

CASE SERIES

# Community experience of colonic stenting in patients with acute large bowel obstructions

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**Background:** Self-expandable metal stents (SEMS) can provide temporary relief of acute large bowel obstructions. Placement of SEMS creates the opportunity for semi-elective 1-stage surgical resections, use of possible adjuvant therapy or palliative relief of malignant obstructions. Our aim was to assess the likelihood of success and possible complication rates of SEMS insertion in a community hospital setting in patients presenting with large bowel obstructions.

**Methods:** We conducted a retrospective chart review at a single community-based hospital. This review addressed the technical success in deployment of the SEMS, clinical success defined by relief of the obstruction, procedure-related complications, surgical interventions and completion of adjuvant therapy for patients with large bowel obstructions.

**Results:** In a 34-month period, 16 patients underwent 16 SEMS procedures. The average age of patients was 69.4 years and 7 (44%) were women. Thirteen patients had intrinsic colorectal cancers, 1 had an extracolonic lesion (ovarian cancer) and 2 had strictures due to diverticular disease. Technical success occurred in all 16 patients, but only 15 (94%) had clinical success. No procedure-related deaths (defined as death within 7 days) occurred. Palliative stenting occurred in 5 patients (31%). Eleven patients (69%) eventually had surgery. Stenting allowed a window for neoadjuvant therapy in 4 patients. Ten of 11 patients (91%) had a 1-stage procedure. One patient had a cecal perforation presenting 2 days after SEMS. This patient received a defunctioning ileostomy.

**Conclusion:** In appropriate patients with large bowel obstructions, SEMS procedures can be safely and effectively performed in a community-based setting.

**Contexte :** Les prothèses métalliques auto-expansibles (PMAE) permettent une correction temporaire des occlusions aiguës du côlon. La pose d'une PMAE offre en effet la possibilité de procéder à une résection chirurgicale semi-urgente de stade 1, d'administrer un traitement adjuvant ou de soulager à titre palliatif les obstructions d'origine néoplasique. Nous avons voulu évaluer les probabilités de succès et les taux de complications possibles associés aux PMAE dans un contexte hospitalier communautaire chez des patients souffrant d'une importante occlusion intestinale.

**Méthodes :** Nous avons procédé à une analyse rétrospective des dossiers d'un seul hôpital communautaire. Cette analyse tenait compte de la réussite technique des PMAE, de la réussite clinique définie par la désobstruction, des complications de l'intervention, du recours à la chirurgie et de l'administration de traitements adjuvants chez des patients souffrant d'une occlusion du côlon.

**Résultats :** Sur une période de 34 mois, 16 patients ont reçu une PMAE. Ils étaient âgés en moyenne de 69,4 ans et 7 (44 %) étaient des femmes. Treize patients avaient un cancer colorectal intrinsèque; il y avait 1 cas de lésion extracolique (cancer de l'ovaire) et 2 patients présentaient des strictures attribuables à une maladie diverticulaire. On a enregistré une réussite technique chez les 16 patients, mais 15 seulement (94 %) ont obtenu une réussite clinique. On n'a déploré aucun décès en lien direct avec l'intervention (défini par sa survenue dans les 7 jours suivants). Chez 5 patients (31 %), on a posé une prothèse à des fins palliatives. Onze patients (69 %) ont éventuellement subi une chirurgie. La prothèse a permis l'administration d'un traitement néoadjuvant chez 4 patients. Dix patients sur 11 (91 %) ont subi une intervention de stade 1. On a déploré une perforation du cæcum chez un patient 2 jours après la pose de la PMAE; on a procédé à une iléostomie temporaire chez ce patient.

**Conclusion :** Chez certains patients souffrant d'une obstruction du côlon, on peut procéder sans danger et efficacement à la pose de PMAE dans un contexte hospitalier communautaire.

**E**ndoscopic deployment of self-expanding metal stents (SEMS) enables temporary relief of acute large bowel obstructions. This procedure provides an opportunity to cleanse the bowel and perform a semi-elective 1-stage colonic resection as opposed to an emergency procedure, which usually requires a colostomy and a 2-stage resection.<sup>1,2</sup> The SEMS also allows for preoperative chemotherapy or radiation treatment of malignant tumours or palliative relief in patients who have inoperable cancer or are deemed to be poor surgical candidates.<sup>1,2</sup>

The placement of SEMS for relief of large bowel obstruction may be underused, possibly from a lack of awareness of the procedure, inappropriate concerns over costs, lack of appropriate training in the technique or perhaps a belief that this technique can be used only in a tertiary setting. The primary aim of this study was to assess the technical and clinical success of SEMS in a community-based setting.

