

Palliation of malignant dysphagia with self expandable esophageal stents

Malign disfajinin kendiliğinden genişleyebilen özofageal stentlerle palyasyonu

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ABSTRACT

Background: In this article, we report our experience with a self-expandable metallic and plastic stent in a consecutive series of patients with malignant dysphagia.

Methods: Between May 2009 and August 2012, 43 patients (29 males, 14 females; mean age 65.4 years; range 39 to 87 years) with malignant esophageal stenoses, who underwent esophageal stent implementation in Thoracic Surgery Department of Erzurum Regional Training and Research Hospital were included in this study. The self expandable metallic stents (SEMS) was chosen in 38 patients with stenotic lesion which located middle and lower esophagus, and the self expandable plastic stents (SEPS) was chosen in five patient with fistula or upper esophageal localization. The mean follow-up was nine months (1 to 39 months). Four patients are live and has been under follow-up.

Results: A total of 54 stents were placed in 43 patients. Forty-nine covered SEMSs were placed in 38 patients and five covered SEPSs were placed in five patients. Eight of the patients with middle and lower esophageal stenosis needed two covered SEMS and one with middle esophageal stenosis needed four covered SEMS. One patient died because of cardiac arrhythmia on the postoperative second day. A tracheoesophageal fistula developed four months after the SEMS implantation in another. All patients improved in oral food intake.

Conclusion: Self expandable esophageal stents are effective palliation methods in patients with malignant dysphagia.

Keywords: Esophageal stenosis; stent; tracheoesophageal fistula.

ÖZ

Amaç: Bu makalede malign disfajili hastalardan oluşan ardışık bir seride, kendiliğinden genişleyebilen metalik ve plastik stentlerle ilgili deneyimlerimiz sunuldu.

Çalışma planı: Mayıs 2009 - Ağustos 2012 tarihleri arasında Erzurum Bölge Eğitim ve Araştırma Hastanesi Göğüs Cerrahisi Kliniği'nde malign özofageal darlığı olan ve özofageal stent takılan 43 hasta (29 erkek, 14 kadın; ort. yaş 65.4 yıl; dağılım 39-87 yıl) çalışmaya alındı. Orta ve alt özofagusta darlığı olan 38 hastaya kendiliğinden genişleyebilen metalik stent (SEMS), fistülü olan veya darlığı üst özofagusta olan beş hastaya kendiliğinden genişleyebilen plastik stent (SEPS) takıldı. Ortalama takip süresi dokuz aydı (1-39 ay). Dört hasta sağ ve halen takip edilmektedir.

Bulgular: Kırk üç hastaya toplam 54 adet stent yerleştirildi. Otuz sekiz hastada 49 adet kaplı SEMS ve beş hastada beş adet kaplı SEPS uygulandı. Orta ve alt özofageal darlığı olan sekiz hastada iki kaplı SEMS ve özofageal darlığı olan bir hastada dört kaplı SEMS gereksinimi oldu. Bir hasta kardiyak aritmi nedeniyle ameliyatın ikinci gününde kaybedildi. Bir diğer hastada SEMS implantasyonu sonrasında trakeoözofageal fistül gelişti. Tüm hastaların oral gıda alımı düzeldi.

Sonuç: Kendiliğinden genişleyebilen özofageal stentler, malign disfajili hastalarda etkili bir palyasyon yöntemidir.

Anahtar sözcükler: Özofageal darlık; stent; trakeoözofageal fistül.



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Inserting a self-expandable esophageal stent is a minimally invasive treatment option for patients with malignant dysphagia and esophagorespiratory fistulas (ERFs) who are not eligible for surgery.^[1] Malignant dysphagia and ERFs occur as a result of esophageal, invasive lung, or gastric cancer, with esophageal malignancy being the sixth most common cause of cancer-related death.^[1] Life expectancy for patients with esophageal cancer is poor, with overall survival rates approaching 10-15% at five years.^[2] In addition, approximately 60% of these cases undergo an esophagectomy due to the advanced stage of the cancer.^[3] In this stage, some patients suffer from esophageal stenosis or even ERFs as a result of the esophageal carcinoma.^[4] Progressive dysphagia is one of the most common devastating complaints of these patients,^[4] and radiotherapy, plastic and metal stents, endoscopic ablation, and resection or bypass surgery are normally used for the palliation of malignant dysphagia,^[5,6] with esophageal stent placement and radiation therapy being the most used.^[6] However, for early palliation of dysphagia in advanced esophageal cancer patients, self-expandable plastic stent (SEPS) insertion prior to chemotherapy may be an appropriate alternative.^[7]

Herein, we report on our experience with a self-expandable metal stent (SEMS) and SEPS in a consecutive series of patients with malignant dysphagia due to either esophageal, pulmonary, or gastric carcinoma.

