

Original Article

The Role of Colonic Stents in Obstructive Metastatic Colorectal Cancers

Hua-Che Chiang
Wen-Chien Ting
Willian Tzu-Liang Chen

Division of Colorectal Surgery, Department
of Surgery, China Medical University
Hospital, Taiwan

Key Words

Colonic stent;
Colon obstruction

Purpose. Self-expandable metallic stents (SEMS) have been widely used in obstructive lesions. They are an alternative treatment for obstructive colorectal tumors. In this article, we retrospectively review our experience with placement of colonic stents for palliative treatment of obstructive metastatic colorectal cancers and inoperable colorectal cancers.

Methods. From March 2004 to March 2007, we inserted SEMS in 15 patients. A retrospective chart review was undertaken at the China Medical University Hospital. For all patients, surgical treatment was not considered initially or the patients refused surgery. We analyzed the technical and clinical success rates of stent placement. All patients were characterized in terms of age, localization of tumor, complications, morbidity and mortality, and the necessity for further interventions.

Results. Our subjects included eight males and seven females, with a mean age of 66 years (range 42-94 years). Sites of the lesion included six upper rectum, four rectosigmoid junction, three sigmoid colon, one descending colon, and one splenic flexure of colon. The stents were successfully implanted in 12 of the 15 patients and bowel obstruction relieved in all patients; the technical success rate was 80% and clinical success rate was 60%. Two patients with stent related perforations required emergency operation on the 4th or 18th day after stent implantation. The mean survival time (stent implantation to death) of the ten stage IV patients (n = 10) was 7 months (range 1-16months). Four patients had complications. In general, there was no stent-related mortality.

Conclusions. Self-expandable metallic stents in patients with malignancy-induced colorectal obstruction is technically feasible, but it has higher morbidity rate in our study. Colonic stent is an alternative option in treatment of obstructed colorectal malignancy, but is not encouraged for every patient. When use of SEMS, surgeon or gastroenterologist should evaluate the clinical benefits and cost effectiveness for the patient.

[J Soc Colon Rectal Surgeon (Taiwan) 2009;20:13-19]

Obstruction of the large bowel frequently results from pelvic neoplasms, including colorectal, ovarian, prostate, and bladder cancers. In the past, the most common treatment for these diseases was resection of the tumor or a diverting colostomy. In cases with recurrent disease, resection is not always

possible. Surgery is performed for palliation, rather than curative intent. Moreover, patients who present with an acute obstruction of the large bowel are frequently in a poor general condition, and these cases are associated with higher surgical mortality and morbidity rates.

Received: December 25, 2008.

Accepted: March 2, 2009.

Correspondence to: Wen-Chien Ting, Division of Colorectal Surgery, Department of Surgery, China Medical University Hospital, Taiwan, No. 2, Yu-Der Road, Taichung 404, Taiwan. Tel: +886-9-6620-2266, +886-4-2205-2121-1638; Fax: +886-4-2202-9083

Recent reports indicate that a self-expandable metallic stent (SEMS) can successfully be used as an alternative procedure in the treatment of obstructive colorectal tumors. The self-expandable metallic stent, which was first described by Dohmoto et al in 1990, was initially used for decompression of obstructions in metastatic colorectal cancer patients as part of palliative care regimen.^{1,2} In 1994, Tejero et al reported the use of SEMS in obstructive colorectal cancers as a bridge to surgery for possible curative resection of colorectal cancers.³ Since then, colonic stents have been used for both palliation of obstructed metastatic colorectal cancers as well as a bridge in patients who will receive curative resection of obstructive colorectal tumors.⁴⁻⁷

Currently, SEMS is used in Taiwan with some cases reported in the published literature. The aim of this study is to review our experience with placement of colonic stents for palliative treatment of obstructive metastatic colorectal cancers and inoperable colorectal cancers.

Materials and Methods

A retrospective chart review of patients was performed at the Department of Colorectal Surgery of China Medical University Hospital, Taichung, Taiwan. From March 2004 to March 2007, a total of 15 patients received SEMS. Indications for insertion of SEMS included poor general health in patients who were not candidates for surgery, and those who refused to have surgery due to an incurable disease. All patients displayed clinical symptoms of colon obstruction. Data, including gender, age, type of disease, site of obstruction, technical and clinical success of stent placement, and complications associated with the procedure, were recorded. All patients underwent regular follow up until the patient expired.

