

Self-expanding metallic stent versus emergency operation for management of acute obstructing left sided colorectal cancer

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Abstract

Background: This study aimed to compare the outcomes of patients, who suffered from colorectal cancer, treated with self-expanding metallic stent (SEMS) as

colorectal cancer.

After insertion of SEMS and 12 patients (group B) were managed with emergency colonic resection. The two groups were compared for the incidence of primary anastomosis, hospital stay, duration of intensive care (ICU stay), post-operative morbidity and mortality.

Results: Both groups had similar age, pre-operative co-morbidity and stage of disease. Placement of SEMS was successful in group A, one patient had migration of stent distally after 2 days and was removed manually. All the other patients underwent elective operation with primary anastomosis (100%). In group B primary anastomosis was performed in 10 /12 patients (83.5%) versus (100%) in group A. The difference in the incidence of primary anastomosis was significant ($p=0.047$). There was a significant difference regarding the median postoperative hospital stays.

Conclusion: When compared with emergency resection, insertion of SEMS as a bridge to surgery for obstructing left-sided colorectal cancer is associated with a higher rate of primary anastomosis as well as a better outcome in terms of hospital stay and stay in the ICU.

Introduction:

Placement of a colorectal stent should be considered for preoperative decompression and for palliation of cancerous large-bowel obstruction. Up to 30 percent of patients with primary colorectal carcinoma present with large-bowel obstruction.⁴⁰ The traditional method of managing complete or subtotal colonic obstruction due to cancer, particularly left-sided obstruction, involves the creation of a diverting colostomy. Patients with complete or subtotal colonic obstruction and a potentially resectable tumor cannot undergo a one-stage operative resection of the tumor and immediate re-anastomosis, because stool within the uncleansed proximal colon leads to breakdown of the anastomosis.⁴¹ Therefore, the initial surgery includes resection of the primary tumor

and colostomy, with reanastomosis at a second operation. Patients with complete colonic obstruction tend to be acutely ill, with advanced disease. Because preoperative placement of an expandable metal colorectal stent permits clinical stabilization with preoperative decompression and cleansing, a one-stage operation can then be performed and colostomy avoided.^{42,43} The stent is removed en bloc at the time of resection of the primary tumor, after serving as a bridge to surgery. If the patient is a poor candidate for surgical resection because of underlying illness or has unresectable or widely metastatic disease discovered by imaging studies, the stent can remain in place for palliation. This study aimed to compare the outcomes of patients, who suffered from obstructing left-sided colorectal

cancer, treated with self-expanding metallic stent (SEMS) as a bridge to surgery with those who underwent emergency operation.

Patients and methods:

This study was conducted from October 2007 to February 2011. Twenty three patients, who had acute obstruction due to malignant left-sided colorectal cancer were divided into two groups, (group A) 11 patients who underwent surgical resection after insertion of SEMS and 12 patients (group B) were managed with emergency colonic resection.

Patient selection criteria included the site of obstruction from the middle rectum and sigmoid colon with to the splenic flexure and descending colon absence of bowel necrosis and perforation. Patients with more proximal obstructions were excluded on the basis of poor site accessibility and low emergency surgery risk. Age, general condition, and tumor stage were not used as exclusion criteria. The

procedures used to diagnose intestinal occlusion were plain abdominal radiography, barium enema examination, and colonoscopy. Barium enema examination also revealed the location and morphology of the obstruction.

Procedure:

All procedures were performed at the interventional radiology by endoscopy **Figure(1)** and fluoroscopy **Figure(2)**. Neither analgesia nor sedation was administered during the procedure. There was no routine administration of antibiotics. During surgery no evidence of tumor growth into the stent lumen was observed. The postoperative course was uneventful with no complications. Mean postoperative hospital stay was 9.3 days (range, 6-25 days). In all cases, findings in pathologic studies revealed adenocarcinoma with several degrees of differentiation. The procedure we used has been described elsewhere.^{6,8-10}



Figure (1a,1b): Showing colonoscopic picture of malignant stricture.