PATIENTS AND METHODS

Between May 2009 and August 2012, 43 patients with malignant esophageal stenoses (29 men, 14 women; mean age 65.4 years; range 39 to 87 years) underwent esophageal stent implantation at Erzurum Regional Education and Research Hospital.

The mean follow-up time ranged from 1 to 39 months (mean 9 months), and currently four patients are still alive and being followed up. The cases included 37 patients with primary esophageal cancer, three with invasive lung cancer, and three others with esophageal invasion stemming from gastric malignancy, and their symptoms were dysphagia (n=43; 100.0%), coughing after the intake of liquid food (n=3; 6.9%), dyspnea (n=1; 2.3%), and chest discomfort (n=1; 2.3%). Furthermore, the stenosis was located in the upper esophagus in two patients (4.6%), the middle esophagus in 22 patients (51.1%), and the lower esophagus in 19 others (44.1%), with three also having fistulous lesions (6.9%) (Figure 1) in the middle esophagus. The histopathological types of

cancer were squamous cell carcinoma (n=28; 65.1%), adenocarcinoma (n=12; 27.9%), adenosquamous carcinoma (n=1; 2.3%), small cell carcinoma (n=1; 2.3%) and signet-ring cell carcinoma (n=1; 2.3%), and surgery was not recommended for any of the patients. The criteria for inoperability were the following: distant metastases (n=15; 34.8%), vascular and cardiac invasion (n=5; 11.6%), tracheal invasion (n=2; 4.6%), esophagorespiratory fistulas (n=3; 6.9%), advanced age and poor general health (n=7; 16.2%), an invasion of lung cancer (n=3; 6.9%), and preexistent coronary artery disease (CAD) (n=1; 2.3%). In addition, seven patients decline to have the surgery. The decision for inoperability was established via the use of esophagography, abdominal ultrasonography (USG), computed tomography (CT), magnetic resonance imaging (MRI), fiberoptic endoscopy, and positron emission tomography-computed tomography (PET-CT) as well as the patients' pathology. Seventeen of the patients underwent radiation and chemotherapy, nine only had chemotherapy, and three only had radiation prior to the placement of the stent. A total of 49 self-expandable membrane-covered metallic (Micro-Tech (Nanjing) Company, Nanjing, PRC) stents were inserted in 38 patients while five membrane-covered plastic esophageal stents (Boston Scientific Corp., Marlborough, MA, USA) were used in the other five. The SEMS was used in the 38 patients with stenotic lesions in the middle and lower esophagus, and the SEPS was utilized in the five patients with fistulas and upper esophageal localization. Four of the SEMS



Figure 1. Bronchoscopic view of the bronchoesophageal fistula (arrow).

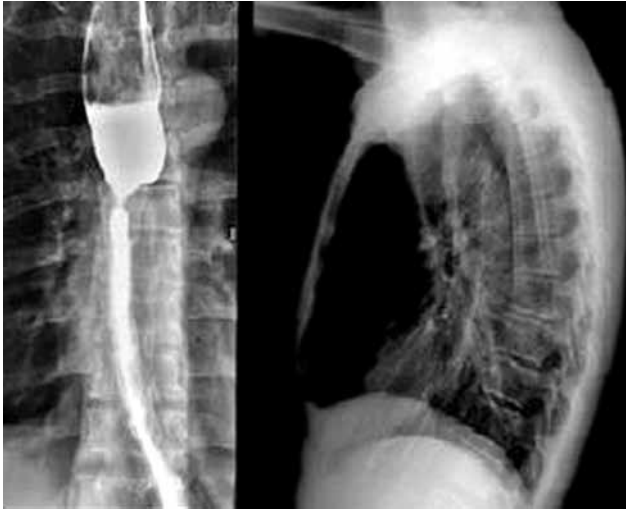


Figure 2. Radiographic view of two of the self-expandable metal stent.

were placed in one patient because of restenosis related to tumor overgrowth that appeared several months after previous stent placements, and two SEMS were placed in eight patients for the same reason (Figure 2). A single self-expandable stent was placed in the remaining patients. The stent diameters ranged from 16 to 20 mm, and the length of the stents varied between 6 and 15 cm. Before the stents were implanted, endoscopic balloon dilatation was performed on all of the patients (100%), and a Dumon stent (Novatech SA in France) was inserted in the trachea of one patient with esophageal and

