Gut 1993; **34**: 680–684

An audit of restorative proctocolectomy

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Abstract

A total of 168 restorative proctocolectomies have been performed without mortality during the past nine years. Morbidity from pelvic sepsis (12%), ileoanal stricture (15%), and pouch related fistulas (16%) have become less with increasing experience of the operation. Pouch excision, which occurred in 30% of the first 50 patients was undertaken in only 4% in the last 68 patients. Despite this, intestinal obstruction (18%) continues to complicate the operation. We have abandoned restorative proctocolectomy after failed ileorectal anastomosis in patients with slow transit constipation as half have now requested pouch excision because of poor results. Failure to identify Crohn's disease continues to influence the outcome: in 10 patients now known to have Crohn's disease six developed post operative fistulas, three have required pouch excision. Sexual impairment has occurred in three male patients (4%). Ten women had children after operation, eight uncomplicated vaginal deliveries occurred without impaired continence. Seven of nine patients over 60 years of age have had a successful outcome. Our data also indicate that the operation may be justified in distal disease if urgency is socially inconvenient. Frequency of defecation is usually less than three per 24 hours in patients with familial adenomatous polyposis but remains variable in those with ulcerative colitis.

(*Gut* 1993; **34**: 680–684)

Restorative proctocolectomy is a useful operation for ulcerative colitis, familial adenomatous polyposis, and some diseases where colonic function is severely disturbed. The aim of the operation is to ablate the diseased bowel while preserving normal function of the anal sphincter.[1 2]

Methods

EVOLUTION OF STANDARD TECHNIQUE

We have used restorative proctocolectomy for nine years, initially with a modest annual operation rate but as confidence has grown and the indications for the operation seemed to have expanded, so the frequency of operation has increased (1984, 4; 1985, 9; 1986, 16; 1987, 21; 1988, 24; 1989, 22; 1990, 24; 1991, 30; so far in 1992, 18). Indications for restorative proctocolectomy now include not only ulcerative colitis and familial adenomatous polyposis but high grade dysplasia, megacolon constipation, and certain cases of distal colitis.

In the first 18 cases the lower third of the rectum was retained and an extensive anal mucosectomy was performed with a sutured pouch (most being of the double limb J variety) at the dentate line. This procedure resulted in considerable damage to the sphincter and was replaced by a technique of abdominal mucosectomy[3] and sutured ileoanastomosis for the next 58 operations. With an intra-anal sutured ileoanal anastomosis, mesenteric vascular division was required to deliver the apex of the pouch to the dentate line in 24 of the first 76 (32%) cases. With increasing confidence of low sutured anastomosis, loop ileostomy has been dispensed with in selected cases (well nourished patients with no steroid medication and with no technical difficulties in the construction of the anastomosis). By 1988 we had begun to adopt the double stapling technique for ileoanal anastomosis (anal transection with a transverse linear stapler: RL30 (Ethicon) and the end to end circular stapler with detachable anvil: CEEA (Autosuture)), incorporating a stapling technique (linear staple cutter PLC 75 (Ehicon)) for pouch construction.[4] In most cases the ileoanal anastomosis lies at the top of the anal columns and hence the anal transition zone is retained; however, in patients with polyposis we usually perform a mucosectomy and a sutured anastomosis at the denate line. After a trial of loop ileostomy in totally stapled restorative proctocolectomy[5] loop ileostomy is now only used in selected cases (four in the last 18 cases after closure of the trial). Rectal excision was originally performed keeping close to the bowel and preserving the superior haemorrhoidal vessels (n=29). Thereafter all rectal excisions have included the mesorectum, care being taken at the pelvic brim to identify and preserve the pelvic nerves and not to enter Dennonvilliers fascia during the anterior rectal dissection.

Results

PATIENTS

We have analysed our results chronologically into three groups; the first and second 50 cases and the last 68. We fully accept that there have been changes in technique during this time, as described earlier, and as Table 1 shows, in all sutured ileoanal anastomosis some form of mucosectomy was performed. The variable use of loop ileostomy is shown.

