Difficult Decisions

Ileostomy or ileal pouch for the surgical treatment of ulcerative colitis?

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Introduction

Until recently, the elective surgical treatment of patients with ulcerative colitis has been either proctocolectomy with a permanent ileostomy or colectomy and ileorectal anastomosis (IRA). The former technique has many disadvantages, not least being the psychological readjustment necessary to face life with an incontinent orifice on the abdominal wall. IRA appears on face value to be more acceptable, but unfortunately disease is left behind in the rectum, which not only may cause persistent gastrointestinal symptoms, but exposes the patient to the considerable risk of developing carcinoma. For these reasons surgeons have striven for a technique which can eradicate the disease entirely, yet restore gastrointestinal continuity and continence. In the past decade, such a procedure has been developed. This operation, known as mucosal proctectomy and pouch anal anastomosis or restorative proctocolectomy, consists of colectomy, removal of the rectal mucosa, and the creation of a pouch from the terminal ileum. The latter is then pulled through the rectal muscular cuff and is anastomosed to the anal canal via the transanal route.¹

The procedure is based on several tenets. First, that ulcerative colitis is a mucosal disease, and thus removal of the colon and rectal mucosa results in its eradication; second, that continence is preserved because the receptors necessary for its maintenance are situated outside the rectum^{2,3} and are not damaged; third, that the formation of a pouch of ileum can increase reservoir capacity so that frequency of bowel action will be reduced compared

to the situation if just a single loop of ileum was used. It would seem from the available evidence that these tenets are true. Since such a procedure would seem to fly in the face of nature, it is hardly surprising that the patient is never returned to normality. Nevertheless, the operation is being carried out in ever increasing numbers, and it is pertinent to ask whether the operation as performed at the present time should be the procedure of first choice for patients suffering from ulcerative colitis who require surgical treatment. To answer the question, it is necessary to examine in detail the advantages and disadvantages of the new procedure and compare them with more conventional techniques. Before these can be considered, however, it is important for the reader to understand certain technical details by which these procedures are accomplished.

Technical considerations

Conventional procedures

Proctocolectomy This operation entails the removal of the whole colon and rectum and the establishment of a permanent ileostomy. In the past, the rectum was removed via a relatively wide perineal dissection. As a consequence, injury to the pelvic nerves was common, resulting in a high incidence of bladder and sexual disturbance.⁴⁻⁷ In order to prevent such injury, Emmanuel Lee of Oxford (1972)⁸ devised the technique of close perimuscular excision of the rectum. The wide adoption of this procedure has certainly reduced the risk of bladder and sexual disturbance. The ileostomy used

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Received: 7 April 1988

by most surgeons is that developed by Brooke (1952)⁹ (Figure 1) in which the terminal 3–4 cm of terminal ileum is everted and sutured directly to the skin of the abdominal wall. As a consequence, the patient has an incontinent stoma, which empties into an appliance. In order to improve the quality of life of patients with an end ileostomy, Kock of Gothenburg devised the reservoir or continent ileostomy (Figure 2).¹⁰ In this procedure, the terminal ileum was fashioned into a pouch, and its efferent spout was intussuscepted back into the pouch lumen so as to form a non-return valve, which would prevent egress of ileal contents from the reservoir. As we will see, despite numerous modifications, theory has not always been borne out in practice.

Colectomy and IRA This operation, popularized by Aylett,¹¹ was devised to eliminate the need for an ileostomy and preserve gastrointestinal continuity and continence. The whole colon is removed

Figure 1 Formation of the Brooke ileostomy. Reproduced from Goligher, J.C. *Surgery of the Anus, Rectum and Colon*, 1984, 5th edition, by permission of Bailliere Tindall.

Figure 2 The Kock continent ileostomy. Reproduced from Goligher, J.C. *Surgery of the Anus, Rectum and Colon*, 1984, 5th edition, by permission of Bailliere Tindall.

and the ileum is anastomosed to the rectum that remains. As mentioned above, this operation leaves disease behind in the rectum, which has important consequences for the patient.

Restorative proctocolectomy

Mucosal proctectomy and ileo-anal anastomosis with a single ileal loop was first performed in man by Ravitch and Sabiston in the late 1940s.^{12,13} Despite some early success, the operation never gained popularity because patients suffered severe frequency of bowel action. The late Sir Alan Parks realized that Ravitch and Sabiston's operation failed because there was a lack of reservoir capacity. He combined the concept of mucosal proctectomy with Kock's continent ileostomy, and by creating a pelvic ileal pouch, the modern operation of restorative proctocolectomy was born. Parks¹ originally used a triplicated or S type of pouch and approximately 10–12 cm of rectum were denuded of mucosa. At the completion of the rectal mucosectomy, the efferent spout of the pouch was drawn down through the rectal muscular cuff and was anastomosed transanally to the anal canal (Figure 3). The operation was tedious; the rectal mucosectomy alone in our hands could often take 3–4 hours to complete. Gradually, the length of rectal cuff which requires denuding has been reduced without an apparent deterioration in function. Apart from the triplicated pouch, several alternative designs are now available. These comprise the J pouch,¹⁴ the lateral isoperistaltic pouch¹⁵ and the W pouch¹⁶ (Figure 4). The J can be modified (MJ) by division of its apex so as to create a spout which simplifies the pouch and anastomosis.

