Emergency management of malignant acute left-sided colonic obstruction

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ABSTRACT

INTRODUCTION The management of acute left-sided colonic obstruction still remains a challenging problem despite significant progress.

METHODS A literature search was undertaken using PubMed and the Cochrane Library regarding the options in emergency management of left-sided colonic obstruction focusing on outcomes such as mortality, morbidity, long-term prognosis and cost effectiveness.

DISCUSSION Colonic stenting is the best option either for palliation or as a bridge to surgery. It reduces morbidity and mortality rate and the need for colostomy formation. Stenting is likely to be cost effective, but data are variable depending on the individual healthcare system. Nevertheless, surgical management remains relevant as colonic stenting has a small rate of failure, and it is not always available. There are various surgical options. One-stage primary resection and anastomosis is the preferred choice for low-risk patients. Intra-operative colonic irrigation has no proven benefit. Subtotal colectomy is useful in cases of proximal bowel damage or synchronous tumours. Hartmann's procedure should be reserved for high-risk patients. Simple colostomy has no role other than for use in very ill patients who are not fit for any other procedure.

KEYWORDS

Colonic neoplasms – Intestinal obstruction – Stents – Colectomy – Hartmann's operation – Colonic irrigation

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The majority of cases of acute colonic obstruction are secondary to colorectal cancer. Between 15–20% of patients with colonic cancer present with symptoms of acute obstruction.^{1–4} Emergency surgery for acute colonic obstruction carries a significant risk of mortality and morbidity and a large number of patients will have a colostomy which is either temporary or permanent.^{1,2,5,6} The general consensus for the management of right-sided colonic obstruction involves one-stage resection and anastomosis for almost all patients but the frailest, thereby avoiding a stoma.¹ The emergency management of acute left-sided colonic obstruction remains controversial. There are several treatment options which include: (i) simple colostomy; (ii) primary resection with end colostomy (Hartmann's operation); (iii) one-stage resection anastomosis which could be subtotal colectomy or segmental colectomy, with or without intra-operative colonic irrigation; and (iv) colonic stenting. This study reviews the existing literature and examines the best evidence for the management of left-sided acute colonic

obstruction in terms of mortality, morbidity, long-term survival, and cost effectiveness.

Methods

A literature search was performed using PubMed and the Cochrane Library in May 2007. The following Mesh descriptor terms were used in combination: 'colonic neoplasms', 'intestinal obstruction', 'stents', 'colectomy'. Also, text terms were used in combination such as: 'colonic obstruction', 'colonic stents', 'Hartmann's operation', 'colonic irrigation', 'colostomy', 'anastomosis'. There was no language restriction. The 'Related Articles' function in PubMed was used and the references of the retrieved articles were reviewed.

Findings

The searches showed one Cochrane systematic review, two further systematic reviews, one meta-analysis, two decision

analysis, seven randomised controlled trials (RCTs), and a large number of non-randomised comparative studies and case series. One further systematic review and a position statement that were published since the original searches were included in the revised manuscript in December 2007.

Colostomy

Simple colostomy is part of the staged management for left-sided colonic obstruction. During the first stage, the obstruction is managed by the colostomy. The second stage takes place a few weeks later where the tumour is resected and the colostomy is closed or, alternatively, the colostomy can be closed at a third stage. The advantage of having a colostomy is that it provides decompression of the colon, minimises surgical trauma, reduces the risk of contamination from unprepared bowel, and allows staging prior to definite resection. There is only one RCT comparing emergency colostomy versus resection for acute left-sided colonic obstruction which did not show any difference in mortality rate; however, the overall length of hospital stay was shorter in the resection group.⁷ Another non-randomised prospective study showed the same mortality rate for both groups.⁸ A Cochrane systematic review that compared staged procedures with primary resection found no evidence to suggest a benefit in mortality with either strategy.⁹ Staged procedures for left-sided colonic obstruction are no longer used mainly due to prolonged hospitalisation and the need for multiple operations.

