

Double-Stapled *vs.* Handsewn Ileal Pouch-Anal Anastomosis in Patients with 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. Whether or not a double-stapled technique, which should preserve the anal transition zone and avoid prolonged anal dilation, facilitates superior fecal continence compared with conventional mucosal resection and handsewn anastomosis is unknown. **PURPOSE:** The aim of this study was to compare functional results after double-stapled and handsewn IPAA. **METHODS:** Twenty-seven consecutive patients (13 females, 14 males; mean age, 37 years) who had proctocolectomy and double-stapled IPAA (J) for chronic ulcerative colitis were identified. Each was matched by sex, age, and surgeon to a control who had undergone a conventional handsewn anastomosis. Functional results at six months after ileostomy closure were compared. **RESULTS:** Median stool frequency in each group was seven. The prevalence of pouchitis was 22 percent in both groups. One pouch failure occurred in each group. The percentage of patients from the double-stapled group with daytime spotting was similar to that of the handsewn group (18 percent *vs.* 26 percent, $P > 0.5$). Nighttime soiling rates were similar as well (41 percent *vs.* 48 percent, $P > 0.5$). **CONCLUSIONS:** Double-stapled IPAA appears to convey no early functional advantage over handsewn IPAA for chronic ulcerative colitis. [Key words: Ileal pouch-anal anastomosis; Ulcerative colitis]

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Total abdominal colectomy and mucosal proctectomy with ileal pouch-anal anastomosis (IPAA) has emerged over the past decade as the procedure of choice for the majority of patients requiring surgical management of chronic ulcerative colitis.¹ The popularity of this procedure has grown because it avoids the need for a permanent

stoma while presumably extirpating all colonic disease and its subsequent cancer risk.

Although long-term functional outcomes of this procedure have been respectable and patient acceptance very good,² a modification of the conventional handsewn anastomosis has been introduced that utilizes a double-stapled technique.³ It is theorized that this method of anastomosis facilitates improved continence by preserving the anal transition zone (ATZ)⁴ and by avoiding the prolonged anal dilation associated with mucosectomy.⁵

However, controversy persists over the fate of the unresected ATZ and, in particular, whether any benefits are realized by the use of this technique.^{6,7} The aim of this study, therefore, was to compare the early functional outcome of IPAA performed using a double-stapled technique that preserved the ATZ to IPAA performed by a conventional handsewn technique that removed the ATZ.

PATIENTS AND METHODS

Since January 1981, over 1400 IPAA's for chronic ulcerative colitis and familial polyposis have been done 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. Although the majority of procedures have been ileal J-pouches with conventional handsewn anastomoses (excising the ATZ), 27 consecutive patients who had restorative proctocolectomy with a double-stapled anastomosis (preserving the ATZ) between January 1990 and December 1991 were identified. All anastomoses were completed with a 28-mm circular stapler and were felt to lie within 2.5 cm of the dentate line. No patient with familial polyposis had a double-stapled technique. Each subject was matched by sex, age, and surgeon

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to a control who had undergone similar pouch construction for chronic ulcerative colitis using a conventional handsewn anastomosis with mucosectomy, during the same time interval. In all but one case, age was matched to within five years. If more than one control was available, the control patient whose surgery was completed closest in time to that of the stapled procedure was chosen.

A data base was constructed for each subject. Functional outcome parameters obtained at six months following stoma closure were recorded. Parameters recorded included 24-hour stool frequency and daytime and nighttime incontinence scores. Perioperative complications as well as episodes of pouchitis were also recorded.

Comparisons between the IPAA done by a conventional handsewn technique with mucosectomy and IPAA done by a double-stapled technique preserving the ATZ were analyzed using the sign test for matched pairs.

RESULTS

Six months following ileostomy closure, there was little difference between the double-stapled and the mucosectomy groups (Table 1). Five (19 percent) patients in the double-stapled group complained of some minor daytime spotting compared with seven (26 percent) patients in the mucosectomy group ($P > 0.5$). Nighttime incontinence, as well, was little different, with 11 (41 percent) patients who had a double-stapled anastomosis having some soiling compared with 13 (48 percent) patients from the mucosectomy group ($P >$

0.5). Stool frequency was similar, with only seven of the matched pairs differing by more than three bowel movements in a 24-hour period ($P > 0.5$) and with a median 24-hour stool frequency of seven in both groups. All patients from both groups could equally distinguish flatus from stool.

Complications were similar. There were seven patients (26 percent) from the double-stapled group with at least one episode of small bowel obstruction compared with six (22 percent) patients in the handsewn group. Pelvic sepsis occurred after mucosectomy in one (4 percent) patient and in three (11 percent) patients following a double-stapled anastomosis. Stricture requiring anal dilation occurred in two (7 percent) patients who had undergone mucosectomy and in one (4 percent) patient who had a double-stapled anastomosis. There was one pouch failure each in the handsewn and the double-stapled groups (4 percent). Both patients who failed had frequent stools with poor control. Six (22 percent) patients from each group had at least one episode of what was clinically felt to be pouchitis. Pouchitis was defined as a syndrome manifest as frequent watery, often bloody, stools with urgency and abdominal cramping, and with symptoms of malaise and/or fever, that is promptly relieved with administration of metronidazole.

