

Small Intestinal Obstruction Complicating Ileal Pouch-anal Anastomosis

YVES FRANCOIS, M.D.,* ROGER R. DOZOIS, M.D., KEITH A. KELLY, M.D., ROBERT W. BEART, JR., M.D.,†
BRUCE G. WOLFF, M.D., JOHN H. PEMBERTON, M.D., and DUANE M. ILSTRUP, M.S.

Small bowel obstruction remains the most common complication after proctocolectomy with ileal pouch-anal anastomosis. Of 626 patients who underwent this operation between January 1981 and October 1986 for ulcerative colitis (544 patients), familial adenomatous polyposis (72 patients), or indeterminate colitis (ten patients), 17% developed small bowel obstruction, 7.5% of whom required surgical intervention. The obstruction occurred either before or after closure of the temporary ileostomy. Patients who had a temporary Brooke ileostomy were more likely to develop obstruction (four of 32 patients, 12.5%) than those who had a loop ileostomy (25 of 564 patients, 4.6%) ($p = 0.07$). Also, patients who had had previous operations were at greater risk of obstruction (8.5%) than those who had not (2.2%) ($p < 0.04$).

ABDOMINAL COLECTOMY with mucosal proctectomy and ileal pouch-anal anastomosis allows patients with either ulcerative colitis or familial adenomatous polyposis to be rid of their colonic disease and yet retain their anorectal function. We prefer a J-shaped ileal reservoir that traverses a very short rectal muscular cuff and is anastomosed directly to the dentate line area and temporarily protected by a diverting ileostomy.^{1,2} The morbidity associated with this technically intricate operation was initially high but has consistently decreased with increased experience.³⁻⁶ In our experience, the overall incidence of postoperative complications has diminished from 50% in our early experience⁷ to 30% more recently.⁸ In patients with ulcerative colitis, pelvic sepsis has been reduced from 11%⁷ to 5%;⁸ the incidence of intestinal obstruction, however, has remained the same, and this is the most common complication.

In this study, we define the frequency of intestinal ob-

From the Department of Surgery and the Section of Biostatistics, Mayo Clinic and Mayo Foundation, Rochester, Minnesota.

struction, attempt to determine the specific factors that may predispose to it, and propose preventive measures and corrective treatment.

Methods

Patient Population

Between January 1981 and October 1986, 626 patients with ulcerative colitis (544 patients), familial adenomatous polyposis (72 patients), or indeterminate colitis (ten patients) had an ileal pouch-anal anastomosis constructed at one of two Mayo-affiliated hospitals. Of the 596 patients in whom a temporary ileostomy was established, 550 have had takedown procedures. Intestinal obstruction was observed either after construction of the ileal reservoir or after takedown of the ileostomy.

For the purposes of the study, the patients were divided into two major categories: Group 1, patients whose obstruction required surgical correction and in whom a specific cause was identified at laparotomy, and Group 2, patients who initially either had resumption of bowel function but subsequently required conservative treatment (nasogastric intubation, intravenous hydration, and no oral treatment) for transient obstruction (as evidenced by flat plate of the abdomen) or required postoperative nasogastric decompression for more than 7 days.

Follow-up

Patients were followed at 6 months initially and annually thereafter, most often by telephone and questionnaire. Complete information was obtained for 612 (98%) of the 626 patients. The mean duration of follow-up was

Reprint requests and correspondence: Dr. Roger R. Dozois, 200 First Street SW, Rochester, MN 55905.

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*Visiting Clinician. Current address: Hôpital C. Bernard, Faculté Alexis Carrel, Lyon, France.

†Current address: Mayo Clinic Scottsdale, Scottsdale, Arizona.

2.3 years; 16% of the patients were followed for less than 1 year and 44% were followed for more than 3 years.

Results

On the basis of the definitions outlined in the Methods section, 17% of the patients developed small intestinal obstruction, 7.5% of whom required surgical correction (Table 1). The initial operation was followed by more occlusions than the second operation, and operation was necessary twice as often after the first operation than it was after the second operation (Table 1).

