

# Preoperative Endoscopic Stent Application for Bridging or Palliative Purposes in Obstructive Left Colon and Rectal Tumors

Selçuk Kaya, Önder Altın

Department of General Surgery,  
University of Health Sciences Kartal  
Dr. Lütfi Kırdar Training and  
Research Hospital, İstanbul, İstanbul

Submitted: 15.01.2019  
Accepted: 29.01.2019

Correspondence: Selçuk Kaya,  
Kartal Dr. Lütfi Kırdar Eğitim ve  
Araştırma Hastanesi, Genel Cerrahi  
Kliniği, İstanbul, Turkey  
E-mail: selcukkaya\_36@hotmail.com



**Keywords:** Colonic decompression; obstruction; obstructive colorectal cancer; self-expanding metallic stent.

## ABSTRACT

**Objective:** The outcomes of endoscopic enteral stent applications in left colon or rectal cancers were evaluated.

**Methods:** All patients who received stent application between January 2016 and December 2017 for obstructive left colon and rectal cancers were retrospectively evaluated. Demographic data, obstructed side, indications, technical and clinical success of the procedure, and also mortality and morbidity rates were recorded.

**Results:** Stents were successfully placed in 12 (85.7%) out of 14 cases. Eight cases received stents for bridge to elective surgery, whereas four had stents for palliative purposes. In one of the palliative cases, Hartman procedure was applied due to perforation at the proximal side of the stent after 3 months. The technical and clinical success rates were 85.7% and 91.7%, respectively. There was no mortality.

**Conclusion:** Application of self-expanding metallic stent in patients with advanced stage obstructive colorectal cancer may be an alternative method compared with emergency surgeries. It can be safely and effectively performed and offers opportunities for palliative treatments and elective surgeries.

## INTRODUCTION

Twenty-five to thirty percent of the patients with colorectal cancers refer to the emergency clinics with intestinal obstruction. Owing to the poor clinical condition of these patients, mortality has been reported as 10%–30%, and morbidity as 40%–50% in patients undergoing emergency surgery.<sup>[1]</sup> In addition, these patients usually have to live with temporary or permanent colostomy. Therefore, endoscopic stents in patients with obstructive colorectal cancer are shown as alternatives to emergency surgery to bridge the surgery to be performed to palliative or elective conditions.<sup>[2,3]</sup>

The self-expanding metallic stent (SEMS) has been highly developed since 1990. Enteral stents were initially used for the palliative treatment of obstruction in inoperable gastrointestinal malignancies. Nowadays, in addition to palliative treatment, it is used to bridge the emergency operation to elective surgery.<sup>[4]</sup> This allows colonoscopic examination of the proximal colon of the obstruction. At the same time, it prevents the delays in treatment in patients with locally advanced and metastatic cancer who are candidates for chemotherapy instead of surgery and in patients with rectal cancer requiring neoadjuvant chemoradiation.

The aim of the present study was to evaluate the results of patients who underwent stenting for obstructive left colon and rectal cancers.

## MATERIAL AND METHODS

Patients who underwent endoscopic stenting between January 2016 and December 2017 due to obstructive left colon and rectum tumors were evaluated retrospectively. The diagnosis of patients with obstructive colorectal cancer was made by clinical examination, abdominal radiography, and rectal contrast abdominal computed tomography (CT), and staging was performed. Informed consent was obtained from the patients before the procedure.

Before the procedure, bowel preparation was performed with the application of enema under sedation. An endoscopic stent was placed in patients diagnosed with colonic obstruction within 24 h. The length of the stent to be inserted into the obstructive tumoral segment was selected by measuring the length of the obstructive bowel segment (2 cm above the proximal and distal edge) of patients detected on CT. All procedures were performed under direct colonoscopic examination. Posterior abdominal radiograms were obtained in all patients to evaluate

**Table 1.** Localization of colon tumors causing acute obstruction

Localization of the tumor	No. of patients	
	n	%
Sigmoid colon	6	50.0
Rectosigmoid region	2	16.6
Left colon	2	16.6
Rectum (middle segment)	2	16.6

the presence of the perforation and the location of the stent. Patients who had stenting for bridging had colonic edema after the bowel preparation. Total colonoscopies were performed in these patients to detect the presence of synchronous tumors. Patients who underwent palliative stenting were hospitalized for at least 1 (1–4) day for observation and then for oncological treatment.

