Treatment of Esophagopleural Fistulas Using Covered Retrievable Expandable Metallic Stents

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ABSTRACT

Purpose: To evaluate the clinical efficacy of placement of covered retrievable expandable metallic stents for esophagopleural fistulas (EPFs).

Materials and Methods: During the period 1997–2013, nine patients with EPF were treated using covered retrievable expandable metallic stents. The underlying causes of EPF were esophageal carcinoma (n = 6), lung cancer (n = 2), and postoperative empyema for Boerhaave syndrome (n = 1).

Results: Technical success was achieved in eight patients (88.9%). In one patient, incomplete EPF closure was due to incomplete stent expansion. Clinical success, defined as complete EPF closure within 7 days, was achieved in five patients (55.6%). Overall fistula persistence (n = 1) or reopening (n = 4) occurred in five patients (55.6%) 0–15 days after stent placement. The causes of reopening were due to the gap between the stent and the esophagus (n = 3) or stent migration (n = 1). For fistula persistence or reopening, additional interventional management, such as gastrostomy, stent removal, or stent reinsertion, was performed. Stent migration occurred as a complication in one patient with EPF from a benign cause secondary to postoperative empyema. In the eight patients who died during the follow-up period, the mean and median survival times were 78.8 days and 46 days, respectively.

Conclusions: Placement of a covered expandable metallic esophageal stent for the palliative treatment of EPF is technically feasible, although the rate of clinical success was poor secondary to fistula persistence or reopening. Fistula reopening was caused by the gap between the stent and the esophagus or by stent migration, and additional interventional treatment was useful to ensure enteral nutritional support.

ABBREVIATIONS

EPF = esophagopleural fistula, PTFE = polytetrafluoroethylene

Esophagopleural fistula (EPF) is very rare and is associated with high morbidity and mortality because of ensuing empyema and nutritional debilitation (1,2). EPF is an uncommon complication of pneumonectomy and is associated with advanced esophageal carcinoma, tuberculosis, diverticulum, Boerhaave syndrome, surgical procedures, endoscopic examinations, chemical injury after ingestion of corrosive substances, and radiation therapy (1–8).

Treatment of EPF begins with control of the empyema, repair of the esophagus, and nutritional support (9,10). Eradication of empyema by direct repair combined with a cover of viable tissue and thoracoplasty should be considered as the treatment of choice; however, because of its invasiveness, it is associated with high mortality rates (2,10). Endoscopic obliteration of the fistulous tract using electrocoagulation, a clip, or a suturing device has been reported to be successful (9,11–13). To our knowledge, there have been only a few reports describing the placement of covered retrievable expandable metallic stents for the treatment of EPF (14). The purpose of this study is to investigate the clinical efficacy of treating EPF with covered retrievable expandable metallic stents.

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MATERIALS AND METHODS

This retrospective study was performed with the approval of our institutional review board. Written informed consent was obtained from all patients at the time of their enrollment.

Patient Population

Baseline characteristics of the patients are detailed in Table 1. From September 1997 to June 2013, 91 patients underwent esophageal or airway stent placement for esophagorespiratory fistula; 9 of these patients were treated using covered retrievable expandable metallic stents for EPF. All nine patients were men with a mean age of 60 years (range, 44–79 y). None of the patients was considered a surgical candidate at the time of stent placement.

The diagnosis of EPF was established with esophagography or computed tomography (CT) examination in all patients. The diagnostic esophagogram finding was a direct communication between the esophagus and pleura without visualization of the trachea or bronchial trees. The diagnostic CT scan finding was a direct communication between the esophagus and pleural space.

The underlying causes of EPF were esophageal carcinoma with or without exploratory thoracotomy (n = 6), non–small cell lung cancer with right pneumonectomy or right lower lobectomy (n = 2), and open thoracoplasty for chronic empyema from Boerhaave syndrome (n = 1). Chemotherapy with (n = 7) or without (n = 1) radiation therapy was performed in all eight patients with a diagnosis of malignancy. The diagnosis of malignancy was established using endoscopic biopsy in all eight patients.

The location of the EPF was evaluated on esophagography before stent placement; fistulas were located in the upper (n = 2), middle (n = 3), or lower thoracic (n = 4) esophagus. The EPF was to the right and left pleura in seven and two patients, respectively. Patients were evaluated for symptoms of dysphagia before and after stent placement. The grade of dysphagia at the time of clinical presentation was defined using a 0–4 grading system and with a previously published grading system (15): grade 0, normal swallowing; grade 1, ability to swallow semisolids; grade 2, ability to swallow soft foods; grade 3, ability to swallow liquids only; and grade 4, absolute dysphagia. All patients reported coughing while swallowing food or saliva. Dysphagia was grade 4 in six patients, grade 3 in one patient, and grade 2 in two patients. The average dysphagia score was 3.44.

Seven patients underwent contrast-enhanced CT before stent placement, and CT scan abnormalities were seen in six patients (Table 1). In one (patient no. 4) of the three patients with hydropneumothorax, there was another esophagopulmonary fistula with a resulting lung

Table 1. Baseline Clinical and Radiologic Information

No.	Sex/Age (y)	Diagnosis or Cause	Fistula Site	Treatment before SP	CT Findings	
					Before SP	After SP
1	M/76	Eso. ca.	LE—Lt. lung	Chemotherapy and RT	Hydropneumothorax, EPF tract	NA
2	M/44	Eso. ca.	UE—Rt. lung	Chemotherapy and RT	Unremarkable	Unremarkable
3	M/79	Eso. ca.	LE—Rt. lung	Chemotherapy and RT	Pleural effusion, EPF tract	Effusion ↓ (chest tube), Pneumonia (left lung)
4	M/58	Eso. ca.	ME—Rt. lung	Chemotherapy and RT	Hydropneumothorax, esophagopulmonary fistula	NA
5	M/55	Eso. ca.	ME—Rt. lung	Chemotherapy and RT; explo. thoracotomy	Aspiration pneumonia	Pneumonia ↑
6	M/55	Eso. ca.	UE—Rt. lung	Chemotherapy and RT; explo. thoracotomy	NA	NA
7	M/53	Lung ca.	ME—Rt. lung	Chemotherapy and RT; Rt. lower lobectomy	NA	NA
8	M/55	Lung ca.	LE—Rt. lung	Chemotherapy; Rt. pneumonectomy	Hydropneumothorax, EPF tract	Hydropneumothorax ↓
9	M/69	Postop. empyema*	LE—Lt. lung	Thoracoplasty for empyema	Empyema, EPF tract	NA

ca. = cancer; EPF = esophagopleural fistula; Eso. = esophageal; Explo. = exploratory; LE = lower esophagus; Lt. = left; M = male; ME = midesophagus; NA = not available; Postop. = postoperative; Rt. = right; RT = radiation therapy; SP = stent placement; UE = upper esophagus; ↓ = decreased; ↑ = increased.
*Empyema developed after primary esophageal repair for Boerhaave syndrome.