Self-expandable metallic stent surgical procedure

A water-soluble contrast enema examination was performed in all cases. This procedure allowed the endoscopist to clearly understand, before the proce-

dure, the stricture location, length, and expected difficulties associated with tortuous bowel segments.

Each patient was placed in the left decubitus or supine position and kept under intravenous general anesthesia. A double channel colonoscope was then advanced to the site of the lesion. When the lesion was identified, a guide wire was passed through the stricture under colonoscopic and fluoroscopic guidance (Figs. 1 and 3). The catheter was inserted after the guide wire was passed successfully past the lesion. Contrast medium was injected to determinate the length of the obstructive lesion. The stent was then inserted along the guide wire (Fig. 1). Finally, a colonoscope was re-inserted to confirm the patency of the stent (Fig. 2). A plain radiograph of the abdomen was taken one day after stent placement to evaluate the expansion of the stents.

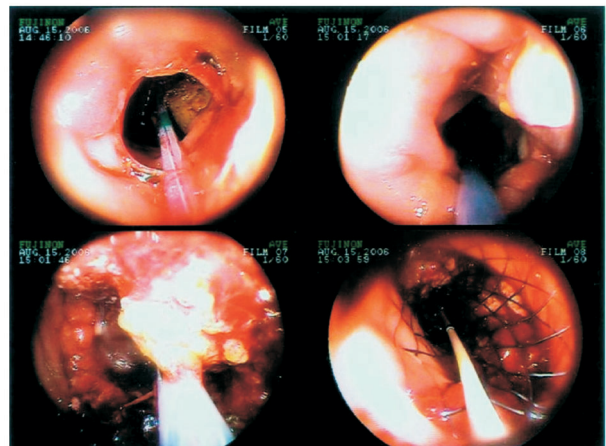


Fig. 1. Stent placing through the scopy

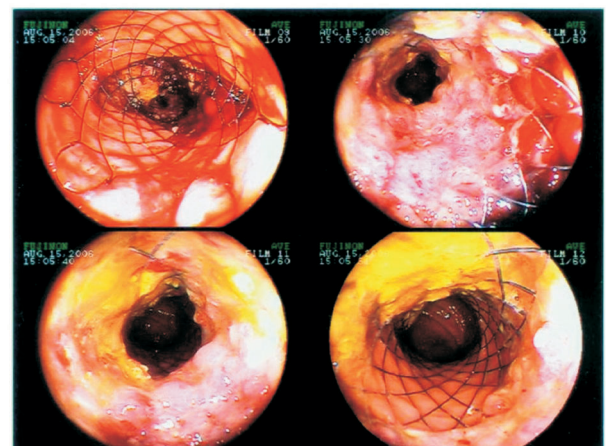


Fig. 2. Expansion of SEMS

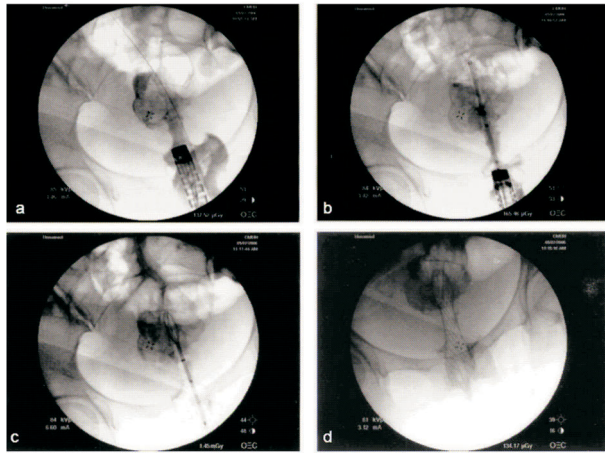


Fig. 3. Procedure under fluoroscopic guidance
 1. Contrast for the tumor length: a~b
 2. guidewire was passed through the stricture and expanded: c~d

Definition of successful stenting

The technical success of the procedure was defined as deployment of the stent across the entire length of the stricture, patency of the stent, and clinical and radiologic relief of the obstruction. Clinical success was defined as the patient's ability to defecate and relief of obstructive symptoms without complication.

