

Laparoscopic surgery in Crohn's disease

Indications and results

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Abstract

Background: An effort was made to assess the feasibility, safety, and outcome of laparoscopic procedures performed in patients with Crohn's disease.

Methods: A prospectively maintained laparoscopic database was analyzed regarding operation time, intra- and postoperative complications, conversion to laparotomy, and length of hospitalization.

Fifty-one patients (23 males and 28 females) with a mean age of 36 (20–79) years underwent a laparoscopic or laparoscopic-assisted procedure for Crohn's disease. The indications included terminal ileitis in 31 patients, colitis in 11, perianal disease in four, duodenal Crohn's disease in three, and rectovaginal and rectourethral fistula in one patient each. Thirty-two patients underwent an ileocolic resection; total abdominal colectomy with ileorectal anastomosis was performed in six patients with end ileostomy in one, take down of end ileostomy and ileorectal anastomosis in three, duodenal bypass gastrojejunostomy in three, and loop ileostomy in six patients.

Results: The mean operating time was 2.4 (0.6–4.5) h and the mean length of hospital stay was 5.1 (3–18) days. Eight complications were noted in seven patients (14%), which included enterotomy in two patients, bleeding in two, stoma obstruction in two, pelvic sepsis in one, and efferent limb obstruction in one. The procedure was converted to laparotomy in seven patients (14%) due to a large inflammatory mass in five and to bleeding in two patients; there was no mortality.

Conclusion: Laparoscopic surgery is a feasible, versatile, and safe modality in the surgical management of Crohn's disease. Despite the often-malnourished state of these steroid-dependent patients with intraabdominal inflammatory

conditions, morbidity, procedural length, and length-of-hospitalization data are all similar to results previously reported for less-challenging laparoscopic colorectal procedures.

Key words: Crohn's disease — Laparoscopy — Inflammatory bowel disease

A large variety of procedures are commonly performed in patients with Crohn's disease [6, 7, 11, 17, 20]. Rapid evolution of laparoscopic bowel surgery, continuous advancement of instrumentation, and performance of more extensive and complex procedures have led to laparoscopic techniques being applied in the treatment of Crohn's disease [1, 9, 10, 15]. Although many of the potential advantages of laparoscopic surgery are still unconfirmed for bowel surgery, the advantages of an improved cosmetic result may play a significant role in the management of young patients with benign disease.

Therefore, the aim of this study was to assess the technical feasibility, safety, and outcome of various laparoscopic and laparoscopic-assisted procedures performed in patients with Crohn's disease.

Materials and methods

All consecutive patients with Crohn's disease who underwent a laparoscopic or laparoscopic assisted procedure between January 1992 and July 1995 were entered in a laparoscopic registry database for analysis. Parameters evaluated included gender, diagnosis, duration of disease, previous surgery, type and duration of procedure performed, conversion, complications, and length of hospitalization.

All patients underwent an elective procedure; patients with evidence of short bowel syndrome, acute obstruction, perforation, peritonitis, or toxic colitis were excluded. Neither fistulae nor localized abscesses nor chronic bowel obstruction were exclusionary criteria. Basically, all patients who underwent surgery for Crohn's disease were offered the laparoscopic or laparoscopic-assisted approach unless they had diffuse sepsis, a complex fistula, three or more prior laparotomies, short bowel syndrome, or known

Table 1. Laparoscopic surgery for Crohn's disease^a

Indication	No. patients	Procedure	No. patients
Terminal ileitis	31	Ileocolic resection	32
Chronic colitis	11	TAC & IRA	6
Perianal sepsis	4	TAC & End Ileostomy	1
Rectovaginal fistula	1	IRA ^b after TAC	3
Rectourethral fistula	1	Loop ileostomy	6
Duodenal obstruction	3	Gastrojejunostomy	3
Total:	51	Total:	51

^a TAC = total abdominal colectomy; IRA = ileorectal anastomosis

^b Patients who had a previous TAC with end ileostomy

diffuse disease. In support of the liberal inclusion criteria for laparoscopic surgery, the senior authors at the two centers performed a total of 2,549 abdominal operations during the 42-month period including 151 anorectal and abdominal operations for Crohn's disease. They also performed a total of 158 laparoscopic colorectal operations during that time period.