Group 1 ("Surgical" Occlusion)

Fifty-five per cent of the surgical obstructions after ileo-anal anastomosis and 60% of the obstructions after closure of the ileostomy occurred within 3 weeks of the respective stages of the operation.

Obstruction After Ileal Pouch-Anal Anastomosis. In this category, the exact cause of obstruction was identified in 30 of the 31 patients and could not be established in one patient who had operation elsewhere. In two thirds of these patients, the temporary ileostomy itself was in some way responsible for the obstruction: stomal stenosis, volvulus, or internal hernia between the mesentery of the temporary ileostomy and the paracolic gutter (Table 2). Other causes included adhesive bands, diffuse adhesions, volvulus around an adhesive band, or a combination thereof (Table 2). In all instances except one, surgical intervention was performed early enough to avoid the occurrence of intestinal necrosis. One patient left the hospital against medical advice and was rehospitalized 3 days later elsewhere, at which time a jejunal resection was needed for jejunal volvulus and necrosis. In 17 patients in whom the loop ileostomy appeared to be responsible for the occlusion, the problem was resolved by converting the loop ileostomy to a Brooke ileostomy (nine patients), exploration and intubation of the afferent limb of the stoma with a long catheter (two patients), early takedown of the ileostomy (two patients), or some type of revision of the

TABLE 1. *Obstruction After Ileal Pouch-Anal Anastomosis (626 Patients) and After Closure of Ileostomy (550 of 626 Patients)*

Operative Phase	No. of Patients at Risk	Patients with Obstruction					
		Total Treated		No Operation Required		Operation Required	
		No.	%	No.	%	No.	%
IAA*	626	62	9.9	31	5.0	31	5.0
Closure	550	39	7.1	25	4.5	14	2.5
Total			17.0		9.5		7.5

* Ileal pouch-anal anastomosis.

TABLE 2. *Cause of Obstruction Requiring Operation After Ileal Pouch-Anal Anastomosis (the First Operation)*

Cause	No. of Patients
Ileostomy	
Stenosis	5
Volvulus	10
Internal hernia	3
Adhesions	
Bands	7
Volvulus	1
Internal hernia	1
Associated lesions	
Peristomal volvulus and internal hernia	1
Peristomal volvulus and band	2
Unspecified	1
Total	31

existing loop ileostomy (four patients). For three patients in whom Brooke ileostomies were responsible for the obstruction, relief was obtained with intubation of the stoma (two patients) or stoma revision (one patient). Altogether, five ileostomies were taken down at the time of surgical relief of the occlusion after ensuring healing of the reservoir and anastomosis by Hypaque enema.

Obstruction After Closure of Ileostomy. After take-down of the ileostomy and restoration of bowel continuity, most intestinal obstructions were due to adhesions (nine of 14 patients) (Table 3). These were relieved by enterolysis. In one patient, stenosis at the site of ileostomy after take-down of the ileostomy was responsible for the occlusion. In two other patients, gradual stenosis of the ileo-anal anastomosis itself led to obstruction. This was relieved by anal dilation with graduated Hegar's dilators.

Group 2 ("Medical" Occlusion)

Obstruction After Ileal Pouch-Anal Anastomosis. The obstruction occurred within 3 weeks of the original surgical procedure in all but two patients (30 and 47 days after operation, respectively). In all instances such episodes of small bowel obstruction regressed within 1 week after

TABLE 3. *Cause of Obstruction Requiring Operation After Ileostomy Closure*

Cause	No. of Patients
Adhesions	9
Ileoanal stenosis	2
Stenosis at site of ileostomy closure	1
Ileal stenosis proximal to ileal reservoir	1
Inflammatory mass secondary to sealed perforation	1
Total	14