Most patients (n=123) were operated on for presumed ulcerative colitis but 10 (8%) are now known to have Crohn's disease and a further 10 (8%) have certain features of Crohn's disease and have been labelled indeterminate colitis. Twenty six patients have had a restorative proctocolectomy for familial adenomatous polyposis of whom 20 had a synchronous proctocolectomy and pouch construction and only four of these patients had a covering loop ileostomy. There were eight patients who had a previous subtotal

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Accepted for publication
6 October 1992

TABLE I *Change in morbidity with experience: comparison of groups*

	First 50 (1984–7)	*Second 50 (1988–90)*	*Last 68 (1990–)*
Age (median (range)) (y)	32 (11–78)	36 (16–68)	34 (21–78)
Age over 60	2	2	5
Diagnosis:			
Ulcerative colitis (n=103)	33	27	43
Probable Crohn's disease (n=10)	3	3	4
Possible Crohn's disease (n=10)	4	3	3
Familial adenomatous polyposis (n=26)	5	7	14
Constipation (failed ileorectal anastomosis) (n=8)	3	3	2
Megacolon and megarectum (n=10)	2	7	1
Dysplasia and polyps (n=1)	0	0	1
Operation:			
Statured ileoanal anastomosis* (anal mucosectony)	50 (18)	15 (0)	4 (0)
Stapled ileoanal anastomosis	0	35	64
Loop ileostomy	45	19	28

*The remainder had abdominal mucosectomy.

colectomy and ileorectal anastomosis for slow transit constipation who had developed recurrent difficulty with defecation that necessitated large doses of laxatives to control secondary constipation. These eight were treated by restorative proctocolectomy. Similarly, there were 10 patients with longstanding acquired megacolon and megarectum with normal ileal function and acceptable anal sphincter activity who have been treated by restorative proctocolectomy. The double stapling technique was never applicable in these cases because of the widely dilated and thick walled anus; hence a hand sewn ileoanal anastomosis was required.

There were seven patients over the age of 60 who have had a restorative proctocolectomy, one of whom had longstanding polyps and high grade dysplasia; the rest had ulcerative colitis.

COMPLICATIONS

Mortality

There has been no operative mortality but two late deaths have occurred; one patient had a fatal motorcycle accident and a further patient who suffered chronic small bowel obstruction after pouch surgery developed fatal septicaemia after pouch excision seven years after the original operation (Table II).

Early morbidity

Table II shows the details of morbidity. Over half of all patients developed a clinically important complication in the first 100 operations (52%); this figure has now fallen to 25% in the last 68 operations. There were three important early complications – namely, infarction of the pouch (n=6), pelvic bleeding (n=6), and pelvic sepsis (n=21). These complications often coexisted and with the exception of pelvic sepsis, their incidence has not fallen with increased experience with the operation. There were three diabetic patients, in the series, and two of them had severe sepsis after operation. Although pouch ischaemia was in the past associated with radical mesenteric vascular division, this complication is still seen. Two recent cases were from malrotation of the pouch and another from mesenteric vein thrombosis complicating pelvic sepsis.

TABLE II *Changes in morbidity with experience*

	First 50 (1984–7)	*Second 50 (1988–90)*	*Last 68 (1990–)*
Early mortality	0	0	0
Late deaths	0	2	0
Complications (total) (n=69):	28 (56%)	24 (48%)	17 (25%)
Infarction (pouch excision (n=6)	2	2	2
Bleeding in pelvis (reoperation) (n=6)	2	1	3
Pelvic sepsis (n=21)	7	9	5
Intestinal obstruction (operation/resection) (n=31)	9 (5/4)	9 (4/0)	14 (5/2)
Stricture at ilioanal anastomosis (n=25)	12	9	4
Fistulas (n=27)	12	9	6
Gall stones (n=8)	4	3	1
Failures (pouch excision) (n=22)	15	4	3
Ischaemia (n=6)	2	2	2
Sepsis (n=3)	2	0	1
Poor function (constipation) (n=10)	9 (4)	1 (1)	0
Crohn's disease (n=3)	2	1	0

Late morbidity

Late complications included stenosis of the ileoanal anastomosis (n=25, 15%). This event seems to be less frequent after the use of stapled anastomosis at the top of the anal column (8% compared with sutured ileoanal anastomosis 22%).

Intestinal obstruction that necessitated admission to hospital occurred in 31 (18%) patients. Episodes of intestinal obstruction usually occurred in the first year of operation but in seven patients admission to hospital with obstruction occurred after the first 12 months. In 14 patients operative intervention was necessary for relief of obstruction and in six of these 10 to 50 cm of small bowel required resection, either because of operative damage (n=3) or infarction from the obstruction (n=3). The frequency of obstruction seems to have remained constant throughout the series even though there has been a tendency to use loop ilesostomy more sparingly with increasing experience.

