British Journal of Surgery 1997, **84**, 814–818

Outcome of 200 restorative proctocolectomy operations: the John Radcliffe Hospital experience

J. ROMANOS, D. N. SAMARASEKERA, J. F. STEBBING, D. P. JEWELL*, M. G. W. KETTLEWELL and N. J. McC. MORTENSEN

*Departments of Colorectal Surgery and *Gastroenterology, John Radcliffe Hospital, Oxford, UK*
Correspondence to: Mr N. J. McC. Mortensen, Department of Colorectal Surgery, John Radcliffe Hospital, Oxford OX3 9DU, UK

Background Restorative proctocolectomy is now the operation of choice for the definitive management of ulcerative colitis and familial adenomatous polyposis (FAP).

Methods A total of 200 patients (117 male, 83 female) underwent restorative proctocolectomy over a 12-year period. Information in a dedicated prospective database was supplemented by chart review. Some 177 had ulcerative colitis, 13 had indeterminate colitis and seven had FAP. Pouch designs were two-loop J ($n = 142$), four-loop W ($n = 45$) and three-loop S ($n = 13$). The majority (73·5 per cent) had a stapled ileoanal anastomosis and 139 patients had a defunctioning ileostomy.

Results There were no deaths. Early morbidity (less than 30 days after operation) included 76 complications in 71 patients (35·5 per cent), of which 35 were related to the pouch itself. Long-term follow-up data were available for 196 patients at a median of 27 months. Sixteen pouches (8·0 per cent) have been excised. Mean daytime frequency was 4·5 (range 1–15). Of 175 patients with colitis, 42 (24·0 per cent) had one or more episodes of pouchitis.

Conclusion Continuous improvements in operative technique have simplified the procedure, and functional results, although variable, have generally been acceptable.

Restorative proctocolectomy was first described by Parks and Nicholls[1] in 1978 and has become the operation of choice for the definitive surgical management of ulcerative colitis and familial adenomatous polyposis (FAP). Continuous improvements in operative technique have simplified the procedure, and functional results, although variable, have generally been acceptable. The majority of patients are satisfied and living stoma-free lives.

The mortality rate approaches zero, but the incidence of complications remains high, the most common being pelvic sepsis, small bowel obstruction and pouchitis.

The aim of the present study was to evaluate the clinical and functional results of the first 200 consecutive patients with a pouch, operated on over a 12-year period at the John Radcliffe Hospital in Oxford.

Patients and methods

A total of 200 patients (117 male, 83 female) underwent restorative proctocolectomy between April 1983 and March 1995. Pouch operations were performed by three consultant surgeons (M.G.W.K., N.J.McC.M. and the late Emanoel Lee). Median age at the time of pouch surgery was 33 (range 6–67) years. A dedicated prospective database has been maintained of all patients undergoing restorative proctocolectomy which includes details of the patient's history, operation, postoperative morbidity, functional outcome and follow-up assessments. This paper reports a retrospective analysis of the information available in the database, supplemented where necessary by reference to the hospital notes.

Following pouch surgery patients were reviewed at 2–12 weeks, 3, 6 and 18 months, and annually thereafter. At each review, data concerning late morbidity and pouch function were obtained, and this included daytime and night-time frequency, presence or absence of incontinence, urgency and mode of pouch evacuation, use of antidiarrhoeal drugs and episodes of pouchitis. Sexual and urinary function were also assessed.

Incontinence was defined as major (gross leakage, wearing pads day and night) or minor (occasional faecal seepage, spotting of underclothes). Urgency was defined as an inability to defer defaecation for at least 30 min.

Pouchitis was defined as an increase in pouch evacuation frequency with endoscopic and histological evidence of acute inflammation.

Diagnosis and indication for surgery

The diagnoses are given in *Table 1*. Of seven patients with FAP, one had a preoperative diagnosis of severe dysplasia and one had an occult carcinoma. The main indication for operation in patients with ulcerative colitis was failed long-term medical treatment of the disease (50·3 per cent) and for indeterminate colitis an acute severe attack (nine of 13 patients) (*Table 2*).

All colonoscopic biopsy series or previous resection specimens were reviewed to minimize errors in histopathological diagnosis. Where there was continuing doubt over the possible diagnosis of Crohn's disease, a three-stage procedure was used in elective cases. Patients with active anal lesions such as perianal fissures or fistulas were excluded.

