What role, if any, for laparoscopic surgery in Crohn’s disease of the hindgut?

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An outsider to the field of surgery would probably take it for granted that surgeons have a highly developed rationale for choosing a laparoscopic approach to Crohn’s disease. After all, an increasing number of surgeons are performing laparoscopic surgery for Crohn’s disease as witnessed by several articles published in the 1990s (Table 1). In fact this is not quite true. Most papers are case reports or series without controls, capable only of suggesting feasibility. Furthermore, comparison studies often feature selection flaws, and therefore beg the question of whether laparoscopic surgery should or not be considered as standard care. An attempt is made herein to give readers a concise insight of the evidence available in the English language literature. It does not pretend to offer a comprehensive review of the topic rather, it highlights some relevant issues, and then outlines what role, if any, laparoscopic surgery should play in Crohn’s disease. There are at least 6 categories for discussion.

Key words: laparoscopic surgery, Crohn’s disease

SHORT-TERM OUTCOME

Nine non-randomized comparison trials (Table) available in the literature include 207 patients undergoing laparoscopic surgery for Crohn’s disease. All concurrent cohort studies but one fail to state the criterion of assigning patients to study arms. Although the procedure performed is (almost invariably) elective laparoscopic-assisted ileocolic resection, the patient series are not quite homogenous with regard to the extent of the disease. All comparison papers but one include selected patients with either stenosis of the terminal ileum (but no mass, fistula, recurrence or perforation) or additional enteric fistula. Only six of nine studies address the short-term clinical outcome in detail. In patients with uncomplicated ileal stenosis, significantly prolonged operating time, shorter hospital stay and disability, and no increase in morbidity rates are reported after laparoscopic surgery. However, statistics are dubious as sample size are inadequate; this in addition to historical cohort bias and flawed design (surgery carried out in two different institutions). Most series without controls do not include patients with a mass and/or fistulas in association with ileal stenosis. Nevertheless, in a large single-institution series (all corners without controls) included 28 patients with a mass (whereof 25 with associated fistula), 16 with single fistula only, and 11 with complex fistulas. There was one conversion due to a fixed mass, one anastomotic leak, and seven early postoperative small bowel obstructions (SBO) with four reoperations. A study comparing seven traditional with six laparoscopic-assisted ileocolic resections in patients with enteric fistulas reported no differences in clinical outcome and 8% conversion rate. Dissimilarly, other authors reported a 30% conversion rate in 10 patients with single fistulas (but no mass). No studies investigating the impact of peritonitis or dense adhesions on the outcome of patients undergoing laparoscopic surgery for Crohn’s disease are available. However, randomized data from patients having minimal invasive surgery for peritonitis due to perforate peptic ulcer suggest that peritonitis offsets the change of access as far as postoperative pain is concerned. The issue of whether adhesions from previous surgery alter the outcome of laparoscopic-assisted right hemicolectomy has been recently addressed. Interestingly, no differences in morbidity rates were found when patients with prior abdominal surgery were compared with patients without prior abdominal surgery were compared with patients without prior abdominal surgery. Another concern is to what extent proximal skip lesions may be missed in laparoscopic surgery for Crohn’s disease. It is known that unexpected intraoperative findings may be encountered despite an extensive preoperative...
### Table

**PAPERS ON LAPAROSCOPIC SURGERY FOR CHRON'S DISEASE OF THE HINDGUT IN THE 1990.**

<table>
<thead>
<tr>
<th>EVIDENCE LEVEL</th>
<th>PAPERS</th>
<th>PATIENTS</th>
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<tbody>
<tr>
<td>Randomized with low rate of false positive or false negative errors</td>
<td>0</td>
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<tr>
<td>Randomized with high rate of false positive or false negative errors</td>
<td>1</td>
<td>31</td>
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<tr>
<td>Non-randomized concurrent cohort comparison</td>
<td>10</td>
<td>231</td>
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<tr>
<td>Non-randomized historical cohort comparison</td>
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<td>50</td>
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Case series without controls