Demographic characteristics of the patients, location of obstruction, success rate of stenting, and morbidity and mortality rates were evaluated. Descriptive statistics were used to analyze the data.

## RESULTS

Success was achieved in 12 (85.7%) out of 14 patients who were planned to undergo stenting. Of the 12 patients who underwent stenting, seven were male, and five were female. The mean age of the patients was 52 (32–77) years. Tumor was localized in the sigmoid colon (n=6), rectosigmoid region (n=2), left colon (n=2), and middle rectum (n=2) (Table 1). Eight patients underwent bridging for elective surgery, and stenting was performed in four of them for palliation. Two patients who had failed stent application had a completely obstructive tumor in the rectosigmoid region, and in another patient, obstruction in the left colon did not allow the guidewire to pass through. These patients were operated under emergency conditions, and Hartmann operation was performed.

After the application, gastrointestinal passage was ob-

erved, and the procedure was terminated (Fig. 1a-c). No complication occurred in any of the patients during the application. Four patients with advanced stage and liver metastasis with stents were implanted for palliation. After stenting, patients who were observed to have a gas–feces discharge were followed up for 2 (1–4) days and referred for oncological treatment with recommendations of low-residue diet. In eight patients, gastrointestinal passage was achieved after stenting with the purpose to bridge to elective surgery, and after bowel cleansing, their total colonoscopies were performed. Two patients who were candidates of elective surgery were operated after neoadjuvant chemoradiotherapy, and the other six patients were operated on an average of 5 (3–8) days later after necessary preoperative preparations.

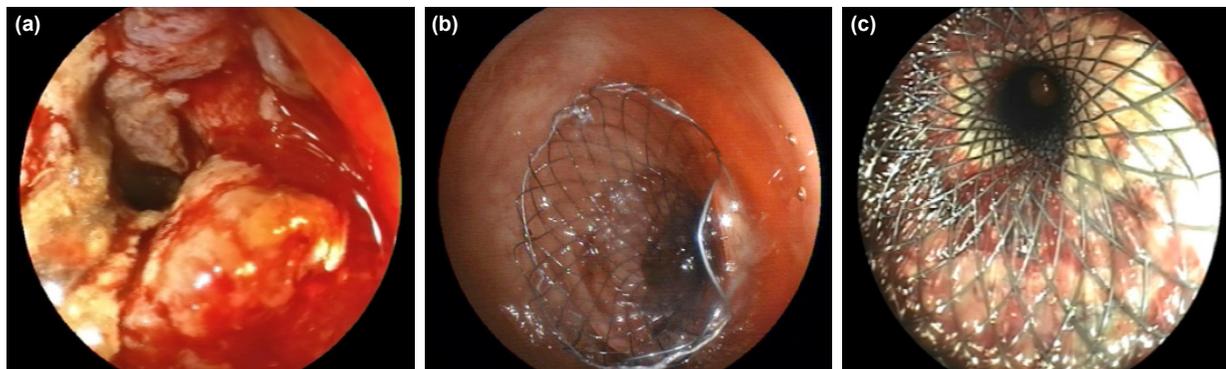
As an early complication, one patient who had a history of anticoagulant use had rectal bleeding 5 days after stenting. The patient had no active bleeding during colonoscopy, and bleeding was stopped spontaneously after 36 h with conservative treatment. One patient who underwent palliative stenting as a late complication was admitted with an acute abdomen 3 months after stenting. The patient was taken to the emergency operation. Colon perforation proximal to the stent was observed, and Hartmann operation was performed.

Our success rate in endoscopic stent application performed due to obstructive left colon and rectum tumors was 85.7% (n=12/14), whereas our clinical success rate was 91.7% because of a complication seen in only one patient.

The 33.3% of the patients were stented for palliation. The mean follow-up period of these cases was 8 (3–17) months, and the patients were lost because of their pre-existing diseases. Any complication did not develop during stent placement for bridging to surgery, and any case of mortality was not observed due to stent application.

