

# Results of Endoscopic Stent Application in Upper Gastrointestinal System Diseases

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## Abstract

**Background:** Endoscopic stenting is an effective treatment modality for upper gastrointestinal malignancies. It is a successful treatment method especially in the removal of dysphagia. We aimed to present the results of single centered endoscopic stent application with this study.

**Methods:** Between January 2014 and December 2017, patients underwent endoscopic stenting due to upper gastrointestinal system diseases were investigated. Demographic data, indications of application, complications, stent characteristics and survey of the patients were evaluated.

**Results:** Eighty six stents were applied to 100 patients. Sixty four of the patients were male and 22 were female. All of the patient's stents were placed successfully. Patients oral intake was corrected. Patients were followed for an average of 220 days. The most common complication was malrotation.

**Conclusions:** Endoscopic stenting is a feasible method with low morbidity and mortality in experienced centers. It is an effective method of eliminating dysphagia.

**Keywords:** Stent; Endoscopy; Complication

## Introduction

Today, endoscopic procedures are increasing. Endoscopy is widely used in the diagnosis and treatment of many diseases. Endoscopic stenting is increasingly involved in the palliation of gastrointestinal malignancies [1]. Stent application especially in patients with advanced stage or metastatic esophageal cancer provides an easy and effective treatment. Endoscopic stent application is an alternative method for the treatment of esophageal fistula and anastomotic leaks. Stent application in distal esophageal malignancies is an easy and effortless procedure in the treatment of dysphagia and correction of oral intake [2]. The same success was partially achieved in proximal esophageal strictures [3]. The esophageal stent applied in malignant stenosis can also be successfully applied in benign stenosis [4].

With the increase of endoscopic stent application, many complications related to the procedure are also developing. The most common of these are migrations, fistula development, bleeding and obstruction [5].

We aimed to discuss the results of self-expandable metal stent (SEMS) commonly used in our clinic in the light of the literature.

## Methods

This study was planned retrospectively. The aim of this study was to evaluate the endoscopic stent outcomes due to upper gastrointestinal system diseases between January 2014 and December 2017. Demographic data of the patients, indications for application, complications, stent characteristics and surveys were evaluated in the study.

Stent characteristics were determined according to disease, endoscopic examination and imaging studies. Stent length was determined by endoscopy. In obstructive lesions, the length of the lesion was determined by imaging methods and the stent length was adjusted. Stent size was considered as a criterion that the lesion was 2 cm longer than proximal and distal. We preferred semi-cuffed stents in tumoral obstruction. In fistula cases we had full-cuffed stents.

Anesthesia was performed when necessary. The stents were placed under guidewire under endoscope control. In cases where the lesion could not be passed in the obstructive lesions, dilation was performed first. After 24 hours from the procedure, control charts were drawn by X-ray. Oral intake was started after X-ray control.

## Results

### Demographic data

Eighty-six patients underwent stenting. A hundred stents were applied. In total, about 250 endoscopy procedures were performed. Sixty four of the patients were male and 22 were female. The average age was 66 (37-89). More than one endoscopic stent was applied to 20 patients (23.3%). Four patients underwent surgery due to endoscopic complication (34.4%).

### Clinical results

None of the patients had any complications to surgery required during the procedure. Hypotension developed in a patient (1.2%). Had to interrupt the process. Procedure was successful after one day. All patient stents were placed successfully (n: 86). Oral intake was better in all of the patients (full recovery: 70% partial recovery: 30%).

The average follow-up period is 220 days (10-720). The mean hospital stay was 2.1 days (1-5).

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When the diagnoses of the patients were examined, esophageal malignancies were observed in the first place. Benign diseases were less common (Table I).

The length of the stent to be selected is set to be at least 4 cm larger than the lesion. The most preferred stent size was 12 cm as shown in Table II.

The most common complication when we looked at the complications after stenting was malrotation. Malrotation developed in 22 of the stent-treated patients (25.6%). In 4 of these patients the stent retracted to the normal position (4.7%). Stents were removed in four patients and replaced with new ones (4.7%). A second stent was inserted in 10 cases (11.6%). Surgery was performed in 4 cases of perforation and obstruction in the small intestines (4.7%). Slippage was more common in patients with benign causes of stenting (n: 16; 18.6%). Migration due to benign is usually seen in the first days (first 1 week). The slippage observed in malignant diseases was generally observed after chemotherapy (n: 6; 7%). Migration developed in full-stented stented patients (n: 8).