Results

Of the 15 patients, there were 8 males and 7 females, with a mean age of 66 years (range, 42-94 years). Sites of the lesion included the upper rectum (n = 6), rectosigmoid junction (n = 4), sigmoid colon (n = 3), descending colon (n = 1), and one splenic flexure of the colon (n = 1). The stents were successfully implanted in 12 of 15 patients (80.0%), yielding a clinical success rate of 60.0% (9/15). The mean operative time of the 12 technically successful cases was 70 minutes (range, 20-210). One patient who required two stents was in surgery 210 minutes. Port-A implantation was also performed in 2 patients (operative times, 85 min and 125 min, respectively). The mean operative time in cases where only a stent was placed (n = 9) was 48 minutes (range, 20-90). Of these 9 pa-

tients, 1 needed balloon dilatation which extended the duration of surgery to 90 minutes.

In 3 patients we were unable to insert the guide wire. In the first patient, we failed to insert the guide wire due to an anatomic reason. In the second patient, we could not pass the guide wire past the splenic flexure obstruction due to a sharp splenic flexure angle. In the third case, which was a patient with ovarian cancer, there was local disease recurrence and invasion into the upper rectum, causing colonic obstruction. The guide wire was unable to pass through the obstruction. All 3 were treated with diverting stoma soon after stent failure.

Four complications occurred after stenting. Two patients with stent-related perforations required emergency surgery on day 4 in one patient and on day 18 in the other patient after stent implantation. Movement of the stent out of the rectum with passage through the anus was observed in 1 patient at 3 months after stenting. The patient died 20 days after that episode in a hospice care unit. The mean survival time (stent implantation to death) for the 10 stage IV patients was 7 months (range, 1-16 months). The mean survival time of 6 patients who did not receive chemotherapy was 5 months. The mean survival time of 4 patients with chemotherapy treatment was 10 months. Two stage IV patients with chemotherapy were still alive at 9 and 12 months. One of them had another obstruction 6 months after stenting, and Hartmann's procedure was performed. In this series, except for 1 patient who died of pneumonia, all of the other patients died from disease progression. Patient details are listed in Table 1. There was no stent-related mortality.

Discussion

According to the literature, most common indications for the use of SEMS are as a bridge to surgery in patients with obstructed colorectal cancer and for palliative treatment of patients with obstructive disease in whom curative resection is an option^{8,9} Self-expandable metallic stent implantation in our study is mainly for palliation treatment of colorectal cancer and patients with inoperable metastatic colorectal malignancy.

Table 1. Patients profile

NO	Sex	Age	Diagnosis	Technical successful	Clinical successful	Complication	Surgery	Survival time (months)
1	F	90	Upper rectal ca	No	No		Yes, colostomy	
2	F	64	Ovary ca with local recurrence and colon obstruction	No	No		Yes, colostomy	
3	M	90	Splenic flexure ca, dementia	No	No		Yes, colostomy	
4	M	58	RS colon ca; liver cirrhosis, Child C	Yes	Yes	No	No	13 months
5	M	62	Recurrent RS colon ca, carcinomatosis	Yes	Yes	No	No	13 months
6	M	52	S-colon ca with carcinomatosis	Yes	Yes	No	No	11 months
7	F	48	Recurrent rectal ca, carcinomatosis	Yes	No	Severe pain, RS junction perforation (18th day after stent)	Yes, Hartmann's procedure	16 months
8	M	94	S-colon ca	Yes	No	RS junction perforation, 4 th day after stent	Yes, Hartmann's procedure	13 months
9	F	46	Rectal ca with multiple liver meta	Yes	Yes	No	No	6 months
10	M	64	S-colon ca. with multiple liver meta	Yes	Yes	No	No	9 months
11	F	77	RS junctional colon ca, ECOG 4, Old CVA	Yes	Yes	No	No	7 months
12	F	55	Cervical ca with local recurrence and rectum obstruction, carcinomatosis	Yes	Yes	No	No	3 months
13	F	90	Rectal cancer with lung metastasis	Yes	Yes	Dislocation	No	3 months
14	M	42	D-colon ca, carcinomatosis	Yes	Yes	No	No	Alive at 9 months
15	M	53	RS junctional colon ca with carcinomatosis	Yes	No	Re-obstruction 6 months later	Yes, Hartmann's operation	Alive at 6 months

