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Original article

Management of acute large bowel obstruction due to colorectal cancer: Diversion colostomy versus stent placement

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SUMMARY

Background and Aim: Colonic stenting is a novel and privileged therapeutic option for malignant obstructions of the large bowel, especially as a bridging procedure to elective surgery. The aim of this retrospective study was to compare the efficacy of the traditional surgical approach with stent placement in the management of obstructing colorectal tumours. Patients and Methods: Thirty-three patients with malignant colonic obstruction were retrospectively studied. Of them, 17 underwent a diversion colostomy (group I), while 16 were treated with SEMS (group II). Early outcome, late outcome and duration of hospitalisation were evaluated. For statistical analysis chi-square and Student's t-test were used (statistical significance level $P<0.05$). Results: One death in each group occurred within the first 3 days following colonic decompression. One case of pulmonary embolism (group I) and one case of asymptomatic colonic perforation (group II) were the only early morbid situations complicating decompressing interventions. Elective surgery was finally performed on 10 patients in group I and in 9 patients in group II. One case of early local recurrence after tumor resection was observed in the stenting group. The cumulated mortality rate was estimated at 6.9% and 9.1 % and cumulated morbidity rate at 20.7% and 9.1% for the two groups respectively. The mean time of hospitalization was significantly longer in the colostomy group. Conclusions: SEMS are effective for the temporary treatment of malignant occlusions of the large bowel and particularly advantageous not only because of their technical simplicity but also good tolerance and quality of life which they offer epecially in cases of locally or distally extended disease.

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INTRODUCTION

Large bowel obstruction is an uncommon presenting symptom of primary colorectal cancer. Being a surgical emergency, it implies a modification in the overall therapeutic approach to colorectal malignancies. Traditionally, emergency management consists of initial decompression of the proximal colon followed by resection after an interval of weeks or months. However, the staged resection has the disadvantage of the unavoidable creation of a colostomy, thus reducing the quality of life in patients with a short life expectancy. Furthermore, it carries a higher perioperative risk due to its multiplicity. For these reasons, self-expandable metal stent (SEMS) placement, being a minimally invasive method, is emerging as a very promising alternative solution. Initially used in the palliative treatment of biliary tract and esophageal tumors, SEMS have increasingly been applied in colorectal cancer over the last decade.[1,2] Results were encouraging and, theoretically, through their clinical implementation, emergency surgery can be avoided and an elective single stage operation can subsequently be performed.[3]

The aim of this retrospective study was to compare the efficacy of the classical diversion colostomy with stent placement in the management of obstructing colorectal tumors, emphasizing the issues of morbidity, mortality and duration of hospitalization.

PATIENTS AND METHODS

Fifty-two patients referred to our unit for acute intestinal obstruction between January 1996 and June 2001 were retrospectively reviewed. After excluding patients presenting peritonitis and those having undergone emergency resection (with or without anastomosis, subtotal colectomy and Hartmann operation) we selected only patients in whom either a diversion colostomy or a colonic SEMS placement was performed as a bridge to elective surgery. Thirty-three patients (16 males and 17 females of mean age 68 years) were finally included.

All patients underwent a barium enema examination with a water-soluble medium and/or an abdominal CT with colonic opacification, in order to determine the level of the obstruction. The obstructing tumour was localized in the rectum (7 cases), the sigmoid colon (19 cases), the descending colon (3 cases), the splenic flexure (2 cases) and the distal half of the transverse colon (2 cases).

A diversion colostomy was performed in 17 patients (Group I). Complete colonic obstruction, critical general status on admission and the non-availability of endoscopic or radiological unit in emergency were the major inclusion criteria in this group. Of them, 16 patients underwent an elective procedure and in 1 case a median laparotomy was performed, aiming to exclude an eventual perforation in the proximal part of the large bowel.

A metal stent was placed in 16 patients (Group II). Partial colonic obstruction and clinical status allowing a few-hours delay in the decompressing intervention by radiological or endoscopic means, were the inclusion criteria in this group. In 14 cases the procedure took place under fluoroscopic control. A 6 French catheter (Cordis, Rodis, The Netherland) was transanally inserted on a hydrophilic guidewire of 0.038 inches (Radiofocus, Tokyo, Japan) and, once passed across the stenotic lesion, an opacification of the proximal colon was performed in order to determine tumour length and to choose the most appropriate stent measuring 3-4 cm more than the estimated length. The stent was inserted on a more rigid guidewire of 0.035 or 0.038 inches of various lengths (260-400 cm) according to the length of the delivery catheter. After the procedure, patients were kept nil per os until decompression, a blood count and a plain abdominal x-ray were performed daily for the first three days. In 2 cases stent placement was performed under simultaneous endoscopic and fluoroscopic control by an experienced gastroenterologist, after previous failure of the fluoroscopic technique. The subsequent management of patients was similar to the above.