Minimal hemorrhages was observed in 10 patients (11.6%). No transfusion required. These hemorrhages were seen in malignant diseases and usually occurred after 3 months. Other rare complications were fistulae, obstruction and perforation (Table III). These complications were seen in malignant patients and after 2 months. The fistula was usually seen in patients receiving chemotherapy. After 3 months of chemotherapy, coughing was detected.

There were obstruction due to food debris in 3 of the patients examined for obstruction (in the 1st month). Food waste was removed endoscopically. In other cases, obstruction due to tumor growth has occurred (after the 45<sup>th</sup> day).

Overgrowth developed in three patients (after the 100<sup>th</sup> day). Restent application was made to these three patients and results were obtained.

**Table I:** Diagnosis of stent-treated patients.

Diagnosis	N(patient)/%
Esophageal cancer	26/30.2
Distal Esophageal cancer	14/16.3
Cardioesophageal cancer	14/16.3
Benign esophageal stricture	12/14
Stenosis in the anastomosis line	12/14
Fistula in the anastomosis line	6/7
Oesophageal fistula	2/2.3
<b>Total</b>	<b>86/100</b>

**Table II:** Stent length.

Stent length	n (stent number)/%
8	4/4.7
10	37/43
12	51/59.3
14	8/9.3
<b>Toplam</b>	<b>100/100</b>

**Table III:** Developing complications.

Complications	n (patient) / %
Migration	22/25.6
Hemorrhage	10/11.6
Occlusion	6/7
Perforation	1/1.2
Fistula	1/1.2
<b>Total</b>	<b>40</b>

## Discussion

There are many types of self-expandable stents (Self-expandable plastic stents, Self-expandable biodegradable stents). The use of SEMS is increasing. According to the purpose of use, stents are produced as cuffless, semi-cuffed and full cuffed. Migration is increased after full cuffed SEMS use [6]. Tumor overgrowth is observed in cuffless stents [6]. Full-cuffed stents are preferred for anastomotic leaks and fistula closure. It is an advantage that the cuffed stents used for benign reasons can be removed when requested. The most preferred type of stent in our clinic is Self-expandable metal stent. In benign cases, we prefer full-cuffed stents. We apply full-cuffed stents especially because of the complete insulation in the fistulas and the ease of removal afterwards. When we examined our cases, migration developed completely in almost all of the full-cuffed stents. The stents that could be reached with the endoscope were pulled back where it should be. Stents falling in the stomach space were removed and replaced with new ones. Full-cuffed stents are rarely fixed with hemostatic clips.

The preferred stent length varies. In the market it is possible to reach stents between 6 and 19.5 cm in size. Stent diameters range from 10 to 23 mm. The size of the stent that we used in our clinic changed according to lesion size, but it was the most preferred 12 cm stent (51%). 10 cm stents were among the most preferred (37%). Our aim is to choose the shortest stent length that is appropriate.

SEMS is deployed using an endoscopic guide and if necessary fluoroscopy [5]. If fluoroscopy is used, proximal and distal marking of the lesion provides ease in the procedure. The size of the lesion determines the size of the stent to be selected. A stent of at least 4 cm longer than the lesion should be preferred [7]. We determine the size of the lesion by endoscope. However, if there is an obstructive mass that prevents the passage of endoscopy, we resort to imaging. For this purpose, we prefer computerized tomography.

More than 95% of patients with stenting due to obstruction improve oral intake [8,9] Success rate due to fistula varies between 70% and 100% [10]. If oral intake is corrected and dysphagia starts again, overgrowth, ingrowth or stent migration should be considered. Complaints of dysphagia were improved in all our patients. At the end of 1 year, there was a blockage in 6 cases. It was obstructed by overgrowth or ingrowth in 3 of these cases. The problem was solved by applying a second stent to this disease. complaints of dysphagia were improved in all our patients. However, despite the partial improvement in 30% of cases, oral intake was achieved (fed with liquid food).

Esophageal stents are used for benign causes such as fistula, stenosis, anastomotic leaks [10-18] The stents used for this purpose are usually full-cuffed. These stents provide advantages because they are easier to remove after the disease has healed. We prefer the cuffed stents. The handicap of the cuffed stents is too much migration. We have seen more stent swings in Full-cuffed stents. As a result, more endoscopic intervention was required.

## Conclusion

In conclusion, endoscopic stenting is a feasible method with low morbidity and mortality. Can be easily applied to patients at risk. It is an effective method with low risk in the treatment of dysphagia. The endoscopist must be experienced.

## Conflicts of interest

The authors declare no conflict of interest.

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