

Results of Mucosal Proctectomy Versus Extrarectal Dissection for Ulcerative Colitis and Familial Polyposis in Children and Young Adults

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● Over a 5-year period, the authors examined 30 consecutively treated patients, aged 16 years or younger, who underwent total colectomy and ileal pouch-anal anastomosis, (IPAA) using two different surgical methods. In 16 patients (group I), extrarectal dissection with stapled J pouch and anastomosis was performed. In 14 patients (group II), mucosal proctectomy with hand-sewn S pouch and anastomosis was performed. The mean follow-up period this study was approximately two years (range, 1 to 5 years). With regard to postoperative complications, quality of life, and occurrence of pouchitis, there were no significant differences between the groups. Stool frequency was not significantly different between the two groups, and approached four bowel movements per day at 1 year after surgery. In both groups, daytime continence was achieved by all patients 6 months after surgery. A greater number of patients in group II demonstrated temporary nocturnal leakage than in group I, but this difference was not statistically significant ($P = .09$). The authors conclude that both methods of IPAA are equally effective in preserving normal sphincter function. In patients with severe rectal inflammation, extrarectal dissection with stapled anastomosis may obviate the need for extended preoperative hyperalimentation or subtotal colectomy, but may carry a small increased risk of recurrent anorectal inflammation. The long-term risk of dysplasia is unknown, but may be slightly higher after extrarectal dissection with stapled anastomosis. Further study of both methods of IPAA is recommended.

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INDEX WORDS: Colectomy, total; ileal pouch-anal anastomosis.

TOTAL COLECTOMY and ileal pouch-anal anastomosis (IPAA) has gained widespread acceptance in the treatment of ulcerative colitis and familial polyposis. Surgical results have continued to improve with increased operative experience, and most patients are now cured of disease, with preservation of normal continence.

IPAA is a technically demanding operation that has been developed over the past few decades by the collaborative efforts of many surgeons. The technical aspects of this procedure vary between surgeon and institution, but generally include mucosal proctectomy, preservation of the anal transition zone, and construction of a pelvic reservoir. Alternatively, a few pediatric surgeons have used extrarectal dissection and stapled ileoanal anastomosis.

At The Cleveland Clinic Foundation, sphincter preservation in children and young adults has been accomplished either by mucosal proctectomy with

hand-sewn S-pouch and ileoanal anastomosis or by extrarectal dissection with stapled J pouch and ileoanal anastomosis. The purpose of this study is to compare the results of these two procedures in pediatric patients over a 5-year period.

MATERIALS AND METHODS

We reviewed the medical records of and conducted telephone interviews with 30 consecutively treated patients, aged 16 years or younger, who underwent total colectomy and IPAA for ulcerative colitis or familial polyposis at The Cleveland Clinic Foundation (F.A., I.L., V.E.) or Hartford Hospital (F.A.) from November 1987 to June 1992. IPAA was performed using two different techniques depending upon the staff surgeon's preference.

Sixteen patients underwent extrarectal dissection with stapled J pouch and anastomosis, as described by Heald and Allen.¹ (group I; Fig 1). There were seven males and nine females, and the median age at the time of surgery was 14.0 years (range, 11 to 16). Fifteen patients had ulcerative colitis, and one had familial polyposis. The average duration of disease was 4.1 years. The indications for surgery included intractable disease in 10 patients and fulminant disease in six. Seven of these patients had previously undergone subtotal colectomy and ileostomy, and four patients did not receive a temporary diverting ileostomy at the time of IPAA.

Fourteen patients underwent mucosal proctectomy with hand-sewn S pouch and anastomosis, as described by Martin et al² (group II; Fig 2). There were six males and eight females, and median age at the time of surgery was 13.5 years (range, 5 to 16). Similar to group I, only one of these patient had familial polyposis; the other 13 had ulcerative colitis. The average duration of disease in this group was 2.1 years. All 14 patients underwent surgery for intractable disease. Two of these patients had previously undergone subtotal colectomy and ileostomy, and all patients in this group received a temporary diverting ileostomy at the time of IPAA.

