Effect of High-Dose Steroids on Anastomotic Complications After Proctocolectomy With Ileal Pouch–Anal Anastomosis

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This review was designed to determine whether "high-dose" steroid therapy (≥20 mg prednisone/day) increases the likelihood of anastomotic complications after restorative proctocolectomy with ileal pouch–anal anastomosis (IPAA). The hospital records of 100 patients undergoing proctocolectomy with IPAA were reviewed. Patient characteristics were analyzed to determine what factors were associated with higher rates of anastomosis-related complications. Seventy-one of our patients were given diverting ileostomies, whereas the remaining 29 underwent a single-stage procedure. Fifty-four percent of the patients in our review were taking steroids preoperatively, 39 of whom were on high-dose therapy. The overall anastomosis-related complication rate was 14%. There was no significant difference in complication rates with respect to age, steroid use, steroid dose, use of a diverting ileostomy, type of anastomosis, duration of disease, or presence of backwash ileitis. A trend toward higher leakage rates was found in patients undergoing single-stage procedures (10.3% vs. 2.8%, $P = 0.14$) as well as in patients undergoing single-stage procedures on high-dose steroids (22% vs. 5.0, $P = 0.22$). Nevertheless, neither of these trends was found to be statistically significant, which was likely influenced by the small sample size. Our data suggest that there may be an increase in anastomotic leakage rates in patients on high-dose steroids undergoing a single-stage proctocolectomy with IPAA. Nevertheless, our rate was not as high as the rates seen by other investigators and did not reach statistical significance. During preoperative counseling, patients on high-dose steroids should be informed of this uncertain but real risk of anastomotic leakage. (J GASTROINTEST SURG 2004;8:547–551)

KEY WORDS: Restorative proctocolectomy, postoperative complications, ulcerative colitis, adenomatous polyposis coli

Restorative proctocolectomy with ileal pouch–anal anastomosis (IPAA) and diverting ileostomy has become the standard procedure for many patients with ulcerative colitis (UC) and familial adenomatous polyposis (FAP) who desire a continence-preserving procedure. More recently, a single-stage procedure (without the formation of a diverting ileostomy) is being performed in a select group of patients. These patients are typically those individuals considered good surgical candidates who do not have contraindications such as preoperative steroid use.[1–4] In addition, previous studies have suggested that a dose of prednisone greater than 20 mg per day ("high-dose") is associated with an increased risk of IPAA leakage.[5,6] The goal of this study was to assess whether high-dose preoperative steroid therapy is associated with anastomotic complications in patients undergoing restorative proctocolectomy and IPAA. We hypothesized that 20 mg or more of prednisone per day would increase anastomotic complications in patients who underwent a restorative proctocolectomy.

MATERIAL AND METHODS

The hospital records of 100 patients who underwent restorative proctocolectomy and IPAA performed

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by a single surgeon between 1995 and 2001 were reviewed. All patients were included regardless of preoperative condition or postoperative course. The mean follow-up time was 34 months (range 4 to 82 months). The data collected included age, sex, preoperative diagnosis, duration of disease, comorbid conditions, presence of backwash ileitis, preoperative steroid use, type of anastomosis, presence or absence of diverting ileostomy, and postoperative complications.

Anastomotic complications were defined as an anastomotic leak or stricture. Pelvic pouch leaks were determined to be present when there was radiographic or clinical evidence of anastomotic disruption or presence of a pelvic abscess. In this study, anastomotic strictures were defined as those needing repeated digital or operative dilations and did not include thin anastomotic webs. Yates-corrected chi-square and Fisher's exact test were used to evaluate categorical data. Statistical significance was set at $P < 0.05$.

RESULTS

All of the patients in our review underwent a proctocolectomy (or completion proctocolectomy) with formation of a J-pouch reservoir for the IPAA. Of the 100 patients, 87 had the diagnosis of UC, nine had FAP, three had Crohn's disease, and one had indeterminate colitis. Overall, 14 patients in our review had anastomosis-related complications. These included five anastomotic leaks and nine anastomotic strictures (Table 1). There were no case-related deaths and no patients in our review required pouch excision.