## METHODS

We retrospectively reviewed the electronic medical records and endoscopy reports of consecutive patients in whom SEMS placement was attempted for acute colonic obstruction by 2 endoscopists. The 2 endoscopists had advanced therapeutic endoscopy training. All patients were reviewed and assessed by gastroenterology and general surgery services. Patients were provided with information regarding the risks and benefits of both acute surgical resection and endoscopic deployment of SEMS. They were informed of the increased risk of perforation with SEMS insertion and the possibility of endoscopic failure. The patients included in this study provided written consent for the endoscopic procedure, but consent was not obtained for participation in this retrospective review.

All procedures were completed under fluoroscopy, and contrast media was used to delineate the length of the stricture. A colonoscope or a therapeutic gastroscope was inserted in the anus and advanced to the distal end of the colonic obstruction. An Xcel cannula (Microvasive Endoscopy, Boston Scientific Corp.) and a guidewire (450-cm length; Microvasive Endoscopy) were used to traverse the obstruction if the endoscope could not do so. Contrast medium was either passed through the cannula or a 60-mL syringe via the endoscope. A wire was manipulated as far proximally beyond the colonic lesion as possible. A SEMS (Microvasive Endoscopy) was chosen by the physician and prepared by the nursing staff. The diameter of the stents were 25 mm, and the length was either 90 mm or 120 mm.

We defined technical success as the ability of the

endoscopist to deploy the SEMS, completely bridging the colonic obstruction; we defined clinical success as relief of obstructive symptoms in the absence of complications. All inpatients were observed by the endoscopist and medical staff for procedure-related complications and clinical success. Outpatients were contacted and followed by the endoscopist to assess clinical success. We defined procedure-related death as death within 7 days owing to a procedure-related complication. Perforation was defined as radiological evidence of free air in the abdomen with clinical symptoms (e.g., abdominal pain).

## RESULTS

Between November 2006 and September 2009, a total of 16 procedures were performed in 16 patients. Of these, 7 (44%) were women. The average age of patients was 69.4 years (Table 1). Most were inpatients ( $n = 13$ ). The locations of the obstructing lesions were the rectosigmoid junction in 2, the sigmoid area in 10 and the descending colon in 4 patients. One patient had an extracolonic malignancy (ovarian), 2 had benign diverticular strictures, 1 had squamous cell carcinoma and 12 had colonic adenocarcinoma.

Preprocedure laboratory values, such as hemoglobin (125.6 g/L) and white blood cell count ( $10.4 \times 10^9/L$ ), were relatively preserved. Stricture lengths were based on

**Table 1. Demographic and clinical characteristics of patients who received self-expandable metal stents for large bowel obstructions**

Characteristic	No. (%)*
Age, mean (range) yr	69.4 (46.0–85.0)
Female sex	7 (44.0)
White blood cell count, mean (range) $\times 10^9/L$	10.4 (6.3–14.2)
Hemoglobin, mean (range) g/L	125.6 (96–191)
Stricture location	
Rectosigmoid junction	2 (12.5)
Sigmoid colon	10 (62.5)
Descending colon	4 (25.0)
Stricture length, mean (range) cm	4.5 (1.8–9)
Type of stricture	
Adenocarcinoma	12 (75.0)
Squamous cell carcinoma	1 (6.2)
Ovarian carcinoma	1 (6.2)
Diverticular disease	2 (12.5)
Technical success	16 (100)
Clinical success	15 (94.0)
Perforation	1 (6.2)

\*Unless otherwise indicated.

radiologic examination with contrast media and calculation of stricture length based on computer models. The average stricture length was 4.5 cm (range 1.8 cm–9.0 cm). Technical success occurred in all 16 patients, of whom 15 (94%) had clinical success. No procedure-related deaths occurred. One patient died due to a *Clostridium difficile* infection 9 days after the SEMS procedure.