Ileostomy closure was performed a mean of 4½ months after IPAA in both groups. Any ileostomy problem that hastened the surgeon's decision to close the ileostomy, such as retraction or stricture, was defined as a stoma complication. All patients were interviewed and the charts were reviewed to determine complications, occurrence of pouchitis, satisfaction with outcome, and functional parameters (ie, number of bowel movements per day, continence). Continence was specified as either daytime or nighttime, and defined as no more than one episode of stool leakage (requiring change of undergarment or pad) per 2 weeks. Pouchitis

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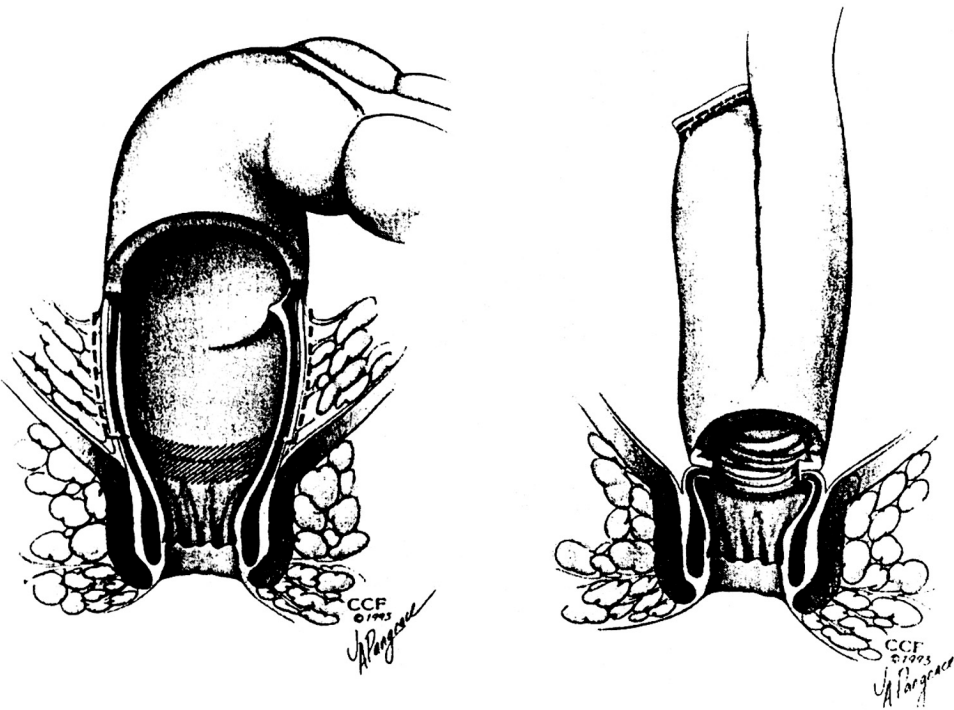


Fig 1. Patients in group I underwent extrarectal dissection with construction of a stapled J pouch and circular stapled anastomosis.

was usually diagnosed clinically and was specified as either transient (responding to a limited course of antibiotic therapy) or chronic (requiring long-term suppressive therapy). Patients were asked whether they felt very satisfied, moderately satisfied, or dissatisfied, and for what reason(s).

Statistical analysis comparing two groups with respect to pouchitis was performed using Fisher's Exact Test. Stool frequency data were analyzed with Wilcoxon's Rank Sum Tests. Comparison of the continence data was analyzed using Fisher's Exact Test. Differences were considered statistically significant if the *P* value was less than .05.

RESULTS

The mean follow-up period in this study was 2.2 years for group I and 2.1 years for group II. Follow-up information was available for all patients at least 1

year after IPAA; for 12 patients in group I and eight in group II, it was available 2 years after IPAA.

There were no deaths. The most frequent complication was small bowel obstruction. Two patients in group I and one in group II required laparotomy for obstruction. One patient in group I was had a pouch leak after stoma closure, which was successfully treated with transanal drainage and diverting ileostomy. The ileostomy was subsequently closed; the patient has two bowel movements per day and is fully continent 1 year later. One patient in group II had a soft anal stricture treated successfully by anal dilation. Finally, two patients in group II had stomal complications requiring early closure.