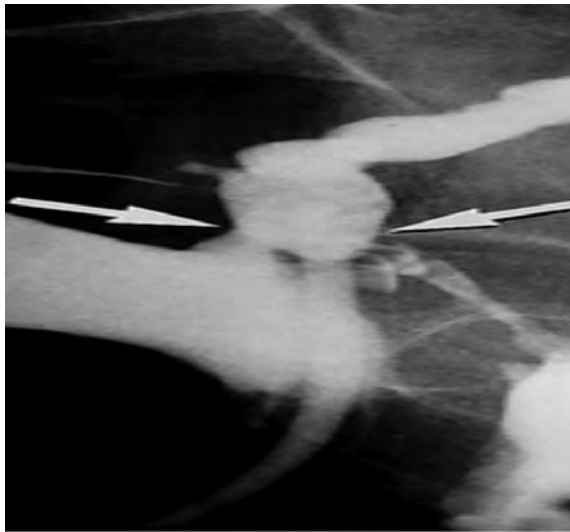


Figure (2a): Barium enema shows successful passage of the guide wire through the malignant stricture area.



Figure (2b): Introducer catheter at the optimal place before fixation of stent.



Figure (3a): Endoscopic views show insertion of the stent to bypass malignant stricture.

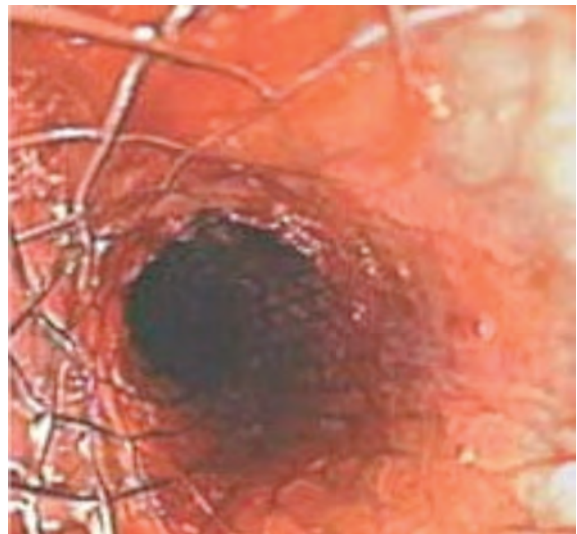


Figure (3b): Endoscopic views show insertion of the stent to bypass malignant stricture.



Figure (4): Shows fully expanded stent 24 hours after insertion.



Figure (5): Endoscopic view of partially expanded stent immediately after the stent placement.

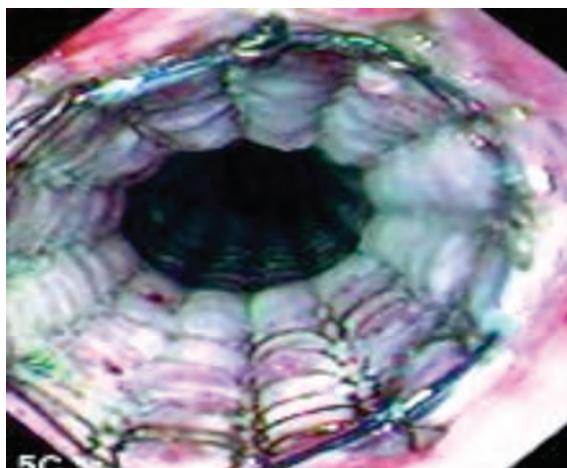


Figure (6): Endoscopic view one month post insertion with complete patency.

Once the guide wire passed through the lesion, the catheter was advanced to the most proximal point, and contrast medium was injected to evaluate tumor length and exclude the possibility of perforation. The super-stiff 0.038-inch guide wire was then inserted, and a stent was placed using the delivery system under fluoroscopic control **Figure(2)**. Then the guide wire was inserted through the lesion under direct vision and was confirmed to arrive at the splenic flexure under fluoroscopic monitor.

The stent used in all patients was esophageal endoprosthesis, 20 or 22 mm in diameter and 70-100 mm in length. After the placement of the stent, a catheter was inserted over the superstiff guide wire until the tip projected a few centimeters beyond the stent. Contrast medium was injected to ensure that the stent was placed properly across the tumor and to assess the stent patency.