Fifty-four patients in our review were taking steroids preoperatively, of whom 39 were on high-dose therapy (≥20 mg prednisone/day). Of the five anastomotic leaks, three (5.6%) occurred in the steroid group, whereas two (4.3%) were found in the nonsteroid group (NS; $P = 0.99$). No leaks were observed in the "low-dose" (1 to 20 mg prednisone/day) steroid group. All three patients taking steroids who had anastomotic leaks were taking high-dose steroids (3 [7.7%] of 39 patients). However, this was not significantly different from the 3.3% leakage rate in patients taking no or low-dose steroids ($P = 0.59$). In addition, no significant difference was found when comparing leakage rate and duration of disease, age, type of anastomosis, or presence of backwash ileitis (see Table 1). Comorbid conditions and preoperative albumin levels were also not found to be associated with anastomosis-related complications (data not shown).

Most of our patients were given temporary ileostomies (71%), and these patients were similar in respect to age, sex, comorbid conditions, and duration of disease as compared to those patients spared an ileostomy. Indications for a diverting ileostomy included patient preference, tension at the anastomotic site, anastomotic leak noted at the time of surgery, or the surgeon's clinical judgment during the procedure. Of the 29 patients who underwent a single-stage procedure, 13.8% had an anastomosis-related complication vs. 14.1% of the patients with diverting ileostomies (NS; $P = 0.99$). With regard to anastomotic leaks, a higher rate was seen in patients with single-stage procedures in comparison to those who had an ileostomy (10.3% vs. 2.8%; $P = 0.14$). In addition, of the nine patients on high-dose steroids who underwent a single-stage procedure, two (22%) had postoperative leaks, which was higher than the 5.0% leakage rate observed in the remaining 20 patients who also had a single-stage procedure (NS; $P = 0.44$). Among those patients who had an ileostomy, the leakage rate in patients on high-dose steroids was not significantly different from those who were taking

Table 1. Anastomotic complications

Risk factors (no. of patients)[†]	Complications*		
	Leak	Stricture	Overall complication rate
Steroid			
Yes (54)	3 (5.6%)	4 (7.4%)	7 (13.0%)
No (46)	2 (4.3%)	5 (10.9%)	7 (15.2%)
Prednisone			
<20 mg (63)	2 (3.3%)	6 (9.5%)	8 (12.7%)
≥20 mg (37)	3 (7.7%)	3 (8.1%)	6 (16.2%)
Ileostomy			
Yes (71)	2 (2.8%)	8 (11.3%)	10 (14.1%)
No (29)	3 (10.3%)	1 (3.4%)	4 (13.8%)
Duration of disease[†]			
≤10 yr (54)	3 (5.6%)	5 (9.3%)	8 (14.8%)
>10 yr (37)	2 (5.4%)	3 (8.1%)	5 (13.5%)
Age			
≤40 yr (51)	1 (2.0%)	4 (7.8%)	5 (9.8%)
>40 yr (49)	4 (8.2%)	5 (10.2%)	9 (18.4%)
Anastomosis			
Stapled (91)	5 (5.5%)	9 (9.9%)	14 (15.4%)
Hand-sewn (9)	0	0	0
Backwash ileitis			
Yes (7)	0	1 (14.3%)	1 (14.3%)
No (92)	5 (5.4%)	7 (7.6%)	12 (13.0%)
Total (100)	5 (5.0%)	9 (9.0%)	14 (14%)

*The chi-squared and Fisher's exact P values for all listed categories are not significant ($P > 0.05$).
[†]Data not available when totals do not equal 100.
[‡]In the nine patients with unknown duration of disease, the overall complication rate was 11.1%.

low-dose or no steroids (3.6% vs. 2.3%; $P = 0.99$) (Fig. 1).

Nine of our patients developed anastomotic strictures. None of these strictures were related to pouch leak or sepsis. There was no association between stricture rate and steroid use, duration of disease, age of the patient, or presence of backwash ileitis (see Table 1). A higher rate of stricture was seen in patients with diverting ileostomies (8 [11.3%] of 71) when compared to patients without ileostomies (1 [3.4%] of 29). This, however, did not reach statistical significance ($P = 0.40$).

All five of the patients who developed an anastomotic leak had the preoperative diagnosis of UC. Although three of the patients with leaks presented with sepsis, the remaining two patients were asymptomatic. Notably, all three patients with symptomatic leaks had initially undergone a single-stage procedure, whereas the two patients with asymptomatic leaks had undergone diverting ileostomies. Of the three patients with symptomatic leaks, two were taking steroids, whereas one was not. Of the two patients with asymptomatic leaks, one patient was on steroids preoperatively and the other was not.

