Closure of Loop Ileostomy: A Review of the Evidence for the Practising Surgeon

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Abstract

Defunctioning loop ileostomy is a common procedure that is employed alongside restorative proctocolectomy in both benign and malignant conditions. Once time has elapsed and the colonic anastomosis has healed, a second operation is carried out to close the loop ileostomy and restore bowel continuity. The two-stage strategy depends on the total morbidity of a longer primary procedure, living with the ileostomy, closure of the ileostomy and subsequent rehabilitation being less than the morbidity associated with one-stage restorative proctocolectomy and rehabilitation alone. The main disadvantage of one-stage restorative proctocolectomy is the risk of leak and pelvic sepsis. In practice, most surgeons use a one-stage restorative proctocolectomy when they perceive the risk of leak to be low and a two-stage strategy when the risk of leak is high. This paper aims to draw together what evidence there is surrounding closure of loop ileostomy from technical, administrative and patient perspectives. The aim is to put the issues surrounding defunctioning stomas and their reversal into perspective in order to inform both the surgeon and the patient, aiding in their decision-making processes.

Conclusion: Closure of loop ileostomy may be of only marginal benefit to the patient in quality of life and satisfaction. The procedure carries significant risks and published data concerning the rates of various complications is highly variable. The relevant studies are reviewed in order to provide useful information on complication rates for patients, surgeons and trainees.

KEYWORDS: ileostomy, stoma, stoma reversal, stoma closure, colorectal cancer
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Conclusion: Closure of loop ileostomy may be of only marginal benefit to the patient in quality of life and satisfaction. The procedure carries significant risks and published data concerning the rates of various complications is highly variable. The relevant studies are reviewed in order to provide useful information on complication rates for patients, surgeons and trainees.
Introduction

The loop ileostomy was introduced in the 1960s and is now used commonly to defunction the distal bowel when the surgeon perceives a high risk of anastomotic leak both in restorative proctocolectomy for bowel cancer or pouch formation in benign disease.\textsuperscript{1,2} Diversion of the faecal stream aims to reduce the impact on the patient of a leak from a colonic anastomosis. This paper focuses on the practical issues surrounding the closure of a defunctioning loop ileostomy following restorative proctocolectomy and reviews the evidence with regard to patient experience and the risks associated with the procedure. The aim is to provide the practising surgeon with enough information to enhance the counselling and consent process in the clinic prior to closure of loop ileostomy.

Methods

Relevant papers were identified from using the PubMed online search facility (http://www.ncbi.nlm.nih.gov/pubmed) using the search terms: “ileostomy closure”; “ileostomy reversal”. Abstracts were retrieved and reviewed for relevance and duplication. The full text versions of relevant articles were obtained and further relevant publications identified from the lists of references within the papers.

Patient satisfaction

Patient satisfaction is difficult to measure but some studies have attempted to quantify this. On the face of it, patients might be expected to have a reduced physical and social
function scores along with a reduced overall quality of life whilst living with the temporary stoma. These measures might reasonably be expected to improve once the stoma is closed.³

One problem with assessing patient satisfaction is that patients report fewer problems to the surgeon than they do to the stoma nurse.⁴ In addition, they may only report some problems when asked directly in person and not when filling out a questionnaire.⁵

There are conflicts within the published data. One study demonstrates that reversal of ileostomy improves both body image and leisure activities but does not manage to show an overall improvement in quality of life.⁵ Improvement in quality of life is seen in one prospective analysis, but body image and general health perception did not improve after reversal.³ Another small study showed improvement of social and physical function as well as overall quality of life after ileostomy reversal.⁶

