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Complete healing of tracheoesophageal fistula in a ventilator-dependent patient by conservative treatment

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Abstract

Acquired nonmalignant tracheoesophageal fistula (TEF) is a rare clinical condition with multiple etiologies, although post-intubation injury is the most common cause. TEFs can be fatal if left untreated due to devastating pulmonary complications caused by tracheobronchial contamination and poor nutrition. Herein, we present a case of complete healing of a post-intubation TEF under conservative treatment in a ventilator-dependent patient, and review previous studies regarding the treatment of acquired nonmalignant TEFs.

Introduction

Post-intubation tracheoesophageal fistula (TEF) is a rare and potentially fatal clinical condition, and definitive surgical repair is usually needed to successfully restore the patient's normal breathing and oral intake. Herein, we present a case of complete healing of a post-intubation TEF by conservative treatment in a ventilator-dependent patient.

Case Report

The patient was an 86-year-old man with a past history of hypertension, chronic obstructive pulmonary disease, and bilateral carotid artery stenosis under regular outpatient department follow-up and medication. He was found unconscious at home and sent to our emergency department in May 2011. His consciousness level was E1V1M2 on arrival at the emergency department, and brain computed tomography showed acute ischemic infarction over the basal ganglia. Pneumonia with respiratory failure and acidosis was also noted. The patient was then sent to the intensive care unit after oral intubation. Tracheostomy was subsequently performed on 30 June 2011 due to prolonged oral intubation and difficult weaning. He was then transferred to our respiratory care unit.

During admission in the respiratory care unit, the patient remained ventilator dependent due to underlying chronic obstructive pulmonary disease and poor respiratory effort. A nasogastric tube was used for feeding. His admission course was stable over the next 2 years until January 2013, when a severe air leak with gastric distension was found. A milky substance similar to tube feeding material was also suctioned out from his tracheostomy tube, and a TEF was highly suspected. A bedside upper gastrointestinal endoscopic exam on 2 January 2013 revealed a fistula tract in the anterior wall of the esophagus 25 cm from the incisor directly communicating with the tracheal lumen, which was compatible with a TEF (Fig. 1). Because of the patient's bedridden and ventilator-dependent status, direct surgical repair of the TEF could not be performed. We therefore repositioned the

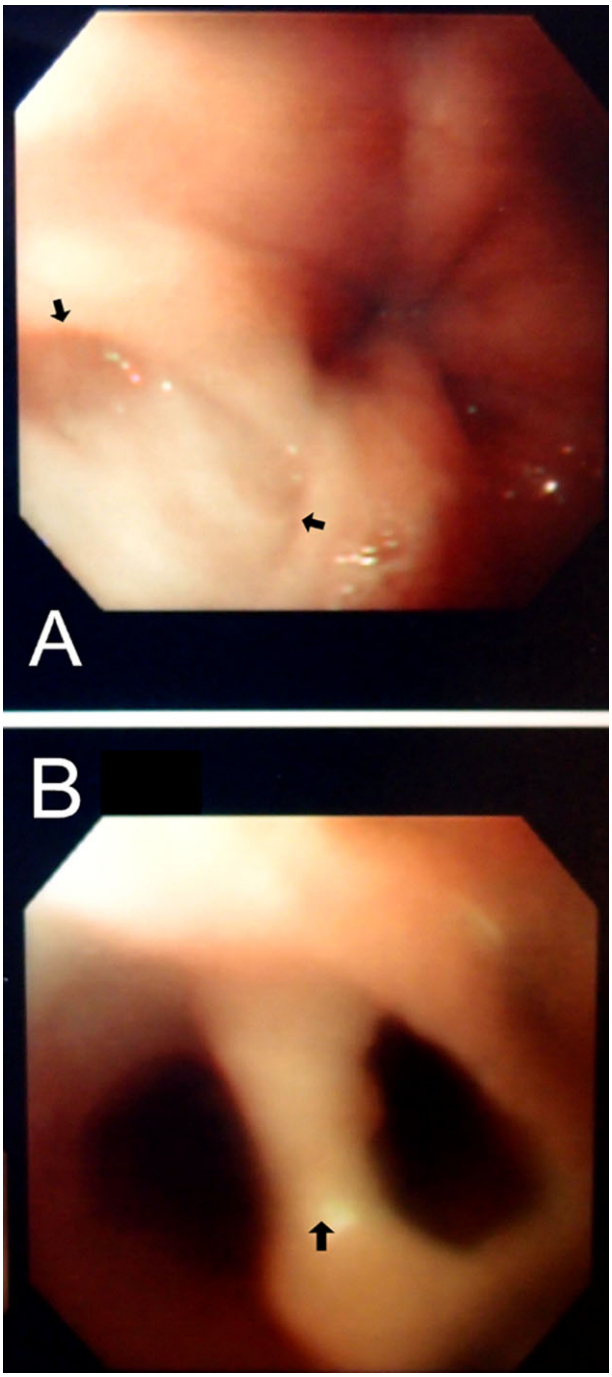

Figure 1. (A) A fistula tract at the anterior wall of the esophagus approximately 1.5 cm in the longest diameter (black arrows), 25 cm from the incisor, with direct communication with the tracheal lumen as shown in (B), where the tracheal carina (black arrow) can be seen.

