

Stent Endoprosthesis for Obstructing Colorectal Cancers

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PURPOSE: Purpose of this study was to assess stent endoprosthesis for colorectal cancer (SECC) as an adjuvant to operative preparation in patients with obstructing colorectal cancers. **METHODS:** A self-expanding stainless steel stent was inserted in 15 patients with obstructing colorectal cancers under colonoscopic observation and fluoroscopic control. Following successful SECC, the colon was mechanically prepared using polyethylene glycol. Definitive surgical treatment then was undertaken. **RESULTS:** All 12 patients in whom the stent had been successfully placed recovered intestinal transit and tolerated mechanical preparation. A satisfactory preparation was confirmed during the operation. Two perforations and one dislocation were encountered. **CONCLUSION:** SECC is a new method for operative preparation of patients with obstructing colorectal cancers, which may reduce morbidity and mortality associated with this difficult problem. [Key words: Colorectal neoplasm; Intestinal obstruction; Stent; Endoprosthesis; Endoscopy; Operative Preparation]

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Mechanical ileus is a common complication of advanced colorectal cancer, particularly if the lesion is located in the left colon. Because there is no effective conservative therapy for mechanical ileus, these patients must undergo emergency surgery.¹ Because of insufficient preoperative preparation, the incidence of postoperative complications in this group is high. Presence of a previously unidentified, proximal colon cancer also may present a problem in these patients. To circumvent these issues, we have used a metallic stent that was inserted through the obstruction under colonoscopic and fluoroscopic control. This technique, which has been named "stent endoprosthesis for colorectal cancer (SECC)," has been used in the treatment of 15 patients with obstructing colon cancers. In this report, the use and complications of this technique and maneuvers required for insertion of the stent are described.

MATERIALS AND METHODS

From November 1993, SECC were placed in 15 patients (7 women and 8 men) who had obstructing colon cancers (mean age, 64 ± 10 (range, 46-79) years). All of these patients had symptoms of colonic obstruction. Barium enema or colonoscopy was used to make the diagnosis of obstruction left colon cancer. The colon proximal to the obstruction was examined using a barium enema, two to three days following successful decompression by SECC (Fig. 1). A mechanical preoperative preparation of the colon was undertaken with polyethylene glycol. Surgical resection of the obstructing lesion then was performed.

SECC SYSTEM

A self-expanding stainless steel Z-stent and an exclusive delivery system were used. The outer diameter of the double stent was 30 (length, 50) mm. The anal side of the stenosis was marked with a metallic clip under colonoscopic vision. A guide wire then was passed through the channel of the endoscope and inserted into the stricture (Fig. 2). The sheath of the delivery system was passed over the guide wire. Under fluoroscopic control, the compressed stent was passed over the guide wire and delivered through the sheath with a pusher. The stent was expanded, fixed in position (Fig. 3).

RESULTS

Of the 15 patients with attempted SECC, the stent was successfully placed in 12 (80 percent) (Table 1). All patients complained of constipation and a sense of fullness. Two patients vomited, but SECC insertion failed for those patients. Case 4 had a severe obstruction that did not permit gas to pass and showed air fluid levels on x-ray findings; therefore, insertion of the stent failed. No patient showed signs and symptoms of shock. This was because of recovery of intestinal transit with defecation following SECC in all patients in whom the stent had been placed. Symptoms of obstruction improved in all patients. The

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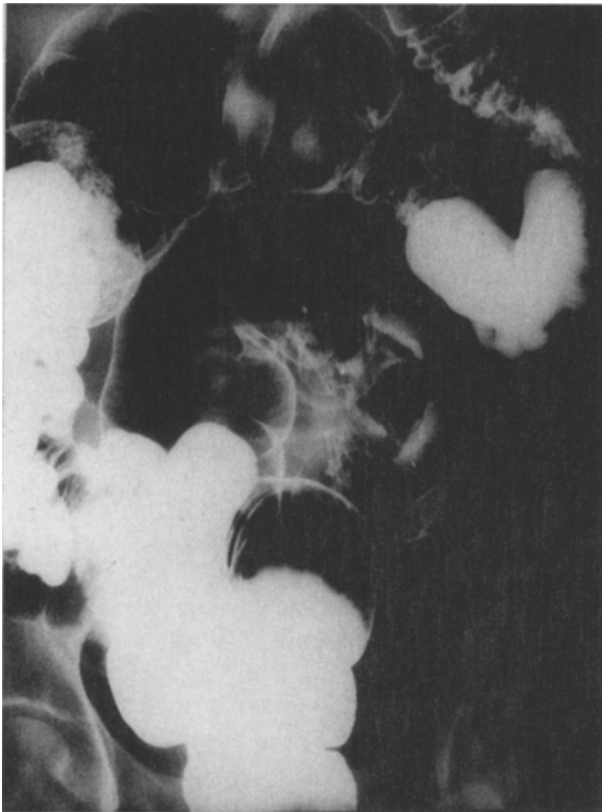