These marginal gains in satisfaction scores probably relate to the make-up of the patient cohort. Whilst a young patient may benefit greatly in terms of body-image from closure of their ileostomy, many cancer patients are elderly and may find a stoma tolerable. In fact, an elderly lady with poor sphincter function may find a stoma easier to manage than the complications associated with a low rectal anastomosis which include diarrhoea, increased stool frequency, nocturnal defecation, and sometimes incontinence.³ These are complications of the rectal surgery rather than the reversal of the ileostomy which are masked while the colon is defunctioned. They still contribute to the change in patient
satisfaction measures at the time of reversal however. Some patients have such poor anorectal function following rectal surgery that they ultimately require a defunctioning stoma to improve their quality of life.\textsuperscript{7} It may be that life with a stoma is so agreeable to some patients that they choose never to have it reversed. In a major Irish tertiary centre in 1999 only 83\% of patients were having their ileostomies closed.\textsuperscript{8} In a large multicentre study collecting data from patients operated in 2000/2001 showed a reversal rate of 89\%, citing factors including patient refusal, general inoperability, tumour progression, death, and anal sphincter insufficiency.\textsuperscript{9} More recent data from a UK NHS hospital show that only 75\% of patients end up being reversed.\textsuperscript{10} Within the UK over recent years a number of changes in surgical practice have been driven by targets set by central government. Such targets have accelerated the initial treatment of the cancer but not subsequent events such as ileostomy closures.

**Complications of reversal of defunctioning loop ileostomy**

Closure of a loop ileostomy is an operation which involves contamination with at least some bowel content, undertaken in a patient who has recently had major surgery, is potentially still somewhat malnourished or unfit in other ways and may even be undergoing adjuvant treatment around the same time. The operation therefore comes with associated morbidity and mortality.

**Overall complication rate**
The majority of studies suggest the overall morbidity of closure of loop ileostomy is between 12% and 22%. Much lower complication rates have been quoted: in a small study aimed at demonstrating the viability of day-case ileostomy closure, the author reports no complications and in an audit of 84 ileostomy closures, a 4% total complication rate has been quoted, although all of these required laparotomy, implying that minor infections such as superficial infections were not included in their figures.

30 day mortality

Closure of loop ileostomy is associated with a low 30-day mortality rate. Many studies do not quote a figure but, when quoted, the figure lies between 0.3% and 2%. The mortality associated with closure is much lower than the rate for the initial surgery, and this may in part be due to patient selection by the surgeons and the anaesthetist involved based on how the patient fared in the original resection and subsequently.

Bowel obstruction

Rates of small bowel obstruction vary between 6.4% and 18.5%. The debate over whether stapled or hand-sewn anastomoses are better in this regard continues, but one early author advocated stapled closure as it gives a wider lumen and hence a lower risk of obstruction. This was backed up in a randomised controlled trial which found a 14% rate obstruction with hand-sewn anastomoses compared to 3% with stapled closure. Despite the continuing debate, it is worth noting that small bowel obstruction following closure of ileostomy is multi-factorial in that it can be adhesional, due to intra-mural
haematoma, or anastomotic stricture. The apparent time advantage with stapling may be offset by the need for more mobilisation and the cost of the stapling device.

Anastomotic leak, fistula and intra-abdominal sepsis

The rates of anastomotic leak with clinical consequence and intra-abdominal sepsis are low, typically 1-3%, but historically rates as high as 8% have been cited in older studies. Rates of fistula formation are similarly low (<1.5%). Fistula formation is likely to be more frequent in patients with Crohn’s disease or due to deep suture placement.

Wound infection

Quoted rates of superficial wound infections vary widely, ranging from 1.5% to 14.2%. Earlier closure (<3.2 months) has been shown to be associated with more wound infections, 2.2%, than closure after 3.2 months, when the rate fell to 0.7%. There is a debate around whether it is best to leave the wound to heal by secondary intention, to carry out delayed primary closure, purse-string closure around a wick or primary closure. Some authors say primary closure of skin under antibiotic cover is enough to limit the risk of wound infection. Other authors use a risk/benefit argument to say that although infection rates are higher with primary closure, the patient benefits when it is uncomplicated by not requiring intensive follow-up (ie dressings). When a wound infection occurs, it is usually an easily-managed complication.

