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Endoluminal Colonic Wall Stents for the Management of Malignant Recto-Sigmoid Obstruction

SHERIF ABDEL AZIZ, M.D.; AMR AFIFI, M.D. and KHALED AUF, M.D.

The Departments of Surgical Oncology; General Medicine** and General Surgery***, National Cancer Institute, Banha University and Ein Shams University.*

ABSTRACT

Aim of the work: A prospective study to assess the applicability and efficacy of endoluminal colonic wall stents (ECWSs) in the management of large bowel obstruction (LBO).

Patients: Twelve consecutive patients with malignant large bowel obstruction without peritonitis were subjected to placement of Endoscopic Colonic Wall Stent under endoscopic and fluoroscopic guidance. Main outcome measures the success rate in ECWS placement, the efficacy in decompressing the obstruction and the patency rate of the ECWS.

Results: Successful placement of ECWSs was obtainable in 11 of 12 patients. Once placed, all 11 patients achieved immediate decompression of their recto-sigmoid obstruction. Nine patients had malignant obstructions associated with distant spread of disease. Among those with malignant obstruction, 6 patients had successful and lasting palliation without colostomy, 4 patients underwent 1-stage resection 1 month later with no evidence of obstruction and 1 patient could not be stented so diversion was done. One patient required a second ECWS secondary to recurrence of obstruction after stent migration and has continued palliation of his stage 4 rectal cancer for the last 11 months. No other complications were encountered.

Conclusions: Urgent surgery with colostomy for recto-sigmoid obstruction was avoided in 11 of 12 patients because of successful placement of ECWSs. We believe that endoscopic colonic stenting is safe, effective and lasting and should be considered as initial non-operative management in all patients seen with recto-sigmoid obstruction in the absence of peritonitis.

Key Words: *Stents, Recto sigmoid carcinoma.*

INTRODUCTION

The primary modality of treatment for colorectal cancer continues to be surgical resection. In a personal series of 896 combined excisions, Goligher performed 710 (79%) with a chance of cure and an operative mortality of only 2.8% **[10]**, although in a more representative survey covering a large number of surgeons, the mortality for curative surgery was close to 10% **[26]**.

However, in the remaining patients the disease is incurable owing to metastases or local invasion. Palliative resection provides good relief of local symptoms (obstruction, diarrhea, constipation, bleeding, pain, tenesmus and rectal discharge), but the mortality can be as high as 21% **[11]**. A simple alternative is a proximal diverting colostomy, but this can only relieve symptoms due to obstruction **[7]**. These procedures often involve a prolonged recovery period, encroaching on an already limited prognosis and may leave patients with a permanent colostomy with which they may not be able to cope **[3]**.

Over the last 50 years, attempting to relieve the local symptoms in these high-risk patients without subjecting them to major surgical intervention, a range of non-surgical techniques has been explored. These include radiotherapy, cryotherapy **[18]** and electro-coagulations **[12,14]** and endoscopic trans-rectal resection **[19]**. These methods had proved effective in many cases but all methods have their risks and limitations. Endoscopic laser treatment is a modality that proved its efficacy over the last decade using the ND-YAG laser **[16,17,22]**. Yet it has many disadvantages such as its high cost, its lack of easy portability, the need for protective glasses and its variable depth of penetration that carries a high risk of perforation. So, its popularity among the gastro-intestinal endoscopists decreased. Expandable endoluminal stents, which are widely used in treating biliary and esophageal strictures **[5]**, have been used successfully to treat LBO in patients with malig-

nant strictures with low morbidity rates **[4,9,21,23]**. These early results prompted us to try this new treatment approach for all patients initially seen with LBO. Our goal in treating these patients was to avoid emergency surgery and colostomy formation. In patients with end-stage malignant neoplasms, stent placement was used as long-term palliation. In patients with resectable colonic malignancy, the stent allowed bowel preparation and one-stage resection.

PATIENTS AND METHODS

All patients hospitalized with acute LBO referred to the endoscopy unit Ein Shams University Hospitals, Banha University Hospitals and National Cancer Institute were offered endoluminal colonic wall stents (ECWSs). Patients who had signs of peritonitis were taken to the operating room and were not considered for this procedure. Over 3.5 years, 12 consecutive patients were enrolled in this study and 11 underwent ECWS under colonoscopic and fluoroscopic guidance; 11 patients had successful placement and they are the subjects of our study. Patients were considered to have an LBO by the clinical history of not passing stool or gas via the rectum and having signs of complete obstruction on plain radiography, computed tomographic scan, or contrast-enhanced enema. No patient refused attempted ECWS placement. One patient underwent endoscopy, but complete obstruction prohibited passing a guidewire. Stenting was performed urgently, usually within 24 hours of admission to the hospital.