After decompression, tumor staging was performed in all patients and consisted of a coloscopy in order to define the nature of the obstructing lesion, an abdominal ultrasound and/or a computed tomography and a thoracic

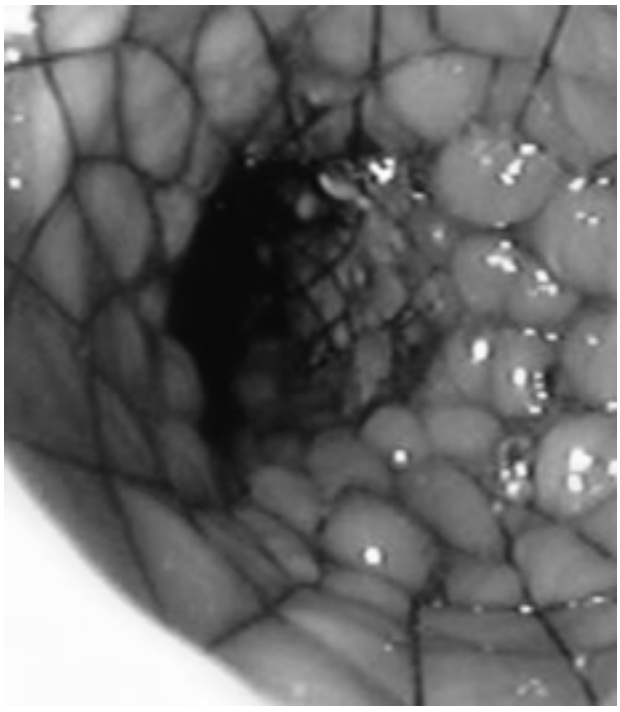
Table 1. Early and late outcome in patients treated with surgery (1a) or colonic stent placement (1b).

1a. Diversion colostomy (Group I)		**2nd stage of resection**	**3rd stage of resection**	**Total number of surgical operations**
Number of patients	17	10	2	29
Morbid complications	1	5	0	6
	• Pulmonary embolism	• enterocutaneous fistula • urinary infection • pulmonary infection • lower mmber phlebitis • anastomotic leakage/peritonitis		
Mortality	1	1	0	2
1b. Stent placement (Group II)		**2nd stage of rersection**	**3rd stage of resection**	**Total number of surgical operations**
Number of patients	16	9	2	11
Morbid complications	4	1	0	5
	• Asymptomatic perforation • Tenesmus • Stent migration • Faecal impaction	• urinary infection		
Mortality	1	0	0	1

x-ray or a thoracic CT in order to reveal distal metastases. In group I, 11 and 6 patients respectively presented localized and metastatic disease. In group II, 9 and 7 patients respectively presented localized and metastatic disease. Patients with localized tumors were judged to be candidates for curative treatment, whereas patients with extending disease were judged to be candidates for palliative therapy.

In both groups we studied the early morbidity and mortality, the duration of hospitalization, the surgical approach following colonic decompression and, in cases of colectomy, the histology of the excised segment, in order to confirm the stage of the malignancy or to detect the presence of benign stricture. All patients were followed up long-term.

For statistical analysis we used chi-square and Student's t-test respectively for estimating differences between nominal and numerical characteristics. The statistical significance level was set at $P < 0.05$. A multivariate logistic regression analysis was performed in variables with statistical significance ($P < 0.10$) in the prerequisite univariate analysis.

