

Laparoscopic restorative proctocolectomy: safety and critical level of the ileal pouch anal anastomosis

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Abstract

Aim The study reports the longer-term results of laparoscopic-assisted restorative proctocolectomy (RPC), with particular reference to safety and the level of the stapled ileal pouch-anal anastomosis (IPAA).

Method Data were collected prospectively from all patients who underwent laparoscopic RP from July 2006 to July 2010. In each patient the operation involved the use of a short (6 cm) Pfannenstiel incision to facilitate placement of the linear stapler for anorectal division.

Results Seventy-five patients underwent RPC either with total proctocolectomy ($n = 53$) or after previous emergency colectomy ($n = 22$). Early postoperative morbidity occurred in 18 (24%) patients and readmission within 30 days occurred in 18 (24%). Morbidity during follow up developed in 29 (39%). A pouchogram was carried out in all 75 patients before ileostomy closure with an abnormality shown in eight. The median level of the

IPAA was at 3.0 cm (1.0–5.0cm) above the dentate line. At a median of 33 (9–57) months, there has been one case of small bowel obstruction and no incisional hernia.

Conclusion In laparoscopic-assisted RPC a limited Pfannenstiel incision allows safe construction of the IPAA at an appropriate level. Laparoscopic RPC is safe and the emerging long-term follow-up data show the benefit of this approach, with very low rates of small bowel obstruction and incisional hernia formation.

Keywords Ileal pouch, postoperative complications, stapled

What is new in this paper?

The data presented demonstrate that in laparoscopic-assisted restorative proctocolectomy a limited Pfannenstiel incision permits accurate placement of the linear stapler to allow construction of the IPAA at an appropriate level while achieving the benefits of minimal invasive surgery.

Introduction

Since its introduction in 1978 [1], restorative proctocolectomy (RPC) has become the procedure of choice for most patients requiring elective surgery for ulcerative colitis and for many with familial adenomatous polyposis. Systematic reviews to address the debate surrounding optimal pouch design and function have shown the superiority of the double-stapled J pouch [2]. Laparoscopic restorative proctocolectomy has been demonstrated to be feasible and safe [3–5]. However, its short-term benefits in terms of reduced morbidity,

shortened length of hospital stay and reduced postoperative pain are less impressive for RPC [3] than after laparoscopic segmental colonic resection [6].

One difficulty with the proctectomy aspect of laparoscopic RPC is to achieve a safe staple line at the anorectal junction because currently available laparoscopic stapling devices do not permit cross-stapling at this level with a single firing. Too high a division resulting in retained rectum may produce poor function. The benefits of laparoscopic RPC should be sought in the longer term incidence of incisional hernia and small bowel obstruction [7]. A short Pfannenstiel incision allows placement of the transverse staple line before division of the anorectum at an appropriate level above the dentate line. We report the results of a series of patients treated by laparoscopic-assisted RPC using this incision, in which the level of the ileal pouch-anal anastomosis was determined.

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Method

A consecutive series of patients under the care of one surgeon, who underwent laparoscopic RPC between July 2006 and July 2010 at The General Infirmary at Leeds, were entered onto a prospective laparoscopic surgery database. The study satisfied the Research Ethics Committee as an audit of practice.

The surgeon had an experience of over 200 open RPC procedures and more than 500 laparoscopic resections. Patients either underwent a single-stage laparoscopic RPC with ileal pouch-anal anastomosis (IPAA) or a restorative proctectomy (RP), having previously had a subtotal colectomy with end ileostomy. Data collected included patient demographics, operative details, conversion rate, intra- and postoperative complications, mortality, re-operation rate, length of hospital stay, readmission rates and reasons for readmission, pouchogram details, time to ileostomy closure, follow up and long-term morbidity.