All three patients with sepsis resulting from anastomotic leakage underwent urgent surgery with creation of a loop ileostomy and drainage of the pelvic abscess. They all subsequently recovered uneventfully and later underwent closure of their ileostomies. The two asymptomatic leaks were found on routine radiographic studies. In one the leak was not apparent on physical examination 1 month after it was discovered, and the patient underwent an ileostomy takedown without any repair and has done well. The other patient with an asymptomatic leak underwent a local repair of the leak and ileostomy takedown in the same setting. This patient has also recovered without event.

DISCUSSION

A proctocolectomy with IPAA has become the procedure of choice for patients requiring excision of the colon and rectum for UC and FAP. Although patients with FAP invariably undergo surgery following diagnosis, patients with UC commonly have surgery after the discovery of a premalignant lesion or after medical therapy has failed. When first envisioned, this procedure was accompanied by a diverting ileostomy.[7] This was done to divert enteric contents away from the newly formed pouch in order to minimize complications of an anastomotic breakdown. Although earlier reports have supported this practice,[8,9] subsequent studies have suggested that IPAA without temporary ileal diversion can be safely performed for a subset of patients undergoing surgery.[1,4,10–14] These patients include those who have adequate preoperative nutritional status and no risk factors that would hinder anastomotic healing (including preoperative steroid use).

Patients with UC are often taking steroids prior to undergoing proctocolectomy with IPAA. Because steroid use has been associated with a substantially

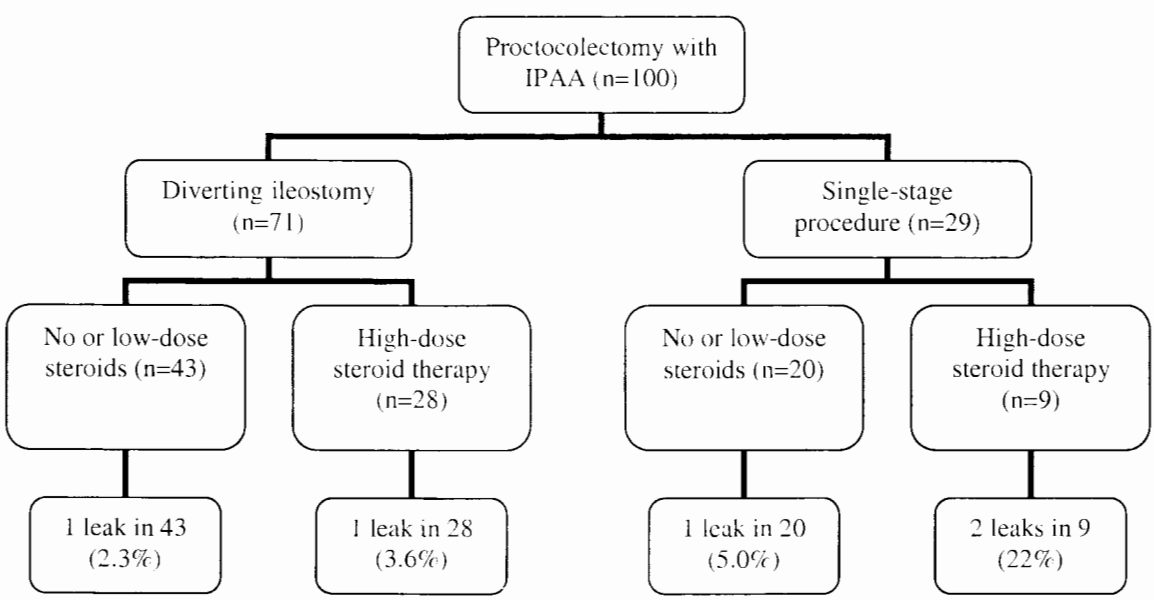

Fig. 1. Anastomotic leakage rate by presence of ileostomy and steroid dose. IPAA = ileal pouch–anal anastomosis.

increased risk of anastomotic leakage following large bowel resection,[15] previous studies have advocated the use of a diverting ileostomy with IPAA in patients on steroids.[12,16] More recently, however, leakage rate after IPAA was not found to be related to steroid use or dosage,[17] and steroid dose was not found to be an important factor in postoperative complications following IPAA.[18]

Although the association between preoperative steroid use and complications following IPAA remains controversial, patients on high-dose steroids undergoing a single-stage proctocolectomy with IPAA consistently have had high complication rates.[5,6] Ziv et al.[5] analyzed 67 patients undergoing IPAA and found no difference in early septic complications between groups with no, low-dose (1 to 20 mg prednisone/day), and high-dose (20 mg prednisone/day) steroid doses. They did, however, show that in their patients who underwent *single-stage* procedures, early septic complications occurred in 3.8%, 20%, and 50% in the no, low-dose, and high-dose steroid use groups, respectively ($P = 0.004$). They concluded that an ileostomy should be included in all patients taking high-dose steroids preoperatively.