Figure 1. Barium enema examination of the colon proximal to the stricture.

polyethylene glycol for mechanical preparation was well tolerated. Surgery was undertaken between 2 and 16 (mean, 5.8) days following stent placement. A satisfactory preparation was confirmed during the operation in all cases. During operation, all stented colons maintained good circulation and showed neither necrosis nor deformity, except one case with perforation. Pathologically, inserted stents were located in the proper muscle layer of subserous layer. Microscopic perforation did not occur, except for one macroscopic perforation case. Hartmann's resection was performed in two patients in the successful insertion group, because one patient was of an advanced age and had lower rectal cancer and, in the other patient, the stent dislocated during the operation. Anastomosis could be done safely in the others. One patient had a postoperative leak, and one had a paralytic ileus. There was no obvious relationship between these two complications and the SECC.

There were three patients in whom insertion was unsuccessful. In one patient, the delivery system could not reach the target because the pathway to the tumor, which was located in the descending colon, could not be shortened using endoscopic techniques.

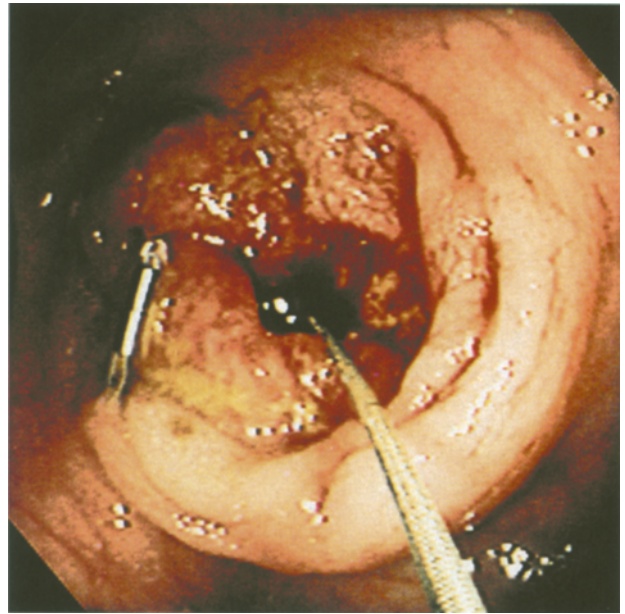


Figure 2. Endoscopic photograph. The anal side of the stenosis was marked with a metallic clip under colonoscopic vision. A guide wire was passed through the channel of the endoscope and inserted into the stricture.

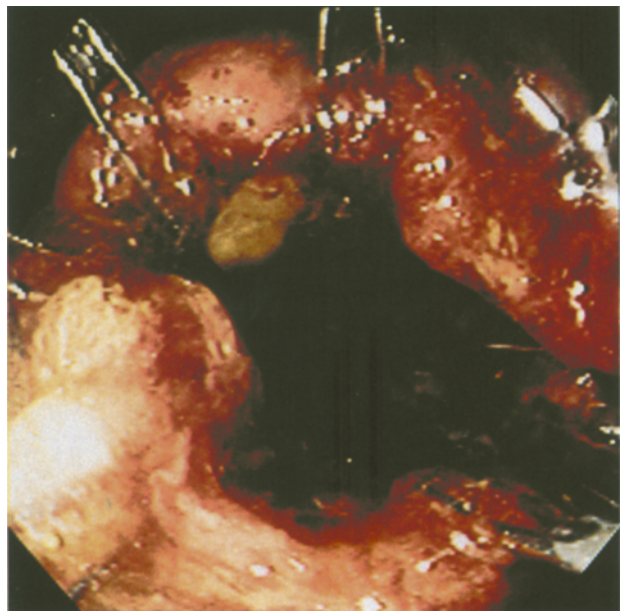


Figure 3. Endoscopic photograph. A metallic stent was expanded and fixed in position.