Table 1. Clinical characteristics of the patients

| Characteristics | n | Age | Range |
|--------------------------------------|----|------|-------|
| Mean age (range) | | 65.4 | 39-87 |
| Gender | | | |
| Males | 29 | | |
| Females | 14 | | |
| Localization of stenosis | | | |
| Upper esophagus | 2 | | |
| Middle esophagus | 22 | | |
| Lower esophagus | 19 | | |
| Criteria for inoperability | | | |
| Distant metastases | 15 | | |
| Vascular and cardiac invasion | 5 | | |
| Tracheal invasion | 2 | | |
| Esophagorespiratory fistula | 3 | | |
| Advanced age and poor general health | 7 | | |
| Invasion by lung cancer | 3 | | |
| Preexistent coronary artery disease | 1 | | |
| Surgery refused | 7 | | |

Table 2. Patient complications

| Complications | n |
|---------------------------|----|
| Major complications | |
| Death | 1 |
| Tracheoesophageal fistula | 1 |
| Minor complications | |
| Minimal hemorrhage | 13 |
| Retrosternal pain | 10 |
| Stent migration | 2 |

tracheal stenosis prior to the implantation of the esophageal stent.

RESULTS

A total of 54 stents were placed in 43 patients. The patient characteristics are listed in Table 1. Eight of the patients with middle and lower esophageal stenosis needed two covered SEMS and one with middle esophageal stenosis needed four covered SEMS. The reason for the multiple stent placement was tumor overgrowth at the upper part of the stent. Minor complications, such as stent migration, minimal intraoperative hemorrhage, and retrosternal pain occurred in two (4.6%), 13 (30.2%), and 10 (23.2%) of the patients, respectively while major complications occurred in two (4.6%) (Table 2). One patient died because of cardiac arrhythmia on the postoperative second day and a tracheoesophageal fistula developed four months after the SEMS implantation in another (Figure 3). We had suggested the placement of a tracheal stent for that patient, but he refused that intervention and was not followed up afterwards.

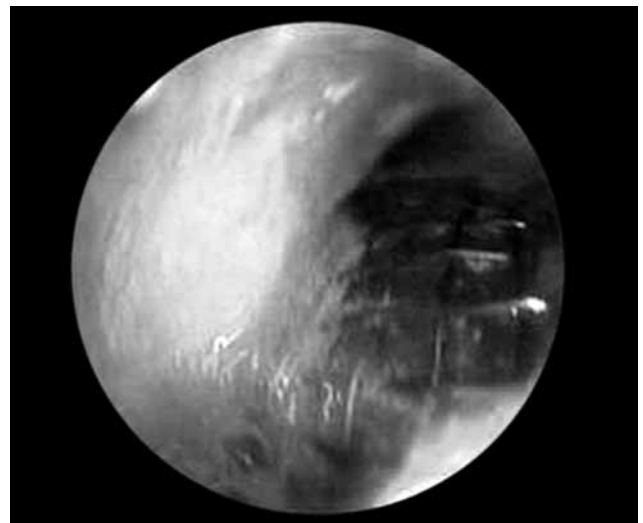


Figure 3. Bronchoscopic view of the tracheoesophageal fistula caused by the self-expandable metal stent.

After investigated this particular case via the hospital automation system, we found that the patient had died two months after this suggesting. In the three patients with fistulas, their cough disappeared after 10 days, and the oral intake of food improved after the procedure in nearly all of the 43 patients.

DISCUSSION

In cases involving malignant esophageal stenosis, the insertion of an expandable stent can markedly improve the quality of life (QoL) for patients with dysphagia.^[4] Celestin^[8] and Atkinson and Ferguson^[9] reported the palliation of malignant dysphagia with a plastic stent in 1959 and the 1970s, respectively, and in 1983, Frimberger^[10] introduced the endoscopic placement of an expandable metallic stent. These earlier efforts led to the development of various self-expandable metallic and plastic stents that are in use today, and these are especially beneficial for the palliative treatment of malignant dysphagia in patients with advanced stage.^[11] Furthermore, self-expandable stents may be used to avoid the insertion of gastrostomy and jejunostomy tubes,^[1] and stent implantation is considered to be a safe and effective treatment option for malignant dysphagia.^[12]