Laparoscopic-assisted procedures were defined as those during which an incision (usually between 2 and 5 cm long) was made through which vascular control and anastomosis were extracorporeally performed. Conversion to laparotomy was defined as whenever any unplanned incision was made or when any planned incision was made longer or earlier in the procedure than anticipated [2]; therefore, all ileocolic resections and total abdominal colectomies were performed as laparoscopic-assisted procedures whereas all stoma creations, staged ileoproctostomies, and gastrojejunostomies were performed as laparoscopic (completely intracorporeal) procedures. The technical details of the procedure have been described elsewhere [4, 8, 19].

All patients were operated upon only after a complete upper and lower gastrointestinal tract investigation. Additionally, a thorough inspection of the entire small bowel was intraoperatively performed [23]. All patients received standard postoperative care, which included removal of the nasogastric tube immediately after surgery, clear liquid diet on the 1st postoperative day, and advancement to regular diet within the next 24–48 h, as tolerated [14]. Patients were discharged home after having a bowel movement only after tolerating a regular diet and having had at least one bowel movement [3].

Results

Fifty-one patients (23 males and 28 females) with a mean age of 36 (20–79) years underwent laparoscopic procedures for Crohn's disease representing 32% of all laparoscopic procedure and 34% of all operations performed for Crohn's disease during the 42-month time period. The mean duration of disease was 6.5 (1–21) years and 10 patients (20%) had at least one previous laparotomy. Table 1 shows the indications and procedures performed. As can be seen, the most common indication for surgery was terminal ileitis in 31 patients followed by Crohn's colitis in 11 patients. The most common procedure was ileocolic resection in 32 patients (31 with terminal ileitis and one patients with isolated ascending Crohn's colitis). Six patients with Crohn's colitis and rectal sparing underwent a total abdominal colectomy with ileorectal anastomosis. Another patient with Crohn's colitis underwent a total abdominal colectomy with end ileostomy. Three patients who had previously undergone a total abdominal colectomy with end ileostomy underwent a reversal procedure with take down of their ileostomy and performance of a laparoscopic ileorectal anastomosis. Six patients underwent construction of a loop ileostomy for temporary fecal diversion due to either severe perianal Crohn's disease or rectovaginal or rectourethral fistula.

Table 2. Complications and reasons for conversion to open surgery

Complication	No.
Enterotomy	2
Bleeding	2
Stoma outlet obstruction	2
Pelvic abscess	1
Efferent limb obstruction ^a	1
Overall morbidity	14%

^a After gastrojejunostomy for duodenal Crohn's

Table 3. Reasons for conversion to open surgery

Reason for conversion	No.
Large inflammatory mass and fistula	5
Bleeding	2
Overall conversion rate	14%

The mean operative time was 2.4 (0.6–4.5) h and the mean length of hospitalization was 5.1 (3–18) days.

Tables 2 and 3 show the complications and conversions, respectively. Eight complications were noted in seven patients (14%); there was no mortality. Both patients who sustained intraoperative bleeding underwent conversion of laparotomy; one patient had bleeding from a mesorectal vessel during the rectal stump dissection, and the other had an injury to the epigastric artery during trocar placement. Both enterotomies were sustained during extensive enterolysis in patients who had had prior resections. Stoma outlet obstruction was noted in two patients [18]; one was treated conservatively for a few weeks with intubation of the stoma and the other required a laparotomy. At laparotomy, torsion of the terminal ileal loop at the stoma site was noted. One patient who developed a pelvic abscess after total abdominal colectomy with ileorectal anastomosis was conservatively treated. Another patient who developed an efferent loop obstruction after gastrojejunostomy and required laparotomy with revision of the gastrojejunostomy. The overall conversion rate was 14% (seven patients). The most common cause was an unexpected finding of a large inflammatory mass with enteroenteric fistula.

Comments

Surgical intervention is often required in the management of various conditions and complications of Crohn's disease [6, 7, 11, 17, 20]. These procedures include segmental small- or large-bowel resection, total abdominal colectomy, total proctocolectomy, strictureplasty, drainage of abscess, gastroduodenal bypass, and creation of an end or loop ileostomy. As seen in this series, all of these procedures are feasible and safe when laparoscopically performed.