The procedure for endoluminal stenting involved conscious sedation with midazolam hydrochloride and fentanyl citrate and colonoscopy to the point of obstruction. A guide-wire was negotiated through the stricture into the proximal dilated bowel under colonoscopic and fluoroscopic guidance. A catheter was placed over the guide wire and a small amount of water-soluble contrast was injected to accurately define the proximal aspect of the obstruction. The catheter was then withdrawn while the guide wire was kept in place. With the colonoscope in place, a 22x90 mm or 22x60 mm wall stent enteral endo-prosthesis (Boston Scientific, Boston, Mass) was introduced over the guide wire beyond the proximal end of the stricture. Under fluoroscopy, the ECWS was slowly deployed. If the stricture was longer than 8 cm, an additional stent (90 22 mm or 60 22 mm) was deployed with a generous overlap with the first stent. Endoscopic evaluation during ECWS deployment ensured a good relation between the distal aspect of the obstruction and the ECWS and documented relief of the obstruction. Endoscopic photographs show placement of the ECWS and decompression (Fig. 1). Plain abdominal radiography was performed after the procedure to exclude perforation and document baseline ECWS position. Fig. (2) shows plain radiographs before and immediately after ECWS placement.

RESULTS

Over 3.5 years, ECWSs were placed in 11 out of 12 patients initially seen with acute LBO using a combined endoscopic and fluoroscopic technique. In 3 patients (27.2%), 2 overlapping stents were used to bridge the stricture. In 1 patient with LBO the guide wire could not be passed through the blockage and therefore, no ECWS was placed. There were 7 male and 5 female patients, whose mean age was 54.3 years (age range, 42-70 years). All 11 patients had malignant disease: 6 patients with sigmoid adenocarcinoma, 2 patients with rectal adenocarcinoma, 2 patients with recurrent rectal adenocarcinoma and 1 patient with small cell carcinoma with pelvic wall metastasis. Six patients had liver metastasis and 1 patient had lung metastasis. All patients had immediate decompression after ECWS deployment and had marked radiographic and clinical improvement of their condition. One stent migrated proximally and obstruction recurred 6 days after the initial ECWS placement. This was treated with a second ECWS placement. The procedure was palliative in 6 patients, 5 of whom died of their disease with no evidence of obstruction 60,113,142,153 and 207 days after the surgical procedure. One patient is still alive with the ECWS in place for more than 11 months. The procedure served as a bridge to surgical resection in 4 patients with adenocarcinoma. The presence of the ECWS did not complicate resection in any of the patients. The patient with adenocarcinoma was operated on 30 days following stent placement.

DISCUSSION

Emergent decompressive colostomy or colonic resection has been associated with high mortality and morbidity rates for various rea-

Table (1): Review of experience with endoluminal colonic stenting.

	Source, y					
	Deans et al., 1994	Canon et al., 1997	Tejero et al., 1997	Turegano et al., 1997	Mainar et al., 1999	Current study
No. of patients/No. of stents	10/10	13/16	38/38	11/17	71/72	12/14
No. of patients with malig/benign neo-plasm	9/1	13/0	38/0	11/0	71/0	11/1
Success rate, %	100	100	100	64	90	91
No. of palliative stents/ No. of stents used as bridges to surgery	4/6	9/4	13/22	6/1	0/64	6/5
Failure of the stent to decompress, %	10	7.7	5.3	0	4.7	0
No. of patients with perforation, %	0	15.4	0	0	4.7	0
No. of patients with tenesmus %	-*	15.4	-*	-*	6.3	0
No. of recurrent obstruction	0	30.8	2.6	0	-*	0
Longest follow up time, month	6	-*	19	7	-*	14