Palliative treatment for colon obstruction due to malignancy is comprised of surgery (including palliative resections, colostomy, or intestinal bypass) and stent therapy.⁴⁻⁷ If there is no contraindication to surgery, palliative tumor resection is the better method of choice.¹⁰⁻¹² When palliative surgery is contraindicated, internal bypass using colonic stent can be an option without increasing the risk of morbidity or mortality. In addition, many studies have demonstrated that placement of stent in patients with inoperable disease have much lower morbidity (< 25% vs. < 50%, respectively) and mortality (< 1% vs. < 10%, respectively) in comparison with surgical intervention.^{8,9,11-14} Stent implantation provides a comparable prognosis and a favorable advantage for avoiding a colostomy. Also, the implantation of stent is a simple

procedure, and is associated with a greater quality of life.¹⁵⁻¹⁹ However, our study revealed a much higher morbidity (4/15, 33.3%). None of the benefits that had been published in the literature were demonstrated in our preliminary study.

The reported technical and clinical success rates of this procedure are 75.0% to 100.0% and 84.0% to 100.0%, respectively.²⁰⁻²² Our study showed a comparable technical success rates (80.0%). However, only 60.0% (9/15) of our patients were considered a clinical success. In our series, we failed to insert the guide wire in 3 patients who had anatomic difficulties. In the first 2 cases we encountered sharp angulation of the splenic flexure and rectosigmoid junction, and in the third case we were unable to inserting guide wire through obstruction site. Khot et al summarized that

the most common reason for stent failure was an inability to place a guide wire across the lesion.²⁰ Another source of difficulty in SEMS implantation is lesions located high up in the colon, particularly those lesions found in the splenic flexure.²³

Stent migration is another major complication associated with the stent procedure, with a reported incidence of 10% to 12%.^{20,21,23} In our study, no stent migration was observed, but an unusual case of stent dislocation out of the rectum and through the anus was observed. This occurred at the 3 months after stent placement. No further procedure was performed due to the poor general condition of the patient. Other complications related to stent placement including re-obstruction, perforation, bleeding, and pain.²⁰⁻²² Obstruction recurred after stenting in patients who received a stent that was too short to bypass the obstruction area. Repeat obstruction also was encountered in cases where poor placement of the stent resulted in inadequate upper margin. One patient experienced repeat obstruction 6 months after stenting due to tumor-related ingrowth. Other than surgery, alternative procedures can be used for tumor ingrowth obstructions, such as ablation of the obstruction and placement of an addition stent over the previous stent.²⁴ In our study, 2 patients suffered from stent-related perforation. The diagnosis of perforation was made on day 4 and day 18 after stent implantation, respectively. During emergency laparotomy, it was discovered that the perforation occurred at rectosigmoid junction in both cases. Based on our experience, colonic perforation should be highly suspected in the patient who complains of severe abdominal pain after stenting.

Most authors have reported SEMS implantation within the left colon, but only a few reports described successful SEMS implantation within the right colon.^{15-19,23,25,26} In our limited experience, we did not place SEMS in the right colon in any of our patients. However, this may be due to our small patient population.

With regard to the cost effectiveness of SEMS, one SEMS costs approximately 66,000 NT dollars and the average cost for a stoma bag for one year is about 125,000 NT dollars. On this basis alone, it appears as though SEMS is more cost-effective. However, in fact, this consideration depends on whether any com-

plication occurs intraoperatively or postoperatively.