Figure 3 Restorative proctocolectomy. A triplicated ileal pouch has been constructed, which has been drawn through the short rectal cuff denuded of mucosa. The distal spout of the pouch has been anastomosed to the anal canal. Reproduced from *Operative Surgery*, Rob and Smith, 4th edition, by permission of Butterworth Scientific.

Comparison of available procedures

Eradication of disease

There can be no argument that the most certain way of eradicating the disease is to perform a proctocolectomy. Although in the past there may have been concern that not all the rectal mucosa could be removed by mucosal proctectomy, all experienced in the technique are satisfied that with the short rectal cuff being used now, this ideal is achieved. Colectomy and ileorectal anastomosis on the other hand obviously leaves disease behind. Not only may this result in continuing local disease, but systemic problems may be perpetuated. The main problem, however, is that the residual rectal mucosa has the propensity to undergo malignant change. The risk increases with time, but is considered to be approximately 10–15% over 25 years.^{17,18} It is for this reason primarily that colectomy and IRA is rarely considered nowadays

Figure 4 The four designs of ileal pouches available at the present time. Reproduced from *Recent Advances in Gastroenterology*, vol. 6, edited by R.E. Pounder, by permission of Churchill Livingstone.

as an appropriate operation for patients with ulcerative colitis. It will therefore no longer be considered in the remainder of this article. It should, however, be realized that the procedure may still be an option in the elderly patient with minimal distal disease.

Safety

There are two aspects to safety when it comes to appraising a surgical procedure; these are the operative mortality and the morbidity. The former is relatively easy to ascertain, but the latter is more difficult to assess.

The operative mortality of elective proctocolectomy and ileostomy is between 0–3% in most series,^{19–22} but a figure as high as 10% has been reported.²³

Several thousand restorative proctocolectomy procedures have now been performed worldwide, but only two treatment-related deaths have been

recorded.²⁴ One suspects that this very low incidence will increase, but it is unlikely to rise above the incidence for the conventional procedure.

The most frequent reason for morbidity following proctocolectomy relates to sepsis, the incidence being approximately 25% of elective cases.^{21,22} Both early and late intestinal obstruction are common, the incidence varying between 7–13% with occasional mortalities.^{6,21–23,25} Another major source of morbidity unique to proctocolectomy is prolonged healing of the perineal wound; 25–49% of perineal wounds remain unhealed at 6 months.^{21,25,26}

Complications which relate to the ileostomy also affect the safety of proctocolectomy. Thus, stenosis, fistula, retraction, prolapse and peristomal hernia may necessitate operative intervention in 5–13% of patients.^{21,25–27} The above remarks apply mainly to a Brooke ileostomy, the incidence of complications, however, after construction of the continent ileostomy are considerably higher. Thus, leakage from a suture line ranges from 4–19%^{28,29} and approximately 30% of reservoirs are initially incontinent.^{29–32} The latter problem is usually due to a desusception of the nipple valve and re-operation is frequent.

The morbidity following restorative proctocolectomy with regard to sepsis and intestinal obstruction is perhaps a little higher than that which

occurs after the conventional procedure. However, many of these complications have been minor and have not required re-operation, nor have they adversely affected the functional result. Sepsis is most common in the pelvis, and has resulted in re-operation in 6% of patients. Operation for intestinal obstruction has also been required in 6% of patients (Table I). Furthermore, the pelvic sepsis rate has been decreasing with increasing experience, and the use of a shorter rectal cuff.

Although the patient who has undergone restorative proctocolectomy invariably has a temporary defunctioning ileostomy, there is no long-term danger from it as for a permanent ileostomy. Similarly, there is no perineal wound which might cause problems.

Bowel function

Patients who have undergone restorative proctocolectomy are invariably continent for 'faeces'. Although the incidence of minor defects in continence is variable (7–55%), major faecal incontinence has been rare with a maximum incidence of 5%.^{24,34,38,40}

With modern techniques, evacuation is achieved spontaneously in all patients and bowel frequency is approximately 6 actions per 24 hours (Table II).^{34–36,38,40} More recently, even less frequency

Table I Post-operative morbidity after ileal pouch–anal anastomosis

Author	Type of pouch	n	No complications	Early laparotomy	
				Pelvic sepsis	Intestinal obstruction
Thow ³³ (1985)	MJ	21	7	2	1*
Metcalf <i>et al.</i> ³⁴ (1985)	J	183	ns	12	13†
	S	5			
Rothenberger <i>et al.</i> ³⁵	S	56	22	6	ns*
Nicholls & Pezim ²⁴ (1985)	J	13	7	ns	0
	S	68	40	ns	6
	W	23	17	ns	1
Fonkalsrud ³⁶ (1985)	LI	78	ns	ns	3
Grant <i>et al.</i> ³⁷ (1986)	J	67	ns	8	4†
	S	15			
Nasmyth <i>et al.</i> ³⁸ (1986)	J	8	3	1	1
	MJ	9	6	0	0
	LI	5	4	0	0
	S	17	6	1	1
Heald & Allen ³⁹ (1986)	J	4	1	0	1
	S	6	3	0	0
Totals			116 (50%) (230)	30 (8%) (396)	31 (6%) (522)

