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ORIGINAL CONTRIBUTIONS

Comparing Functional Results One Year and Ten Years After Ileal Pouch-Anal Anastomosis for Chronic Ulcerative Colitis

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Proctocolectomy with ileal pouch-anal anastomosis (IPAA) is the treatment of choice for most patients with chronic ulcerative colitis. Long-term results, however remain undefined; the major concern is that function may deteriorate. PURPOSE: The aim of this study was to assess functional outcome in a subgroup of patients who have an IPAA for chronic ulcerative colitis for >10 years. METHODS: Among 1400 IPAA patients, 75 consecutive subjects (31 females and 44 males; median age 31 at operation) were identified who had the procedure prior to 1982. All patients had functional results recorded 1 year and 10 years following ileostomy closure. RESULTS: There were four deaths during the follow-up period; none were pouch related. Two patients refused ileostomy closure. Of the remaining 69 patients, there were 8 (11 percent) failures, leaving 61 subjects available for study. Stool frequency (7 ± 3, mean ± SD) remained unchanged. Of the 50 subjects with initially excellent daytime continence, 39 (78 percent) remained the same, 10 (20 percent) developed minor incontinence, and 1 developed poor control after 10 years. Four of 10 subjects (40 percent) with initial minor daytime incontinence remained unchanged, 4 (40 percent) improved, and 2 (20 percent) worsened. The one subject with poor control at one year was unchanged. Nocturnal fecal spotting increased over the 10-year period but not significantly (38 percent *vs.* 52 percent; $P = 0.08$). CONCLUSIONS: After IPAA, functional results in terms of stool frequency and rate of fecal incontinence did not deteriorate with time. [Key words: Ileal pouch-anal anastomosis; Ulcerative colitis]

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Over the past decade, the ileal pouch-anal anastomosis (IPAA) has emerged as the procedure of choice in most patients with chronic ulcerative colitis requiring surgical management of their disease. The popularity of this procedure has grown, mainly because it avoids the need for a permanent stoma and presumably rids the patient of disease and subsequent cancer risk.

Since the report by Martin *et al.*[1] in 1977, there have been many publications describing several variations of pouch design, with or without mucosectomy; all report acceptable functional results

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during the first few years after operation.[2-4] Because the IPAA is a relatively new procedure, there is little data on long-term functional results.

Therefore, the aim of this study was to identify a group of patients with a diagnosis of chronic ulcerative colitis who had undergone an IPAA *a minimum of 10 years previously* and to evaluate the functional results, particularly with regard to whether they had improved, deteriorated, or remained the same.

PATIENTS AND METHODS

Since January 1981, over 1,400 ileal IPAA operations have been performed at the Mayo Clinic. A registry of all patients undergoing this operation has been kept by a data clerk, with follow-up initiated at six months after ileostomy closure and yearly thereafter. At no time does a surgeon enter data or conduct the follow-up surveys.

From this registry, 75 consecutive patients who had undergone this procedure for chronic ulcerative colitis, between January 1981 and May 1982, were identified. Ages, at time of surgery, ranged from 16 to 51 years, with a median age of 31 years. There were 31 females and 44 males.

The standard operation was a two-stage procedure using the two-limbed "J"-shaped ileal pouch, similar to the pouch described by Utsunomiya *et al.*[5] In the first stage, abdominal colectomy, proximal proctectomy, endorectal mucosectomy, and ileal pouch anastomosis with defunctioning loop ileostomy was completed. Eight to twelve weeks later, the ileostomy was closed at a second operation. Only two patients did not have a covering stoma.

Each patient had a data file containing information obtained at *both* 1 year and 10 years following ileostomy closure. Follow-up data included stool frequency, daytime and nighttime incontinence scores, and episodes of pouchitis. In addition, all complications were recorded.

Daytime incontinence was classified as *never*, *occasional*, and *frequent*. Patients with excellent daytime control who did not stain their underclothes were classified as never having fecal incontinence. Those with no gross incontinence, but who had occasional minor soiling and no interruption of daily activity were classified as occasional fecal incontinence, while patients with gross incontinence or soiling that interrupted daily activity were classified as having frequent incontinence.

Nighttime incontinence was classified similarly, but because of the difficulty in grading severity during sleeping hours, incontinence at night was classified as either being present or absent, with any staining or soiling of underclothes regarded as incontinence.

Pouchitis was identified as a syndrome manifest by frequent watery, often bloody stools, urgency, incontinence, abdominal cramping, and malaise or fever. An episode of pouchitis was considered to have occurred if two or more of these symptoms were present for at least two days and relieved by the administration of an antibiotic.

Failure of the IPAA was defined as the need for a permanent ileostomy, with or without excision of the pouch.

Functional outcome at the 1-year follow-up was compared with outcome recorded at 10 years. Nonparametric analysis of the data was done using the sign and Wilcoxon's signed rank tests.