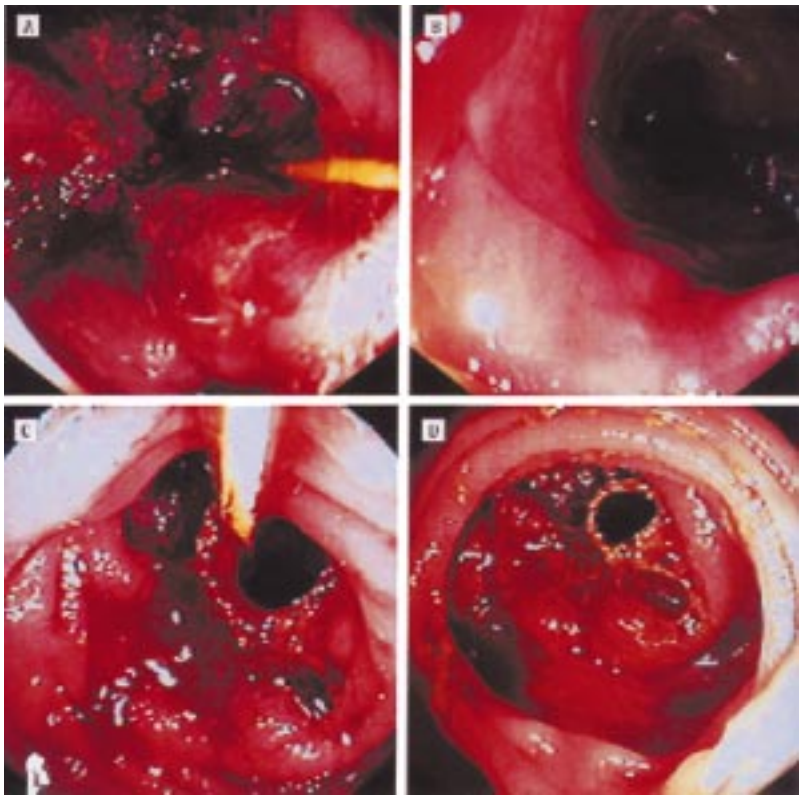

Fig. (1): Insertion of endoluminal colonic stent; A- A guide-wire inserted through the obstruction, B- Stent negotiated through the obstruction, C- Stent inserted with guide-wire in place, D- Stent finally in place.

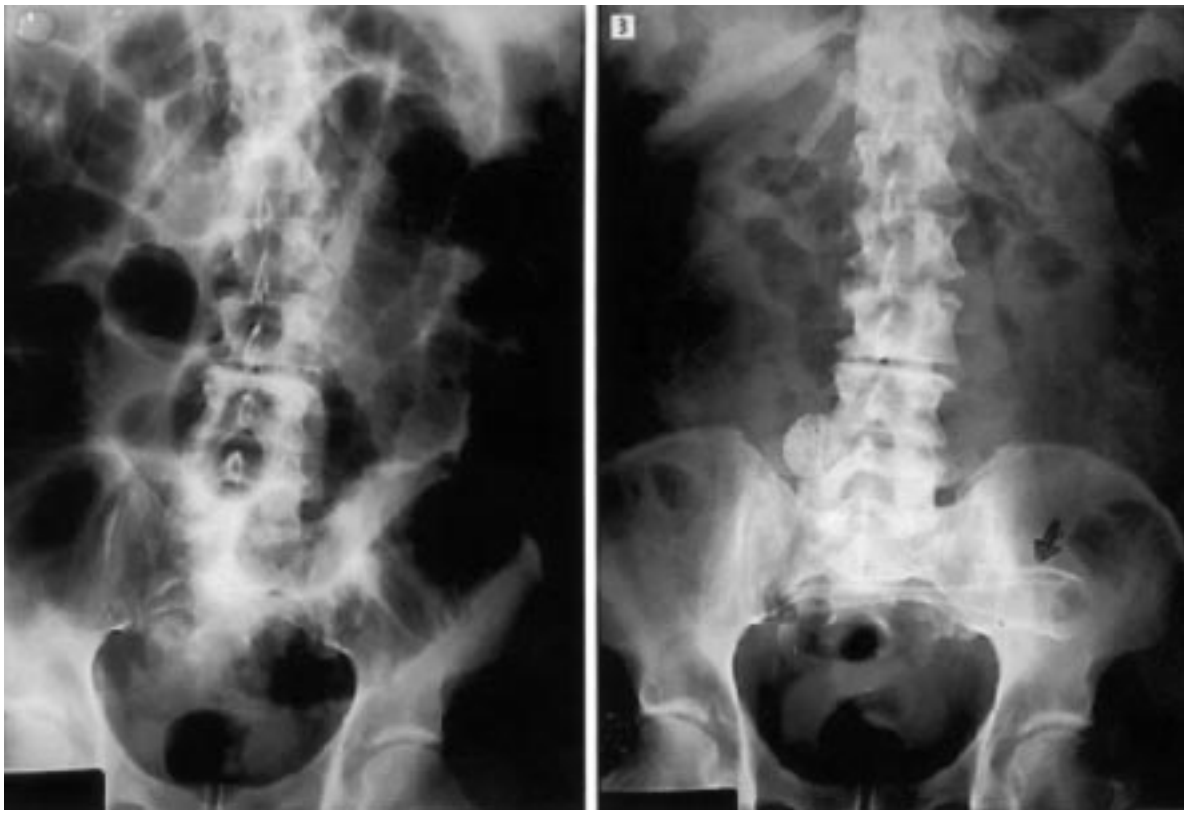

Fig. (2): Plain abdominal X-ray; A- Before insertion of the stent showing multiple fluid levels, B- After insertion of the stent showing relief of colonic obstruction.

sons **[7]**. Placement of ECWSs avoids urgent surgery in this high-risk group of patients. In other experienced centers **[15]** good results have been achieved with this technique (Table 1). Endoluminal colonic wall stenting is associated with a lower complication rate than emergency surgery, but there are several concerns specific to this technique.