Twenty seven fistulas occurred after operation. Fistulas either presented early (n=13), in which case they usually resulted from a breakdown of an ileoanal anastomosis or a suture line deshiscence in the pouch to the abdominal wall, perineum, or vagina (two cases that were later proved to have Crohn's disease). Alternatively fistulas have presented later after operation (n=14) due to unrecognised Crohn's disease (n=4), chronic obstruction at the ileoanal anastomosis (n=3), from a stitch sinus (n=1), or from possible reactivation of latent cryptoglandular infections (n=6). Table III shows the anatomical varieties of fistulas, their relation to the underlying bowel disorder, and outcome. Fortunately this complication seems to have occurred less often with increasing experience.

The presence of symptomatic gall stones in eight patients is interesting and is the subject of a more thorough investigation.

POUCH EXCISION (FAILURES)

In 22 (13%) patients the pouch has been excised. In half (11 cases) this was at the patients' request because of poor function. One patient with Crohn's disease requested pouch excision because of severe diarrhoea, four patients with slow transit constipation who had a pouch requested excision because of continuing

TABLE III *Fistulas complicating restorative proctocolectomy (no of excisions)*

	Crohn's disease (n=6)	*Megarectum or constipation (n=3)*	*Ulcerative colitis (n=18)*
Ileoanal anastomosis→skin (n=3)	0	1	2 (1)
Pouch appendage→skin and bladder (2) (n=3)	0	0	3 (1)
Pouch→skin (n=4)	2 (2)	1	1
Loop ileostomy closure→skin (n=1)	0	1	0
Small bowel damage/anastomosis→skin (n=3)	0	0	3 (1)
Ileostomy closure→bladder (n=1)	0	0	1
Ileoanal anastomosis→vagina (n=10)	4 (1)	0	6 (1)
Ileoanal anastomosis→perineum (n=2)	0	0	2

abdominal distension and a feeling of incomplete evacuation. The remaining six patients who requested pouch excision all had ulcerative colitis. Pouch excision was undertaken in two other patients with Crohn's disease because of pouch fistulas. In three patients the pouch was removed because of severe sepsis after operation and in six early excision was necessary because of infarction.

POUCH FUNCTION

Table IV gives the eventual outcome according to the underlying pathology.

Patients with familial adenomatous polyposis have a uniformily excellent functional result. All of them have intact pouches and bowel frequency ranges from one to four per 24 hours.

By contrast, restorative proctocolectomy for slow transit constipation is now no longer recommended as half have had their pouch excised because they were dissatisfied with the functional results. On the other hand, results of restorative proctocolectomy in patients with megacolon and megarectum have been good.

Restorative proctocolectomy is not recommended knowingly for Crohn's colitis, as recurrence is eventually anticipated and there is a high incidence of complications. Half the patients with Crohn's disease in this series developed fistulas after operation and three have already had their pouch removed. Those with Crohn's disease who still retain their pouch, however, have a bowel frequency that is only just greater than in those patients having the operation for ulcerative colitis. All of these patients are loath to consider an ileostomy at the moment but fully accept that pouch excision may eventually be necessary.

The functional result in patients with ulcerative colitis is extremely variable. Some patients have a bowel frequency of only two in 24 hours whereas others defecate 10 times in 24 hours. Despite this the symptom of urgency is invariably improved and all 81 patients with ulcerative colitis who have been followed up for more than six months state that they can defer defecation for more than two hours. In ulcerative colitis 17% of patients continue to take antidiarrhoeal agents and some dietary restriction is reported in 25%. Despite this, constipating agents and dietary restriction tends to be used less often with increasing duration of follow up. Twenty six patients with ulcerative colitis had disease confined to the left colon and seven restorative proctocolectomies were performed for proctitis alone because of severe urgency. The 33 patients with distal disease have functional results that are indistinguishable from those with total colitis.

Nine patients over the age of 60 are included in this series. Two pouches failed because of ischaemia but the clinical results in the remaining seven patients are indistinguishable from younger patients in the series. All three diabetic patients had a satisfactory outcome despite the fact that one of them has severe autonomic neuropathy. Somewhat surprisingly all six patients in whom a small bowel resection was performed for obstruction report a satisfactory outcome with a defecation frequency (6·3 in 24 hours) that is not in excess of the total population.