Technique and postoperative care

Our technique has been described previously [4]. All patients received oral mechanical bowel preparation unless they had undergone subtotal colectomy. They were sited for a temporary ileostomy by the colorectal nurse specialist. A single dose of broad-spectrum antibiotics was administered. The modified Lloyd-Davies' position was used, with the legs in Allen stirrups such that the thighs were level with the abdomen. Port placement and pneumoperitoneum were established as described [4]. Dissection commenced with the left colon in a lateral to medial fashion, the inferior mesenteric vessels were divided with an endoscopic stapler, and dissection proceeded to the splenic flexure and then sequentially along the transverse colon and then down the right colon to the ileum. The rectum was mobilized laparoscopically as far as the pelvic floor, then a small (6 cm) Pfannenstiel incision was made to complete the pelvic dissection and to allow placement of a linear contour device (Ethicon Endo-surgery, Bracknell, UK) to divide the rectum at the pelvic floor level. The pouch was constructed using two limbs of 20 cm of ileum with two to three firings of a linear stapler (TLC 75 Ethicon Endo-Surgery) and a double stapled end-to-end anastomosis was constructed with a circular stapler (ELS 29 Ethicon Endosurgery). All patients had a defunctioning ileostomy.

A pouchogram was arranged for 8 weeks postoperatively with closure of the ileostomy shortly thereafter. The height of the IPAA above the dentate line was measured at the time of closure of the ileostomy and/or at routine pouchoscopy 1 year later.

Statistical Analysis

Results are presented as median (range) for quantitative outcomes and frequencies and percentage for categorical outcomes.

Results

Seventy-five (34 male) consecutive patients with a history of ulcerative colitis ($n = 69$) or familial adenomatous polyposis ($n = 6$) who underwent laparoscopic-assisted RPC with IPAA were included. Three patients who underwent a totally laparoscopic RPC without a limited Pfannenstiel incision were excluded. The median age was 35 (15–72) years.

Fifty-three patients underwent a laparoscopic restorative proctocolectomy and ileo-pouch anal anastomosis and 22 underwent laparoscopic restorative proctectomy after previous subtotal colectomy with end ileostomy. There were no conversions. The median length of stay was 7 (2–62; interquartile range, 5–11) days. There was no mortality.

Morbidity within the first 30 days after surgery occurred in 18 (24%) patients (14 (27%) of 52 after RPC; 4 (18%) of 22 after RP). Five patients experienced more than one complication (Table 1). Two (2.6%) required re-operation within 30 days (postoperative bleeding, 1; pelvic collection, 1). Three (4%) had a high output ileostomy intractable to medical management and remained as an inpatient until an early stoma closure. One of these patients had a stenosed ileostomy.

Readmission within 30 days of surgery occurred in 18 (24%) patients (Table 2). The most common reason was high output ileostomy ($n = 6$, 8%) or pelvic collection ($n = 4$, 5%). Three (4%) patients admitted with high ileostomy output had pre-renal renal failure that resolved with water and electrolyte replenishment.

Table 1 Early postoperative morbidity following laparoscopic restorative proctocolectomy in 75 patients.

Morbidity	Number of patients (%)
Pelvic abscess/collection	6 (8)*
Ileus/small bowel obstruction	5 (7)†
Minor wound infection	4 (5)
High output ileostomy	3 (4)
Ileostomy problems	2 (2.7)
Postoperative bleeding	1 (1.3)
Mesenteric thrombosis	1 (1.3)

*Laparoscopic washout, $n = 1$; antibiotics +/- CT guidance, $n = 5$.

†Managed conservatively.

Table 2 Reasons for readmission following laparoscopic restorative proctocolectomy in 18 (24%) patients.

	Number of patients (%)
High output ileostomy	6 (8)
Pelvic collection without operative intervention	4 (5)
Abdominal pain	3 (4)
Small bowel obstruction managed conservatively	2 (2.7)
Minor wound infection	2 (2.7)

The median interval from surgery to the contrast enema was 9 (2–51; IQR 7–12) weeks. Of the 75 examinations an abnormality was seen in eight (radiological leakage ($n = 5$), small bowel obstruction managed conservatively with no subsequent pouchogram or recurrence ($n = 1$), small leak from blind end of the J pouch ($n = 1$), anastomotic stricture ($n = 1$). Two studies demonstrated persistent leakage from the pouch and the ileostomy has not yet been reversed. The median level of the IPAA was 3.0 (1.0–5.0) cm above the dentate line. Of the 73 patients whose ileostomy had been closed, the median time to closure from RPC was 14.5 (2–124; IQR 10–25.5) weeks.