Operative technique and pouch design

The categories of pouch operations performed are shown in *Fig. 1*. In 123 patients (61·5 per cent) rectal dissection was performed in the mesorectal plane and in 77 (38·5 per cent) a close rectal dissection was performed. Three pouch designs were used during the series: the two-loop J pouch (142 patients (71·0 per cent)), the four-loop W pouch (45 (22·5 per cent)) and the three-loop S pouch (13 (6·5 per cent)).

The majority of patients, 147 (73·5 per cent), underwent a stapled pouch–anal anastomosis. Some 53 (26·5 per cent) had an endoanal handsewn anastomosis. In general, a stapled anastomosis was performed without mucosectomy. The extent of mucosectomy performed with a handsewn anastomosis reduced as the series matured. To date, the anal transition zone has been preserved in 165 patients (82·5 per cent) and removed in 35 (17·5 per cent).

Paper accepted 12 September 1996

Some 139 patients had a defunctioning ileostomy fashioned at the time of pouch surgery, of which 129 had been closed at the time of analysis. The median time to closure of ileostomy after restorative proctocolectomy was 16 (range 4–103) weeks. Sixty-one patients underwent pouch surgery without an ileostomy.

The majority of patients (80·0 per cent) with ulcerative or indeterminate colitis were on steroid therapy at the time of surgery. All patients received prophylaxis for deep vein thrombosis (heparin 5000 units subcutaneously twice daily) and perioperative antibiotics (intravenous cephalosporin and metronidazole).

Results

Early morbidity after pouch surgery

There were no postoperative deaths in the series. Early morbidity (less than 30 days) included 76 complications in 71 patients (35·5 per cent). Of these, 35 (46 per cent) were related to the pouch procedure itself and the remaining 41 (54 per cent) were non-specific (*Table 3*).

Thirteen patients developed pelvic and intra-abdominal sepsis; six underwent further laparotomy to achieve adequate drainage, two were managed with computed tomography (CT)-guided drainage of the abscess and five were managed with antibiotic therapy alone. Pouch haemorrhage occurred in five patients: one pouch was excised for uncontrollable bleeding and refashioned; two were controlled by suturing or diathermy of the bleeding vessel; and two settled spontaneously. Three pouches were excised for ischaemia and these patients were left with a permanent ileostomy. Adhesive small bowel obstruction occurred in six patients, of whom five were on steroid therapy before operation and four required laparotomy.

Long-term complications

Long-term follow-up data were available for 196 of the 200 patients at a median of 27 (range 0·5–139) months. Four patients are being followed elsewhere in the UK or overseas. During this period 65 complications were noted in 54 patients (27·6 per cent), as detailed in *Table 4*.

Anastomotic stenosis ($n = 17$), small bowel obstruction ($n = 16$), pelvic sepsis ($n = 7$) and pouch–vaginal fistula ($n = 6$) presented significant management problems.

Table 1 Preoperative diagnosis

Diagnosis	No. of patients	M:F
Ulcerative colitis	177	104:73
Indeterminate colitis	13	6:7
Familial adenomatous polyposis	7	5:2
Functional problems	2	1:1
Hirschsprung's disease	1	1:0

Table 2 Indications for restorative proctocolectomy

	Ulcerative colitis ($n = 177$)	Indeterminate colitis ($n = 13$)	FAP ($n = 7$)
Failed medical treatment	89 (50·3)	4	0
Acute severe attack	79 (44·6)	9	0
Severe dysplasia	6 (3·4)	0	1
Carcinoma	3 (1·7)	0	1