DISCUSSION

Leakage of stool or mucus has been reported to occur in up to 50 percent of patients who have undergone an IPAA.⁸⁻¹⁰ This is often most troublesome during sleep. The most consistent physiologic finding observed in patients with incontinence was decreased anal canal resting pressure.^{11, 12} A possible etiology may be that occult internal sphincter damage occurs during the mucosectomy, most likely as a result of the prolonged anal dilation.⁵ On the other hand, the role of the highly sensitive anal transition zone in maintaining fecal continence is unknown, but its removal has been theorized as one reason for impaired control.¹³ Recent work from both Ferrara *et al.*¹⁴ and Grotz *et al.*¹⁵ has demonstrated the importance of neorectal and anal canal coordination in the maintenance of continence; the lack of coordination that may occur following surgery may be an important mechanism of incontinence.

The double-stapled technique was introduced to try to decrease fecal incontinence by avoiding the

Table 1.
Results Six Months After IPAA

Parameter	Double Stapled (ATZ preserved)	Handsewn (ATZ excised)	P
No.	27	27	NS
Age (yr)	37 (16-64)	37 (17-55)	NS
Sex (F:M)	13:14	13:14	NS
No. of bowel movements/24 hr	7 (3-24)	7 (3-16)	NS
Daytime incontinence	5 (19%)	7 (26%)	NS
Nighttime incontinence	11 (41%)	13 (48%)	NS
Pouchitis	6 (22%)	6 (22%)	NS
Bowel obstruction	7 (26%)	6 (22%)	NS
Pelvic sepsis	3 (11%)	1 (4%)	NS
Stricture	1 (4%)	2 (7%)	NS
Pouch failure	1 (4%)	1 (4%)	NS

mucosectomy altogether. It has been postulated that by avoiding mucosectomy and the prolonged anal dilation associated with it, less internal sphincter injury would occur. Johnston *et al.*⁴ demonstrated higher maximum anal canal resting pressures and less minor fecal leakage in 12 patients who had undergone a stapled anastomosis compared with 24 patients who had undergone mucosal proctectomy. Similarly, Lavery *et al.*¹⁶ retrospectively compared seven patients with a double-stapled IPAA with seven patients who had undergone mucosectomy and found lower anal canal pressures and higher daytime and nighttime incontinence rates in the latter group. In contrast, Keighley *et al.*¹⁷ did not demonstrate any difference in functional outcome between 15 patients who had anal canal mucosectomy and 6 who had a double-stapled technique, although it is unclear whether the mucosectomies were done from above or below.¹⁷

Two prospective, randomized trials comparing the techniques reported no difference in clinical function or complications.^{6, 7} Physiologic parameters were similar, with a significant drop in anal canal resting pressures in both the mucosectomy and stapled group. Although the stapled anastomoses were generally associated with greater anal canal resting pressures compared with those handsewn, this did not appear to correlate with any improved function in either study.

Our study supports the findings of Seow-Choen *et al.*,⁶ Luukkonen and Jarvinen,⁷ and Keighley *et al.*¹⁷ that there is little difference in outcome following ileal pouch-anal anastomosis, whether it is done by the conventional handsewn technique with mucosectomy or by the newer double-stapled technique that preserves the anal transition zone. It may be that introduction of the stapler head through the anal canal during the double-stapled technique results in internal sphincter injury, similar to that hypothesized to occur during mucosectomy. It is conceivable that much of the drop in anal resting pressure following restorative proctocolectomy is as a consequence of autonomic denervation and not direct sphincter injury. During rectal dissection, the autonomic innervation of the internal anal sphincter is susceptible to injury.^{18, 19} With low rectal transection, disruption of the myenteric plexus is evident by the loss of the rectal anal inhibitory reflex. Loss of the excitatory as well as the inhibitory innervation of the internal sphincter may result in overall decreased sphincter tone, and

reinnervation may explain the apparent improvement over time of internal sphincter function.

Although excision of the anal transition zone may decrease anal sensation,^{13, 17} it does not eliminate the ability to discriminate between flatus and stool.¹⁷ Moreover, anesthetizing the anal canal has been shown to result in no impairment of continence in the majority of subjects.²⁰ In our study, discrimination between flatus and stool was equally good in both groups at six-month follow-up.

There is nothing in our data to suggest that a double-stapled anastomosis is safer. There is little doubt, however, that a double-stapled technique, which avoids mucosectomy, is easier to perform.²¹

The main argument from opponents of the double-stapled technique is that diseased mucosa is likely to remain with this procedure; the anastomosis being 1 to 3 cm proximal to the dentate line. Several studies have confirmed this,²²⁻²⁴ but its clinical relevance is not known. Indeed, islets of columnar epithelium have been found following conventional handsewn anastomosis with mucosectomy.²³ If there is a risk in leaving diseased mucosa, it would seem reasonable to assume that this risk increases as the amount of mucosa remaining increases.

In selected patients, there may be some advantage of the double-stapled technique over the conventional handsewn anastomosis, such as in older patients or in obese patients.

A double-stapled ileal pouch-anal anastomosis which preserves the anal transition zone, conveys no significant early functional advantage over a conventional handsewn anastomosis. Because this was a retrospective study, final recommendations await completion of our prospective trial.

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