In this study, we demonstrated an acceptable technical success rate with regard to stent placement, but a much lower clinical success rate was observed. In addition, a higher morbidity rate was observed in our study compared with the published literature. However, this may be due to the limited number of cases at our center. Other disadvantages to our study include a lack of comparison with surgically treated patients, no evaluation of quality of life after stenting, and a comparison of the cost of stenting with surgery.

Conclusion

In our early and limited experience we demonstrated that SEMS placement in patients with malignancy-induced colorectal obstruction is technically feasible, but is associated with a high rate of morbidity. Although colonic stent can be used as palliative treatment and an alternative procedure to surgery, the only benefit is to avoid either permanent or temporary colostomy.

In conclusion, colonic stent for palliative treatment of obstructive metastatic colorectal malignancy is not encouraged for every patient. All surgeons and gastroenterologists should evaluate the clinical benefits and cost effectiveness when using colonic stent. Until large prospective randomized trials have proved the superiority of the colonic stent, it should not be routinely applied for palliative treatment of obstructive metastatic colorectal malignancy.

References

1. Dohmoto M, Rupp KD, Hohlbach G. Endoscopically-implanted prosthesis in rectal carcinoma. *Dtsch Med Wochenschr* 1990;115:915.
2. Spinelli Iy, Dal Fante M, Mancini A. Selfexpanding mesh stent for endoscopic palliation of rectal obstructing tumors: a preliminary report. *Surg Endosc* 1992;6:72-4.
3. Tejero E, Mainar A, Fernandez L, Tobio R, De Gregorio MA. New procedure for the treatment of the colorectal neoplastic obstructions. *Dis colon Rectum* 1994;37:1158-9.
4. Adler DG, Baron TH. Endoscopic palliation of colorectal cancer. *Hematol Oncol Clin North Am* 2002;16:1015-29.

5. Xinopoulos D, Dimitroulopoulos D, Tsamakidis K, Apostolikas N, Paraskevas E. Treatment of malignant colonic obstructions with stent and laser. *Hepatogastroenterol* 2002; 49:359-62.
6. Harris GJC, Senagore AJ, Lavery IC, Fazio VW. The management of neoplastic colorectal obstruction with colonic endoluminal stenting devices. *Am J Surg* 2001;181:499-506.
7. Fazio VW. Indications and surgical alternatives for palliation of rectal cancer. *J Gastrointest Surg* 2004;8:262-5.
8. Keymling M. Colorectal stenting. *Endoscopy* 2003;35:234-8.
9. Lee YM, Law WL, Chu KW, Poon RT. Emergency surgery for obstructing colorectal cancers: a comparison between right-sided and left-sided lesions. *J Am Coll Surg* 2001;192: 19-25.
10. Baron TH, Rey JF, Spinelli P. Expandable metal stent placement for malignant colorectal obstruction. *Endoscopy* 2002; 34:823-30.
11. Rosen SA, Buell JF, Yoshida A, Kazsuba S, Hurst R, Michelassi F, Millis JM, Posner MC. Initial presentation with stage IV colorectal cancer: how aggressive should we be? *Arch Surg* 2000;135:530-5.
12. Makela J, Haukipuro K, Laitinen S, Kairaluoma MI. Palliative operations for colorectal cancer. *Dis Colon Rectum* 1990; 33:846-50.
13. Liu SK, Church JM, Lavery IC, Fazio VW. Operation in patients with incurable colon cancer: is it worthwhile? *Dis Colon Rectum* 1997;40:11-4.
14. Joffe J, Gordon PH. Palliative resection for colorectal carcinoma. *Dis Colon Rectum* 1981;24:355-60.
15. Park JJ, Del Pino A, Orsay CP, Nelson RL, Pearl RK, Cintron JR, Abcarian H. Stoma complications: The Cook County Hospital experience. *Dis Colon Rectum* 1999;42:1575-80.
16. Nugent KP, Daniels P, Stewart B, Patankar R, Johnson CD. Quality of life in stoma patients. *Dis Colon Rectum* 1999;42: 1569-74.
17. Johnson R, Marsh R, Corson J, Seymour K. A comparison of two methods of palliation of large bowel obstruction due to irremovable colon cancer. *Ann R Coll Surg Engl* 2004;86: 99-103.
18. Bhardwaj R, Parker MC. Palliative therapy of colorectal carcinoma: stent or surgery? *Colorectal Disease* 2003;5: 518-21.
19. Xinopoulos D, Dimitroulopoulos D, Theodosopoulos T, Tsamakidis K, Bitsakou G, Plataniotis G, Gontikakis M, Kontis M, Paraskevas I, Vassilobopoulos P, Paraskevas E. Stenting or stoma creation for patients with inoperable malignant colonic obstructions? *Surg Endosc* 2004;18:421-6.
20. Khot UP, Lang AW, Murali K, Parker MC. Systematic review of the efficacy and safety of colorectal stents. *Br J Surg* 2002; 89:1096-102.
21. Sebastian S, Johnston S, Geoghegan T, Torreggiani W, Buckley M. Pooled analysis of the efficacy and safety of self-expanding metal stenting in malignant colorectal obstruction. *Am J Gastroenterol* 2004;99:2051-7.
22. Keymling M. Colorectal stenting. *Endoscopy* 2003;35:234-8.
23. Tsurumaru D, Hidaka H, Okada S, Sakoguchi T, Matsuda H, Matsumata T, Nomiyama H, Utsunomiya T, Irie H, Honda H. Self-expandable metallic stents as palliative treatment for malignant colorectal obstruction. *Abdom Imaging* 2007;32: 619-23.
24. Maetani I, Tada T, Ukita T, Inoue H, Yoshida M, Saida Y, Sakai Y. Self-expandable metallic stent placement as palliative treatment of obstructed colorectal carcinoma. *J Gastroenterol* 2004;39:334-48.
25. Meisner S, Hensler M, Knop FK, West F, Wille-Jorgensen P. Self-expanding metal stents for colonic obstruction: experiences from 104 procedures in a single center. *Dis Colon Rectum* 2004;47:444-50.
26. Ptok H, Meyer F, Marusch F, Steinert R, Gastinger I, Lippert H, Meyer L. Palliative stent implantation in the treatment of malignant colorectal obstruction. *Surg Endosc* 2006;20: 909-14.