Values in parentheses are percentages. FAP, familial adenomatous polyposis

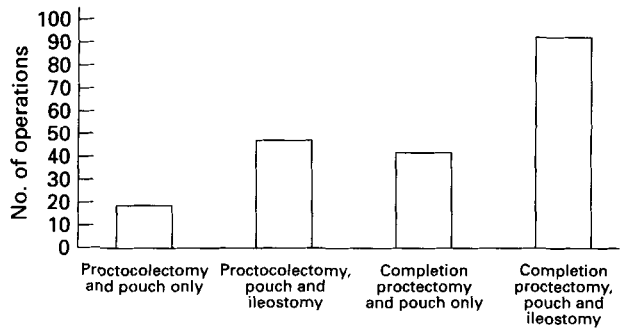

Fig. 1 Numbers of each type of restorative proctocolectomy operation performed

Table 3 Early morbidity

Complication	No. of patients ($n = 71$)	Management	
		Surgery	Conservative
Procedure specific			
Pouch haemorrhage	5	3	2
Pouch ischaemia	3	3	0
Intra-abdominal or pelvic sepsis	13	8	5
Small bowel obstruction	6	4	2
Small bowel perforation	1	1	0
Pouch–vaginal fistula	1	1	0
High ileostomy or pouch output	6	0	6
Non-procedure specific			
Paralytic ileus	3	0	3
Septicaemia	1	0	1
Wound sepsis	5	0	5
Wound dehiscence (superficial)	1	0	1
Bleeding from duodenal ulcer	1	1	0
Perforated duodenal ulcer	1	1	0
Other*	29	0	29

*Urinary tract infection, respiratory tract infection, psychiatric, etc.

Table 4 Long-term complications

Complication	No. of patients ($n = 54$)	Management	
		Surgery	Conservative
Pouch–vaginal fistula	6	5	1
Pelvic sepsis	7	6	1
Pelvic collection of fluid	2	0	2
Small bowel obstruction	16	11	5
Incisional hernia	3	3	0
Enterocutaneous fistula	3	1	2
Anastomotic stenosis	17	17	0
High pouch output	1	0	1
Fistula *in ano*	4	1	3
Perianal abscess	2	2	0
Other*	4	0	4

*Depression, anal pain, addisonian crisis

Pouch excision

Sixteen (8·0 per cent) pouches have been excised. Four were excised within 30 days of surgery for haemorrhage ($n = 1$) or ischaemia ($n = 3$). The remainder were excised 5·5–71 (median 15) months after pouch surgery. The indications for excision are detailed in *Table 5*, the commonest cause being chronic pelvic sepsis. In three patients with indeterminate colitis a diagnosis of Crohn's disease was established at a later date.

Pouch function

Functional data were assessed for 183 patients with a functioning pouch. Seventeen patients were excluded: the four patients being followed elsewhere, three who had early pouch excision and ten awaiting ileostomy closure.

Median daytime stool frequency was 4·5 (range 1–15). Some 144 patients (78·7 per cent) reported passage of stool once or less at night. The distribution of stool frequency is detailed in *Table 6*.

Thirty-one patients presented with faecal incontinence (two major, 29 minor). Sixty-three patients (34·4 per cent) were clearly able to discriminate flatus from liquid or semisolid stools. The remainder enjoyed a varying degree of discrimination but only 20 patients (10·9 per cent) reported urgency. Fifty-two patients (28·4 per cent) continued to take antidiarrhoeal drugs. Functional outcome with regard to pouch design is shown in *Table 7*.

Table 5 Reason for pouch excision

	No. of patients
Haemorrhage	1
Ischaemia	3
Sepsis	4
Incontinence	2
Pouchitis	3
Crohn's disease	3

Table 6 Stool frequency in 183 patients

Frequency	Daytime*	Nocturnal†
0–1	2	144
>1–2	6	9
>2–3	33	10
>3–4	36	3
>4–5	43	2
>5–6	30	4
>6	33	1

*Median 4·5 (range 1–15); †median 0 (range 0–11)

Table 7 Pouch design and function in 183 patients

Type of pouch	Incontinence	Urgency	Spontaneous evacuation	Antidiarrhoeals
J ($n = 130$)	23	18	127	48
S ($n = 41$)	6	1	19	3
W ($n = 12$)	2	1	11	1

Bladder and sexual function

Some 178 (90·8 per cent) of 196 patients had normal bladder function. Five (4·3 per cent) of 115 men had sexual dysfunction: four complained of poor erections and one of retrograde ejaculation. Five (6 per cent) of 81 women complained of dyspareunia.