endotracheal tube so that the balloon rested below the fistula site and removed the nasogastric tube. Gastrostomy to drain the gastric content and jejunostomy for feeding were then performed on 7 January 2013. The postoperative course was

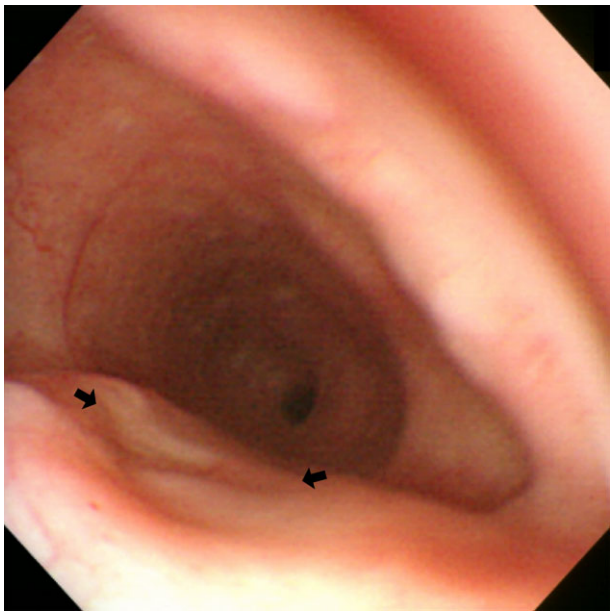

Figure 2. Eight months after gastrostomy and feeding jejunostomy, complete healing of the tracheoesophageal fistula (TEF) tract was found (black arrows pointed out the original border of the TEF), with scarring over the original fistula site 25 cm from the incisor; no wall defects were noted.

smooth, and no pulmonary soilage was found. The patient's clinical condition and nutritional status were stable over the next 8 months. We therefore performed another upper gastrointestinal endoscopic exam on 17 September 2013, and complete healing over the original TEF was noted without any visible wall defects (Fig. 2).

Discussion

Acquired nonmalignant TEF is a rare but challenging clinical problem with diverse etiologies, although post-intubation injury remains the most common cause [1]. The reported prevalence rate of TEF among tracheostomy patients is 0.5% [2], and certain risk factors have been identified, including high cuff pressure, excessive motion of the tube, infection, hypotension, steroid use, diabetes, and the use of a nasogastric tube [3]. In the current case, the combination of long-term ventilation with tracheostomy and the nasogastric tube was the main reason for the formation of the TEF. It has been reported that surgical repair combining direct primary suture closure of tracheal and esophageal defects and interposition of a pedicled soft tissue flap provides the best outcome and chance of resuming oral intake. Spontaneous closure rarely occurs [1, 2].

In cases of post-intubation TEF, segmental resection and reconstruction of tracheal or bronchial defects during surgical repair is usually necessary due to the combined effect of

pressure from the tracheostomy and nasogastric tube and the resulting circumferential pressure necrosis of the tracheal wall [1, 2, 4]. Unfortunately, mechanical ventilation after tracheal resection surgery is contraindicated because of a high risk of tracheal dehiscence. To solve this problem, Douglas et al. proposed a two-stage method [2]. Before the patient is weaned from the ventilator, the endotracheal tube is repositioned so that the balloon rests below the fistula site, and the nasogastric tube is then removed. Gastrostomy and feeding jejunostomy are performed to drain gastric contents and provide feeding. Definitive surgical repair is then postponed until after the patient has been weaned from the ventilator. However, in our patient, the long-term ventilator dependence hindered the possibility of successful definitive surgical repair for the TEF. We therefore used the first stage of the method proposed by Douglas et al. to control pulmonary soilage, thereby releasing the combined pressure caused by the nasogastric tube and promoting healing by decreasing the amount of gastric content reflux, and providing nutritional support with jejunostomy feeding. Complete esophageal diversion including cervical esophagostomy has not been recommended in previous studies [1, 2] unless there is persistent soilage of the tracheobronchial tree, and therefore was not used in our case. Esophageal stents have been reported to seal nonmalignant TEFs but to be useless in promoting healing, and some reports have even implicated that stents may create giant TEFs [5].

To the best of our knowledge, no studies have discussed the outcomes of solely conservative treatment in treating acquired nonmalignant TEF. Nevertheless, conservative treatment including repositioning the endotracheal tube below the fistula site, removing the nasogastric tube, and establishing gastrostomy and feeding jejunostomy may not only be a palliative therapy for ventilator-dependent patients, but may also provide a chance for complete healing.

In conclusion, definitive surgical repair of a TEF with interposition of a pedicled soft tissue flap currently provides the best outcomes and success in restoring normal breathing and swallowing in patients with an acquired nonmalignant TEF. In patients who are ventilator dependent, however, conservative treatment, if done properly, may also provide a chance for complete healing.

Disclosure Statements

No conflict of interest declared.

Appropriate written informed consent was obtained for publication of this case report and accompanying images.

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