**Table updated through 2002.**

work-up (proctoscopy, colonoscopy, computer tomography, small bowel series). In a series of 51 consecutive patients (without controls) where running the small bowel laparoscopically was routinely performed, synchronous jejunal strictures (undetected at preoperative small bowel series) were diagnosed and treated by strictureplasty. On hypothetical implication of a likely future increase in attempting a laparoscopic approach to Crohn’s disease could be a reduced use of strictureplasty, i.e., for ileocolic anastomotic recurrence. In fact, ten of such recurrences were laparoscopically resected with 20% conversion and 10% morbidity rates in a study comparing 70 traditional with 46 laparoscopic assisted ileocolic resections. Preservation of abdominal wall with a peak onset before the age of 35 years, 70-90% of patients undergoing surgery at 10 years and a reoperation rate of 44-53%.

Crohn’s disease entails considerable scarring of the abdominal wall. In a comparison of 11 laparoscopic-assisted ileocolic resections with 11 conventional similar procedures a body-image questionnaire revealed better results after the former surgery. Although the patients were well-matched for extent of disease and indication for surgery, the results are flawed by a significantly different time lag between surgery and survey (7.2 vs 40 months p < 0.01). Moreover, one may wonder about what makes 62% of the patients prefer laparoscopic rather than traditional surgery in spite of a higher hypothetical risk of ureter injury (5% vs. % as stated in the photo questionnaire). Realistic expectations and adequate information are legitimate areas of concern. Although a laparoscopic approach helps containing scarring, location of scars is at least as important. Incisions for specimen withdrawal should be placed in the midline and/or suprapublically. Port placement should be planned keeping in mind that defunctioning stoma may be an option in severe perianal disease or in selected patients with refractory Crohn’s colitis, and that 28-31% of all patients with colorectal Crohn’s disease will end up with permanent ileostomy laparoscopic cration of intestinal stomas offers to patients the advantage of no laparotomy wound healing (close to the stoma site) and to surgeons a nonresectional procedure suited to initiate laparoscopic colorectal surgery. However, papers including patients with perianal Crohn’s disease (among others) report 6% to 10% rates of postoperative complications directly related to surgical technique with a 50% reoperation rate (inadequate fascial opening, incorrect limb orientation, etc). Curiously, surgeons experience was found statistically non-predictive of short-term outcome at univariate analysis of 42 prospectively evaluated patients.

**RECURRENCE AFTER LAPAROSCOPIC SURGERY**

The definition of recurrence in Crohn disease merits a review of its own. The stricter the definition, the lower the recurrence rates. Involvement of resection margins and anastomotic configuration, respectively, have been and are controversial issues with regard to recurrence. This review cannot do justice to these two topics. The former has been settled in a randomized trial, which showed that microscopic involvement of margins has no bearing on recurrence rates. Claims suggesting that stapled functional end-to-end anastomoses may delay recurrence remain to be proven in a randomized setting. The above reasoning also applies to the case of laparoscopic surgery for Crohn’s disease as suggested by the results of a study comparing 39 selected laparoscopic ileocolic resections with 53 matched conventional (but historical) controls. Only recurrence requiring further surgery was taken into account. There were no significant differences in the ratio of microscopically involved and not involved resection margins in the two groups, and all anastomoses were stapled with a functional end-to-end configuration. Postoperative morbidity did not differ significantly, and so did five-year recurrence rates (25.6% vs. 26.4%).