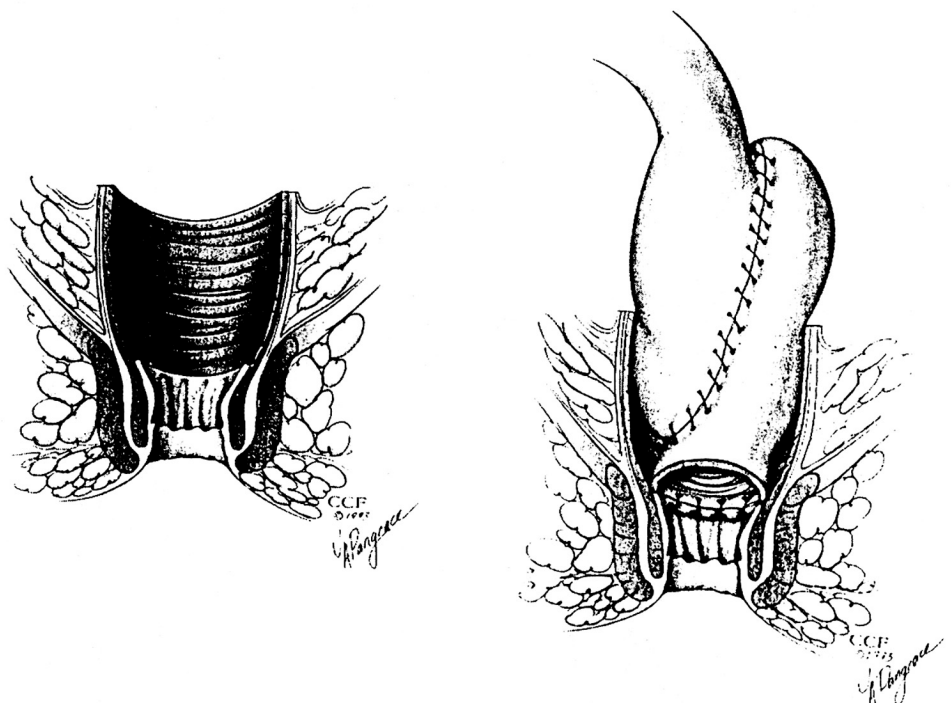


Fig 2. Patients in group II underwent mucosal proctectomy to the tops of Morgagni's columns, with a hand-sewn S pouch and anastomosis.

Ninety-three percent of group I and 94% of group II patients were moderately or very satisfied. One patient in group I and one in group II were dissatisfied because of chronic pouchitis limiting normal activities. There were two patients with chronic pouchitis and two with transient pouchitis in each group ($P = .642$). Chronic pouchitis is well controlled in one patient in group II, by intermittent intubation of the pouch; a pouch revision is planned for this patient. In the patients with chronic pouchitis, there has been no subsequent histological evidence of Crohn's disease. One patient in group I has recurrent anorectal inflammation, which is well controlled with a hydrocortisone suppository. Results of the biopsy of this area showed columnar epithelium, crypt abscesses, and no evidence of dysplasia.

Stool frequency was approximately four bowel movements per 24 hours, and was not significantly different between group I or II at any time during the study (Fig 3). Six months postoperatively, daytime continence had been achieved in all patients except for one in group II who had occasional daytime leakage until 1 year after the surgery (Fig 4). A greater number of patients in group II had temporary nocturnal leakage than in group I, but this difference was not statistically significant ($P = .09$). The median time required to achieve nocturnal continence was 0.5 years in both groups. The small number of patients in this study limits the value of statistical analysis.

DISCUSSION

In the past decade, the outlook for children and young adults with ulcerative colitis and familial polyposis has greatly improved. IPAA with sphincter preservation has replaced proctocolectomy and permanent ileostomy as the surgical treatment of choice. At the same time, early diagnosis and improved medical management have contributed to the decrease in the number of patients with ulcerative colitis who require

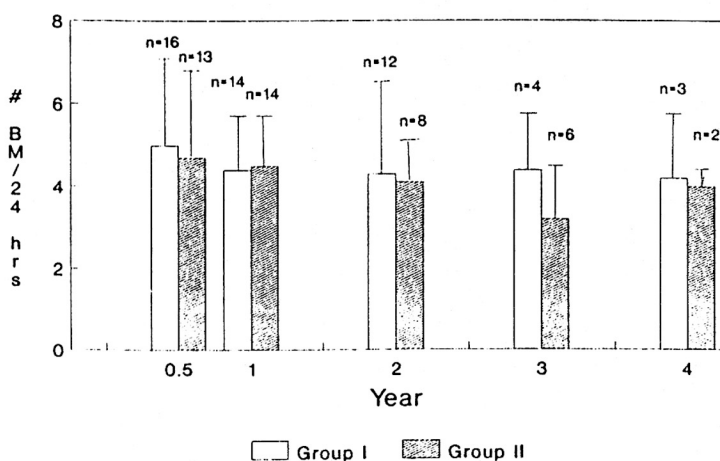


Fig 3. Stool frequency. There was no significant difference between the two groups during the study period.

