



Clinical outcomes of self-expandable metal stent (SEMS) placement as palliative treatment for malignant colorectal obstruction: A single-center study from Japan



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HIGHLIGHTS

- It is necessary to establish a logistic framework with a mixed team of endoscopists and surgeons to support re-intervention and surgery.
- Colorectal stenting is a valid therapeutic option, palliative SEMS placement is likely to result in re-occlusion within a year of stenting.

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ABSTRACT

Objectives: We aimed to assess the efficacy of self-expanding metal stent (SEMS) implantation as palliative treatment for malignant colorectal obstruction.

Methods: We retrospectively reviewed the records of patients with malignant colorectal obstruction who underwent SEMS insertion as palliative treatment in our hospital between March 2013 and December 2016. We analyzed demographic, clinical, and operative characteristics.

Results: A total of 13 patients (8 males, 5 females; median age, 80.1 years) were reviewed. Tumor location included the left colon, rectum, and right colon in 38.5%, 38.5%, and 23% of the patients, respectively. Advanced and early colorectal cancer were noted in 7 (63.6%) and 4 (36.4%) cases, respectively. The mean ColoRectal Obstruction Scoring System score was 0.92 before stenting and 3.92 after stenting. Oral intake was resumed at a median of 2.1 days after SEMS placement. Median stent patency was 7.6 months, and 69.2% of patients maintained stent patency until death or the end of follow-up. Stent-related adverse effects included: re-occlusion (4 cases, 30.8%); stent migration (1 case, 7.7%), and pain with tenesmus (2 cases, 15.4%). In patients with re-occlusion (median follow-up interval, 1.3 months), stent patency was maintained for a median of 10.3 months (early failure, within 3 months; late failure, >11 months).

Conclusion: SEMS placement as a palliative treatment is likely to fail within a year, leading to re-occlusion. It is very important to maintain vigilant monitoring using X-ray, CT, and colonoscopy after SEMS placement, with close cooperation between the endoscopist and surgeon. A logistic framework involving careful follow-up, even in the absence of symptoms, and a combined team involving endoscopists and surgeons should be established to support re-intervention and surgery. We recommend vigilant monitoring of patients who received SEMS placement for palliation of malignant colorectal obstruction.

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1. Introduction

Colonic stent placement represents an established strategy for managing patients with malignant obstruction due to colorectal cancer. In 1991, Dohmoto first described the placement of self-expandable metal stents (SEMSs) as a palliative treatment [1,2]. Hospitals in Japan started performing SEMS placement since

Abbreviations: SEMS, self-expandable metal stents.

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January 2012, when this procedure became covered by the national health insurance system.

In 2014, the European Society of Gastrointestinal Endoscopy expressed several opinions on the efficacy of SEMS implantation for colorectal cancer ileus [3]. SEMS placement is strongly recommended as the preferred treatment for palliation of malignant colonic obstruction. However, in our patients, we encountered colonic stent-related adverse effects such as re-occlusion or stent migration, which required emergency re-intervention. To determine the rate of re-occlusion after SEMS placement as palliative treatment for malignant colonic obstruction, we performed a retrospective investigation of the cases treated in our hospital.

2. Methods

2.1. Patients

We retrospectively reviewed consecutive patients with malignant colorectal obstruction who underwent SEMS insertion in our hospital between March 2013 and December 2016. Only patients who received SEMS placement as palliative treatment were included in the final analysis. Our indications for SEMS placement for malignant colorectal stricture were as follows: total colon without Rb (tumor within 3 cm of the anal verge), however ileocecum is difficult; impossible passage of the colonoscope; and unresectable colorectal cancer or refusal of the patient to undergo operation. Our retrospective review was approved by the ethics review board of our hospital.

2.2. Data collection

We analyzed data regarding the age, sex, tumor location, tumor stage, chemotherapy regimen, adverse effects related to colonic stenting, stent patency, ColoRectal Obstruction Scoring System (CROSS) score before and after stenting, time to oral intake after SEMS placement, and clinical course. In patients with re-occlusion, we further analyzed stent patency, complaint at readmission, therapeutic strategy, follow-up duration, clinical course, and adverse effects related to the placement of the colonic stent.