TABLE 4. Reports of Obstruction After Ileal Pouch-Anal Anastomosis

Reference	No. of Patients	Type of Reservoir(s)	% of Patients with Obstruction	
			Total	Requiring Operation
Parc ¹¹	108	J		5.5
Becker and Raymond ⁴	100	J	15.0	7.0
Williams et al. ³	91	S	30.0	20.0
Nasmyth et al. ¹²	17	S		
	22	Duplicated		7.5
Cohen et al. ⁵	70	J		
	12	S		5.5
Schoetz et al. ¹³	69	J		
	22	S	27.8	12.2
Nicholls et al. ¹⁴	68	S		
	13	J		12.0
	37	W		
Bubrick et al. ¹⁰	23	S	43.5	30.4
Utsunomiya et al. ¹⁵	41	J		7.4
This study*	600	J	7.2	7.2
	22	S	9.0	9.0

* In four cases, the type of reservoir that was constructed was not stated.

initiation of nonoperative measures. In three patients, the obstructive episode resolved after placement of a small catheter in the afferent limb of the loop ileostomy. In seven patients, the temporary ileostomy was taken down by the abdominal route because the patients had experienced at least one episode of partial small bowel obstruction after the first operation. In three patients, no specific lesion was seen; in two patients, adhesions were encountered; and in one patient each, a loop of small intestine caught behind the reservoir or an intestinal volvulus behind the ileostomy was encountered.

Obstruction After Closure of Ileostomy. In all instances, the small bowel obstruction occurred within 2 weeks of the ileostomy take-down. The episodes lasted less than 1 week after initiation of conservative medical treatment in all but three patients (8, 9, and 10 days, respectively). Conservative treatment consisted of nasogastric intubation and intravenous (I.V.) feedings.

Recurrent Small Bowel Obstruction

Six patients presented with repeat obstructive episodes. In three patients, a "medical" obstruction took place after each of the two stages of the ileal pouch-anal procedure. In two patients, the obstructive episode after the first stage was resolved with conservative measures, but another episode after take-down of the ileostomy required surgical correction. One patient with familial adenomatous polyposis underwent four separate surgical explorations for small bowel obstruction due to dense adhesions after closure of the ileostomy.

Risk Factors

Nine separate factors were analyzed in an attempt to explain the occurrence of small bowel obstruction requiring surgical correction. Seven of the nine factors analyzed did not seem to increase significantly the risk of intestinal obstruction. They included 1) age, 2) sex, 3) the nature of the primary disease (that is, familial adenomatous polyposis [5.5%] vs. ulcerative colitis [7.5%]), 4) whether the ileostomy was taken down via a small peristomal incision (3.3%) or an abdominal incision (0%), 5) the type of reservoir (that is, S-shaped [9%] vs. J-shaped [7.2%]), 6) whether ileal resection (3.6%) or simple unfolding of the loop ileostomy (2.1%) was done at the time of ileostomy closure, and 7) establishment of the stapled versus sutured anastomosis at the time of ileostomy closure and restoration of intestinal continuity.

Two factors, however, seemed to augment the risk of small bowel obstruction. After the first operation, a Brooke ileostomy seemed to favor small bowel obstruction. Indeed, "surgical" obstructions developed in four (12.5%) of 32 patients with a Brooke ileostomy, but in only 26 (4.6%) of 564 patients with a loop ileostomy ($p = 0.07$). Patients who had had previous operation were more at risk for obstruction (8.5%) than those who had not (2.2%) ($p < 0.04$).

Discussion

Postoperative small intestinal obstruction is the most common complication of ileal pouch-anal anastomosis. In contrast to perianastomotic and pelvic sepsis, which admittedly is more troublesome but has decreased in frequency with increasing surgical experience,⁹ the rate of small bowel obstruction remains elevated and unchanged. A survey of the literature reveals an overall frequency of intestinal obstruction after ileoanal anastomosis ranging from 15%⁴ to as much as 43.5%,¹⁰ and the incidence of "surgical" obstruction hovers around 5–20% (Table 4).

