Turkish Journal of Thoracic and Cardiovascular Surgery 2019;27(1):88-92
http://dx.doi.org/doi: 10.5606/tgkdc.dergisi.2019.16755

Original Article / Özgün Makale

Esophageal self-expandable metal stent placement for the palliation of dysphagia due to lung cancer

Akciğer kanserine bağlı disfajinin palyasyonunda özofageal kendinden genişleyebilir metal stent yerleştirilmesi

Fazlı Yanık, Yekta Altemur Karamustafaoğlu, Yener Yörük

Department of Thoracic Surgery, Medicine Faculty of Trakya University, Edirne, Turkey

ABSTRACT

Background: This study aims to report our experience with esophageal self-expendable metal stents for the palliation of malignant dysphagia and tracheoesophageal fistulas caused by lung cancer.

Methods: Esophageal self-expandable metal stents were deployed in 56 patients (55 males, 1 female; mean age 63.5 years; range, 42 to 79 years) with malignant dysphagia due to lung cancer between August 2002 and May 2018. Of the patients, 34 had received previous chemoradiotherapy, eight only chemotherapy, and three only radiotherapy, while four had pneumonectomy. Tracheoesophageal fistula was coexisting in 12 patients (21%). Stents were inserted under fluoroscopic control over guide-wire in 28 patients and under flexible endoscopic control in the remaining 28 patients. One stent was used in all patients, except two patients with tracheoesophageal fistula, one patient who had an external compression causing downward migration of stent, and two patients who had tumor progression.

Results: Dysphagia improved in all patients after stent insertion. Tracheoesophageal fistula was sealed off in all patients. All patients remained asymptomatic without dysphagia symptoms during the follow-up period except for two patients who underwent gastrostomy. All patients with tracheoesophageal fistula died. Their mean duration of survival was 2.8 months. Of the patients with tracheoesophageal fistula, one died of mediastinitis, one died of esophageal perforation, while the others died of cancer-related reasons. Of the dysphagia patients without tracheoesophageal fistula, all died except for two patients. Mean duration of survival in this group was 4.3 months.

Conclusion: Dysphagia in lung cancer may have many underlying reasons. Self-expandable metal stents may provide satisfactory relief of dysphagia symptoms with minimal morbidity after a single procedure in patients with limited lifespan.

Keywords: Dysphagia; esophageal stents; lung cancer.

ÖZ

Amaç: Bu çalışmada, akciğer kanserinin neden olduğu malign disfaji ve trakeoözofageal fistüllerin palyasyonu için özofageal kendinden genişleyebilir metal stentler ile ilgili deneyimimiz bildirildi.

Çalışma planı: Ağustos 2002 ve Mayıs 2018 tarihleri arasında akciğer kanserine bağlı malign disfaji nedeni ile 56 hastaya (55 erkek, 1 kadın; ort. yaş 63.5 yıl; dağılım, 42-79 yıl) özofageal kendinden genişleyebilir metal stent uygulandı. Hastaların 34'ü önceden kemoradyoterapi, sekizi sadece kemoterapi ve üçü sadece radyoterapi almışken dördü pnömonektomi geçirmişti. On iki hastada (%21) trakeoözofageal fistül de vardı. Stentler 28 hastada floroskopik kontrol altında kılavuz tel üzerinden, geri kalan 28 hastada fleksibl endoskopik kontrol altında yerleştirildi. Trakeoözofageal fistüllü iki hasta, dış bası nedeniyle stenti aşağıya yer değiştiren bir hasta ve tümör progresyonu olan iki hasta dışında, tüm hastalarda tek stent kullanıldı.

Bulgular: Stent yerleştirildikten sonra tüm hastalarda disfaji iyileşti. Tüm hastalarda trakeoözofageal fistül kapandı. Gastrostomi uygulanan iki hasta dışında, tüm hastalar takip süresi içinde disfaji semptomları olmadan asemptomatik kaldı. Trakeoözofageal fistüllü tüm hastalar kaybedildi. Ortalama sağkalım süreleri 2.8 ay idi. Trakeoözofageal fistüllü hastalardan biri mediastinit, biri özofagus perforasyonu, diğerleri ise kanser ilişkili nedenlerle öldü. Trakeoözofageal fistülü olmayan disfaji hastalarından ikisi dışında hepsi öldü. Bu grupta ortalama sağkalım süresi 4.3 ay idi.