Pouchitis

Forty-two (24·0 per cent) of 175 patients with colitis and functioning pouches presented with pouchitis. Of these, 29 experienced one episode, six had two episodes, three had three episodes, three had four episodes and one experienced five episodes. The median duration of episodes of pouchitis was 21 (range 2–364) days. Standard treatment comprised a 2-week course of oral metronidazole and steroid enemas. Those who did not tolerate metronidazole were prescribed ciprofloxacin or ampicillin–clavulanic acid preparations. A few patients with chronic or recurrent pouchitis were treated with low-dose ciprofloxacin (250 mg daily) for 3 months. Three patients had the pouch excised for intolerable symptoms from resistant pouchitis.

Discussion

The principal advantage of restorative proctocolectomy over panproctocolectomy is avoidance of a permanent stoma. The procedure offers the opportunity to remove the diseased colon whilst preserving intestinal continuity, avoids long-term stoma-associated morbidity and, compared with ileorectal anastomosis, avoids the risk of carcinoma or recurrent proctitis in the retained rectum.

This series contained a higher proportion of patients with inflammatory bowel disease than many published series as there is a relatively small, local FAP practice. Patients undergoing urgent or emergency surgery for colitis usually undergo total abdominal colectomy as the first procedure, which allows for pathological confirmation of the diagnosis in the resected colon, provides time to return the patient to optimal nutritional and medical status, and permits the patient to experience and manage a stoma. Patients undergoing primary elective or secondary pouch procedures are offered preoperative counselling by a stoma therapist and have the opportunity to meet other patients with a pouch (Kangaroo Club members in an Oxfordshire patient support group). In addition, anorectal physiology studies and, more recently, anal ultrasonography are performed to ensure that the anal sphincter is intact and functioning normally. Age is not a factor in deciding to create a pouch.

The majority of patients in this series had a J pouch fashioned. It is the authors' belief that this design is technically the most straightforward and, to date, there has been no convincing published evidence of significant benefit from more complex constructions. The double-stapled technique now employed during pouch–anal anastomosis has largely eliminated the need for endoanal dissection and preserves the anal transition zone.

Despite luminal inspection of the pouch before leaving the theatre, five patients experienced significant early postoperative haemorrhage. It is the authors' policy routinely to decompress the pouch with a rectal catheter; this has the added advantage of providing early warning of any haemorrhage.

Pelvic sepsis appears to be the commonest early postoperative complication (range 0–25 per cent) in reported series[2–7] and the present experience (6·5 per cent) is consistent with these reports. Adequate drainage of sepsis is essential and may require formal laparotomy (six of 13 patients with early sepsis and two of seven with sepsis presenting after 30 days) or CT-guided drainage (two of 13 and four of seven patients respectively). Sepsis became the commonest reason for long-term pouch excision in the study. Excision of the pouch may be required to remove the source of sepsis in patients who have not responded to drainage and antibiotic therapy, or may be requested for poor function. Tissues involved by chronic sepsis heal by fibrosis, and pouch dysfunction presumably arises from loss of compliance of the reservoir.

Anastomotic stenosis (8·5 per cent) was the commonest long-term complication in the present series, in keeping with the reported incidence (5–18 per cent) in other series[2,5]. Most of these stenoses were diagnosed by examination before closure of the defunctioning ileostomy, and dilatation was performed at the time of closure. No patient needed revision of the anastomosis but several required repeated dilatation. Overall, 32 dilatations were carried out in 17 patients. There was no significant difference in the incidence of anastomotic stenosis between stapled and handsewn anastomoses ($P = 0{\cdot}64$, χ^2 test).

In common with other series[6,8] nearly one in ten patients required admission for adhesive small bowel obstruction. A high proportion of these required operative intervention (11 of 16), including two patients who required small bowel resection and anastomosis.

Pouch–vaginal fistula is a difficult problem to manage. In this series, one fistula healed with antibiotic therapy alone but the other five patients underwent an initial defunctioning ileostomy followed by surgical closure. One fistula recurred after closure and the patient was later diagnosed as having Crohn's disease, which led to excision of the pouch. Fistulas can occur into the vagina in a female patient or present as a perianal fistula. If the perianal fistula is superficial, it can be treated by fistulotomy. However, if it involves the sphincter complex the use of a seton technique may be preferable. Pouch–vaginal fistulas can be repaired via a transvaginal or transperineal approach[9,10].

The functional results in the present series were acceptable, with a median daytime stool frequency of 4·5. The majority of patients had an undisturbed night or needed to pass stool once at night, an important result in terms of quality of life. Quality of bowel control is probably more important than simple frequency. Few patients had significant urgency following the construction of the pouch and many enjoyed good or excellent discrimination.