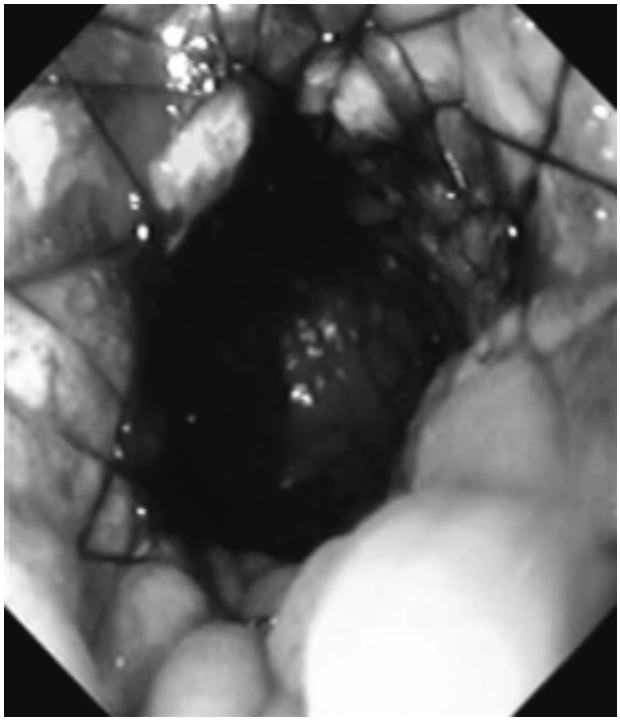


Figures 1.

RESULTS

Stent placing technique

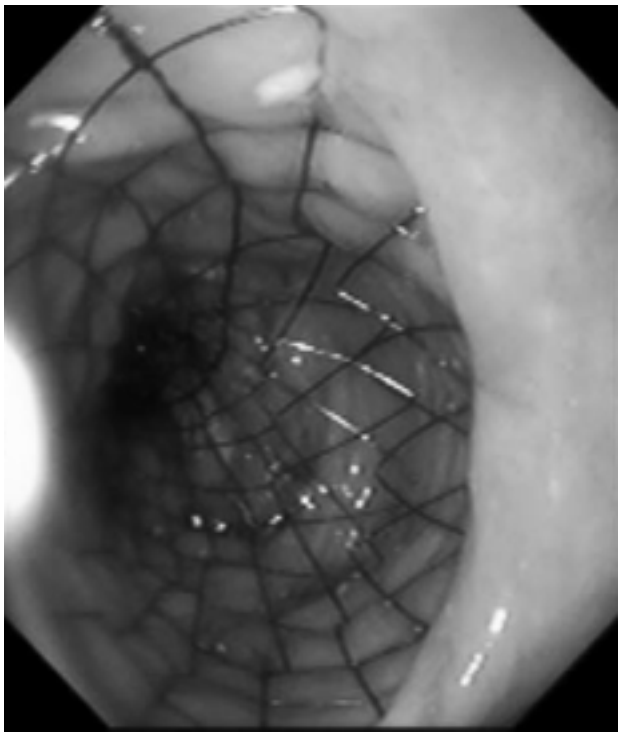
The mean duration of the stent placing procedure was estimated at 64 min (15-210 min). The method was perfectly tolerated and there was no need for anesthesia or analgesia. The fluoroscopic approach was successful in 13/16 cases. Of the remaining three patients one died and the other two were successfully managed with the endoscopic approach. Forty-eight hours after decompression, normal colonic transit was settled in all treated patients (Figures 1, 2, 3).



Figures 2.

Early outcome

One death in each group occurred within the first 3 days following colonic decompression. In group I, a 75-year-old woman died because of multivisceral failure (mortality rate: 1/17=5.9%). In group II, cardiac failure was the cause of death of a 85-year-old woman operated on for peritonitis, complicating the placement of the stent (mortality rate: 1/16=6.2%). In group I, early morbidity was represented by one case of pulmonary embolism, successfully treated by continuous heparin perfusion (morbidity rate: 1/17=5.9%). One case of asymptomatic colonic perforation randomly identified during the subsequent elective operation and one case of stent migration resulting in relapsing stenosis were the major complications observed after stent placement. Tenesmus, and stent occlusion by fecal materials were complications of



Figures 3.

minor importance (morbidity rate 4/16=25%).

Late outcome

In group I, elective surgery took place within a mean period of 73.5 days (12-318 days) following emergency decompression. In 10 patients (10/17=58.8%) a tumor resection was performed according to a two-stage procedure (in 8 cases) or to a three-stage procedure (in 2 cases). Five patients were rejected for operation on grounds of limited life expectancy and one patient was judged inoperable because of his age. Postoperative complications included one death due to heart failure, an entero-cutaneous fistula, an urinary infection, a pulmonary infection, a lower member phlebitis and a peritonitis due to anastomotic leakage. In total, in 29 surgical interventions performed in this group, cumulated mortality and morbidity rate were respectively estimated at 6.9% and 20.7%.