SEXUAL FUNCTION

Although a detailed sexual history was not recorded before operation only three of 71 men (4%) have had any sexual dysfunction after pouch construction. One suffers from a weak erection and two complain of retrograde ejaculation. Dyspareunia has been troublesome after operation in eight of 97 women (8%). Ten women have had children after pouch construction, two by caesarian section. Eight women have had a total of nine vaginal deliveries and none of these women have had impaired continence after delivery.

POUCHITIS

Pouchitis has been recognised clinically and confirmed by endoscopy in 30 patients.

Seven have had repeated episodes of pouchitis of whom four are now known to have Crohn's disease. All 23 single attacks of pouchitis have responded within three days of treatment with metronidazole orally. Pouchitis has not occurred

TABLE IV *Functional outcome*

	*Known ulcerative colitis**	*Possible Crohn's disease*	*Definite Crohn's disease*	*FAP*	*Constipation*	*Megacolon/ rectum*
Total pouch construction (n=168)	104	10	10	26	8	10
Pouch excisions (early bleeding, infarction or sepsis) (n=26)	13 (7)	1	3	0	4	1
Functioning pouches (ileostomy closed: follow up >6 months (n=133)	81	8	7	24	4	9
24 hour bowel frequency (range)	6·1 (2–10)	5·8 (4–11)	7·1 (4–13)	2·3 (1–4)	6·7 (6–8)	2·3 (1–4)
Nocturnal soiling	8	2	1	0	0	0
Antidiarrhoeal agents	14	4	6	0	0	0
Dietary restriction	20	5	7	0	0	0
Pouchitis:						
Single attack (n=23)	18	1	1	3	0	0
Repeated attacks (n=7)	2	1	4	0	0	0

*One patient with dysplasia and multiple polyps; FAP=familial adenomatous polyposis.

in patients with constipation or megacolon but has been found in three of 24 patients with familial adenomatous polyposis.

Discussion

After nine years exploring a new operation for large bowel disease we considered that it was time to take stock and objectively evaluate the merit of restorative proctocolectomy for ulcerative colitis, familial adenomatous polyposis, and functional bowel disorders. We therefore reviewed all patients by personal interview where possible (n=154). Those living abroad or in other regions and unable to attend were contacted by post or telephone. The review was undertaken by one of two research fellows who attempted to be as objective as possible. An independent investigator outside the surgical team was not used.

Although restorative proctocolectomy is associated with a low mortality the morbidity is considerable. Complications after operation have become less prominent with increasing experience, but there is still a failure rate of about 10%. Some failures are due to ischaemia, sepsis, and fistulas in the early period after operation and it is to be hoped that these complications will become less with further experience. Half of all the failures are because patients are dissatisfied with the functional results of this operation. The only way in which these late pouch excisions are likely to be minimised is by greater care in patient selection, particularly the identification of Crohn's disease. Pouch construction is no longer recommended for functional bowel disease unless there is a megacolon and megarectum. Fistulas after operation are a special problem of this operation and seem to be related to a failure to recognise Crohn's disease, technical problems related to pouch construction and ileoanal anastomosis, or from secondary sepsis. In our opinion not all of the pouch excisions performed would now be necessary; in some of the earlier cases of fistulas that were encountered the pouch might now be salvaged.

Small bowel obstruction continues to occur after this operation despite increasing experience with the procedure. In some patients the small bowel has required resection for relief of obstruction due to infarction or iatrogenic damage. As the incidence of intestinal obstruction has persisted despite a lower frequency of covering loop ileostomy it is difficult to blame the use of a loop ileostomy for the increased frequency of this complication.

One important finding from this series has been a failure to identify Crohn's disease preoperatively,[6] despite thorough radiology, endoscopy, histology from biopsy or colectomy specimens, absence of perianal disease, and apparently normal small bowel at operation. The eventual outcome in patients with Crohn's colitis has been poor. Six developed fistulas and three out of 10 have had their pouch excised. Many of the remaining patients with an intact pouch have repeated episodes of pouchitis, diarrhoea is generally troublesome, and most patients require medication for symptoms. Not all cases of Crohn's disease were identified in the colectomy specimen; nevertheless we now rarely perform pouch construction at the time of colectomy because of the possibility of unrecognised Crohn's disease. We also believe that preliminary colectomy results in safer pouch surgery,[7] because patients are no longer on steroid medication, are well nourished, and there is no co-existing sepsis. As a consequence of this policy loop ileostomy is now used in only 22% of operations.[9-10] In those cases with indeterminate colitis, only time will tell whether these patients behave as those with ulcerative colitis or true Crohn's disease.[11] We would not routinely recommend restorative proctocolectomy knowingly for patients with Crohn's colitis because the failure rate is high and most will eventually develop recurrence of disease in the anal canal or in the small bowel. So far two of 10 patients with a diagnosis of Crohn's disease have already developed recurrence in the small intestine. Nevertheless some of the patients with an intact pouch have had a relatively satisfactory short term outcome. Most of these patients are loath to consider a permanent ileostomy at the moment. Nevertheless most are likely at some stage to lose their pouch and in so doing will sacrifice 40 to 50 cm of terminal ileum.