It is of note that in four of five men with sexual dysfunction pelvic dissection was performed in the mesorectal plane, which may carry a higher risk of damage to the pelvic nerves than perimuscular pelvic dissection[11]. Clearly meticulous technique is required to minimize pelvic nerve damage. The cause of dyspareunia following pouch surgery is less well defined but presumably relates to healing tissues in the pelvis and alteration in the support provided for the posterior wall of the vagina. Two patients in this series enjoyed normal pregnancies after restorative proctocolectomy and both babies were delivered by elective caesarean section. Caesarean section may be a sensible option for patients with a pouch as vaginal delivery may compromise sphincter function sufficiently to precipitate continence problems.

The reported incidence of pouchitis following restorative proctocolectomy varies between 7 and 45 per cent[12–14]. If strict clinical, endoscopic and histological criteria are applied, the true incidence appears to be 10–20 per cent[2,14,15]. All three criteria were taken into account in diagnosing pouchitis in two-thirds of the present patients. In one-third, the diagnosis was made on the clinical presentation and endoscopic appearance of the pouch mucosa, without histological confirmation, and this may explain why the incidence in this series exceeded 20 per cent.

A critical review of the postoperative outcome after restorative proctocolectomy compared with that following construction of a Kock pouch or permanent ileostomy has shown only a marginal benefit for the pouch[2]. All patients contemplating pouch surgery should be realistically counselled about the potential morbidity and possibility of long-term pouch failure. One of the continuing difficulties with pouch surgery is the inability, despite careful investigation, confidently to predict outcome for an individual patient. Restorative proctocolectomy is not a return to normality, but in patients who are motivated to avoid a permanent stoma, who are otherwise fit and who have good sphincter function, it represents a significant surgical advance.

References

1 Parks AG, Nicholls RJ. Proctocolectomy without ileostomy for ulcerative colitis. *BMJ* 1978; **ii**: 85–8.
2 Köhler L, Troidl H. The ileoanal pouch: a risk–benefit analysis. *Br J Surg* 1995; **82**: 443–7.
3 Marcello PW, Roberts PL, Schoetz DJ Jr, Coller JA, Murray JJ, Veidenheimer MC. Long-term results of the ileoanal pouch procedure. *Arch Surg* 1993; **128**: 500–4.
4 Galandiuk S, Scott NA, Dozois RR *et al.* Ileal pouch–anal anastomosis. Reoperation for pouch-related complications. *Ann Surg* 1990; **212**: 446–54.
5 Setti-Carraro P, Ritchie JK, Wilkinson KH, Nicholls RJ, Hawley PR. The first 10 years' experience of restorative proctocolectomy for ulcerative colitis. *Gut* 1994; **35**: 1070–5.
6 Pemberton JH, Kelly KA, Beart RW Jr, Dozois RR, Wolff BG, Ilstrup DM. Ileal pouch–anal anastomosis for chronic ulcerative colitis. Long-term results. *Ann Surg* 1987; **206**: 504–13.
7 Williams NS, Johnston D. The current status of mucosal proctectomy and ileo-anal anastomosis in the surgical treatment of ulcerative colitis and adenomatous polyposis. *Br J Surg* 1985; **72**: 159–68.
8 Pescatori M, Mattana C, Castagneto M. Clinical and functional results after restorative proctocolectomy. *Br J Surg* 1988; **75**: 321–4.
9 Pemberton JH. Complications, management, failure and revisions. *In: Nicholls J, Bartolo D, Mortensen N, eds. Restorative Proctocolectomy.* Oxford: Blackwell Scientific Publications, 1993: 34–52.
10 O'Kelly TJ, Merrett M, Mortensen NJMcC, Dehn TCB, Kettlewell M. Pouch–vaginal fistula after restorative proctocolectomy: aetiology and management. *Br J Surg* 1994; **81**: 1374–5.
11 Becker JM, Raymond JL. Ileal pouch–anal anastomosis. A single surgeon's experience with 100 consecutive cases. *Ann Surg* 1986; **204**: 375–83.
12 Dozois RR, Goldberg SM, Rothenberger DA *et al.* Restorative proctocolectomy with ileal reservoir. *Int J Colorectal Dis* 1986; **1**: 2–19.
13 McIntyre PB, Pemberton JH, Wolff BG, Beart RW, Dozois