原 著

大腸支架在阻塞性轉移性大腸直腸癌的角色

江驊哲 丁文謙 陳自諒

中國醫藥大學附設醫院 外科部 大腸直腸外科

目的 自擴式金屬支架廣泛使用在各種阻塞性病灶。對於阻塞性大腸直腸癌提供另一種治療方式。在台灣，使用的病例數較少。本文中，大腸支架使用於阻塞性、轉移性及無法手術的大腸直腸癌的姑息性療法，我們回顧性探討使用經驗。

方法 從 2004 年三月到 2007 年三月，在中國醫藥大學附設醫院共有 15 位病人使用大腸支架。我們對於他們的病例作了回顧性探討。所有的病人在開始評估時皆為不適宜手術或者病人拒絕手術。我們分析了支架置放的技術性成功率及臨床成功率。此外，所有病人的年齡、病灶位置、併發症、死亡率以及併發症後的進一步的處理方式都做了詳細的統計及分析。

結果 共有八位男性及七位女性，平均年齡為 66 歲 (從 42 到 94 歲不等)。病灶部位為上直腸 (6 位)、直腸乙狀結腸交接處 (4 位)、乙狀結腸 (3 位)、降結腸 (1 位)、大腸脾彎處 (1 位)。技術性成功率為 80% 及臨床成功率為 60%。有 2 位病人產生與支架相關的腸穿孔而需要緊急手術。有四位病人產生併發症。對於第四期病人 (10 位) 的平均存活時間為 7 個月 (介於 1 到 16 月)。整體而言，沒有與支架相關的死亡病例。

結論 自擴式金屬支架對於惡性腫瘤所引起的大腸阻塞技術上是可行的，但是它卻有著較高的併發症。自擴式金屬支架對於惡性腫瘤所引起的大腸阻塞是一種可以選擇的處理方式但不應該被鼓勵。因此，自擴式金屬支架在使用時，應該要衡量臨床上的優劣得失與經濟效益。

關鍵詞 大腸支架、大腸阻塞。