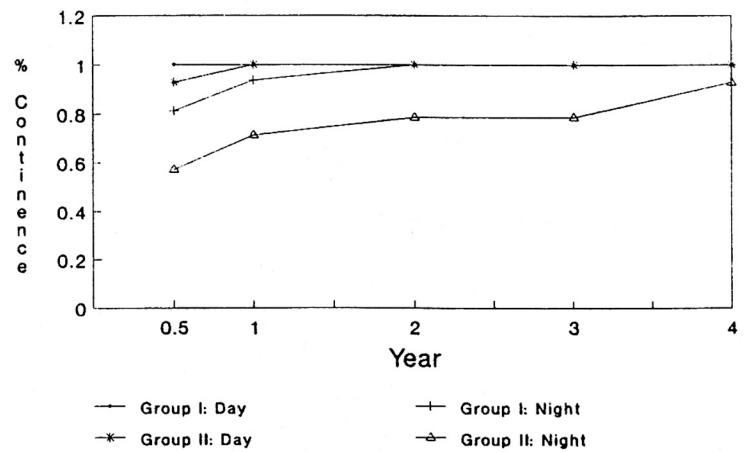


Fig 4. Continence improves with time. There was no significant difference in daytime or nighttime continence between the two groups.

emergent or staged procedures for toxic megacolon, hemorrhage, or colonic perforation.³ Finally, lower postoperative morbidity and improved functional results have led many gastroenterologists to refer patients who have ulcerative colitis at an earlier stage of disease, thus avoiding the complications of steroids, growth failure, delayed sexual maturity, and chronic debilitation.

Sphincter preservation for benign colorectal disease using mucosal proctectomy was first proposed in 1947 by Ravitch and Sabiston, who performed total colectomy, rectal mucosectomy, and ileoanal anastomosis in dogs.⁴ Soave⁵ adapted the technique to the treatment of Hirschsprung's disease and, in 1963, described the operative details emphasizing the importance of preserving a strip of distal anal mucosa. Subsequently, in 1977, Martin et al reported on 17 patients who underwent total colectomy, mucosal proctectomy, and straight ileoanal anastomosis. Many of these patients had frequent, watery stools, but complete bowel control was achieved in 13 of them.² Others⁶ reported the occurrence of frequent stools and perianal excoriation after this procedure¹¹ and, in 1980, Fonkalsrud,⁷ Parks et al,⁸ Goligher,⁹ and Peck¹⁰ reported the addition of an ileal reservoir to reduce the number of daily bowel movements. In 1982, Martin and Fischer¹¹ described several technical refinements, including preservation of the anal transition zone to allow distinction of gas from stool, and construction of an S reservoir with a short anal spout to facilitate evacuation and prevent fecal stasis. They further emphasized the importance of reducing gross rectal inflammation preoperatively to facilitate complete mucosectomy and to prevent cuff abscess or pelvic sepsis. Finally, in 1985, Martin et al¹² demonstrated that the top of the columns of Morgagni represent a critical level for preservation of continence without recurrent disease. They showed that

an anastomosis placed below that level is likely to result in incontinence without recurrent disease; if placed above, it results in complete continence but recurrence of disease in 50% of patients.

A different approach to sphincter preservation was pioneered by Aylett¹³; in 1953 he reported 300 cases of ulcerative colitis treated by total colectomy and ileorectal anastomosis, with favorable results. Ileorectal anastomosis has been advocated in patients who have minimal rectal disease, but is less than satisfactory in children because gross rectal involvement is common in these patients. In 1977, Nass et al¹⁴ found that 54% of their pediatric patients required conversion of an ileorectal anastomosis to an ileostomy because of recurrent disease; and in three of the patients, cancer had developed during a relatively short period of observation. Khubchandani et al¹⁵ found a 5.6% incidence of carcinoma in 51 patients. Other investigators have noted a risk of 5% to 15% over a period of 30 years.¹⁶⁻¹⁸ For these reasons, the operation has been gradually modified to preserve shorter and shorter lengths of rectal muscle, duplicating the technique of extrarectal dissection described by Swenson and Bill¹⁹ for the treatment of Hirschsprung's disease. The ileoanal anastomosis in this procedure has been greatly simplified by the development of the Premium CEEA and Reticulator intestinal staplers.

At the Cleveland Clinic, sphincter preservation may be accomplished equally well by mucosal proctectomy or by meticulous extrarectal dissection. In both groups there was a high rate of daytime continence. Nocturnal leakage was observed in the early postoperative period, particularly after mucosal proctectomy and hand-sewn anastomosis, but tended to resolve over time. Transient nocturnal leakage may be related to several factors. First, the hand-sewn anastomotic technique may temporarily stretch the sphincter mechanism.²⁰ Another factor affecting nighttime fecal incontinence is the solidity of the stool. Liquid stool may tremendously stress the sphincter mechanism, leading to incontinence even with a normal sphincter. Finally, transient nighttime leakage may result from a relative decrease of sensory tissue in patients undergoing hand-sewn versus stapled anastomosis. Hand-sewn anastomoses were placed precisely at the top of Morgagni's columns, whereas stapled anastomoses were placed 1 to 2.5 cm above the dentate line by bimanual examination. Thus, stapled anastomoses may preserve more sensory tissue, leading to improved early continence.