Incisional hernia
Incisional hernia formation at the former stoma site is a common problem that presents to
the general surgeon but as a late complication it may be under-reported. Individual
studies have quoted rates of 0.9%, 4.1%, and 18.5%.\textsuperscript{17,18,23} A large meta-analysis looked
at many studies but only 3 studies reported rates of hernia and these showed that 5 of 136
(3.7%) patients went on to develop stoma-site herniae.\textsuperscript{14} The authors comment on the
scarcity of data. In a later meta-analysis (co-authored by the first author of the original
meta-analysis) including 3652, a stoma-site hernia rate of 1.8% was calculated.\textsuperscript{15}

**Predictors of complications**

If it were possible to identify technical or patient factors that predispose a patient to
complications, it would be possible to counsel the patient appropriately and/or modify the
techniques employed. To this end, it seems that patients who have a loop ileostomy
formed for inflammatory bowel disease have a higher complication rate than when the
ileostomy is carried out as part of a cancer operation.\textsuperscript{12}

Delaying closure of the ileostomy appears to be of benefit, both in terms of wound
infection but also the overall complication rate falls after 8.5 weeks.\textsuperscript{12,18} Closure however
should be carried out before adjuvant therapies begin.\textsuperscript{27}

Operative factors that predict a higher rate of complications include supervised operation,
soft silicone drain, stapled anastomosis, bowel prep and irrigation of the distal segment
pre-operatively. In this series it is worth noting that stapled closure was the exception
rather than the rule, being carried out in only 17% of cases.\textsuperscript{13}
Reducing complications

Pre-operatively, a water-soluble contrast enema is used to exclude leak from the rectal anastomosis, but this study can also be used to check for any obstruction distal to the anastomosis. 18

The timing of closure is important, although this relates to resolution of intestinal oedema and maturation of adhesions rather than anastomotic healing which is normally complete in the first two weeks. 24 After this, performing the closure is best either after 8.5 weeks or after 3.2 months but before any adjuvant therapy commences.12,18,27

Intra-operatively, testing for leaks in water bath prior to returning the anastomosis to the abdomen has been advocated but closure over a drain or delayed primary closure not necessary. 28,29

Expedited discharge

Although closure of ileostomy in the ambulatory setting (ie discharge within the first 24 hours) has been reported in the USA, it is possible to adopt a “fast-track” approach, analogous to the enhanced recovery protocol, which has shown that discharge by post-operative day 2 is possible.16,30 Criteria for discharge include establishment of oral diet, passage of stool or flatus, adequate analgesia, and adequate mobility.

Conclusion
What should we do and how should we advise our patients? Many patients and their relatives are well-informed when they attend the clinic and they may ask specific questions about the risks and benefits of closure of loop ileostomy. This review aims to give an overview of the whole procedure for the practising general surgeon or their trainees with enough current information to answer those specific questions.

Some of the data regarding patient satisfaction appear contradictory. It has long been assumed by many (and probably most patients fall into this group pre-operatively) that life with a stoma is barely tolerable and that life after reversal will suddenly improve. This seems to be an over-simplification. Perhaps we should be counselling our patients that closure of the ileostomy does not necessarily improve body image, general health perception, quality of life or ability to participate in leisure activities and that it is associated with small but definite risks. So what risks could we quote? It would seem reasonable to quote a 1% mortality; 15% overall complication rate; 10% small bowel obstruction; 2% leak/fistula/intra-abdominal sepsis, and 2% hernia. But what about wound infections? Should we offer patients a choice between a 1.5% rate when the wound is left to heal by secondary intention and a 14% rate with primary closure? For all the papers on the subject, the final decision about whether closure of loop ileostomy is the right choice for a particular individual should rest with the patient and their surgeon.

**Conflict of interest statement**

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References