Sonuç: Akciğer kanserinde disfajinin altta yatan pek çok nedeni olabilir. Yaşam süresi sınırlı olan hastalarda kendinden genişleyebilir metal stentler minimal morbidite ile disfaji semptomlarında yeterli rahatlığı tek bir işlem sonrası sağlayabilir.

Anahtar sözcükler: Disfaji; özofageal stentler; akciğer kanseri.

Received: June 12, 2018 *Accepted:* August 29, 2018

Correspondence: Fazlı Yanık, MD. Trakya Üniversitesi Tıp Fakültesi Göğüs Cerrahisi Anabilim Dalı, 22030 Edirne, Turkey.
Tel: +90 284- 235 76 41 e-mail: fazliyanik@hotmail.com

Cite this article as:
Yanık F, Karamustafaoğlu YA, Yörük Y. Esophageal self-expandable metal stent placement for the palliation of dysphagia due to lung cancer. Turk Gogus Kalp Dama 2019;27(1):88-92

©2019 All right reserved by the Turkish Society of Cardiovascular Surgery.

Lung cancer is the most important reason of cancer-related death among both males and females. LeRoux[1] reported that 1-2% of lung cancer patients initially had malignant dysphagia, while tracheoesophageal fistula (TEF) develops in less than 1% of them.[2,3] Fully covered esophageal self-expandable metal stents (SEMSs) are used for palliation of malignant dysphagia and TEF for these patients to improve the quality of their remaining life. However, experience and data on the roles of these stents in palliation of dysphagia due to lung cancer or other external compressive mediastinal malignancies are still limited. Therefore, in this study, we aimed to report our experience with esophageal SEMSs for the palliation of malignant dysphagia and TEFs caused by lung cancer.[4]

PATIENTS AND METHODS

We retrospectively reviewed all patients who presented with malignant dysphagia as a result of lung cancer in Department of Thoracic Surgery, Medicine Faculty of Trakya University between August 2002 and May 2018. Esophageal self-expandable 100-120×18-20 mm covered nitinol stents (Ultraflex Boston Scientific, Galway, Ireland and Micro-Tech (Nanjing) Co., Ltd., Nankin, China) were inserted in 56 consecutive patients (55 males, 1 female; mean age 63.5 years; range, 42 to 79 years). Histopathologic diagnosis was squamous cell carcinoma in 42 patients, adenocarcinoma in 10 patients, small-cell carcinoma in three patients, and large-cell carcinoma in one patient. Two patients had tumor compression in the proximal, 44 in the middle, and 10 in the distal part of the esophagus (Figure 1). Thirty-four patients received previous chemoradiotherapy, eight only chemotherapy, and three only radiotherapy, while four had pneumonectomy. Tracheoesophageal fistula was coexisting in 12 patients (21%) (Figure 2). Self-expandable metal stent was inserted under fluoroscopic control in 28 patients[5] and under flexible endoscopic control in the remaining 28 patients. No tracheal stent was used to treat the TEF. Endoscopy was performed under moderate sedation. Endoscope was forwarded under direct vision and approximate length of tumor and luminal caliber were measured. A guide-wire to the stomach was passed through the obstructed esophageal segment and deployed under endoscopic view guidance. If the endoscope could not be carried beyond obstruction, dilatation was performed using esophageal bougie dilators (Medovations SafeGuide dilator, California, USA) to permit passage. Self-expandable metal stents deployment was confirmed under endoscopy. Placement of SEMS was controlled by chest X-ray after intervention. Patients were permitted to drink water after intervention and advised to go on liquid diet the next day. The follow-up has been obtained through outpatient oncology clinic visits and phone conversations. Ethical approval was not required for this retrospective study of routinely collected anonymized database. A written informed consent was obtained from each patient. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 20.0 (IBM Corp., Armonk, NY, USA).

