Safety And Efficacy of Stenting In Large Bowel Obstruction - A Review Of Clinical Practice

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Abstract

AIM/Introduction
Self-Expanding Metallic Stents (SEMS) have been used as bridge to definitive surgery or for palliation in large bowel obstruction. It is employed as an alternative to emergency surgery with low complication and stoma rates.

Patients and methods
Data was collected retrospectively on patients who underwent colonic stenting from December 2000 to August 2009. Patient demographics, indication, location of stricture, complications and survival were included in the assessed data.

Results
Seventy-five patients with a mean age of 72 years were identified. Fourteen (19%) patients had the procedure as a bridge to surgery and the remaining 61 (81%) patients had a palliative procedure. In 47 (63%) patients the stricture was in the sigmoid colon. Successful stenting was achieved in 60 (80%) patients. The aetiology was benign in 5 (7%) patients. Complications occurred in 6 patients with migration in 3 (4%), expulsion in 2 (3%) and perforation in one (1%) patient. There was no stent-related mortality.

Conclusion
Colonic stenting is a useful intervention that reduces the morbidity and mortality associated with emergency surgery for large bowel obstruction. In this series the procedure had a high success and low complication rates.

Introduction

Approximately 35,000 new cases of colorectal cancer (CRC) are diagnosed in the UK every year. Nearly a third of these present as emergency with large bowel obstruction (LBO).1 Patients who undergo emergency surgery have high mortality (15-30%) and morbidity (40-50%), which is much higher when compared to elective surgery.2 Controversy still exists in the surgical management of LBO, with some units advocating primary resection with anastomosis and others performing Hartmann’s procedure.3 This often results in increased stoma formation compared to 5% when undergoing an elective procedure.4 Patients presenting with LBO often have a combination of electrolyte disturbance, nutritional deficiency and an unprepared colon ahead of a potential emergency colonic resection. Older patients are put at even greater risk of post-operative morbidity, mortality and readmission.5 Patients who undergo emergency colonic resections often develop multi-organ failure needing support in the critical care unit. The length of hospital stay and their overall recovery is usually prolonged, often denying them an opportunity to receive adjuvant therapy.6 It is known that approximately 20% of patients present with (Stage IV) metastatic disease. The presence of metastases can greatly influence decision making particularly in the elderly. These situations often are difficult to manage and pose a dilemma in choosing the appropriate palliative procedure.

SEMS (Figure 1) have increased in popularity in recent years as an alternative strategy in the management of patients with obstructed CRC. They have reduced mortality and morbidity and can be used as a bridge to surgery and as a palliative adjunct in patients with metastatic disease. When used as a bridge to surgery there is improved quality of life and survival.7,8 This study is a retrospective analysis of consecutive patients who underwent insertion of SEMS over a period of eight and a half years at University Hospital of South Manchester.

Methods

Patients who underwent SEMS insertion from December 2000 to August 2009 for obstructed CRC were included in the study. Data was collected from an electronic log within the radiology department at University Hospital of South Manchester. This was followed by a review of all case notes. The data collected included patient demographics (Table 1), indication for stent insertion (Table 2), stricture location (Table 3), emergency or elective procedure, complications (Table 4) and survival.
Seventy-five patients had SEMS inserted during this period with a median age of 74 years (range 36-97) and the M:F ratio was 38:37. Stents were successfully inserted in 60 (80%) patients. This was determined by successful placement of the stent at the location of the stricture and relief of large bowel obstruction. Fourteen (19%) patients had the stent placed as a bridge to surgery and 61 (81%) patients had stenting as a palliative procedure (Table 1).

The indication for stent insertion was LBO caused by primary malignant stricture (89%), metastatic ovarian carcinoma (4%), diverticular disease (3%), metastatic gastric carcinoma (1%), metastatic pancreatic carcinoma (1%) and for inflammatory bowel disease (1%) (Table 2).

The location of the obstruction that was successfully stented is shown in Table 3. The majority of the stents were inserted for left sided colonic obstruction. The sigmoid colon (63%) was the commonest location of obstruction with very few strictures proximal to splenic flexure. Three (4%) patients underwent stenting for benign disease, two for diverticular disease and one for inflammatory bowel disease (Crohn’s). Stent placement in one patient with diverticular disease was unsuccessful as the stricture could not be passed.

Complications occurred in 6 (8%) patients with stent migration and expulsion occurring in 3 (4%) and 2 (3%) patients respectively. One (1%) patient developed perforation and there were no incidence of stent-related mortality (Table 4). The median survival was 18 months for the bridge to surgery group and 5 months for the palliative group. Twelve (16%) patients were alive at the time of data analysis.

Discussion

The results from our unit demonstrate that in experienced hands, SEMS can be inserted successfully in majority of patients with low morbidity. The data has shown that the population who present with large bowel obstruction tend to be elderly. Furthermore the primary indication for stent insertion was colorectal adenocarcinoma (89% of patients). Of these, 67 (89%) patients presented with left-sided disease, whilst only 8 (11%) patients had right-sided disease. This is similar to published data, which have shown that in excess of 70% of malignant large bowel obstruction occurs as a result of left-sided lesion9-12. SEMS was inserted for metastatic disease causing large bowel obstruction in 5 patients. The metastatic cancer was from 3 ovarian, 1 gastric and 1 pancreatic malignancy. There is presently little data regarding long-term outcome following stent insertion. In this series there were 3 stents inserted for benign disease (diverticular disease and inflammatory bowel disease) but published data suggests that stent migration is higher in this group.13 One patient in our group experienced this problem.