In a study by Tjandra et al.,[6] 50 patients who underwent a single-stage IPAA were compared to 50 patients who had the procedure with diverting ileostomy. Nine of their patients had anastomotic leaks, eight of whom were taking high-dose steroids. In their patients who were spared an ileostomy, 86% on high-dose steroids had septic complications compared to 2% taking no steroids or low-dose steroids ($P < 0.001$). Based on these results, they recommend a diverting ileostomy in all patients taking more than 20 mg of prednisone per day undergoing an IPAA.

The goal of our study was to assess whether preoperative high-dose steroid use increases anastomotic complications after proctocolectomy with IPAA. In our sample of 100 patients undergoing restorative proctocolectomy, our anastomosis-related complication rate was 14%, which is comparable to other studies.[13,16] There was no significant difference in complication rate with respect to age, steroid use, steroid dose, use of a diverting ileostomy, type of anastomosis, duration of disease, or presence of backwash ileitis.

When we examined anastomotic leak rates, however, several trends were noted. When stratifying by the use of a diverting ileostomy, the rate of leaks in patients undergoing a single-stage procedure was higher than in those with ileostomies (10.3% vs. 2.8%). This association between higher leakage rates in patients undergoing single-stage procedures has been reported,[19] but (as in this study) this trend was recently found not to be statistically significant.[10] In addition, among the five anastomotic leaks in this study, all leaks in patients with ileostomies were asymptomatic, whereas all of the symptomatic leaks were found in patients without diverting ileostomies. These findings confirm previous reports that ileostomies do not significantly decrease the rate of anastomotic leaks, but do lessen the severity of their presentation.[20]

In this study, patients on high-dose steroids undergoing single-stage procedures were found to have a higher leak rate than those in the low-dose or no steroid use group (22% vs. 5%). In contrast to the studies by Ziv[5] and Tjandra,[6] our findings did not reach statistical significance (Table 2). It is, however, difficult to draw concrete conclusions from any of these studies because the number of patients on high-dose steroids undergoing a single-stage procedure was small. In our study we had nine patients who underwent the single-stage procedure and were on high-dose steroids, whereas Ziv et al.[5] similarly had 10 and Tjandra et al.[6] had only seven. In addition, our comparison of patients without diverting ileostomies based on steroid dose had a statistical power of only 16%. It would require 45 patients on high-dose steroids and 100 patients on low-dose or no steroids (all without diverting ileostomies) to approach a power of 80%.

CONCLUSION

For patients who require a proctocolectomy and desire a continence-preserving procedure, the formation of an IPAA is usually the procedure of choice.

Table 2. Comparison of anastomotic breakdown rates in patients undergoing a single-stage procedure in the current and previous studies

Comparative study	Anastomotic disruption rate	*P* value*
Ziv et al.[5] (1996)		
No or <20 mg prednisone (n = 36)	3/36 (8.3%)	
≥20 mg prednisone (n = 10)	5/10 (50%)	0.015
Tjandra et al.[6] (1993)		
No or <20 mg prednisone (n = 43)	1/43 (2.3%)	
≥20 mg prednisone (n = 7)	6/7 (85.7%)	<0.001
Current study		
No or <20 mg prednisone (n = 20)	1/20 (5.0%)	
≥20 mg prednisone (n = 9)	2/9 (22.2%)	0.44

*Fisher's exact test.

It is common for these patients to be on steroids preoperatively, and many centers invariably perform diverting ileostomies in these patients. We were unable to confirm the very high complication rates seen in these patients. Therefore, in our experience, steroid therapy alone does not preclude someone from being a candidate for a single-stage procedure. Our data suggest that there may be an increase in the rate of anastomotic leaks in patients on high-dose steroids undergoing a single-stage procedure. This complication rate, however, was not as great as rates seen by other investigators and did not reach statistical significance. Studies on this topic have very small numbers, but all suggest that high-dose steroids may impair wound healing and lead to increased leak rates. The prudent surgeon would counsel his/her patients accordingly when discussing the need for a diverting ileostomy in a patient on high-dose steroids.

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