## DISCUSSION

In emergency obstructive colorectal tumors, simple colostomy, together with resection of the tumor, end-colostomy (Hartmann surgery), or stomal or non-stomal



**Figure 1.** (a) Sigmoid colon in the tumor circularly occluding the lumen. (b) The first in situ image of the self-expandable metallic stent negotiated through tumor occluding the sigmoid lumen. (c) The self-expandable metallic stent was fully expanded, and allowed free passage through the lumen.

resection and anastomosis are performed depending on the general condition of the patient, the extent and localization of the tumor, and the physician's experience.<sup>[5]</sup> However, these approaches have inherent problems and complications. Factors, such as severe fluid–electrolyte imbalance, bacterial translocation, advanced age, and comorbidity, are associated with high mortality and morbidity rates. The mortality rate in these patients requiring emergency operation is 15%–34%, and the morbidity rate is relatively high (32%–64%).<sup>[6,7]</sup>

The possibility of constructing a stoma is relatively higher in patients who underwent emergency surgery because of left colon and upper rectum tumors.<sup>[8]</sup> In patients undergoing Hartmann surgery, the stoma is permanent in 30%–40% of the patients.<sup>[9,10]</sup>

In patients with poor general condition or in the presence of widespread disease, such as peritoneal carcinomatosis, irresectable metastasis, and irresectable T4 tumors, SEMS has been widely accepted as an alternative method to emergency surgery to convert emergency state to elective state in cases of resectable tumors so as to eliminate the disadvantages that may be caused by emergency operation or with the purpose of palliation.<sup>[11,12]</sup>

In SEMS application, owing to technical reasons, such as bowel contamination, non-visualization of the tumor, and failure to negotiate the guidewire or stent, success may not be achieved. In a study with a median follow-up period of 106 (68–288) days, technical and clinical success rates of SEMS were reported to be 96.2% and 92%, respectively. In the same study, it was reported that SEMS functioned with a 97% success rate during follow-up of patients or until patients were lost to follow-up.<sup>[13]</sup> In another study, technical and clinical success and complication rates were reported as 86%, 84%, and 22.5%, respectively.<sup>[14]</sup> In our follow-up period of 8 (3–17) months, our technical and clinical success rates were 85.7% and 91.7%, respectively. The reason for our failure in two patients was that we failed to pass the guidewire.

Early-term perforation due to SEMS or guidewire may be seen. In addition, in the long-term, perforations may be seen as a result of the continuous eroding of the colon wall by the stent. In previous studies, the rates of perforation and migration due to SEMS were reported to be 3.8% and 11.8%, respectively.<sup>[11]</sup> In addition, the chemotherapeutic agent bevacizumab increases the risk of perforation up to 3-fold.<sup>[15]</sup> In our study, the sigmoid colon was perforated proximal to the stent 3 months after stent application in one patient, and Hartmann procedure was applied to this patient.

More rarely seen stent complications may include rectal bleeding, pain, and tenesmus. The mortality rate related to stenting was reported in <1% of the patients.<sup>[13,16]</sup> While no mortality was observed in our study, one patient had a complaint of rectal bleeding 5 days after stenting. During colonoscopy, any active bleeding was not observed, and bleeding spontaneously stopped after 36 h with conservative treatment.

In patients with successful stenting, fluid–electrolyte balances improve by providing the gastrointestinal passage, and time is gained for preoperative preparation in patients undergoing elective surgery. In 1.5%–9% and 15%–50% of the patients, a synchronous tumor or adenomatous polyp accompanies the pre-existing colon tumor.<sup>[17–19]</sup> Therefore, total colonoscopy should be performed before surgery in patients with colorectal tumors. Owing to stenting, it is possible to perform total colonoscopy, and the extent of the surgery to be performed in the presence of a synchronous tumor changes.

