughs, it will not increase airway damage.

A 69-year-old man with a chronic TEF was the first patient to be successfully treated with our novel occluder (▶ Video 1). He had been diagnosed 7 years previously with esophageal cancer and underwent surgery. He presented 1 year prior to treatment with cough, aspiration, and weight loss. An endoscopic examination revealed a tracheoesophageal fistula 27 cm from the incisors (▶ Fig. 1), with a diameter of 0.8 cm. After several esophageal stent placements and replacements and anastomotic sutures, there was still evidence of difficulty in healing of the fistula. We therefore decided that application of this new instrument was an appropriate treatment strategy.

We inserted a 9-Fr catheter through the endoscope, so that the device could be introduced into the airway. After releasing the distal dilation disc under direct vision with a bronchoscope, we gently pulled the device until it was fixed against the airway wall (▶ Fig. 2a). As the flexible catheter was removed, we observed that the side of the gastroscope slowly pulled the device to release the proximal expansion disc (▶ Fig. 2b).

The patient tolerated a normal diet after 2 days. By the 4-month follow-up, all of his clinical symptoms had been relieved, and his body mass index had increased.

▶ Fig. 1 View during gastroscopy showing a fistula between the esophagus and the tracheal wall, with a nasogastric tube seen inside the esophageal lumen.

▶ Video 1 Treatment of a tracheoesophageal fistula (TEF) by gastroscopy and bronchoscopy, using a newly developed dumbbell-shaped occluder.

▶ Fig. 2 Endoscopic images showing the orifices of the fistula occluded by the occluder device on: a bronchoscopic view; b gastroscopic view.
from 18.5 kg/m² to 23.6 kg/m². Gastroscopy and tracheoscopy evaluations showed that the fistula was completely blocked, and no leakage was found on gastrointestinal radiography and computed tomography (▶Fig. 3). The findings of the present case demonstrate that our newly developed dumbbell-shaped occluder can effectively block a TEF, thereby providing a new method for mechanical TEF closure.

Competing interests

The authors declare that they have no conflict of interest.

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