The CROSS (Table 1) assigns a score assessing the degree of stricture or obstruction based on the patient's level of oral intake: 0, requiring continuous decompression; 1, no oral intake; 2, liquid or enteral nutrition; 3, oral intake of soft solids, low-residue diet, or full diet with symptoms of stricture; and 4, oral intake of soft solids, low-residue diet, or full diet without symptoms of stricture.

2.3. Stents and implantation procedure

The stenting procedure followed the Mini-Guidelines for Safe Placement of Colonic Stents [4]. Two types of SEMSs were used, namely the WallFlex enteral colonic stent (Boston Scientific

Corporation, Natick, MA, USA) or the Niti-S enteral colonic stent (Taewoong Inc., Gimpo, South Korea). The stenosing lesion was stented using a combined endoscopic and fluoroscopic approach, requiring a mixed team of endoscopists and surgeons. Using an endoscope, a guide wire was introduced across and beyond the stenosed or obstructed segment. The SEMS was inserted through the endoscope over the guide wire and deployed in place (Fig. 1).

3. Results

Of the 22 patients with malignant colorectal obstruction who received SEMS placement in our hospital between March 2013 and December 2016, 13 received palliative treatment, while 9 patients received bridge-to-surgery therapy. The sample of 13 patients reviewed included 8 males (61.5%) and 5 females (38.5%) aged 59–87 years (median age, 80.1 years) (Table 2). A WallFlex enteral colonic stent was used in 10 patients, while a Niti-S enteral colonic stent was used in the other 3 patients.

The tumor was located in the left colon in 38.5% of patients, in the rectum in 38.5% of patients, and in the right colon in 23% of patients. Advanced colorectal cancer was noted in 7 cases (63.6%), while early-stage colorectal cancer was noted in 4 cases (36.4%). Over the course of the study period, death occurred in 9 cases (81.8%).

The mean CROSS score was 0.92 before stenting and 3.92 after stenting. Patients resumed oral intake meal at a median of 2.1 days after SEMS. A total of 4 patients received chemotherapy (30.8%) after stenting, with no major adverse events except stent migration.

Stent patency varied between 1 and 34 months, with a median of 7.6 months, and was maintained until death or end of follow-up in 69.2% of patients.

The following adverse effects related to colonic stent implantation occurred: re-occlusion (4 cases, 30.8%), stent migration (1 case, 7.7%), and pain with tenesmus (2 cases, 15.4%). Serious complications such as perforation, bleeding, incontinence, or fistula were not observed.

Among the subgroup of 4 patients that had re-occlusion after SEMS placement (3 males, one female; median age, 78 years)



Fig. 1. Postoperative radiograph in a patient who underwent self-expanding metal stent insertion as palliative treatment for malignant colorectal obstruction. The stenosing lesion was stented via a combined endoscopic and fluoroscopic approach.

Table 1
The ColoRectal Obstruction Scoring System (CROSS).

Level of oral intake	Score
Requiring continuous decompressive procedure	0
No oral intake	1
Liquid or enteral nutrient	2
Soft solids, low-residue, and full diet with symptoms of stricture*	3
Soft solids, low-residue, and full diet without symptoms of stricture*	4

Japan colonic stent safe Procedure Research Group.

Symptoms of stricture contain abdominal pain/cramps, abdominal distension, nausea, vomiting, constipation, and diarrhea which are related to gastrointestinal transit.

Table 2

Overview of patients who underwent self-expandable metal stent (SEMS) placement as palliative treatment for malignant colorectal obstruction.