When one stent was not long enough to span the lesion, a second stent was inserted to overlap the first. Balloon dilation was not performed in any of the patients either before or after the implantation of the stent. Patients were transferred to the surgical ward for observation after the procedure. Abdominal plain radiography was performed to assess the stent expansion and patency as well as possible complications in 24 h. Once symptoms of obstruction remitted, further tumor staging and clinical evaluation were carried out to determine which patients should receive selective surgical therapy and which patients should undergo stent implantation as the definitive palliative

treatment. The two groups were compared for the incidence of primary anastomosis, hospital stay, duration of intensive care (ICU stay), post-operative morbidity and mortality. Two stents were required in two patients. A stent slightly longer than the lesion was always chosen.

Results:

Patients with operable colorectal carcinoma were considered as candidates for selective surgery. The mean time between stent placement and surgery was $3(1\pm0.3)$ days (range: 2-5 days). These patients underwent adequate bowel preparation and adjuvant systematic therapy. The stent did not interfere with or prolong the surgery in any of these patients. The stents were fully expanded as well as in good position and afforded sufficient tumoral coverage (only one patient with stent migration after 2 days) and adequate cleaning of the colon in all patients during surgical exploration. Mild rectal bleeding was the only complication reported in two cases (18%), due to advancing of the delivery system; both recovered uneventfully after 48 hours. One patient reported minimal anorectal pain that lasted one day after stent placement, which was well tolerated, and no analgesia was required. The mean time for colonic preparation before surgery was 3.4 days (range, 2-5 days). All the patients had primary colonic adenocarcinoma, with various degrees of grades the site of obstruction was found between the splenic flexure and the Recto sigmoid junction; the majority of lesions were located in the

middle rectum. Placement of the stents was accomplished under fluoroscopic guidance in combination with colonoscopy; in all patients two patients (18%) required the placement of two stents to achieve complete decompression. The median time required for stent placement was 23 minutes (range, 12 to 50 minutes). Mean postoperative hospital stay was (7±4.5)10-17 versus 7-25(13±4.5) in both

groups respectively with a significant difference. Complications encountered in this study were, mild rectal bleeding in two patients, versus one in the other group which required no active intervention. Only one patient developed tolerable anorectal pain. No major complication as perforation occurred in group A versus two patients with anastomotic leak one week postoperative in group B.

Table (1): Preoperative patients' characteristics.

Diagnosis	Group A stent insertion	Group B emergency surgery	P value
Age <30 -50 >50	4(36%) 7(63%)	3 (25%) 9 (75%)	ns
Sex :M/F	5/6	7/5	ns
Site of Obstruction Splenic flexure Middle rectum Descending colon Sigmoid	3(27%) 5(45%) 2(18%) 1(9 %)	5(41.7%) 3(25%) 3(25%) 1(8.3%)	
Median duration of obstructive symptoms	1-3(2±.5%)	1-4(3 ±1.5%)	ns

The 11 patients **Table(1)** ranged in age from 39 to 70 years, with a median of 58 years. Fifteen patients (58%) were men, and 11 (42%)

were women. The median duration of obstructive symptoms reported by the patients was 2 days (range, 1 to 4 days).

Table (2): Postoperative patients' characters.

Diagnosis	Group A stent insertion	Group B emergency surgery	P value
The median time for stent removal	2-5 (3.4 ±0. 3)		
Dukes classification Stage			
A	1(9.1%)	1(8.1%)	
B	4(36.3%)	4(34.3%)	
C	6(55.5%)	7(57.6%)	
D	0	0	
Hospital stay	10-17(7±4.5)	7-25(13±4.5)	< 0.05
Pathological type			
Primary	9(81%)	11(88.8%)	
Recurrent	2(18%)	1(8.1%)	
Adenocarcinoma Grades			
I	0	0	
II	4(36%)	5(40.5%)	
III	5(45%)	6(48.3%)	
IV	2(18%)	1(8.1%)	
Post operative complications			
Anastomotic leak	0	3(24.3%)	
Bleeding	1(9%)	4(32.4%)	
Pain	2(18%)	3(24.3%)	
Wound infection	1(9%)	3(24.3%)	
Total morbidity	3.2±1.2	7.2±4.7	0.012
ICU stay	1-3 (2±1.5)	1-5 (3±4.5)	