Palliative treatment of malignant dysphagia is the principle choice of therapy in patients with inoperable esophageal, invasive lung, and gastric cancer. Endoscopic laser therapy, electrocautery, and self-expandable esophageal stents can be used to treat this condition, and out of these, stent placement is the most effective,^[11] with both SEMS and SEPS being used in malignant dysphagia patients as well as those with ERFs, which develop in cases of advanced esophageal and lung cancer and lead to pulmonary symptoms as a result of the aspiration of secretions and food.^[4,13,14] Turkyilmaz et al.^[15] in their series comprised of 326 patients with malignant esophageal disorder found that ERFs were present in 5% (n=18) of their study participants. Covered stents are suitable for the sealing of fistulas because they can prevent the esophageal contents from passing into the fistula. After covered esophageal stent placement, clinical symptoms related to the aspiration usually regress. However, if the esophageal stent did not seal the ERF or if the tracheobronchial system was obstructed because of a primary tumor, a tracheal and/or bronchial stent should then be placed into the airway.

Before stent implantation, an endoscopic radiological examination such as esophagography should be performed, and fiberoptic bronchoscopy may also be necessary for patients with symptoms of aspiration. In addition, dilation is necessary in most patients, but the maximum degree of dilation has not

yet been established.^[4] However, it is usually advised to dilate to at least 12 mm, but excessive dilatation may cause stent migration.^[16,17]

For those who undergo stent implantation, major and minor complications may develop in approximately 2-10% and 20-33% of the patients, respectively,^[4,11,18] and Eroglu et al.^[19] reported that the overall complication rate without chest pain was 31.7% in their series.

Some of the patients die as a direct result of the procedure, and in the study by Turkyilmaz et al.,^[20] they reported a stent-related mortality rate of 2.3%. Perforation, chest pain, aspiration, and minor bleeding are the most common early complications^[11] while stent migration, tumor overgrowth, persistent reflux, recurrent dysphagia, fatal bleeding, perforation, and tracheoesophageal fistulas are seen later.^[11] Furthermore, stent obstruction may occur due to tumor progression and food impaction.^[11] Moreover, tumor progression may occur in 4-18% of the cases of stent implantation.^[21]

The incidence of stent migration is higher with covered stents (23%) than with uncovered stents 8.7%,^[22] but stent removal is only indicated for symptomatic patients.^[23] In cases of stent implantation at the upper and middle third of the esophagus, fistula formation and tracheal compression is possible, and bleeding and perforation may develop due to pressure necrosis on the tumor or the esophageal wall.^[11]

A success rate of between 86-100% has been reported for the improvement of dysphagia,^[24,25] but in our series, the rate was 100% for this and stent implantation. Furthermore, the major and minor complication rates were 4.6% and 30.2%, respectively. The minor complications that we identified were stent migration into the stomach, minimal hemorrhage during the operation, and retrosternal pain which occurred in two (4.6%), 13 (30.2%), and 10 (23.2%) patients, respectively. Migrations were seen in patients with upper esophageal stenosis, and the stents were replaced in these cases. However, our replacement ratio was 4.6% and this ratio was lower than in other reports because the dilatation was performed at a maximum of 12 mm.^[25] We also removed one stent via a laparotomy because the patient had symptoms of abdominal pain and nausea. When minimal hemorrhage occurred, no treatment was needed, but retrosternal pain was treated with parenteral analgesics. Furthermore, the early mortality rate within the first 30 days in our study was 2.3%, and this rate was acceptable when compared with other studies in the literature.^[22,26]

The most common late complication was stent obstruction due to tumor overgrowth (n=9, 20.9%), and this rate was similar to that found in the literature.^[21] However, no food impaction was seen in the stent because we advised our patients to eat semisolid and liquid foods. There was also no gastroesophageal reflux related to the stent because they contain an anti-reflux mechanism consisting of a plastic valve system in the distal portion of the SEMS which prevented any reflux. In addition, we saw no signs of perforation or aspiration, and there was minimal hemorrhage in 13 patients during the operation. In spite of these issues, the success rates for the stent implantation procedure and for improvement in the dysphagia were both 100%.

Conclusion

Our findings revealed that self-expandable esophageal stents are an effective palliative treatment option for patients with malignant dysphagia who are not candidates for surgical intervention and that these stents can also improve the patients' ability to orally intake food. Furthermore, ERFs can be sealed via the implantation of covered metallic and plastic esophageal stents. Hence, because this procedure is quick and safe and has a high success rate, it should be considered for all patients with malignant dysphagia.

Declaration of conflicting interests

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