RESULTS

No patient was lost to follow-up. Of the 75 subjects identified, 4 had died during the follow-up period. None of these deaths were pouch related. One patient died of liver failure present as a result of hepatitis acquired before the pouch surgery. Another died of multiple myeloma and one patient died as a result of a cholangiocarcinoma. The last death was the result of a pancreatic malignancy.

Two patients chose not to have their defunctioning ileostomies closed. Of the remaining 69 subjects available for study, there were 8 failures (11 percent). Five of these occurred within the first year following surgery and 3 occurred later at 4, 7, and 9 years. As can be seen in Table 1, a perioperative complication was the most common reason for early failure; recurrence of undiagnosed Crohn's disease was the most common etiology of late failure.

Early complications were frequent. Seventeen (23 percent) of the initial 75 subjects developed at least one episode of small bowel obstruction and 6 (8 percent) had evidence of pelvic sepsis following pouch construction. Late complications, *excluding* pouchitis, were unusual. Two patients had perianal abscesses, one occurring at 5 years, the other at 10 years; both were drained with no sequelae. Neither patient has yet to be diagnosed with Crohn's disease. One subject developed a perforation of the pouch four years postoperatively

Table 1.
Pouch Failures

Patient	Complication	Time
1: 19-yr-old M	Pelvic sepsis postoperatively with multiple perianal fistulas, probable Crohn's disease	Excised at 1 yr
2: 28-yr-old F	Pelvic sepsis postoperatively with evidence of pouch ischemia at surgery	Excised at 2 wk
3: 29-yr-old M	Anal stenosis postoperatively requiring anal dilations and frequent bowel movements with incontinence	Excised at 9 mo
4: 20-yr-old F	Perforation of pouch 8 mo postoperatively with recurrent sepsis and fistula at closures	Ileostomy at 8 mo
5: 35-yr-old M	Pelvic sepsis postoperatively with poor function and resultant permanent ileostomy	Ileostomy at 11 mo
6: 24-yr-old M	Perianal fistulas and poor function with evidence of Crohn's disease in pouch	Excised at 4 yr
7: 20-yr-old F	Poor function since ileostomy closure with no real change over the years	Ileostomy at 9 yr
8: 31-yr-old M	Perianal disease with poor function and evidence of Crohn's disease	Ileostomy at 7 yr

that was drained and defunctioned. No etiology was found, but intestinal continuity was restored without further problems. Two patients developed perianal Crohn's disease, resulting in pouch failure.

Pouchitis

A reliable record of the incidence of pouchitis could not be obtained at the one-year follow-up. At 10 years, 16 (26 percent) of the 61 subjects with functioning pouches had experienced at least one episode of pouchitis. Two of the eight failures had been diagnosed with pouchitis at some point, but both turned out to have Crohn's disease. No other subjects that failed had pouchitis. A history of pouchitis did not seem to affect long-term function, although one patient continues to take antibiotic prophylaxis to control symptoms.

Functional Outcome

Sixty-one subjects were available for functional assessment at 1 year and 10 years.

Stool Frequency

Stool frequency remained unchanged over 10 years; the median frequency was 7 in a 24-hour period at both 1 year and 10 years ($P = 0.76$). The range of stool frequency was similar, with only one patient well outside the normal range, having an average of 16 bowel movements per day both at 1 year and 10 years (Fig. 1). All patients studied were able to evacuate their pouches spontaneously.

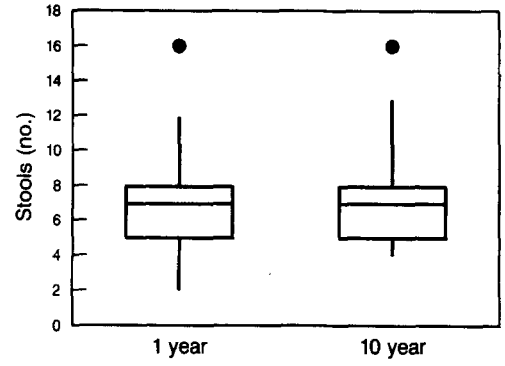

Figure 1. Comparison of 24-hour stool frequencies at 1-year and 10-year follow-ups.

Daytime Incontinence

Fifty (82 percent) of the subjects reported excellent daytime control at the 1-year follow-up. Of these, 39 (78 percent) patients still reported excellent control at 10 years, 10 (20 percent) patients reported occasional daytime staining, and 1 (2 percent) patient had developed poor control that interfered with social activities.

Ten (16 percent) subjects reported occasional daytime control problems initially at 1 year. At 10 years, 4 remained unchanged, 4 improved, and only 2 had developed worse control. Only 1 (2 percent) of the 61 patients initially complained of poor daytime control and this was unchanged at 10 years.