According to the recommendations stated in the guideline of the Consensus Conference and Emergency Surgery Society, since stenting in patients with obstructive left colon tumors with the intention to bridge to open surgery reduces the need for stoma formation, decreases morbidity rates, and shortens hospital stay, it should be performed selectively by a specialized team on this field.<sup>[20]</sup>

Emergency surgery in obstructive colorectal tumors will increase the mortality risk of the patient and cause persistence of a stoma in 30%–40% of the cases. While the mortality rate of SEMS is <1%, it also decreases requirement for stoma by 83%. It is also safe as a low-cost and minimally invasive method.<sup>[21]</sup> It also provides time for the clinical staging of the disease, prevents the delayed application of chemoradiotherapy, and allows the elective surgery to be performed in a single stage.

In conclusion, SEMS application is considered as a safe and effective treatment alternative for emergency surgical interventions because of the possibility of palliative treatment and elective curative surgery for patients with advanced obstructive colorectal tumors.

#### Ethics Committee Approval

Approved by the local ethics committee (date and number: 2018/514/144/10).

#### Informed Consent

Retrospective study.

#### Peer-review

Internally peer-reviewed.

#### Authorship Contributions

Concept: S.K.; Design: S.K., Ö.A.; Data collection &/or processing: S.K., Ö.A.; Analysis and/or interpretation: S.K.; Literature search: S.K.; Writing: S.K.; Critical review: S.K.

#### Conflict of Interest

None declared.

## REFERENCES

1. Riedl S, Wiebelt H, Bergmann U, Hermanek P Jr. Postoperative complications and fatalities in surgical therapy of colon carcinoma. Results of the German multicenter study by the Colorectal Carcinoma Study Group. [Article in German]. *Chirurg* 1995;66:597–606.
2. NICE (National Institute for Health and Care Excellence) guidelines. Colorectal cancer: The diagnosis and management of colorectal cancer. 2011. Available at: <https://www.nice.org.uk/guidance/cg131/ev->

- idence/full-guideline-pdf-183509680. Accessed February 20, 2019.
3. Kim EJ, Kim YJ. Stents for colorectal obstruction: Past, present, and future. *World J Gastroenterol* 2016;22:842–52. [CrossRef]
  4. Keymling M. Colorectal stenting. *Endoscopy* 2003;35:234–8.
  5. Altuntas YE, Aksakal N, Öncel M. Stent Application for Obstructive Left Colon and Upper Rectal Tumors: Current Status. *Dis Colon Rectum* 2011;21:49–56. [CrossRef]
  6. Tekkis PP, Kinsman R, Thompson MR, Stamatakis JD; Association of Coloproctology of Great Britain, Ireland. The association of coloproctology of great britain and ireland study of large bowel obstruction caused by colorectal cancer. *Ann Surg* 2004;240:76–81.
  7. Kamocki ZK, Zaręba KP, Bandurski R, Baniukiewicz A, Wroblewski E, Gryko M, et al. Own experiences of endoscopic self-expandable stent placement for malignant colorectal ileus. *Wideochir Inne Tech Malo Inwazyjne* 2014;9:59–63. [CrossRef]
  8. Philips RK, Hittinger R, Fry JS, Fielding LP. Malignant large bowel obstruction. *Br J Surg* 1985;72:296–302. [CrossRef]
  9. Deans GT, Krukowski ZH, Irwin ST. Malignant obstruction of the left colon. *Br J Surg* 1994;81:1270–6. [CrossRef]
  10. van de Wall BJ, Draaisma WA, Schouten ES, Broeders IA, Consten EC. Conventional and laparoscopic reversal of the hartmann procedure: a review of literature. *J Gastrointest Surg* 2010;14:743–52.
  11. 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. [CrossRef]
  12. Gürbulak B, Gürbulak EK, Akgün İE, Büyükaşık K, Bektaş H. Endoscopic stent placement in the management of malignant colonic obstruction: Experiences from two centers. *Ulus Cerrahi Derg* 2015;31:132–7. [CrossRef]
  13. Watt AM, Faragher IG, Griffin TT, Rieger NA, Maddern GJ. Self-expanding metallic stents for relieving malignant colorectal obstruction. A systematic review. *Ann Surg* 2007;246:24–30. [CrossRef]
  14. Blake P, Delicata R, Cross N, Sturgeon G, Hargest R. Large bowel obstruction due to colorectal carcinoma can be safely treated by colonic stent insertion-case series from a UK district general hospital. *Colorectal Dis* 2012;14:1489–92. [CrossRef]
  15. Small AJ, Coelho-Prabhu N, Baron TH. Endoscopic placement of self-expandable metal stents for malignant colonic obstruction: long-term outcomes and complication factors. *Gastrointest Endosc* 2010;71:560–72. [CrossRef]
  16. Tilney HS, Lovegrove RE, Purkayastha S, Sains PS, Weston-Petrides GK, Darzi AW, et al. Comparison of colonic stenting and open surgery for malignant large bowel obstruction. *Surg Endosc* 2007;21:225–33. [CrossRef]
  17. Wexner SD. Neoplastic disorders of the colon. In: Wexner SD, Stollman N, editors. *Disease of the colon*. 1st edition. New York: Informa Healthcare Inc; 2007. p. 489–506.
  18. Otchy D, Hyman NH, Simmang C, Anthony T, Buie WD, Cataldo P, et al; Standards Practice Task Force; American Society of Colon and Rectal Surgeons. Practice parameters for colon cancer. *Dis Colon Rectum* 2004;47:1269–84. [CrossRef]
  19. Kim MS, Park YJ. Detection and treatment of synchronous lesions in colorectal cancer: The clinical implication of perioperative colonoscopy. *World J Gastroenterol* 2007;13:4108–11. [CrossRef]
  20. Ansaloni L, Andersson RE, Bazzoli F, Catena F, Cennamo V, Di Saverio S, et al. Guidelines in the management of obstructing cancer of the left colon: consensus conference of the world society of emergency surgery (WSES) and peritoneum and surgery (PnS) society. *World J Emerg Surg* 2010;5:29–38. [CrossRef]
  21. Targownik LE, Spiegel BM, Sack J, Hines OJ, Dulai GS, Gralnek IM, et al. Colonic stent vs. emergency surgery for management of acute left-sided malignant colonic obstruction: a decision analysis. *Gastrointest Endosc* 2004;60:865–74. [CrossRef]