The low morbidity and excellent functional results of pouch construction with ablation of all colonic disease and the anal mucosa among patients with familial adenomatous polyposis make us believe that this is the operation of choice in most patients for this disease. In an inherited disease with a 50% penetrance resulting in large bowel malignancy, the stigma of a stoma if conventional proctocolectomy is used or the need for repeated sigmoidoscopy if ileorectal anastomosis is offered for treatment make potential recruitment of family members for screening a real problem.[12] These families are notoriously unreliable both in allowing themselves to be followed up and allowing their family members to be screened. The arguments against restorative proctocolectomy for familial adenomatous polyposis on the grounds that the operation carries a much greater morbidity than ileorectal anastomosis[13,14] now seem to be unfounded, particularly when the need for annual and sometimes difficult sigmoidoscopy after ileorectal anastomosis is considered.[15,16] We do not think that regular pouch surveillence is necessary after operation in polyposis even though polyps have been reported in the small bowel, because their malignant potential is very low.[17]

We previously proposed that restorative proctocolectomy might have a role in the management of patients with continued constipation despite subtotal colectomy and ileorectal anastomosis if there was objective evidence of slow transit constipation.[18] The results of this audit indicate that restorative proctocolectomy should be resisted as an option in these patients particularly as many have features of the irritable bowel syndrome, which in all groups seems to be associated with poor functional results. On the other hand, in adult megacolon with a megarectum, the results are extremely good provided small bowel and anal function are normal.

The results of restorative proctocolectomy for ulcerative colitis are variable. Some patients

seem to do well and have a bowel frequency of less than four in 24 hours without any impairment of continence. By contrast, some patients seem to have a frequency that is rarely less than 10 in 24 hours and need to take antidiarrhoeal agents and modify their diet. The one symptom that is invariably improved by restorative proctocolectomy is that of urgency. Indeed these results justify the operation even in distal disease where urgency is the principal symptom. Retaining the anal mucosa sometimes results in bleeding from the involved mucosa but discrimination may be improved by avoiding mucosectomy.[3] We would usually advise mucosectomy for dysplasia or coexisting colorectal cancer, however, as we do in polyposis. Elderly patients should not necessarily be denied the operation if they are fit and have normal anal function. Even patients with diabetes mellitus complicated by autonomic neuropathy are not necessarily a contraindication to restorative proctocolectomy. The functional results of patients who have lost up to 50 cm of small bowel raises the question as to whether repeated pouch construction is justified in those patients whose pouch has had to be removed because of ischaemia.

The identification of symptomatic gall stones after operation might imply that the enterohepatic circulation of bile salts is disturbed by altering the function of the terminal ileum after this operation. Changes in bile acid metabolism after restorative proctocolectomy is currently being investigated and the results are awaited with interest.

At one time pouchitis was thought to be a serious complication of pouch construction and even an argument against restorative proctocolectomy. In our experience, however, pouchitis is often only a single event that responds rapidly to treatment with metronidazole. If repeated pouchitis occurs the possibility of underlying Crohn's disease should be seriously explored.[19 20]

Sexual complications after operation were fortunately uncommon, in line with most other's experience, furthermore it seems that a close rectal dissection is not necessary to avoid autonomic nerve damage in men.[20 21] Perhaps the most encouraging finding from this audit is that the quality of life, sexual fulfilment, and procreation are often improved by the operation.[21 22] The quality of life after restorative proctocolectomy seems now to be appreciably better than after conventional proctocolectomy although this was not measured in this audit.[23] This being the case, provided patients realise that they may experience a bowel frequency of seven in 24 hours (usually five stools in the day and one night time evacuation), the operation has unquestionably improved the wellbeing of most patients. Furthermore, the operation has also changed the indications for surgical resection in ulcerative colitis.[21]

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