

Laparoscopic Restorative Proctocolectomy for Ulcerative Colitis

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Laparoscopic restorative proctocolectomy is becoming more frequently employed in the surgical treatment of ulcerative colitis. The technique was first described in the early 1990s and has grown in acceptance. Multiple studies confirm that laparoscopic restorative proctocolectomy is safe and delivers a functional result equivalent to the result of an operation performed through a conventional midline incision. Patients value the superior cosmetic result of a laparoscopic restorative proctocolectomy. Hand-assisted techniques and tissue-sealant devices have enabled more surgeons to perform the operation and encouraged operative times to decrease. Laparoscopic subtotal colectomy for severe colitis has been demonstrated to be safe.

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The application of laparoscopic surgery to colon and rectal disease, and ultimately ulcerative colitis, was motivated by the great advance laparoscopic cholecystectomy represented over conventional open cholecystectomy. Patients appreciated an operation that eradicated disease in an equally efficacious manner to an operation performed through a larger incision and which provided the added benefits of diminished pain, improved cosmesis, and a shorter hospital stay. Segmental laparoscopic colectomy was described in 1991 and, regardless of the disease state being treated with surgical resection, reliably provided an earlier return of bowel function in addition to the expected laparoscopic benefits of less pain, a shorter hospital stay, and smaller incisions.

Increasing experience with laparoscopic techniques prompted surgeons to take on operations of greater magnitude. Laparoscopic cholecystectomy is now considered routine and relatively simple. The operation is performed in only one quadrant of the abdomen and does not require an anastomosis. Segmental laparoscopic colectomy is considerably more complicated as the procedure requires manipulation of tissues in multiple quadrants and necessitates the restoration of intestinal continuity. Though the procedure of laparoscopic

restorative proctocolectomy is increasingly performed throughout the world, it was initially unclear whether an operation so technically complex could be performed at all.

Early Results

Despite the daunting technical challenges, the first laparoscopic total proctocolectomy with end ileostomy was first described in 1992.¹ The earliest experiences with laparoscopic restorative proctocolectomy were reported in 1994 and 1995.^{2,3} The Cleveland Clinic Florida group reported the results of their prospective study in 1994.² Their study was undertaken to compare the duration of ileus and of hospitalization after restorative proctocolectomy and ileal-pouch anal anastomosis in both patients undergoing operation via laparoscopic-assisted techniques or standard laparotomy. Twenty-two patients underwent laparoscopic-assisted proctocolectomy and 20 age-, sex-, and diagnosis-matched controls underwent standard laparotomy. Mucosal ulcerative colitis was the diagnosis in 16 patients undergoing laparoscopic-assisted proctocolectomy and in 15 standard laparotomy patients, while polyposis was the diagnosis in six laparoscopic-assisted proctocolectomy and five standard laparotomy patients. The mean time to resolution of postoperative ileus was 4.2 days (4 to 11) in the laparoscopic-assisted proctocolectomy group and 3.3 days (2 to 5) in the standard laparotomy group. Hospital discharge was similar in each group occurring at a mean of 8.7 days (7 to 13) after laparoscopic-assisted proctocolectomy and 8.9 days (6 to 18) after

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standard laparotomy. Neither the length of time for ileus resolution nor the length of hospitalization was reduced in the laparoscopic-assisted proctocolectomy group. The authors concluded that laparoscopic-assisted ileal-pouch anal anastomosis conferred none of the theoretical advantages associated with other laparoscopic procedures.

Thibault and Poulin in 1995 described their technique for laparoscopic proctocolectomy and the results in their first four patients.³ The mean operative time was 7 hours, 18 minutes, and average blood loss was 493 mL. Return to a liquid diet took a mean of 4 days. Average postoperative stay, which depended on full return of bladder function and teaching of stoma care, was 10 days. These authors did not compare their patients to a control group.

These studies were important in the documentation that laparoscopic proctocolectomy could be performed safely. These studies did not garner enthusiasm for the procedure from patients, gastroenterologists, or surgeons because the operative times were quite a bit longer than the operation performed through a conventional incision and the length of stay reduction revealed for patients undergoing segmental colectomy was not demonstrable.