The first concern of this technique is perforation. This endoscopic technique is clearly a high-risk procedure given the presence of tumor or inflammation. Although one series had 2 perforations for a rate of 15.4% **[4]**, the overall rate seems to be less then 5%. With early diagnosis of perforation, patients are treated essentially the same as if stenting was unavailable. The second technical problem is failure to relieve obstruction due to the inability to get a guide wire through the mass. This has occurred in up to 36% in one series **[2]** but with more experience, this may be less of a problem.

Finally, the complication of tenesmus, which occurs when the stent is in contact with the sphincter complex, is a completely avoidable problem. Our tendency if faced by a very low rectal tumor would be to use an alternative method of decompression such as plasma Argon coagulator.

Five series **[4,7,16,23,25]** other than our own, are listed in Table (1). From these 5 series, 142 colon stents were placed for malignancy and only 1 stent was placed for benign disease. From our experience, we believe that any patient who is initially seen with LBO should be offered a colon stent as initial therapy; there is no need to document a malignant stricture prior to placing a stent. ACT scan might show locally advanced rectal cancer, which would be appropriate for neo-adjuvant chemo-radiation. It might also unexpectedly show multiple liver metastases, in which case the stent could be left in place indefinitely for palliation as was done in some patients described. This approach simplifies the management of a patient who was initially seen emergently with LBO. After stent placement, the patient's condition can be further evaluated. If appropriate, resection of the affected colon can be performed as a one-stage procedure.

The long-term complications of recurrent

obstruction and stent migration may be limiting factors in the use of this technique for long-term palliation of malignant disease. In one study **[4]**, up to 30.8% of patients developed recurrent obstruction. This problem will be dependent on the disease process and length of follow-up time. Many patients will die before recurrent obstruction becomes an issue. Stents may migrate in the presence of malignant disease that is treated with palliative chemotherapy or radiotherapy after stent placement.

In our series, we placed a total of 14 ECWSs in 10 patients with acute LBO. The ECWS allowed us to adequately decompress the obstructing lesion. The patients could then undergo further resuscitation, begin nutritional therapy and have proper evaluation of the extent of their disease. One-stage surgical resection then could be considered for appropriate candidates. Six of our patients underwent ECWS placement as their definitive treatment because of either disseminated tumor spread or prohibitive medical risk.

Four patients compose a second group, 2 had potentially resectable adenocarcinoma. Three of these patients in this group underwent decompressive ECWS placement followed by bowel cleansing and 1-stage surgical resection. One patient with diverticular disease refused surgery and remained symptom free. In this group two-stage surgical treatment was avoided, with ECWS serving as a bridge to safe elective one-stage resection.

Except for migration of 1 stent leading to recurrent obstruction in one patient, there was no complications. Tenesmus, as seen by other authors **[4,15]** was a potential complication in patients with low rectal tumors where the edge of a bridging stent may irritate the anal sphincter. The patency rate and durability of ECWS is encouraging. In our series, 6 patients received palliative ECWSs, all of whom either died with functioning ECWSs in place or are alive without recurrent obstruction. In addition to the short-term benefits, ECWS may also be cost-effective. One recent study showed an overall cost savings of 20% in patients treated for palliation and 29% in patients who ultimately undergone resection **[25]**. Endoluminal colonic wall stents avoid major operations, potentially lowering hospital charges and overall cost. The physical, economical and psychological stress of colostomy to the patient is also avoided by using an ECWS. As regards the need for colonoscopy, in the literature the reports from Spain came from interventional radiologists. In the University of Alabama, Birmingham, it was done by gastro-enterologists and interventional radiologists. Actually we believe the contrary. We believe that a surgeon or an experienced gastro-enterologist should be involved. The reason is that you want to have somebody who is technically skilled to do the procedure and take care of the complications that happen which is perforation. At the same time we believe that the scope is needed in there to be able to do the procedure safely, i.e. to use a video scope. Doing it with fluoroscopic guidance, in our minds, is not safe enough. You really need to see the scope so that you know where your guide wire is going and you are really not causing any injuries to the bowel, which is very friable and inflamed in these patients. And actually going to the complications that were reported in the literature, we see that the perforations were reported mostly by the reports that came from the radiologists. In our population, which is small, most of the lesions were in the recto sigmoid area so they were distal. However, in the literature there have been attempts at stenting lesions in the proximal descending colon as well as in the transverse colon. We think, as this technology improves and the expertise improves, there is a role to stent any lesion in any part of the colon.

In conclusion, 11 patients avoided emergency surgery with colostomy because of successful placement of ECWSs. We believe that endoscopic colonic wall stenting is safe and effective and thus, should be considered as initial treatment in all patients with benign or malignant disease seen with LBO in the absence of peritonitis. The major disadvantage of this approach is the necessity of having readily available experienced endoscopists, interventional radiologists and ancillary personnel for these emergencies.

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