Overall, at 10-year follow-up, 43 (70 percent) patients had excellent daytime control, 14 (23 percent) patients occasional soiling, and 4 (7 percent) patients poor control. Although some deterioration

was evident in a total of 13 patients (6 females and 7 males; median age, 31), this was not statistically significant (Fig. 2).

Nighttime Incontinence

At 1 year, 23 (38 percent) patients complained of nighttime soiling. Of these, only 5 (22 percent) were improved at 10 years. On the other hand, 14 of the 38 subjects (37 percent) who reported good nighttime control initially, complained of incontinence at the 10-year follow-up, for an overall rate of 52 percent nighttime soiling at 10 years. Although a trend was present, these changes did not reach statistical significance ($P = 0.08$) (Fig. 3).

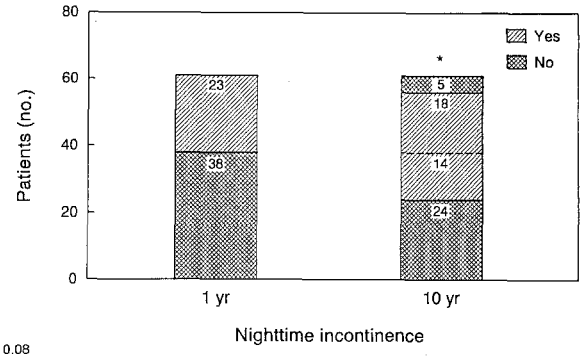

Figure 3. Number of subjects with or without nighttime soiling at 1 year compared with changes in both groups at 10 years.

DISCUSSION

The goals of surgery for chronic ulcerative colitis are to eradicate the disease, protect the patient from future malignant disease, and to provide a good quality of life. Several reports document that IPAA accomplishes these goals.[6,7] This observation is based for the most part on the results of follow-up data gathered within five years of operation. Whether this outcome remains durable is unknown.

Our study demonstrated clearly that functional results, in terms of stool frequency and rates of fecal incontinence, remain acceptable at 10 years following operation. Except for pouchitis, late complications were unusual and, other than the occurrence of previously undiagnosed Crohn's disease, did not lead to failure. In fact, the majority of failures (75 percent) occurred within the first year of surgery. Early perioperative morbidity, particularly pelvic sepsis, did seem to affect chances of a successful outcome, as confirmed by others.[8,9] It is important to remember that these patients were the first to undergo IPAA at our institution. As familiarity with this operation has been gained, serious postoperative morbidity has decreased and chances of success have increased.

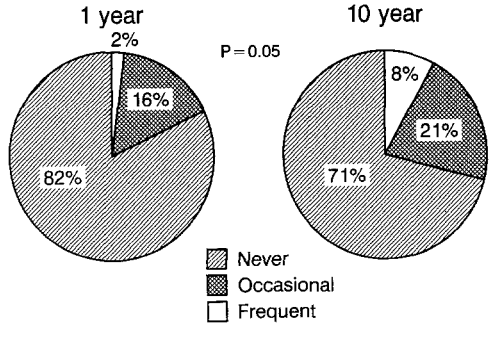

Figure 2. Comparison of daytime incontinence percentages at 1-year and 10-year follow-ups.

Although it is generally felt that function improves with time,[10] our study demonstrated that there was little change in function over the long term. Indeed, there may be slight deterioration in control of continence, although this was not a statistically significant change. It should be noted that the majority of those patients who complained of "occasional" daytime incontinence or nighttime soiling were happy with their results. Obviously, it will be important to continue to follow these patients as they age past 60 years.

Nonspecific reservoir inflammation or pouchitis is a complication reported to affect anywhere from 5 percent to 40 percent of patients with a pelvic ileal reservoir after IPAA.[6,11-13] The etiology is unknown. In this study, a prevalence of 26 percent by 10 years was observed in this early group of patients. The presence of pouchitis did not seem to affect long-term function and did not contribute to pouch failure in any of these patients. Although a study from Gemlo *et al.*[8] supports these findings, a recent study from The Netherlands has reported pouchitis to be a frequent cause of failure of pelvic reservoirs in colitis patients (37 percent of patients responding poorly to medical treatment).[14] However, the overall failure rate in this study is reported to be 22 percent, much higher than most published reports.

CONCLUSION

At Mayo, IPAA using the J-configuration and endoanal mucosectomy is the most common operation performed for patients with chronic ulcerative

colitis. In the literature, controversy exists over the functional outcome of IPAA with mucosectomy *vs.* IPAA with preservation of the anal transition zone.[15, 16] Our results indicate that with mucosectomy, functional outcome remains reasonably stable over the long term, with the added benefit of minimal or no risk of a malignant change. Whether this long-term result is likewise achieved by an anal transition zone sparing operation remains to be determined.

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