Primary resection

Primary colonic resection for acute left-sided colonic obstruction is considered the standard treatment by most surgeons. Debate exists, however, as to the type of operation. Primary resection with end colostomy, known as Hartmann's procedure, is considered the safest option.^{6,10} The main advantages are that there is no risk of anastomotic dehiscence and the operation can be performed by less experienced and non-specialist surgeons. The main disadvantages of Hartmann's operation are the need for a second major operation to reverse the colostomy, and the fact that 40–60% of patients do not have their colostomy reversed, thereby significantly affecting their quality of life.^{10,11} The reversal rate for Hartmann's operation done specifically for cancer is actually much lower at less than 20%.^{10,11}

Primary resection and anastomosis has an advantage since it is a definite procedure that does not require further surgery. The main disadvantages are that it requires a more experienced surgeon and there is a risk of anastomotic leakage from an unprepared bowel in an already very ill patient. There are no RCTs comparing the two techniques. The various non-randomised studies have not shown

Hartmann's operation to have any benefit in mortality.^{5,6,11–15} Indeed, most studies have shown Hartmann's operation to be associated with a poorer prognosis which is most likely related to selection bias as anastomosis is avoided in high-risk patients.^{11,15}

Although primary resection and anastomosis is generally preferred in selected patients, there is some debate as to the type of resection.¹⁴ One option is to do a total or subtotal colectomy.¹⁵ This procedure avoids the problem of an unprepared bowel and also protects against any future malignancy of the right colon. This is a more extensive operation with many patients complaining of diarrhoea afterwards.^{15,16} In the 1980s, segmental colectomy with intra-operative colonic irrigation (ICI) was suggested as an alternative operation.¹⁶ It has the benefit of making an anastomosis on a prepared bowel and preserving the normal colon. The main concerns are the prolonged operative time, the risk of spillage and contamination, and the need for increased expertise. There is only one RCT from the SCOTIA group that compared the two techniques.¹⁶ It concluded that segmental resection following ICI is the preferred treatment, due to fewer problems with bowel function. However, it did not show any difference in mortality or morbidity. Another non-randomised study comparing the two techniques did not show any difference in mortality but showed significantly more surgical postoperative complications in the ICI group and in particular wound infections.¹⁷ The main problem with ICI was that it was time consuming, having to allow up to an extra hour, although this is known to improve with experience.

To overcome the problems of ICI, various studies suggested segmental resection and primary anastomosis with manual decompression only, as an alternative.^{18–21} This idea was supported by various RCTs comparing mechanical bowel preparation, with no preparation in elective open colonic surgery. The results were separately examined in a Cochrane systematic review of 9 RCTs²² and in a meta-analysis of 7 RCTs.²³ These showed that there is no convincing evidence that mechanical bowel preparation is associated with reduced rates of anastomotic leakage after elective colorectal surgery. There is one RCT comparing ICI with manual decompression in acute left-sided colonic obstruction.²¹ It concluded that manual decompression is as good as ICI with no difference in morbidity or mortality, and it is a shorter and simpler procedure. Other non-randomised studies or case series have shown manual decompression to be safe.^{18–20}

Although one-stage resection and anastomosis is considered to be a better option than Hartmann's procedure in left-sided colonic obstruction, this is not true for all patients, and other parameters should be examined before choosing the operation.^{5,13,24} Patients should be stratified according to risk. The Association of Coloproctology of Great Britain and

Ireland (ACPGBI) study of large bowel obstruction caused by colorectal cancer identified four important predictors of outcome – age, ASA grade, operative urgency, and Dukes' stage.⁵ Similar results were shown by other studies.^{15,24} Some recent large studies have demonstrated a higher mortality rate after one-stage resection and anastomosis for the right colon than the left colon,^{5,15,25} whereas one study did not show any difference.²⁶ Although this result might appear unexpected, it can be explained by the fact that almost all patients with right-sided obstruction are treated by one-stage resection and anastomosis, whereas patients with left-sided obstruction are carefully selected according to risk. It would be considered appropriate to choose a simpler and safer procedure such as Hartmann's operation or even a diverting colostomy for patients deemed to be at high risk. This consensus is reflected in a questionnaire survey of American gastrointestinal surgeons in 2001 who responded that 67% would perform Hartmann's operation and 26% a simple colostomy in the high-risk patient.²⁷