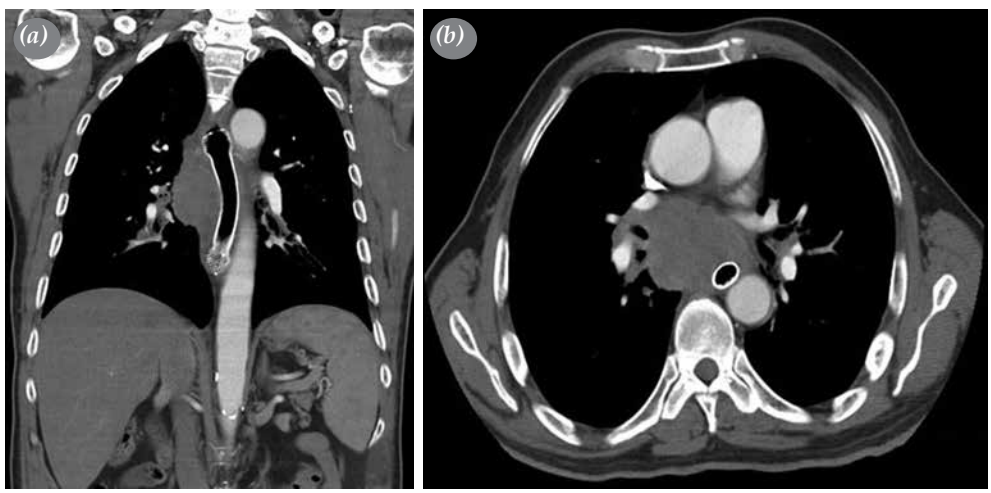


Figure 1. Computed tomography images of same patient. **(a)** In coronal plane, image obtained after stent placement shows expanding of lumen. **(b)** In axial plane, image obtained before stent placement shows segmental luminal narrowing in mid-esophagus.

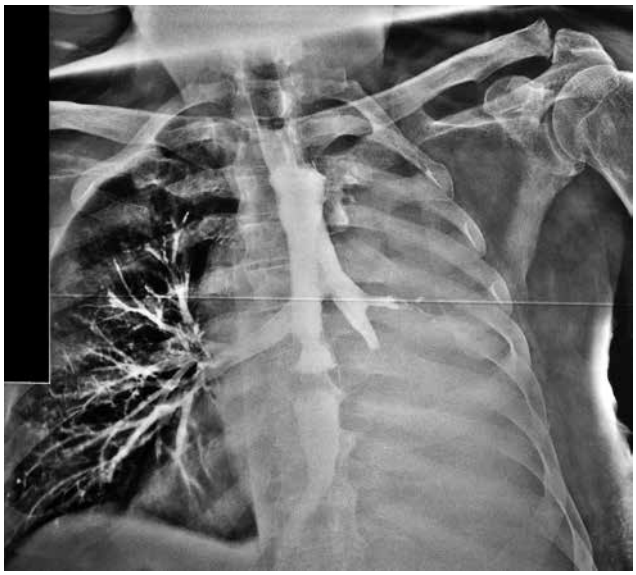


Figure 2. Posteroanterior lung graphy shows after placement of stent on esophagus passage graphy with barium enema in patient with tracheoesophageal fistula.

Data were expressed as mean±standard deviation. Frequencies and percentages were used for the categorical measures.

RESULTS

We did not deploy SEMSs above the upper sphincter of the esophagus. Single stent was used in all patients except for two patients with TEF, one patient who had an external compression causing downward migration of stent during intervention, and two patients who had tumor progression after one month. All fistulas were sealed off, and passages were provided for all patients except for one (92%). In this patient with huge tumor invading the aorta and esophagus, esophagus perforation was seen after deployment in chest computed tomography. Thereupon, left thoracotomy was performed, stent was removed, esophagus perforation was repaired, and gastrostomy was applied. This patient died after one week of surgery. Translational pain was seen in 30 patients (53%) and was treated with diclofenac potassium 50 mg twice a day, and no hospitalization was required. There was no procedure-related airway obstruction in our patients, although we deployed SEMSs in four patients with pneumonectomy. During follow-up, no clinical appearance of dysphagia symptoms were seen. However, gastrostomy was needed in two patients due to stent migration over distal obstruction after two weeks and nine months. All patients with fistulas died with a mean duration of survival of 2.8 months (range, 1-4 months). Of these patients, one died of predeployment mediastinitis, one died of esophageal perforation, while the others died of cancer-related reasons. All patients without a fistula died with a mean duration of survival of 4.3 months (range, 0-14 months) except for two patients with one-week and one-month follow-up.

