Treatment of Malignant Tracheoesophageal Fistula

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KEYWORDS

• Tracheoesophageal fistula • Enterorespiratory fistula • Endobronchial stenting
• Endoesophageal stenting • Interventional bronchoscopy • Interventional esophagoscopy
• Interventional radiology

KEY POINTS

- This article focuses on the interventional treatment of malignant enterorespiratory fistulas, especially tracheoesophageal fistula (TEF).
- TEF is a devastating condition for the patient, and typically occurs after radiochemotherapy for advanced esophageal cancer or extensive mediastinal nodal disease from lung cancer.
- Life expectancy of these patients is measured in months after successful treatment of the fistula, and only days to weeks with a persistent fistula.
- To stop repeated episodes of aspiration and septic pneumonia, single or double stenting of the esophagus and trachea with self-expandable coated stents is the established palliative treatment.
- Surgical interventions are justified only in very select cases, and carry a very high morbidity and mortality.

INTRODUCTION

Fistulas from the enteric tract to the respiratory tract can develop in more ways than as a tracheoesophageal fistula (TEF).[1] As the abbreviation TEF is often used to refer also to fistulas between the stomach and bronchi or lung, this context is used for TEF in this article. Because benign TEF has been dealt with extensively in a previous issue of this series,[2] the authors concentrate here on malignant TEF (mTEF), and describe in detail modern palliative treatment options and their typical problems.

The issues and interventions in benign fistulas are markedly different. Typically the fistula develops in a patient with other major medical issues, often as a complication of prolonged intubation. Many, if not most of these fistulas can be approached surgically with a relatively small operation using a cervical approach. Repair of the fistula is often difficult, but with interposition of healthy tissue (eg, strap muscle, sternocleidomastoid or pectoralis muscle) and removal/repositioning of the inciting cause of the fistula (ie, tracheostomy tube, nasogastric tube), good results can be obtained if the patient is able to recover from the underlying major medical problem. Stenting often aggravates the problem, and long-term complications (granulation tissue, dried secretions) make this a less appealing long-term solution. In patients without life-threatening comorbidities, a substernal gastric bypass can offer long-term functional ability to eat without aspiration through the fistula.

EPIDEMIOLOGY OF MTEF

TEF develops in approximately 5% to 15% of patients with an esophageal malignancy and in less than 1% of those with bronchogenic carcinoma.[3–5] Most patients with mTEF suffer from esophageal cancer and very few from other

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malignancies: 19 of 264 (7.2%) pulmonary tumors and 2 of 264 (0.8%) mediastinal tumors in the series from Balazs and colleagues.[5] The incidence of mTEF seems to have increased over the last 30 years to a level well above 10% of all nonresected esophageal cancers. Malignant TEF usually develops during or after completing radiochemotherapy for tumor necrosis in an area that previously showed tumor progression into the wall of the tracheobronchial system. The fistula site is esophagotracheal in 52% to 57% of patients and esophagobronchial in 37% to 40%. In the remaining patients (3%–11%), communication is established peripherally, through the lung parenchyma, forming an esophagopulmonary fistula.[6] The attribution of development of mTEF to necrosis induced by radiochemotherapy is controversial in the literature and is not statistically confirmed. Balazs and colleagues[5] found only 4 of their 264 cases to have developed TEF within 4 weeks of beginning radiation therapy, and suggest that TEF is more frequently observed after radiation therapy because of the prolonged survival observed with radiochemotherapy.

SYMPTOMS AND DIAGNOSIS

Typical symptoms of mTEF, such as coughing, aspiration, and pneumonia, are neither uncommon nor surprising during radiochemotherapy. Thus the recognition of the formation of TEF may be delayed for 1 to 18 months after the first clinical symptoms.[5] Patients may present in severe septic condition, with manifest aspiration pneumonia as the most frequent symptom (95% in the study of Balazs and colleagues[5]). Clinical confirmation of TEF is most easily achieved using a swallowing test of water in the presence of an experienced doctor. Water-soluble contrast swallowed under fluoroscopic control can achieve definitive diagnosis, estimation of the size, and exact topographic description of TEF (Fig. 1). Additional computed tomography (CT) scanning immediately after swallowing contrast media can give further information about the location of the TEF relative to areas of tumor necrosis, may show deposits of contrast media in the mediastinum, and is helpful for planning further treatment. Endoscopic confirmation of the esophageal fistula opening is mostly easy, as it is the larger orifice of both fistula endings. In smaller fistulas, recognition of the tracheal or bronchial opening (Fig. 2) can be challenging and requires some experience.

TREATMENT

Because of the underlying disease and radiation therapy, the general condition of these patients is always severely deteriorated. Repeated episodes

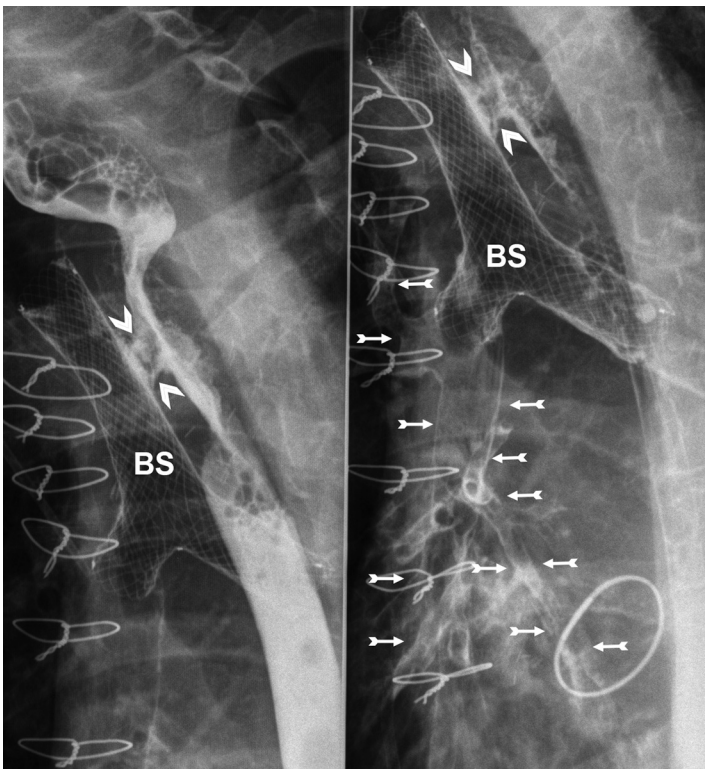

Fig. 1. Persisting tracheoesophageal fistula (TEF) (*arrowheads*) after positioning a bronchial Y-stent (BS), with leakage along the stent and "bronchography" (*arrows*) by the aspiration of contrast media, illustrating why primary esophageal stenting is preferable and mere stenting of the trachea frequently is insufficient.