In our study, the average number of bowel movements per day was practically equivalent in both

groups, and similar to that reported by Martin and Fischer¹¹ and Telander et al.²¹ The number of bowel movements is related to the capacity and compliance of the ileal reservoir. In our patients, S reservoirs were constructed using three 10-cm limbs, and J reservoirs were constructed with two 15-cm limbs. The reservoir for each group was initially calibrated to contain approximately 200 to 250 cm³. Compliance is difficult to measure, given the limitation of current manometric techniques. The most commonly used balloon technique assumes that the rectum is a closed cylinder and that rectal size and extrarectal tissues do not affect the measured values. Accordingly, we have not routinely measured compliance of the neorectum.

In our experience, the occurrence of pouchitis was nearly equivalent after both types of IPAA procedures. Pouchitis rarely occurs after IPAA for familial polyposis, but has been noted in approximately 10% to 40% of patients after IPAA for ulcerative colitis.²² Pouchitis usually presents with crampy lower abdominal pain and increased frequency of stools, with occasional bright red blood in the rectum. In many cases, it is episodic, occurring within the first postoperative year, and responds promptly to 1 to 2 weeks of metronidazole therapy. Chronic or intractable pouchitis may be associated with incomplete evacuation and fecal stasis or previously unrecognized Crohn's disease. If chronic pouchitis responds to intermittent intubation, then revision of the pouch should be considered. To prevent chronic pouchitis, we have reduced the anal spout of the S reservoir to no more than 1 to 1.5 cm in length.

One of the obvious advantages of extrarectal dissection and stapled anastomosis is the relative simplicity of the procedure. There may be other advantages as well. For example, the procedure is much less time-consuming than mucosal proctectomy and hand-sewn IPAA. In addition, in cases of severe rectal inflammation, it may be safer to perform the dissection just outside the muscular wall rather than in the submucosal plane where there is a greater risk of perforation or retention of rectal mucosa and subsequent cuff abscess. For similar reasons, extrarectal dissection and stapled anastomosis may obviate the need for a 4- to 6-week period of preoperative hyperalimentation or staged subtotal colectomy required for patients who have severe rectal disease.

On the other hand, because the stapled anastomosis is placed deep within the pelvis and may not be precisely visualized with respect to the dentate line, a small cuff of columnar epithelium may be retained. This may be problematic in the short term because of recurrent anorectal inflammation, and in the long-

term because of dysplasia. The long-term risk of dysplasia is unknown, but may be higher in patients with retained rectal mucosa. Recent studies²³ have shown that rectal columnar epithelium extends past half the maximum length of the transition zone and is inflamed in most patients who have ulcerative colitis. At the Cleveland Clinic, our current practice and recommendation is that all patients undergo a yearly anoscopic examination after stapled IPAA, but not after mucosal proctectomy and hand-sewn IPAA. At present, dysplasia has been noted in only three of more than 600 pediatric and adult patients after stapled IPAA for ulcerative colitis performed within the last 15 years.²⁴ Further follow-up will be required to determine the exact long-term risk of dysplasia.

Certain limitations of our study should be acknowledged. First, this is a retrospective study of a relatively small series of patients. Second, the two procedures were performed by two separate groups of surgeons, thus possibly introducing bias based on surgical experience. Finally, there may be some degree of selectivity of patients, affecting the functional

outcome. Some of the procedures for group II were performed at a second institution by one of the authors, albeit using standard techniques. In addition, several patients in group II were referred to our institution after undergoing subtotal colectomy elsewhere.

Despite these limitations, we have shown that total colectomy IPAA may be successfully performed for ulcerative colitis and familial polyposis, using either mucosal proctectomy and hand-sewn S reservoir or extrarectal dissection with stapled anastomosis and J reservoir, with practically equivalent clinical outcome. The principle advantage of mucosal proctectomy is that it provides the surgeon with the ability to visualize placement of the anastomosis at the top of the columns of Morgagni, perhaps reducing the risk of subsequent dysplasia. In contrast, the principle advantage of extrarectal dissection with stapled anastomosis and J pouch is that it is a simpler procedure that may obviate the necessity for preoperative hyperalimentation or subtotal colectomy in patients who have severe rectal disease.

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