RR. Comparing functional results one year and ten years after ileal pouch–anal anastomosis for chronic ulcerative colitis. *Dis Colon Rectum* 1994; **37**: 303–7.
14 de Silva HJ, Kettlewell MGW, Mortensen NJ, Jewell DP. Acute inflammation in ileal pouches (pouchitis). *Eur J Gastroenterol Hepatol* 1991; **3**: 343–9.
15 Moskowitz RL, Shepherd NA, Nicholls RJ. An assessment of inflammation in the reservoir after restorative proctocolectomy with ileoanal ileal reservoir. *Int J Colorectal Dis* 1986; **1**: 167–74.

British Journal of Surgery 1997, **84**, 818

Case report

Spontaneous resolution of histologically proven liver metastases from colorectal cancer

A. FRANCIS, J. G. TEMPLE and M. T. HALLISSEY

Department of Surgery, Queen Elizabeth Hospital, Edgbaston, Birmingham B15 2TH, UK
Correspondence to: Mr M. T. Hallissey

Spontaneous regression of adult solid tumours is rare, being reported most commonly in patients with hypernephroma and melanoma. A case of regression of metastatic rectal cancer is described.

Case report

In January 1983 a 69-year-old man presented with a 6-week history of altered bowel habit and weight loss. Physical examination showed a 5-cm hard liver edge and sigmoidoscopy revealed a tumour at 15 cm. Anterior resection was performed for a large mobile tumour at the rectosigmoid junction. Large (diameter greater than 7 cm) metastases were present in both lobes of the liver and a Tru-cut (Travenol Laboratories, Thetford, UK) biopsy was taken from a left lobe metastasis.

Histopathological examination confirmed the tumour to be a moderately to poorly differentiated adenocarcinoma with scirrhous stroma, infiltrating through the bowel wall to the serosa. There was extensive spread in extramural veins, metastases in all the lymph nodes sampled and tumour at the lateral margins of excision. The liver biopsy contained fibrous tissue infiltrated with irregular clumps of neoplasm consistent with metastatic adenocarcinoma. The patient was given no additional therapy and remained well until July 1984 when he developed haematuria. Cystoscopy and biopsy revealed a moderately differentiated transitional cell carcinoma of the bladder, which was treated by endoscopic resection.

Paper accepted 16 August 1996

Follow-up ultrasonography of the liver in September 1989 showed no abnormality. In 1994, contrast-enhanced computed tomography showed two abnormalities in the right lobe of the liver less than 1 cm in diameter and consistent with simple hepatic cysts. The left lobe was normal. The patient remains symptom-free after 10 years of follow-up. Review of the original histology confirmed the findings for both primary and metastatic disease.

Discussion

Spontaneous regression of a number of different types of cancer has been reported[1], although in many cases this was either a partial or temporary phenomenon. Commonly cited tumours include renal cell carcinoma, melanoma, choriocarcinoma and the childhood tumours, retinoblastoma and neuroblastoma[2]. Spontaneous resolution of metastases is less commonly reported but pulmonary metastases from renal cell carcinoma are known to resolve occasionally following nephrectomy[3]. Complete resolution of histologically confirmed metastatic colorectal cancer has, to the authors' knowledge, not been reported previously. The reasons for such regression remain speculative[4]. Differentiation is recognized in childhood and germ-cell tumours, leaving a residual benign mass. For the remaining tumours, suggestions range from removal of a source of trophic agents to an immunological effect. It has not been possible to identify any factor that may have been involved in the regression in this case, other than removal of the primary tumour.

References

1 Everson TC, Cole WH. *Spontaneous Regression of Cancer. Philadelphia, Pennsylvania: WB Saunders*, 1966.
2 Cole WH. Efforts to explain spontaneous regression of cancer. *J Surg Oncol* 1981; **17**: 201–9.
3 Braren V, Taylor JW, Pace W. Regression of metastatic renal carcinoma following nephrectomy. *Urology* 1974; **3**: 777–8.
4 Baker HW. Biologic control of cancer. The James Ewing Lecture. *Arch Surg* 1986; **121**: 1237–41.