DISCUSSION

Stankey et al.[5] described three possible explanations for dysphagia associated with lung cancer: *(i)* external compression of the esophagus within the mediastinum by the huge lung tumor or bulky mediastinal lymph adenopathy; *(ii)* compression of the pharynx and cervical esophagus by bulky lymph-node within the neck; and *(iii)* esophageal stenosis depending on mediastinal radiotherapy. Progressive dysphagia can significantly increase the risk of aspiration, pneumonia, and malnutrition and is associated with poor quality of life. Malignant dysphagia in advanced lung cancer is mostly related with metastatic lymph node or locoregional tumor growth and can lead to limited oral intake and increased malnutrition. In patients with TEF, oral intake suppressed by coughing and aspiration, pneumonia and sepsis leads to death. Self-expandable metal stent placement is an important and effective palliation method for these patients with malignant dysphagia.[4,6,7] We also consider that SEMS implantation is an effective and fast method of relieving malignant dysphagia with low morbidity and mortality. Avoidance of general anesthesia, outpatient implantation and immediate recovery from dysphagia in most patients are major advantages. It has been reported that, SEMS may be migrated or obstructed by tumor progression and foods in 60-70% of patients.[8,9] Doosti-Irani et al.[10] reported recurrent dysphagia (31%) due to stent migration (11%), tumor in or overgrowth (14%), or food obstruction (7%) after stent placement. Some studies mentioned that covered stents are accompanied with a high rate of migration (one-third).[11-13] We have experienced late distal migration in only two patients despite the use of covered stents, partial obstruction with food in two patients and perforation in one patient. In these patients, SEMS migration was treated with a second SEMS and food obstruction was treated endoscopically. Most of the adverse events were not lethal, but one patient died because of distal perforation who required emergency thoracotomy. Other reported complications are chest pain, bleeding and perforation.[12,14] Our most common complication was chest pain, which was easily controlled with

painkillers (53%). All fistulas were sealed off except in one patient (92%). Fuccio et al.[14] demonstrated successful sealing off in all but one patient (93%), which is consistent with our study. All patients were recommended alimentation in small amounts, and blended or liquid foods for preventing obstruction. A mean overall survival of 2.1-2.2 months after SEMS insertion was reported in previous studies.[15,16] In our study, mean overall survival was 3.54 months. We believe that effective improvement in alimentation in the early stage is important for these patients.

As several studies reported that prior radiotherapy increased the risk of severe complications after SEMS placement, we also think that SEMS provides more efficient nutrition in patients with planned radiotherapy with minimal complication rate.[17,18] The considerable length of survival in patients with TEF should encourage palliative treatment of dysphagia in patients with advanced lung cancer to allow improved oral nutrition and quality of life. Although survival durations of patients with TEF are much shorter, SEMS application prevents early death from pulmonary sepsis. Dubecz et al.[19] suggested that patients with advanced lung cancer had a median survival of 48 days, while patients with TEF had a median survival of 58 days. In our study, duration of survival was shorter in patients with TEF (mean 2.8 months for TEF and 4.3 months for non-TEF), with 54% of patients surviving less than one month.

Our study has some limitations. First, it is a retrospective study including consecutive patients; thus, the study is open to selection bias. Secondly, our findings are from a single institution and a small sample size due to the rarity of the entity. Despite these limitations, the current study provides valuable information about the standard procedure for the insertion of SEMS in all patients and evaluates this perfect palliative method from many perspectives.

In conclusion, dysphagia in lung cancer may cause numerous secondary problems besides lung disorders. Self-expandable metal stents may provide satisfactory relief of dysphagia with minimal morbidity in a single procedure in patients with limited lifespan.

Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors received no financial support for the research and/or authorship of this article.

REFERENCES

1. Le Roux BT. The presentation of bronchial carcinoma. Scott Med J 1968;13:31-7.
2. Hyde L, Hyde CI. Clinical manifestations of lung cancer. Chest 1974;65:299-306.
3. Martini N, Goodner JT, D'Angio GJ, Beattie EJ Jr. Tracheoesophageal fistula due to cancer. J Thorac Cardiovasc Surg 1970;59:319-24.
4. Altemur Karamustafaoglu Y, Yoruk Y. Self-expandable esophageal stents placement for the palliation of dysphagia as a result of lung cancer. Dis Esophagus 2010;23:561-4.
5. Stankey RM, Roshe J, Sogocio RM. Carcinoma of the lung and dysphagia. Dis Chest 1969;55:13-7.
6. Homs MY, Kuipers EJ, Siersema PD. Palliative therapy. J Surg Oncol 2005;92:246-56.
7. Stewart DJ, Balamurugan R, Everitt NJ, Ravi K. Ten-year experience of esophageal self-expanding metal stent insertion at a single institution. Dis Esophagus 2013;26:276-81.
8. Selinger CP, Ellul P, Smith PA, Cole NC. Oesophageal stent insertion for palliation of dysphagia in a District General Hospital: experience from a case series of 137 patients. QJM 2008;101:545-8.
9. Siersema PD, Hop WC, van Blankenstein M, van Tilburg AJ, Bac DJ, Homs MY, et al. A comparison of 3 types of covered metal stents for the palliation of patients with dysphagia caused by esophagogastric carcinoma: a prospective, randomized study. Gastrointest Endosc 2001;54:145-53.
10. Doosti-Irani A, Mansournia MA, Rahimi-Foroushani A, Haddad P, Holakouie-Naieni K. Complications of stent placement in patients with esophageal cancer: A systematic review and network meta-analysis. PLoS One 2017;12:e0184784.
11. Christie NA, Buenaventura PO, Fernando HC, Nguyen NT, Weigel TL, Ferson PF, et al. Results of expandable metal stents for malignant esophageal obstruction in 100 patients: short-term and long-term follow-up. Ann Thorac Surg 2001;71:1797-801.
12. Yoruk Y. Esophageal stent placement for the palliation of dysphagia in lung cancer. Thorac Cardiovasc Surg 2007;55:196-8.
13. Reijm AN, Didden P, Schelling SJC, Siersema PD, Bruno MJ, Spaander MCW. Twenty-three years of self-expandable metal stents placement for malignant esophageal strictures Endoscopy 2018;50:31.
14. Fuccio L, Hassan C, Frazzoni L, Miglio R, Repici A. Clinical outcomes following stent placement in refractory benign esophageal stricture: a systematic review and meta-analysis. Endoscopy 2016;48:141-8.
15. Gupta NK, Boylan CE, Razzaq R, England RE, Mirra L, Martin DF. Self-expanding oesophageal metal stents for the palliation of dysphagia due to extrinsic compression. Eur Radiol 1999;9:1893-7.
16. De Gregorio BT, Kinsman K, Katon RM, Morrison K, Saxon RR, Barton RE, et al. Treatment of esophageal obstruction from mediastinal compressive tumor with covered, self-expanding metallic Z-stents. Gastrointest Endosc 1996;43:483-9.

17. Fuccio L, Scagliarini M, Frazzoni L, Battaglia G. Development of a prediction model of adverse events after stent placement for esophageal cancer. Gastrointest Endosc 2016;83:746-52.
18. Lecleire S, Di Fiore F, Ben-Soussan E, Antonietti M, Hellot MF, Paillot B, et al. Prior chemoradiotherapy is associated with a higher life-threatening complication rate after palliative insertion of metal stents in patients with oesophageal cancer. Aliment Pharmacol Ther 2006;23:1693-702.
19. Dubecz A, Watson TJ, Raymond DP, Jones CE, Matousek A, Allen J, et al. Esophageal stenting for malignant and benign disease: 133 cases on a thoracic surgical service. Ann Thorac Surg 2011;92:2028-32.