**SMALL BOWEL OBSTRUCTION AFTER SURGERY**

Crohn’s disease was the second most common cause of SBO after adhesions (7% and 74%) in a consecutive (but retrospective) series of 552 patients accounting for 1001 admissions during a 10-year period. Only two (of the nine available) comparison studies on laparoscopic surgery for Crohn’s disease included or subsequently reported the long term outcome. The former is a retrospective comparison of 48 traditional with 26 laparoscopic-assisted ileocolic resections performed during a five-year period.
ferences in early morbidity rates (17% vs. 19%). At a mean follow-up of 30 (range 2-59) months there were no differences in bowel habits and use of restricted diet or drugs for bowel movements, but a significantly reduced rate of symptomatic SBO was reported in the laparoscopic-assisted group (31% vs. 8% p = 0.02) 15. These data are supported by another retrospective study comparing 39 totally laparoscopic ileocolic resections with 53 conventional controls. The open surgery group was well-matched, done by the same surgeons at the same institution, but unfortunately not over the same period. A decreased rate of symptomatic SBO following laparoscopy was found at five-year follow-up (36% vs. 10% p=0.02) 10. Although the figures on SBO rates in these two studies 15,31 seem quite similar, it is noteworthy that fixed mass and fistulas were exclusion criteria in one trial only 15.

SURGICAL STRESS

A prospective non-randomized study comparing 11 conventional with 11 laparoscopic-assisted resections investigated the impact of the change of access on serum interleukin (IL)-4, IL-6 and IL-10, serum C-reactive protein (CRP), and plasma granulocyte elastase during postoperative day 1 to 15. There were no statistically significant differences in IL-4, IL-6, IL-10, and CRP levels between the two arms, but granulocyte elastase levels were significantly diminished after laparoscopic-assisted surgery (1.46 vs 1.89 g/l p 0.02) 13. Moreover, significantly decreased serum SRP levels after laparoscopic-assisted surgery were reported in a concurrent cohort comparison of 24 traditional with 11 laparoscopic-assisted ileocolic resections 18.

OTHER LAPAROSCOPIC PROCEDURES

Other potentially advantageous laparoscopic procedures include segmental colon resection, subtotal colectomy with end ileostomy or ileorectal anastomosis, and total proctocolectomy with end ileostomy. So far, no data are available in the literature on laparoscopic segmental resection for a short skip lesion of the colon, or on laparoscopic total proctocolectomy for colonic and anorectal Crohn’s disease. Two case series (51 and 88 consecutive patients without controls) from highly specialized centers 31,32 included nine subtotal colectomies (three with end ileostomy and six with ileorectal anastomosis) with no postoperative complications.

CONCLUSIONS

Although the literature on laparoscopic surgery for Crohn’s disease includes data on 492 patients, the quality of the studies is not sufficient to draw definitive evidence-based conclusions (Table). Future efforts should prompt prospective multicenter comparison trials with appropriate design, and adequate sample size of patients with homogenous extent of clinical disease. Areas of concern, which should be addressed in future laparoscopic studies, include adhesions from previous surgery, single fistulas, identification of proximal skip lesions, and the risk of reduced use of stricturoplasty (for proximal skip lesions or anastomotic recurrence). Equivalence (or superiority) of laparoscopy should be proven challenging areas of failure of traditional surgery. In fact, non-randomized evidence suggest that laparoscopic surgery may fair better not only in short-term outcome (preservation of the abdominal wall, shorter hospital stay and disability), but also in the long-run (decreased rates of late symptomatic SBO). Moreover, five-year recurrence rates after ileocolic resection in selected patients do not seem to be affected by laparoscopic approach. Meanwhile, the role of laparoscopic surgery in Crohn’s disease should be limited to the creation of de-functioning stoma for severe perianal disease (or refractory colitis in the debilitated patient), ileocolic resection for symptomatic terminal ileal stenosis (in the absence or fixed mass and/or complex fistulas), or segmental resection for a short skip lesion of the colon, preferably within the frame of comparison trial. Benefits can be expected with these procedures provided that indications for surgery are not influenced by the change of access, and postoperative complication rates remain within the range of traditional colorectal surgery. Other potentially advantageous laparoscopic procedures such as subtotal colectomy and total proctocolectomy should probably be performed only in centers with high surgical expertise and patient-volume. In fact, the evidence available so far, although favorabler, is too anecdotal to allow safe extrapolation by surgeons with less laparoscopic experience to their own practice. Until further and better evidence will become available, patients with complex perforative disease, a large fixed mass and/or complex fistulas should not undergo laparoscopic resectional surgery.

REFERENCES


**Literature updating**