In most patients, the cause is not specific and the incidence does not differ from that after proctocolectomy and Brooke ileostomy or subtotal colectomy and ileorectostomy performed for ulcerative colitis (Table 5). Watts et al.¹¹ reported an incidence of 2–3% per year for the first 3 years after proctocolectomy. Some authors reported a higher incidence when colectomy was performed for colitis,^{12,13} whereas others reported a greater incidence when it was performed for polyposis;¹⁴ in the latter instance, excessive fibrosis or mesenteric fibromatosis has been blamed.¹⁵ In our study, as regards the risk of "surgical" occlusions, we did not find a significant difference between the two disease entities: 5.6% for polyposis and 7.5% for ulcerative colitis. None of our patients who had operation for polyposis have developed mesenteric fibro-

TABLE 5. Reports of Obstruction After Colectomy and Ileorectostomy or Proctocolectomy and Brooke Ileostomy

Reference	No. of Patients	Operations (No. of Patients)	Surgical Obstruction (%)
Morowitz and Kirsner ¹⁶	1796	Colectomy, subtotal (496) Proctocolectomy	12.5
Watts et al. ¹⁷	151	Proctocolectomy (115) Colectomy + ileostomy (16) Ileorectal anastomosis (12) Miscellaneous (8)	9.7
Ritchie ¹⁸	306	Proctocolectomy (177) Colectomy + ileostomy (108) Miscellaneous (21)	13.0
Hughes et al. ¹⁹	188	Proctocolectomy (63) Colectomy + ileostomy (97) Ileorectal anastomosis (20) Miscellaneous (8)	9.0
Roy et al. ²⁰	340	Proctocolectomy + colectomy and ileostomy	5.0
Grüner et al. ²¹	200	Colectomy + proctectomy (144) Ileorectal anastomosis (56)	8.3
Oakley et al. ²²	154	Ileorectal anastomosis (154)	2.1, early 17.2, late

matosis. We believe that the causes for such obstruction are by and large nonspecific and mostly due to adhesions. Bublick et al.,¹⁰ however, reported three instances of compression of the third portion of the duodenum by the superior mesenteric artery, a problem that was corrected by a side-to-side duodenojejunostomy. We and other authors (Table 4) who frequently perform this procedure have not seen this specific cause of upper gastrointestinal (G.I.) obstruction. We have, however, seen herniation of a loop of ileum behind the reservoir mesentery lead to high-grade obstruction. To obviate such a complication, some surgeons prefer to close the pelvic floor around the ileal reservoir.

Certainly the type of ileal reservoir does not seem to be of major etiologic importance. Nicholls et al.,¹⁶ who compared the results obtained in patients with S-shaped, J-shaped, and W-shaped reservoirs (Table 4), noted fewer obstructions in the limited number of J-shaped reservoirs they constructed. In our own experience, the percentage of "surgical" occlusions was 9% in 22 S-shaped pouches and 7.2% in 600 J-shaped pouches ($p < 0.05$).

The temporary diverting ileostomy is often responsible for such obstructive episodes, especially after the first stage of the ileo-anal procedure. In other major procedures, the ileostomy itself seems to play less of an etiologic role in obstruction but is still involved in many patients (Table 5). Whether the Brooke ileostomy is more often at fault than the loop ileostomy, as we noted, has not been studied extensively by other investigators. Fasth and Hulten¹⁷ reported an incidence of about 3% with loop ileostomy that

was performed for other reasons. Although we have had good results in patients without a protective ileostomy in selected situations,¹⁸ at present, we are not prepared to advocate eliminating the protective ileostomy for fear of increasing the risk of pelvic sepsis,¹⁹ which is a more life-threatening complication. It is important to make an abdominal wall aperture of sufficient size to prevent a "pinching" effect and edema. Also, we have not found it necessary to twist the stoma 180°, which is a method that may have been instrumental in certain series.

If the occlusion occurs soon after either phase of the operation, it is reasonable to expect that the obstruction will be resolved with conservative measures. If a stoma is present, intubation of the afferent limb may solve the problem. If the stoma itself is the source of the obstruction, especially if it is recurrent, one should consider earlier take-down of the temporary ileostomy, after ensuring that the reservoir and its anastomosis to the anus have healed. We also agree with Utsunomiya et al.²⁰ that absorbable sutures and extensive lavage of the peritoneal cavity should be used. Wong²¹ maintained that early operation is preferred because of the risk of necrosis. The clinical course of the patient will dictate how early one should intervene; certainly, in our own experience and that of others, the problem of necrosis has been very rare.

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