However, to date, very few small series of laparoscopic procedures in patients with Crohn's disease have been reported (Table 4) [1, 9, 10, 15]. In these preliminary small series, the only procedure performed was ileocolic resection or right hemicolectomy. All of the authors reported "good" results with low or absent morbidity and a low conversion rate. The mean length of hospitalization ranged from 6.6 to

Table 4. Laparoscopic surgery for Crohn's disease

Author	No. patients	Procedure	Morbidity (%)	Conversion (%)	Hospital stay (mean days)
Milsom et al. [10]	9	Ileocolic resection	0	0	7
Bauer et al. [1]	18	Ileocolic resection	11	22	6.6
Kreissler et al. [9]	20	Ileocolic, small-bowel colon resection	0	0	NS ^a
Current series	51	Various ^b	14	14	5.1

^a NS = not stated

^b See Table 1

7 days. The higher rates of morbidity and conversion noted in the current series were probably related to the larger number of patients and the complexity and extent of the surgical procedures which were performed. However, despite these factors, the mean length of hospitalization was shorter than that reported by other authors [1, 9, 10]. With the exception of the single case of epigastric artery hemorrhage necessitating conversion, there were no complications felt to be uniquely attributable to the laparoscopic approach. Specifically, enterotomy during enterolysis, bleeding during dissection of a thickened inflamed Crohn's mesentery, pelvic outlet obstruction, and postoperative bowel obstruction can all be noted sequelae of a laparotomy.

Although an extensive preoperative evaluation is routinely performed in patients with Crohn's disease, unexpected intraoperative findings may be encountered. These conditions include inflammatory mass, abscess, fistula, or synchronous proximal stricture. In such cases, the laparoscopic procedure may be attempted according to the level of skill and experience of the surgical team. As shown in the current series, a large inflammatory mass with an enterointeric fistula was the major cause for conversion. However, conversely, during laparoscopic bowel evaluation, synchronous jejunal strictures unrecognized by preoperative small-bowel radiographic investigation have been identified. These lesions have been treated by extracorporealization and strictureplasty through the same 2–5-cm incision. Conversely, no patient has returned during the 3-year period because of an unrecognized stricture.

In conclusion, we feel that laparoscopy can safely be offered to the majority of patients who require elective surgery for localized Crohn's disease.

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Discussion

Dr. Sandor: I would like to know whether you face special difficulties related to the Crohn's pathology when dissecting and operating.

Dr. Reissman: Yes. As I mentioned, the major cause for

conversion was presence of a severely inflamed mass that was missed in the preoperative workup. This was a finding related, of course, to Crohn's disease that was the main cause for conversion. I should say that we do not routinely perform an abdominal CT scan, in these patients, unless the patient has very clear symptomatology.

Some other technical problems that we faced were during the division of the mesenteric vessels in the inflamed meso colon (ph) in patients with Crohn's disease. That's why we prefer to do that stage of the procedure extracorporeally. After we complete the whole mobilization of the terminal ileum and right colon and exteriorize the specimen that needs to be removed, we do the division and the anastomosis extracorporeally.

Dr. O'Rourke: I'm a little cautious about using staples in Crohn's disease. I still use them laparoscopically. I just wondered whether you felt that compared to absorbable sutures, using staples has any inherent risk factors.

Dr. Reissman: I don't think that the use of staples in Crohn's disease has any risk factors. I'm not aware of any literature about that and I think that many of us feel pretty confident in using stapled anastomoses in Crohn's disease.

Can you just tell us exactly how you handle the small bowel? You know, from my limited experience with these patients, the small bowel is very difficult to handle. Running

the small bowel may sound like a simple thing to do, but that could be the most hazardous part of the operation.

Dr. Reissman: I agree that you really need to be careful about doing that. But the fact is that in the preoperative workup, there are several things that could be missed, and one of these is a strictured section of the small bowel. You really wouldn't feel very good about leaving that in without taking care of it. Now, practically, what we have done, is use two Babcock clamps which we never close with a ratchet. We are very gentle when handling the bowel.

Dr. Edey: Do you actually handle the bowel or do you handle the mesentery?

Dr. Reissman: No. We actually handle the bowel. I think that if you try to grasp the mesentery, you run the risk of bleeding. I think it's safe to handle the small bowel itself, providing you do it very carefully and gently.

But I feel that it's really important, since you don't have the opportunity to inspect and palpate, as you do in open surgery. You do not have any tactile sensation of the small bowel when you do a laparoscopic procedure. We never had a problem with enterotomies during that maneuver. We go all the way from the terminal ileum to the ligament of Treitz, just to make sure that there are no additional sites of Crohn's.