The experience and subspecialty of surgeon seems to be a primary factor in the choice of anastomosis or end colostomy. It has been shown that primary anastomosis is more likely to be performed by colorectal consultants than general surgeons, and consultants generally than unsupervised trainees.²⁴ The ACPGBI study has shown that the mortality rate following surgery was similar between ACPGBI and non-ACPGBI members.⁵ This result can be challenged as the study was done on a voluntary basis. The Large Bowel Cancer Project showed that registrars had a higher mortality rate than consultants after primary resection for obstruction in the late 1970s, and this result has remained unchanged 20 years later in the Zorcolo study.^{1,24} Other studies have also shown that unsupervised trainees had significantly greater morbidity, mortality and anastomotic dehiscence rates.^{8,28}

Colonic stents

Colonic stents were introduced in the 1990s and have been used: (i) for palliation in patients who have inoperable cancer, or are unfit for surgery; or (ii) as a bridge to surgery, which means that the acute obstruction is managed by the stent and the patient has an elective operation for the cancer at a later stage.²⁹ In the elective setting, where a patient with an already diagnosed colonic cancer is treated conservatively and eventually presents with obstructive symptoms, the role of colonic stent as palliation is clear. In the emergency setting of acute colonic obstruction, the differentiation between palliation and bridge to surgery is artificial, and the final decision is often made later after the patient has been properly staged and recovered from the obstruction. This should, increasingly, not be the case with the more wide-spread availability of out-of-hours CT scan.

There are two systematic reviews analysing the outcome of colonic stenting for large bowel obstruction. The first included 29 case series with 598 patients,³⁰ and the second 54 studies with 1198 patients.³¹ The technical success was 92% and the clinical success 88%. The technical failure rate was higher for descending colon and more proximal stenting than for rectosigmoid stenting. The mortality rate in the most recent review was 0.6% (7 deaths) mostly associated with perforation.³¹ Six of these deaths occurred in the palliative treatment group. Problems related to colonic stenting included perforation in 3.7% of patients, migration in 12% of cases, and re-obstruction in 7%. These studies have shown that colonic stenting is a relatively safe technique with high success rates.^{29–31}

There are two RCTs comparing colostomy versus colonic stenting for palliation of malignant colonic obstruction.^{32,33} Both favoured the use of stents as they were safe, effective and alleviated the need for colostomy, thereby having a positive effect on the patient's quality of life. In contrast, the Dutch Stent-in I multicentre RCT in patients with incurable colorectal cancer had to be terminated prematurely because of four stent-related delayed perforations resulting in three deaths among 10 patients.³⁴ The authors pointed out that they used a new stent, the WallFlex colonic stent, for which there is no published data on its safety. There are only a few non-randomised studies comparing colonic stenting as a bridge to surgery versus emergency resection for obstructing left-sided colorectal cancer. One such retrospective case-matched study showed that stents are associated with a higher rate of primary anastomosis as well as a better outcome, in terms of length of hospital stay and stay in the ITU. It also showed that the mortality rate was more than double in the emergency resection group, but that failed to reach statistical significance due to the small sample.³⁵ Another retrospective comparative study showed significantly less postoperative complications in the stent group.³⁶ In a prospective, non-randomised study, the findings were again a higher primary anastomosis rate, a lower severe complication rate and a shorter hospital stay in the stent group. The mortality rate was almost 3-fold in the emergency surgery group, but this failed to reach statistical significance.³⁷ An interim analysis of short-term outcomes of a multicentre RCT has shown similar results.³⁸ There is one recent meta-analysis of non-randomised studies that compared colonic stenting and open surgery for malignant large bowel obstruction.³⁹ The results showed a lower mortality rate, shorter hospital stay, and a lower colostomy formation rate in the stent group. In particular, the mortality rate for the emergency surgery group was 12.1%, and for the stent group 5.7%.⁴⁰ There was no distinction between palliative and bridge-to-surgery stenting. This last figure contrasts with the mortality rate for stenting reported in a large systematic review to be 0.6%.³¹ There is very limited