Age (years)	sex	Tumor location	Stage	Stent	Stent size	Chemotherapy before SEMS	Complication	Stent patency (months)	CROSS score (pre)	CROSS score (post)	Days to oral intake after SEMS	Clinical course
81	female	Descending colon	IV	Wall Flex	22×60	none	none	34	1	4	1	alive
80	male	Ascending colon	IIla	Wall Flex	22×60	none	re-occlusion	17	1	4	1	dead
59	male	Rectum (Rs)	IV	Wall Flex	22×60	Chemotherapy after SEMS CapeOX	re-occlusion	10	1	4	1	alive
87	male	Descending colon	IIla	Wall Flex	22×60	none	re-occlusion	3	1	4	1	alive
87	male	Descending colon	IIla	Wall Flex	22×60	none	none	3	0	4	2	dead
72	female	Rectum (Rs)	IV	Wall Flex	22×90	AVA+FOLFOX	none	1	1	4	3	dead
87	male	Sigmoid colon	II	Niti-S	22×80	none	none	10	1	4	3	dead
75	male	Transverse colon	IV	Wall Flex	22×60	AVA+ FOLFOXIRI	none	8	1	4	1	dead
86	female	Sigmoid colon	IV	Wall Flex	22×60	none	re-occlusion	11	1	4	6	dead
86	female	Rectum (Ra)	IIla	Wall Flex	22×60	none	none	11	1	4	1	dead
83	female	Transverse colon	IV	Wall Flex	22×90	none	none	6	1	3	3	dead
79	male	Rectum (Ra)	IV	Niti-S	22×120	AVA+CapeOX	migration	12	1	4	2	alive
79	male	Rectum (Ra)	IV	Niti-S	22×120	AVA+CapeOX	none	1	1	4	2	dead

Abbreviations: AVA, bevacizumab CapeOX, chemotherapy regimen involving capecitabine and oxaliplatin; CROSS, ColoRectal Obstruction Scoring System; FOLFOX, chemotherapy regimen involving 5-fluorouracil, folinic acid, and oxaliplatin; FOLFOXIRI, chemotherapy regimen involving FOLFOX and irinotecan.

(Table 3), stent patency was maintained for a median of 10.3 months, and stent failure could be divided into early stage (within 3 months) and late stage (later than 11 months). The median follow-up interval was 1.3 months; however, one patient was not followed-up. Emergency management such as colostomy had to be performed in almost all patients who had re-occlusion.

4. Discussion

Colorectal cancer is among the most common malignant diseases, and malignant colorectal obstruction has been reported in 7%–29% of patients with colorectal cancer [5]. Most acute colorectal obstructions are believed to be due to cancer, and, in the general population of patients with colorectal cancer, approximately 20% of cases across all age groups present with symptoms of acute obstruction [6,7]. However, compared to non-emergent surgery or surgery for non-obstructive conditions, emergency surgical decompression is associated with both higher operative mortality and poor overall survival [8,9]. Moreover, stoma surgery such as colostomy decreases quality of life.

On the other hand, SEMS placement can alleviate malignant colonic obstruction and avoid emergency decompression surgery.

SEMS placement is less invasive than surgery, which is why, from its first report in literature, it has been used for palliative treatment of obstructive colorectal cancer with the aim to avoid surgery in such high-risk patients [1,2]. Patients treated with colonic stenting experienced rapid improvement in symptoms, and there is significant evidence that SEMS-based treatment is effective and associated with low morbidity and mortality [10]. SEMS placement is recognized as a very important therapeutic strategy to maintain quality of life, which is especially relevant in palliative care. In fact, our patients showed significant improvement in the mean CROSS score, from 0.92 before stenting to 3.92 after stenting. To our surprise, the patients resumed oral intake at a median of 2.1 days after SEMS placement. These findings confirm that SEMS placement is indeed effective from this perspective, in agreement with the clinical indication that such a procedure is the preferred treatment for palliation of malignant colonic obstruction, which represents a strong recommendation supported by high-quality evidence in the clinical guidelines put forth by the European Society of Gastrointestinal Endoscopy [3].

However, a large prospective study reported that short-term complications did not occur more often in patients who underwent palliative surgery, while late complications were more

Table 3

Patients with re-occlusion after self-expandable metal stent placement as palliative treatment for malignant colorectal obstruction.