Nine patients received a 90 × 25-mm SEMS, and 7 received a 120 × 25-mm SEMS. Three of 16 patients had prior surgery. Five patients received the SEMS for palliative purposes and did not require surgery. Of the 11 patients who had surgery, 4 had neoadjuvant therapy. The average wait for surgery was 41 (range 2–180) days. Ten of the 11 patients who had surgery had a successful 1-stage procedure. One patient had a cecal perforation 2 days after the deployment of the SEMS. There was no perforation at the site of the SEMS (descending colon). The patient, however, was passing gas and stool for 2 days before the perforation. The patient had an emergency right hemicolectomy and ileostomy with creation of a mucous fistula. This patient recovered, was discharged from hospital and received adjuvant therapy. No further surgery was performed as the patient was later deemed to have inoperable cancer owing to multiple metastases in the liver and lungs.

## DISCUSSION

We evaluated outcomes after management of large bowel obstructions with SEMS. In Canada, SEMS may not be used to their full potential owing to a perceived lack of data regarding the safety, technical and clinical success associated with the placement procedure.

In this community hospital-based study, we evaluated the outcomes of 16 consecutive patients referred for metal stenting of large bowel obstructions. Thirteen patients (81%) underwent metal stenting for colorectal cancer. Of the remaining patients, 1 (6%) had extracolonic malignancy (ovarian), and 2 (12%) had benign diverticular disease-related stricture. Both patients who had benign strictures had favourable outcomes. Currently, SEMS are generally used in patients with cancer, but there may be an increased role in patients with benign disease as well. This needs to be evaluated further.

All 16 patients who underwent the procedure had technical success, and 15 (94%) had clinical success that led to decompression of the large bowel. This success rate is similar to that reported in other studies.<sup>3-5</sup> We postulate that the 1 patient who experienced a cecal perforation may have had stent failure since the patient was passing gas and stool for 2 days before the perforation. Furthermore, we cannot comment on the patient's colonic motility, which could have been a contributing factor in the perforation.

Recently, some surgeons have introduced a 1-stage emergency treatment option for patients who present with left-sided large bowel obstructions. This would decrease

the need for colostomy and dispel the belief that colonic irrigation is optimally necessary in the management of large bowel obstructions. A study by Park and colleagues<sup>6</sup> evaluated outcomes of laparoscopic surgery after SEMS placement compared with 1-stage emergency surgical treatments. The end result was that surgery after SEMS resulted in shorter operative times, earlier passage of flatus and oral intake, shorter stay in hospital and fewer postoperative complications. Even though some surgeons may feel that bowel preparation is less relevant over time, the health and viability of a distended large bowel is a concern and can be mitigated by decompression with SEMS.

Another advantage of SEMS over surgery is being able to choose the timing of an operative intervention. Elective daytime procedures have many favourable outcomes compared with emergency nighttime procedures, including lower cost, decreased fatigue of surgical staff and more personnel available during the day than at night. Appropriate training for deploying SEMS should be provided to ensure patient safety. Though no formal numbers regarding training for this procedure have been reported, we believe at least 10 procedures under the supervision of a credentialed physician should be performed to obtain certification. In addition, if the procedure is not performed on a routine basis at a particular centre, this should be an indication for referral to a centre that performs SEMS more regularly (community or academic centre). Contraindications for deployment of SEMS are as follows: operator inexperience or lack of certified training, anal verge obstructive lesion and unstable patients despite resuscitation.

The use of SEMS followed by surgery has been shown to be more cost-effective than emergency surgery.<sup>7,8</sup> In Canada, the lack of widespread use of SEMS may be partly owing to cost considerations. The stents themselves are expensive compared with most endoscopically placed devices (\$1800–\$2200 for the stents v. \$10–\$400 for other devices, such as polypectomy snares, ERCP catheters, etc.). However, they provide satisfactory palliation and avoid the need for a surgical colostomy and the associated discomfort and costs associated with colostomies in patients who cannot be offered any other procedure. For the surgical candidates, it allows the procedure to be performed electively with all the appropriate preparation. Patients with SEMS can be discharged from hospital when decompression occurs (usually after 2–3 d), decreasing length of stay in hospital. Ultimately SEMS are cost-effective and likely increase quality of life.

## CONCLUSION

We found that trained operators in a community-based setting can achieve favourable outcomes in patients who require SEMS for large bowel obstructions. This can hopefully lead physicians to consider this option in the management of large bowel obstructions. Hopefully, the

cost associated with the use of SEMS can be viewed in conjunction with other factors, including length of stay in hospital, multiple potential surgeries and patient outcomes. The cost of SEMS inappropriately appears to be prohibitively expensive if increased costs to endoscopy units are considered independently from costs related to surgery and colostomy care.

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