Fourteen patients (19%) had SEMS insertion as a ‘bridge to surgery’. This method seeks to alleviate the symptoms of large bowel obstruction allowing for adequate decompression and optimisation prior to a planned procedure. By avoiding an emergency procedure, there is an associated reduction in the morbidity, including stoma formation, and the significant mortality, which can be associated with emergency surgery. Stent insertion has a high success rate with figures exceeding 80%. Successful insertion is lower in the ‘bridge to surgery’ group.14 Although stenting as a bridge to surgery is a useful option, presently there are resource problems in most of the units and round the clock stent service may not be available.

Complications from SEMS insertion are quoted a high as 25%-15, however in this series the rate was low (8%) (Table 4). Whilst the most significant risk of perforation is quoted at 3-4% in published works, in this series there was one perforation. This was a localised perforation that was managed conservatively and did not lead to fatality. Stent migration and expulsion was a problem in 5 (7%) cases in this series compared to other series which have had this problem in around 12% of patients.16 In this series, we did not have any cases of re-obstruction which has been reported as occurring in up to 7% of cases.17 The vast majority of cases (89%) in this series were of left-sided stricture. Whilst it is feasible for a skilled radiologist to insert a stent under fluoroscopic control, often a combined radiological and endoscopic method improves the insertion success.18 For right-sided strictures it is likely that this can only be realistically achieved with a combined approach.

In this series the median survival in the palliative group was 5 months compared to 18 months in the bridge to surgery group. Median survival following stent insertion when used as a bridge to surgery has been reported as up to 27 months.19 In this study, it is difficult to draw definite conclusions regarding survival in bridge to surgery group because of relatively small number of patients.

There have been over 100 articles published involving the use of SEMS for use in large bowel obstruction. Although the number of publications is large, these remain relatively small case series compared to this study. At present, no randomized controlled trial has...
been completed comparing emergency surgery versus SEMS for management of large bowel obstruction. A recent randomized controlled trial was halted prematurely due to an unexpectedly high number of perforations at the early stages. The long-term data of the effects of stent insertion is not available. Concerns have been expressed regarding the consequences of SEMS and dissemination of tumour cells. A recent study identified increased serum levels of CK20 mRNA following stent insertion in malignant LBO, however, the oncological consequences have not yet been made clear.

**Conclusion(s)**

SEMS can be a useful intervention to manage patients who present with obstructed CRC. This study demonstrates that high success rates of insertion are achievable and this is associated with low morbidity and mortality. These outcomes are consistent with similar published data in this area. Clearly large randomized controlled trials are needed to assess the comparison of emergency surgery versus SEMS insertion for malignant large bowel obstruction. The UK Colorectal Stenting Trial (CREST) has started recruiting patients and aims to recruit 400 patients to address this issue. Long-term data evaluating the effects of stent insertion is also required.

**Abbreviation(s)**

- SEMS - Self-expanding metallic stents
- CRC - Colorectal Cancer
- LBO - Large Bowel Obstruction

**Acknowledgement(s)**

Audit Department; University Hospital of South Manchester
Department of Radiology; University Hospital of South Manchester

**Reference(s)**


Illustrations
Illustration 1

Colonic Stent Illustrations and Tables

1. **Colonic Stent in-situ (Figure 1)**
Table 1. Demographics

<table>
<thead>
<tr>
<th>Patients</th>
<th>n=75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean)</td>
<td>72 years (36-97)</td>
</tr>
<tr>
<td>Male:female</td>
<td>38:37</td>
</tr>
<tr>
<td>Bridge to surgery</td>
<td>14 (19%)</td>
</tr>
<tr>
<td>Palliative</td>
<td>61 (81%)</td>
</tr>
<tr>
<td>Successful stent insertion</td>
<td>60 (80%)</td>
</tr>
</tbody>
</table>

Table 2. Stent indication

<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorectal carcinoma</td>
<td>67 (89%)</td>
</tr>
<tr>
<td>Metastatic ovarian carcinoma</td>
<td>3 (4%)</td>
</tr>
<tr>
<td>Diverticular disease</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Metastatic gastric carcinoma</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Metastatic pancreatic carcinoma</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>1 (1%)</td>
</tr>
</tbody>
</table>

Table 3. Stricture location

<table>
<thead>
<tr>
<th>Location</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectum</td>
<td>8 (11%)</td>
</tr>
<tr>
<td>Recto-sigmoid</td>
<td>5 (7%)</td>
</tr>
<tr>
<td>Sigmoid</td>
<td>47 (63%)</td>
</tr>
</tbody>
</table>
Table 4. Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migration</td>
<td>3 (4%)</td>
</tr>
<tr>
<td>Expulsion</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Perforation</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Mortality</td>
<td>0</td>
</tr>
</tbody>
</table>
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