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Original research

Short-term outcomes following the use of self-expanding metallic stents in acute malignant colonic obstruction – A single centre experience

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HIGHLIGHTS

- Management of obstructing colorectal cancer is challenging.
- Successful SEMS deployment obviates need for emergency surgery.
- Other benefits include shorter hospital stay and lower rates of permanent stomas.

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ABSTRACT

Background: Colonic self-expanding metallic stents (SEMS) may provide prompt relief of acute malignant colorectal obstruction (AMCO) and are increasingly used either palliatively or as a bridge to surgery (BTS) in patients in whom a definitive surgical approach is unsuitable. We evaluated short-term outcomes of malignant colorectal obstructive patients who underwent SEMS insertion in our institution over a 3-year period. **Methods**: A prospectively maintained database was reviewed to identify all patients who presented to our institution with AMCO between August 2010 and 2013 and who were treated with a SEMS either temporarily or permanently. Additional data was retrieved from chart reviews and operation notes. **Results**: Sixteen patients (12 males, 4 females) each had a single stent inserted during the study period, either palliatively ($n = 11$) or as a BTS ($n = 5$). The technical and clinical success rates were both 87.5% (14/16). The two unsuccessful stenting cases both had disseminated disease and required emergency surgery while five patients with curable disease proceeded to elective resections. There was no procedure-related mortality or stent-related perforations. The mean (standard deviation) length of stay post acute surgery was longer than elective surgery [45 ± 21.2 vs. 15.8 ± 4.0, days]. All patients in the BTS group were stoma-free post-operatively, while both patients who had emergency surgery ended up with permanent stomas. Finally, the stent complication rate was 6.2% (1/16), secondary to migration. **Conclusions**: Although limited by a small sample size, the study shows that SEMS have favourable short-term outcomes. Further adequately powered trials are needed to confirm those findings.

1. Introduction

Colorectal cancer is the second most common cause of cancer in women, and the third most common in men [1]. Acute malignant colorectal obstruction is a common surgical emergency, with a reported incidence of 8–29 % [2,3]. A population-based study [4] showed that one in four (i.e. 25%) postoperative deaths following surgery for colorectal cancer arises from patients who originally presented with obstruction. Sequelae of large bowel obstruction include colonic dilatation, bacterial translocation, metabolic derangements as well as an increased risk of colonic perforation [5]. Consequently, urgent surgical decompression is needed. Whilst the treatment of acute right-sided malignant colonic obstruction is widely accepted as resection with primary anastomosis [6], there is ongoing debate among the surgical community regarding the optimal treatment for acute left-sided obstruction. Indeed, the latter can be treated with a colonic resection with primary anastomosis, with or without a diverting stoma or a Hartmann's

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procedure, with a later reversal of colostomy and restoration of luminal continuity [2,7]. Irrespective of the technique used, emergency surgery is associated with significantly higher mortality rates (14.9%) compared to elective surgery (<6%) [8–11] as well as worse oncological outcomes [12]. In addition, a curative resection is not possible for one-third of patients presenting with acute malignant colonic obstruction due to locally advanced disease, distant metastases or severe comorbidities [13].

Colorectal stents provide an alternative to emergency surgery for the management of obstructing colorectal cancer. Over the last twenty years, self-expanding metallic stents (SEMS) have emerged as a favourable therapeutic approach, both as a palliative option (in patients with advanced or unresectable cancer) [14–16] and as a bridge to surgery measure (in patients with potentially curable disease) [17,18]. In both instances, the use of SEMS relieves the obstruction and obviates the need for emergency surgery, while enabling correction of fluid and electrolyte abnormalities and completion of pre-operative staging [19]. This report describes a single surgeon's stenting experience in a cohort of patients who presented with acute malignant colonic obstruction in a tertiary referral centre in Ireland.

2. Materials and methods

2.1. Patient population

A prospectively maintained database of all colorectal cancer patients was analysed to identify all patients who presented to our service with acute malignant colorectal obstruction and who were treated with a SEMS between August 2010 and 2013. Malignant large bowel obstruction was diagnosed by clinical examination (through a combination of obstipation or decrease in stool frequency, vomiting, abdominal pain and distension) and confirmed radiologically with plain abdominal radiographs and contrast-enhanced computed tomography (CT) scans. Patient selection criteria for stenting were location of the obstruction at or distal to the hepatic flexure and absence of clinical or radiographic evidence of perforation. Patients with obstructions proximal to the hepatic flexure were excluded because of poor site accessibility. However, age, general physical condition or disease stages were not considered exclusion criteria. Stents were inserted to either palliate or alleviate acute malignant colonic obstruction.