Functional Outcomes with Increasing Experience

There was little written about laparoscopic proctocolectomy between the years 1995 and 2000. These years were crucial to the development of laparoscopic colectomy however. Centers of excellence for laparoscopic colon surgery were developing. Surgeons at institutions that focused on laparoscopic approaches to colon and rectal disease were performing hundreds of segmental colon resections. Instrumentation continued to improve. In 2000, Marcello and coworkers compared the laparoscopic approach to restorative proctocolectomy to the traditional open procedure.⁴ The authors utilized prospectively gathered data and compared techniques using a case-matched design. Forty patients, comprising 20 consecutive laparoscopic cases (13 mucosal ulcerative colitis, 7 familial adenomatous polyposis), were matched for age, gender, and body mass index with 20 open cases (13 mucosal ulcerative colitis, 7 familial adenomatous polyposis) performed during the same time period. Mucosal ulcerative colitis patients were also matched for severity of disease by using hemoglobin and albumin levels, whole blood count, and steroid dependency. A loop ileostomy was made in 12 of 13 laparoscopic mucosal ulcerative colitis patients, all open mucosal ulcerative colitis patients, and no familial adenomatous polyposis patients. The median age was 25 years (range, 9 to 61). There were no intraoperative complications in either group and no conversions in the laparoscopic group. The operative times (median, range) were significantly longer in laparoscopic cases (330, 180 to 480 minutes) versus open cases (230, 180 to 300 minutes). Bowel function returned more quickly in laparoscopic cases (2, 1 to 8 days) versus open cases (4, 1 to 13 days); and the length of stay was shorter in laparoscopic cases (7, 4 to 14 days) versus open

cases (8, 6 to 17 days). For diverted patients, the median length of stay was reduced by 2 days in laparoscopic cases (6, 4 to 14 days) versus open cases (8, 6 to 17 days). Complications occurred in 4 of 20 laparoscopic patients (three obstruction/ileus and one pelvic abscess) and 5 of 20 open patients (two obstruction and ileus, one each anastomotic leak and abscess, peptic ulceration, and episode of dehydration). These authors concluded that return of intestinal function and length of stay were reduced in the laparoscopic group compared with the open group. This is the only study to report a length of stay reduction for laparoscopic proctocolectomy and even that reduction was only 1 to 2 days after a week of hospitalization.

Ky and coworkers expanded on this work by looking at a group of patients undergoing one-stage laparoscopic restorative proctocolectomy.⁵ All patients who underwent laparoscopic-assisted one-stage restorative proctocolectomy (29 mucosal ulcerative colitis; 3 familial adenomatous polyposis) over a 24-month period at the Mount Sinai Medical Center in New York were followed up prospectively for short-term and long-term complications and functional outcome. There were 32 patients (17 males) with a median age of 32 years (range, 16 to 29 years). There were no conversions to open surgery. There were two intraoperative complications, an inconsequential rectal perforation during mobilization, and one staple line misfire. There were 11 postoperative complications: three obstruction/ileus; two pouchitis; two wound infections; two strictures; one pelvic abscess; and one pouch leak (at the top of the "J"). Three patients required reoperation (one temporary ileostomy, one lysis of adhesions, and one transpouch drainage). The median number of bowel movements was seven per day (range, 2 to 15). The authors concluded that a one-stage laparoscopic-assisted restorative proctocolectomy could be performed effectively and safely. They hypothesized that techniques in laparoscopic large-bowel surgery were evolving rapidly and the role of this operation in the surgical treatment of patients with mucosal ulcerative colitis and familial adenomatous polyposis was likely to expand.

The predicted increase in interest indeed occurred. More centers began to perform laparoscopic proctocolectomy and publish their experiences. Growing surgical expertise and evolving technologies resulted in shorter operating times. These additional studies reinforced the safety of the procedure and confirmed the equivalent functional outcomes.

Maartense and coworkers in 2004 performed a randomized controlled trial in the Netherlands to evaluate postoperative recovery after hand-assisted laparoscopic or open restorative proctocolectomy with ileal pouch anal anastomosis for ulcerative colitis and familial adenomatous polyposis.⁶ Specifically, 60 patients were randomized for hand-assisted laparoscopic ($n = 30$) or open surgery ($n = 30$). The primary outcome parameter was postoperative recovery in the 3 months after surgery, measured by quality-of-life questionnaires (Short Form 36 Health Survey questionnaire and the Gastrointestinal Quality of Life Index (SF-36 and GIQLI)). Secondary parameters were postoperative morphine requirement and surgical

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