*Covering loop ileostomy not used in all cases; †complications in relation to type of pouch not stated; ns, not stated; MJ, and J, duplicated; S, triplicated; W, 4-loop; LI, lateral or isoperistaltic.

Table II Frequency of defaecation after ileal pouch–anal anastomosis

Author	Type of pouch	n	Frequency of defaecation	Period of follow-up (months)
Thow ³³ (1985)	MJ	21	6	3
Metcalf <i>et al.</i> ³⁴ (1985)	J S	157	7.2	12†
Rothenberger <i>et al.</i> ³⁵ (1985)	S	40	5.7*	16
Nicholls & Pezim ²⁴ (1985)	J	12	5.5	13
	S	58	3.7*	24
	W	18	4.1	5
Fonkalsrud ³⁶ (1985)	LI	67	7*	22
Nasmyth <i>et al.</i> ³⁸ (1986)	J	6	7	12
	MJ	4	6.3	12
	LI	4	7	12
	S	8	5	12
Martin <i>et al.</i> ⁴⁰ (1986)	J	7	6–8	12
	S	93	2–4	12

*Includes patients who intubate the pouch; †frequency in relation to type of pouch not stated.

has been reported with the larger capacity W pouch.¹⁶ Severe urgency of defaecation, as experienced by patients before the operation, is rare and 60% of patients can postpone a call to stool for more than 30 minutes.³⁸

It is thus clear from the results to date that patients, after restorative proctocolectomy, can attain reasonable bowel function. Despite imperfections, the operation should be compared with the function achieved after an ileostomy. Many surgeons believe that, provided the incontinence of an end stoma is accepted, patients have no problems with the function of their stoma. This is a fallacy. A recent survey⁴¹ of 322 patients with an end ileostomy revealed that only 35% considered that their stoma functioned perfectly; skin irritation occurred in 49%; offensive noise and odour was complained of by 42%, and 29% had difficulty in managing the appliance. Although such problems can be reduced by construction of a continent ileostomy, as noted previously approximately 30% of patients having this operation are in fact incontinent.^{29–32}

Quality of life

There are many facets which contribute to the quality of one's life. Bowel function is clearly one of these factors, but others, such as sexual function, psychological and social effects, are equally and sometimes more important. There are as yet no comparative studies examining quality of life following conventional proctocolectomy and res-

torative procedures. Most of the information that is available on this topic relates only to ileostomy patients. Although it is frequently stated that such patients lead a full and active life, they nevertheless experience considerable problems. Thus, the incidence of depression and social isolation is approximately 45%.^{42,43} Sexual difficulties, including impotence, occur in approximately one-fifth of patients having the conventional proctocolectomy^{4,7} and bladder disturbances occur in 16%.⁴⁴ Although close perimuscular dissection will reduce pelvic nerve damage, some of the sexual and bladder difficulties are not neurogenic in origin and will persist. Most series of restorative proctocolectomy have a very low incidence of sexual disturbance; in our own series for instance only one patient complained of retrograde ejaculation, and none had impotence.

Conclusions

In recent years, great strides have been made in the surgical treatment of ulcerative colitis. Restorative proctocolectomy eliminates the disease and preserves gastrointestinal continuity. It has been shown to be a safe procedure provided essential principles are adhered to. Continence is nearly always preserved provided there is no technical mishap. Damage to pelvic autonomic nerves with consequent bladder and sexual problems hardly ever occurs. Frequency of defaecation remains a hindrance, but is tolerable, and with recent innovations is diminishing. Despite these glowing commen-

dations, the operation is arduous for the patient, and since it requires a defunctioning stoma for a short period it means the patient is subjected to at least two operations. Furthermore, in the early weeks after ileostomy closure bowel function is erratic and takes some time to settle down. For these reasons, the operation should only be performed in patients who are physically fit, whose motivation is high and who have stable personalities. In addition, from the outset, their continence mechanism must be satisfactory. They also must be shown unequivocally to have ulcerative colitis. If the operation is performed in a patient with

Crohn's disease, the outcome is very likely to be disastrous. Provided these stipulations are adhered to, we believe that the operation of restorative proctocolectomy should be the procedure of first choice for the patient with ulcerative colitis, provided, of course, that the surgical team have the necessary expertise. It is of interest that with growing publicity, the decision as to which elective operation should be performed is being taken out of the hands of the physician and surgeon, for patients are voting with their feet and are demanding referral to centres which specialize in restorative proctocolectomy.

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