A significant difference between both procedures regarding the complications rate $P < 0.05$

Discussion:

Self-expandable metallic stents have been used successfully for several years to relieve neoplastic obstruction of the biliary tract, trachea, and main bronchi. They have been used in the digestive tract to provide palliative treatment of cancer esophagus.^{12,16} Several articles have described the use of metallic stents to treat colon stenosis, and satisfactory results have been documented.^{11,13} It has been reported that when patients with colorectal

malignancy present with bowel obstruction, is usually in an advanced stage.^{4,7} In this study 36% of these cases are in stage B of the Dukes classification, and 56% are in stage C,⁷ none of the cases involved in this study was in stage D. SEMS for colorectal obstruction was performed in the past either under radiological or endoscopic control. We introduced the guide wire under radiological and endoscopic guidance in most patients. The guide wire could be inserted under direct vision, radiation

exposure could be reduced, and biopsies for histology could be taken during the procedure. Endoscopic placement of SEMS is advantageous over radiological placement because the accessibility to colorectal tumor sites is greater and stents can directly pass through the working channel of the endoscope.⁸ These advantages are especially obvious when the obstruction is proximal to the rectosigmoid. De Gregorio et al.⁹ have reported that the guide wire cannot be progressed under fluoroscopic guidance but reaches the neoplastic stricture under endoscopic guidance. Interventional radiologists are much more experienced in passing the guide wires through obstructive lesions and deploying SEMS.^{8,10}

In our study, fluoroscopy in combination with endoscopy improved SEMS deployment. Even then, stent was still rather difficult to implant in the splenic flexure compared with that in the rectum and sigmoid which agrees with another study which stated the difficulty in stent deployment in the descending colon and splenic flexure.¹⁰

We treated 11 patients with acute malignant colorectal obstruction with SEMS placement with a successful rate of 90%.^{10,11} After successful stent placement and proper bowel preparation, 8 patients achieved elective radical colorectal surgery and anastomosis without severe complication. Two patients with inoperable malignancy obviated emergency colostomy after successful stent.

Placement success rate in some reports reached 95% which may be due to the more refined Chinese instruments and improved manipulation skill. In our work there was no significant difference between both groups regarding the hospital stay but with more complications rates in group B which agrees with others.¹² Binkert et al.¹³ showed that SEMS placement can reduce the cost due to a shorter hospital stay and a lower complication rate. Colonoscopy and fluoroscopic guidance provide adequate assessment of the site of obstruction in most cases and help to locate the site of stenosis. Allowing easy and proper positioning of the stent. After resolution of clinical symptoms of obstruction patients were prepared for primary colonic resection with end-to-end anastomosis. Therapeutic options

for these complicated cases were a two-stage surgical procedure with resection of the mass and colostomy in the first stage and creation of an end-to-end anastomosis in the second. The use of colostomy bag for certain period of time has a psychological impact on the patient. Another option was primary mass resection and creation of an end-to-end anastomosis in a single stage, which carries the risk of anastomotic leak with the associated high morbidity and mortality.^{14,15}

Complications encountered in this study were, mild rectal bleeding in two patients, versus one in the other group which required no active intervention. Only one patient developed tolerable anorectal pain. No major complication as perforation occurred in group A versus two patients with anastomotic leak one week postoperative in group B.

The rates of morbidity and mortality in surgical treatment of colorectal carcinoma decrease when elective surgery is scheduled and the colon is adequately prepared.¹⁶ In this study we avoid emergency surgery for patients with acute malignant obstruction giving chance for proper colonic preparation and correction of the patient's general condition. Placing metallic stents can treat an acute colonic obstruction. Thus, colostomy for evacuation can be avoided, with consequent physical, psychological, and economic advantages for the patient.

Conclusion:

Implantation of a colorectal stent before scheduled surgery is an excellent alternative to emergency surgery in cases of acute intestinal obstruction caused by tumors in the rectosigmoid or descending colon. And also provides ample time not only for staging but also for optimal colonic preparation for elective surgery.

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