## Obstrüktif Sol Kolon ve Rektum Kanseriinde Ameliyat Öncesi Köprüleme ya da Palyasyon Amaçlı Endoskopik Stent Uygulaması

**Amaç:** Obstrüktif sol kolon ve rektum kanseri nedeniyle endoskopik bağırsak stent uyguladığımız hastaların sonuçlarını değerlendirmektir.

**Gereç ve Yöntem:** Ocak 2016–Aralık 2017 tarihleri arasında obstrüktif sol kolon ve rektum tümörü nedeniyle endoskopik stent girişiminde bulunan hastalar geriye dönük olarak irdelendi. Hastaların demografik özellikleri, obstrüksiyonun lokalizasyonu, endikasyon, uygulamanın teknik ve klinik başarısıyla birlikte mortalite ve morbidite oranları değerlendirildi.

**Bulgular:** Stent uygulaması planlanan 14 hastanın 12'sinde başarı sağlandı (%85.7). Olguların sekizine elektif ameliyat için köprüleme, dördüne ise palyasyon amaçlı stent yerleştirildi. Palyatif amaçlı stentleme yapılan bir hasta stent uygulamasından üç ay sonra stentin proksimalinden perforasyon olduğu gözlemlendi ve bu hastaya Hartmann ameliyatı yapıldı. Teknik ve klinik başarı oranımız sırasıyla %85.7 ve %91.7 idi. Stent uygulamasına bağlı mortalite gözlemlenmedi.

**Sonuç:** Kendiliğinden genişleyen metalik stent (SEMS) uygulaması ileri evre obstrüktif kolorektal tümörü olan hastalara gerek palyatif tedavi gerekse de elektif küratif cerrahi şansını vermesi nedeniyle acil cerrahi girişimlere alternatif güvenli ve etkili bir tedavi metodu olarak görülmektedir.

**Anahtar Sözcükler:** Kendiliğinden genişleyen metalik stent; kolonik dekompresyon; obstrüksiyon; obstrüktif kolorektal kanser.