In the other two patients, the guide wire could not be passed through the stricture.

The most severe complication of SECC was perforation, which occurred during insertion of the guide in one case and following successful stent insertion in another. Remodeling stent used in the latter patient

Table 1.
Clinical Results

Case	Tumor Location	Symptoms	Stent Insertion	Duration of Stenting (days)	Operation	Complication of Stent	Operative Complication
1	Rectum	C, M, S	Successful	16	LAR	—	—
2	Sigmoid	A, C, V	Failed	0	Hartmann's	Perforation	—
3	Sigmoid	A, C, S	Successful	2	LAR	—	—
4	Sigmoid	C, S, V	Failed	0	Hartmann's	—	—
5	Sigmoid	C, M, S	Successful	7	Sigmoidectomy	—	Leakage
6	Rectum	C, S	Successful	5	Miles	—	—
7	Sigmoid	C, S	Successful	7	Sigmoidectomy	—	—
8	Sigmoid	C, D, S	Successful	3	Sigmoidectomy	—	—
9	Descending	A, C, S	Failed	0	PR	—	—
10	Sigmoid	C, M, S	Successful	6	PR	—	—
11	Sigmoid	A, C, D, S	Successful	5	Sigmoidectomy	Perforation	—
12	Rectum	C, M, S	Successful	4	AR	—	—
13	Rectum	C, S	Successful	7	Hartmann's	—	Ileus
14	Rectum	C, S	Successful	3	Hartmann's	Dislocation	—
15	Rectum	C, S	Successful	5	LAR	—	—

A = abdominal pain; C = constipation; D = diarrhea; M = melena; S = sense of fullness; V = vomiting; LAR = low anterior resection; PR = partial resection; AR = anterior resection. Rate of insertion, 12/15 = 80 percent.

had greater expanding power and less flexibility than that of the typically used stent. Perforation was not detected until the operation because the patient was asymptomatic.

The other severe complication was dislocation of the stent. In this patient, a covered stent was used to protect the intestinal wall. However, because fixation of the covered stent was inadequate, it dislocated to the anal side of the lesion during the operation.

Other minor complications included anal bleeding and abdominal discomfort. All patients had a small amount of anal bleeding on the first day, but this resolved within a few days in the majority of cases. One-half of the patients complained of abdominal discomfort, which was mild, and did not require special treatment.

DISCUSSION

The first use of a steel stent for an inoperative malignant rectal stricture was reported in 1991 by Dohmoto.² Itabashi *et al.*³ reported the application of steel stents in two patients with nonresectable, recurrent neoplasms, in whom palliative colostomy was avoided. A stent also has been used before surgery in another two cases.⁴ Our SECC system is similar to these previously described methods but involves colonoscopic application. For this reason, it is more simple and direct. Without colonoscopy, the guide wire could not be passed through the severe stricture in patients with symptomatic obstructions.

Stent insertion has significant advantages over other commonly used devices. A nasogastrintestinal tube is not effective for lower colorectal obstructions,¹ and an anal decompression tube confines the patient to the hospital for 3 to 14 days and may not relieve the symptoms.^{5,6} Patients who have undergone SECC can ambulate freely, which improves their preoperative quality of life.

Indication for this technique was a resectable malignancy located in the left colon or rectum in patients with subjective symptoms of colonic obstruction. Our experience showed significant advantage of SECC, which included decompression proximal to the stricture, ability to mechanically prepare the colon, ability to study the colon proximal to the lesion using barium enema, avoidance of an emergency operation, and improvement of postoperative quality of life. The most severe complication was perforation, the incidence of which can be decreased by careful application of suitable stent. The minor complications would not prohibit the application of this technique.

Operative preparation for obstructing colorectal cancers is difficult. However, it is important because it is closely related to postoperative morbidity and mortality. SECC improves operative conditions, because the colon can be prepared, and the surgery is semielective. More experience with this technique and development of advanced devices will make the SECC a common procedure for treatment of obstructing left side colon and rectal cancers.

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