Age (years) Sex	Tumor location	Stage	Patency (months)	Follow-up (months)	Complaint	Therapy	Clinical course
80 male	Ascending colon	SEN1HOPO stage IIIa	17	None	difficulty in passing stool	Emergency cecostomy	death after 17 months
87 male	Descending colon	SEN1HOPO stage IIIa	3	1	vomiting	emergency stent-in-stent	death after 3 months
86 female	Sigmoid colon	SSNOHOPO stage II	11	2	abdominal pain	Emergency sigmoid colostomy	death after 2 months
59 male	Rectum (Rs)	SEN1H2M1 (lung) stage IV	10	1	None colonoscopy	Anterior resection of rectum	alive for 1.5 years with chemotherapy

frequently noted in patients who received palliative SEMS placement [11]. Stent-related complications mainly included colonic perforation (10%), stent migration (9%), and re-obstruction (18%) [11]. In our palliative patients, the adverse effects related to colonic stent placement included re-occlusion (30.8%), stent migration (7.7%), and pain with tenesmus (15.4%), but no complications such as perforation, bleeding, incontinence, or fistula were noted. Moreover, stent patency varied widely, ranging between 1 and 34 months, with the average of 7.6 months (235.6 days). Patients with re-occlusion (4 cases) maintained stent patency for the average of 10.3 months (319.3 days). In palliative patients with malignancy, re-obstruction is expected. Indeed, the main cause of re-obstruction in our patients was the progression of the neoplastic process, which resulted in stent blockage or lumen formation.

At admission for re-obstruction, median stent patency in the palliative setting has been reported to vary widely, ranging between 55 days and 343 days [12,13]. In patients receiving SEMS placement, median stent patency was reported at 106 days (range, 68–288 days) [14]. Re-obstruction may occur due to early or late stent failure. In our patients, the overall re-obstruction rate was 30.8%, which is higher than the value reported in a previous review (18%), while stent patency (319.3 days) was similar to the value reported in the same review (between 55 and 343 days). While around 80% (range, 53–90%) of patients are said to maintain stent patency until death or end of follow-up [3], only 69.2% of our patients did so.

We believe the discrepancy in re-obstruction rate is related to the follow-up interval and the use of routine examinations such as simple abdominal X-ray. In our patients with re-occlusion, the median follow-up interval was 1.3 months, and one patient was not followed-up. Almost all these patients had to undergo emergency treatment such as colostomy. While the follow-up interval was strict, we did not perform the examination if the patient had no symptoms. We performed abdominal computed tomography in patients with acute symptoms (Table 3). We would like to emphasize that routine examinations such as simple abdominal X-ray should be performed, and we should never fail to follow our patients every few months after SEMS placement, to improve the outcome of re-intervention or surgery in the event that SEMS re-obstruction occurs [15]. Simple X-ray can help confirm the status of stool, including amount and position of stool in the vicinity of the stent.

In patients with early-stage re-obstruction, endoscopic re-intervention (stent-in-stent) is likely to provide good outcomes. Indeed, it is reported that re-obstruction could be managed endoscopically with success, and stent replacement or re-opening via a stent-in-stent procedure have been described as first-choice strategies, with satisfactory results (clinical success, 75%–86%) [3,14,16]. Most importantly, it is necessary to establish a logistic framework with a mixed team of endoscopists and surgeons to support re-intervention and surgery.

Our findings indicate that, while it is necessary to recognize that colorectal stenting is a valid therapeutic option, palliative SEMS placement is likely to result in re-occlusion within a year of stenting [14,16,17]. Therefore, such patients should be carefully followed-up with examination such as X-ray, computed tomography, and colonoscopy even if no symptoms are present. Both the surgeon and the endoscopist should assess the patient's symptoms and signs independently after SEMS placement and then communicate and confer with each other regarding the findings. In this study, the patients

were followed-up with colonoscopy at least once a year, computed tomography once every three months, and X-ray monthly. This follow-up strategy facilitated the diagnosis of patients with early-stage re-obstruction. We recommend vigilant monitoring of patients who received SEMS placement for palliation of malignant colorectal obstruction.

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