The median duration of follow up was 9 (9–57) months. At follow up, 29 (39%) patients experienced morbidity, nine of whom had more than one type of complication (Table 3). Eighteen (24%) have been treated for pouchitis and nine (12%) required dilatation of a pouch-anal anastomotic stricture under anaesthetic. Two patients have required an ileostomy once more owing to poor function. One patient required a laparotomy in the second trimester of pregnancy for small bowel obstruction secondary to a band adhesion. None of the patients developed an incisional hernia. The functional results are shown in Table 4.

Discussion

The safety and feasibility of laparoscopic RPC have been demonstrated in single-centre studies [4,5,8–11] and in

Table 3 Long-term morbidity following laparoscopic restorative proctocolectomy in 75 patients.

	Number of patients (%)
Pouchitis	18 (24)
Pouch-anal anastomotic stricture	9 (12)
Poor function	6 (8)
Small bowel obstruction treated surgically	1 (1.3)

Table 4 Function.

Follow up, median (range) months	33 (9–57)
Median number of stools per 24 h	7 (4–7)
Median stools per night	1 (0–2)
Complete continence diurnal	65/75 (87%)
Complete continence nocturnal	58/75 (77%)
Antidiarrhoeal medication	52/75 (69%)

two meta-analyses [3,12]. Some advantages of the laparoscopic approach are seen in the short-term outcome compared with open surgery but these are probably of little clinical significance [3]. RPC is associated with a high rate of postoperative morbidity, regardless of the type of surgery [13] and the morbidity rate of 24% in the present study is well within the reported range and nearly identical to our rate of 22% published previously [4]. Ileoanal anastomotic stricture occurred in 12% of patients, slightly higher than in other published series [6,11]. All but one responded to a single dilatation.

Small bowel obstruction following open ileal pouch surgery is common, with a cumulative risk at 10 years of more than 30% [13,14]. Of 1005 patients having an open RPC at the Cleveland Clinic, small bowel obstruction was seen in 254 (25.3%) at a median follow up of 2.3 years, of whom 70 required surgery [13]. MacLean *et al.* [14] reported 351 episodes of small bowel obstruction in 273 (23%) patients of 1178 having open RPC at a mean of 8.7 years. Obstruction in the 30 days after RPC accounted for 154 (44%) of the episodes, of which only eight needed re-operation. In contrast, surgery was needed in 72 patients having 197 (56%) later episodes, with adhesions being the cause in 90%. The cumulative risks of obstruction and the need for surgery to treat it were 31.4% and 7.5% at 10 years.

There is now some information on the incidence of small bowel obstruction after laparoscopic RPC. Of 15 articles reviewed by Gutt, four studies comparing laparoscopic and open surgery showed a reduction in adhesion formation for the former [15]. This was supported by a recent study by the Mayo Clinic, [16] in which 34 patients underwent laparoscopic assessment of intra-abdominal adhesions at the time of ileostomy closure. Adhesions were minimal and greatly reduced compared with historical controls and 50% of the patients had no adhesions at all. This reduction may to lower readmission rates for small bowel obstruction, as may be suggested in the present study with only one patient requiring surgery during follow up [17].

Incisional hernia formation in the abdominal wound after open surgery, is common [18], with a rate of 4.1% at 2.3 years after RPC [13]. Laparoscopic rectal cancer surgery is associated with a reduction in incisional hernia

[19] and similar findings have been demonstrated for laparoscopic restorative proctocolectomy [20]. This is supported by the absence of any case of incisional hernia in the present series.

The main motive for this study was concern about the level of the IPAA. A totally laparoscopic RPC with intracorporeal IPAA is technically difficult as there is currently no instrument able to apply reliably a transverse staple line with one firing across the gut tube at or below the anorectal junction. This is largely due to the angle of deployment of the instrument, especially in a narrow male pelvis. It is unacceptable to construct an ileal pouch rectal anastomosis. A small Pfannenstiel incision overcomes this difficulty by allowing better angulation of the instrument to achieve a transverse staple line at the correct level. This technical detail has not adversely affected function (Table 4), which is similar to that after laparoscopic IPAA [5].

The superior cosmetic result of laparoscopic RPC has been demonstrated [21,22]. Polle *et al.* [21] showed that the body image and cosmesis scores of female patients were significantly higher after laparoscopic compared with open RPC. Cosmesis may even be improved further with single incision laparoscopic surgery (SILS) [23].

This study adds to the literature confirming the safety of laparoscopic RPC. It indicates furthermore the benefits of very low rates of small bowel obstruction and incisional hernia formation.

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