In group II, elective surgery took place within a mean period of 15.2 days (5-60 days) following decompression. Nine patients underwent a resection according to a two-stage procedure (in 7 cases) or to a three-stage procedure (in 2 cases). No postoperative deaths occurred. One case of urinary infection was the sole complication. The remaining 7 patients preserved a colonic stent as palliative therapy. Three of them were complicated by stent occlusion due to tumor invasion (2 patients were successfully managed with a second stent placement), or to fecal impaction (1 patient). In total, 11 surgical interventions were performed in this group with a cumulated mortality and morbidity rate of 9.1% for both.

Histological study

In 17 out of 19 patients who underwent surgical resection, the histological study confirmed the presence of adenocarcinoma. It was classified according to Dukes classification in stages B, C and D in 5, 5 and 6 cases respectively. One patient presented a giant polyp with in situ carcinoma and in the remaining two patients a tumor-like benign stenosis was identified as a complication of diverticulitis.

Statistical analysis

In univariate analysis, diversion colostomy was a predictive factor for the risk of a permanent colostomy. The difference in the two decompression methods was at the limit of statistical significance (P=0.066). Old age also constituted a risk factor for a lifelong colostomy (P=0.045), whereas tumour stage had no impact (P= 0.19). Multivariate analysis confirmed these results. The duration of hospitalization and the bridging period to elective surgery were significantly shorter in the stent placement group (P=0.02 and P=0.034 respectively).

DISCUSSION

Auto-expanding metal stents were originally introduced as an alternative treatment to permanent colostomy for inoperable colon tumors. To date, they are considered a promising procedure, bridging to curative surgery in cases of acute malignant bowel obstruction. In different series in the medical literature, the mortality rate of primary colostomy varies between 0% and 39%.[4,5] In our study this was estimated at 5.9%. Old age, advanced disease, operative risk and metabolic complications due to prolonged intestinal occlusion explain the relatively high mortality rate of this minimally invasive method.

Stent placement in the large bowel was successfully accomplished in all but two cases under fluoroscopic guidance alone and in the remaining two cases in association with lower GI endoscopy. In the literature, there is growing evidence that the fluoroscopic method is adequate for stent placing and quite harmless, thus avoiding the need for general anesthesia.[6-8] However, in some cases, stent insertion may necessitate the use of a rigid overtube to facilitate the passage through a mobile

sigmoid colon. This maneuver unavoidably increases patient discomfort, and in these cases coloscopy would be a better option, offering the possibility of direct visualization and thus gentler manipulation. Moreover, endoscopy allows tissue sampling in order to confirm or reject the malignant character of the stenotic lesion, which is of crucial importance for the subsequent management of these patients. In terms of complications, both approaches have yielded comparable results and the perforation risk during coloscopy is well established, being not different from the risk with the fluoroscopic approach (6.2% in our series), even in cases where hydrophilic guidewires are used.[9,10]

The bridging time to elective surgery was significantly shorter in patients treated with stents (P=0.034). The classical treatment of surgical decompression should always be followed by a relatively long period before the second operation, for reasons of patient rehabilitation and trauma healing. Nevertheless, in our opinion the shorter bridging time in our stenting group was not only due to technical advantages. Because of the initial lack of experience about the limitations and complications of the newly developed technique (such as stent migration or stool impaction), we tried to perform tumor resection not too late following decompression.

Furthermore, the risk of a permanent colostomy reducing quality of life is significantly lower in the stenting group (43.7 versus 6.2%, P=0.066). This may be due to rapidly advanced disease or to the presence of other comorbid situations contraindicating a second intervention.

The mean time of hospitalization was significantly longer in the colostomy group, because of both the greater total number of operations performed in these patients (29 versus 10) and the increased morbidity of the surgical method (20.7% versus 9.1%).

Finally, in a 41-year-old woman we observed a local recurrence of a sigmoid carcinoma, classified in stage Dukes B and treated with stent placement 8 days before resection. During surgery there was no evidence of local extension (particularly retroperitoneal). The recurrence occurred early, 6 months after resection, and a second operation was required. It could be attributed to leakage of malignant cells after the mechanical decompression of the large bowel. Theoretically, cell leakage can take place either towards systemic circulation or locally. In fact, an increase of tumor cells both in portal vein and peritoneal cavity has been observed during colon cancer surgery, but no impact on local recurrence or on patient survival has ever been demonstrated.[11-14]

In conclusion, stent placment seems to be an effective method for the temporary treatment of malignant occlusions of the large bowel and particularly advantageous because of its technical simplicity, good tolerance and quality of life and, especially, as a palliative therapy in cases of locally or distally extended disease. In contrast, in candidates for curative treatment, diversion colostomy should always be the first therapeutic option, according to the recommendations of the French consensus conference on colon cancer.

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