2.2. Stent insertion

Colonic SEMS were deployed in an operating theatre under both endoscopic and fluoroscopic guidance (Fig. 1), with the patient in the left lateral position using a combination of intravenous midazolam (Roche, UK) and fentanyl (Janssen, UK). A contrast study was performed to confirm the anatomical site and length of the stricture and to exclude bowel perforation. A 450 cm, super stiff 0.038 JAG guide wire (Boston Scientific Corporation, Galway, Ireland) was used to negotiate the stricture and subsequently the stent delivery system was deployed over this guide wire. Uniform size (25 × 90 mm) Wallflex^{TM} colonic stents (Boston Scientific Corporation, Galway, Ireland) were used in all patients. Balloon dilatation was not performed in any patients either before or after SEMS insertion. A single colorectal surgeon deployed all stents.

Antero-posterior abdominal radiographs were taken afterwards to check that the stent had fully deployed and the colon had decompressed. After the obstruction had resolved, pre-operative staging was completed and patients with potentially curable disease were offered elective resections, while those with evidence of distant metastases were referred for consideration of palliative chemotherapy.

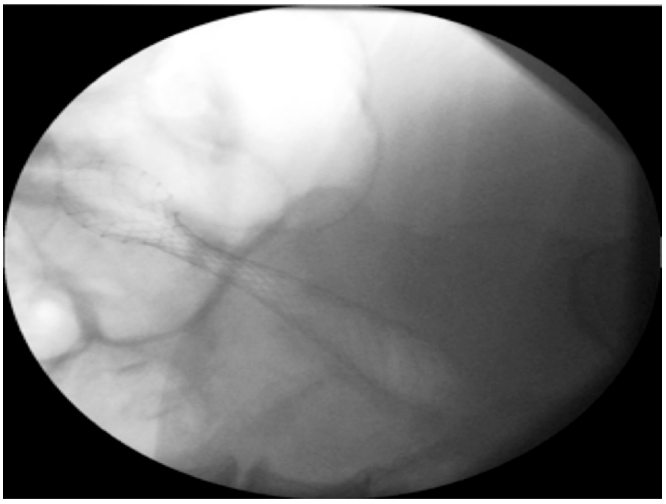

Fig. 1. Intrao-perative fluoroscopic image demonstrating an obstructing sigmoid tumour treated with a SEMS, with flaring evident at both ends consistent with satisfactory placement.

2.3. Study end-points

Technical success (TS) was defined as successful stent deployment across the obstructing tumour with radiographic confirmation of flaring of the stent both proximally and distally and visible stool passage. Clinical success (CS) was defined as colonic decompression with resolution of obstructive symptoms, without the need for further intervention during the hospital stay [20]. Stent complications were defined as those leading to new symptoms, characterized by perforation, reobstruction and stent migration [21,22]. Thirty-day procedure mortality was defined as death within 30 days of SEMS insertion, or within 30 days of elective or emergency/unplanned surgery. Hospital stay related to the number of days spent in hospital following either SEMS insertion or surgery.

2.4. Sources of data

Theatre registries and patient records were reviewed and the following information collected: patient demographics, location of obstruction, maximal extent of disease, number of stents inserted, TS and CS rates, details of further interventions performed after stenting (such as surgery, palliative chemotherapy, or stent re-insertion), length of time between SEMS insertion and elective/emergency surgery, stent complications, 30-day mortality and morbidity, length of hospital stay post stent placement or surgery and overall patient survival.

2.5. Statistical analysis

Data was analyzed using SPSS v21 (SPSS Inc., Chicago, IL) and presented as mean (standard deviation) or median (interquartile range) depending on their distribution. Categorical variables were summarised as frequency and percentage. As $n < 20$, no p value was calculated.

3. Results

Sixteen patients (12 males, 4 females) presented with acute malignant colorectal obstruction during the study period and they all had a single SEMS inserted, either as a temporizing measure or as a definitive intervention. Data was available on all of them and their demographics are outlined in Table 1. Five patients (i.e. 31.2%) had