Table 1 Various options in malignant acute left-sided colonic obstruction with indications and associated benefits and problems

	Indication	Benefits	Problems
Stenting	Palliation Bridge to surgery	Lower colostomy rate Lower mortality	Limited availability Not always successful Uncertainty regarding long-term outcomes
One-stage resection anastomosis	Low-risk patients	No need for colostomy	Concerns for anastomotic dehiscence
Intra-operative colonic irrigation	In combination with one-stage resection anastomosis	Addresses the issue of bowel preparation	Time consuming No evidence that it is necessary
Subtotal colectomy	Proximal bowel damage and synchronous tumours	Safe as segmental resection	More extensive operation Diarrhoea
Hartmann's operation	High-risk patients Inexperienced surgeon	No risk of anastomotic dehiscence	Needs further major surgery for reversal of colostomy Many patients are never reversed
Simple colostomy	Palliation in very frail	Only option if stenting not possible	Burden of colostomy

data on long-term survival of using the stent as a bridge to surgery.³⁹

The cost effectiveness of colonic stents is an important parameter as stents are very expensive. It is thought that their cost is offset by the shorter hospital stay and the lower rate of colostomy formation. Two decision analysis studies from the US and Canada calculated the cost-effectiveness of two competing strategies – colonic stent versus emergency primary resection for acute left-sided malignant colonic obstruction.^{40,41} Both concluded that colonic stent followed by elective surgery is more effective and cost efficient than emergency surgery. A small retrospective study from the UK in 1998 showed that the mean net saving from palliative stenting compared to surgical decompression was £1769, whereas the saving from stenting as a bridge to surgery followed by elective resection, compared to emergency Hartmann's operation followed by elective reversal was £685.⁴² A RCT from Greece comparing stenting and colostomy for palliation of patients with inoperable malignant partial colonic obstruction showed very small difference in the costs, with the stent group being 6.9% (132 euros) more expensive per patient.³² Another study from Switzerland reported stenting to be 19.7% less costly than surgery.⁴³ None of these studies incorporated the hidden costs of stoma bags used in the community. Although stents seem to be cost effective, results are difficult to compare because costs are calculated in a different way in every health care

system, costs differ between palliation and bridge to surgery, and the cost of stents is likely to reduce over time.

Conclusions

The management of acute left-sided colonic obstruction still remains a challenge despite significant progress. The various options are summarised in Table 1. A recent position statement by the ACPGBI with a more detailed discussion of the issues has drawn similar conclusions.⁴⁴ The single procedure that makes the biggest difference is colonic stenting, either for palliation or as a bridge to surgery. In the palliation group, it allows patients, at the end of their life, to avoid the additional burden of a colostomy. In the bridge-to-surgery group, the colonic stent has reduced mortality and morbidity rate, has shortened the hospital and ITU stay, and has reduced the rate of colostomy formation. It has basically converted a complicated urgent colectomy into an elective one. We still need more information regarding the long-term outcome. However, as it has a small rate of failure and, more importantly, as it is not available everywhere, particularly after hours and during the weekends, other options of the surgical management of acute left-sided colonic obstruction remain relevant. A recent systematic evaluation of surgical strategies has confirmed the limited number of RCTs and the often poor quality of non-randomised studies.⁴⁵ There is still enough

evidence to suggest that the majority of patients can be treated safely with one-stage resection and anastomosis. Subtotal colectomy and ICI are not proven to add any additional benefit. Subtotal colectomy is still very useful in cases of synchronous tumours or proximal bowel damage. Hartmann's procedure should be reserved for high-risk patients. There are remaining grey areas but clinical decisions will often depend on the surgeon's experience. More senior supervision is needed in the management of these patients. Simple colostomy has no role other than for palliation or use in very ill patients who would not survive any other procedure.

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