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Best evidence topic

## Is laparoscopic ileocecal resection a safe option for Crohn's disease?



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## ABSTRACT

A best evidence topic was constructed according to a structured protocol. The question addressed was whether laparoscopic ileocecal resection for Crohn's disease is associated with higher morbidity rates in comparison to open surgery. From a total of 123 articles, 11 studies provided the best available evidence on this topic. Five observational studies, two randomized trials, three follow up studies and a meta-analysis were identified. The primary author, date and country of publication, study type, patient group characteristics, relevant outcome parameters and results of these papers were tabulated. Peri-operative morbidity was either similar between the laparoscopic and the open group, or favored the laparoscopic approach. Convalescence was consistently reported to be shorter in the laparoscopic treatment arm, at cost of longer duration of surgery. Limited evidence suggests lower incidence of small bowel obstruction and disease recurrence for laparoscopy, although follow up data are of poor quality. It may be concluded that laparoscopic ileocecal resection is a safe alternative approach to open surgery for uncomplicated Crohn's disease, provided laparoscopic expertise is available.

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### 1. Introduction

A best evidence topic was constructed according to a structured protocol. This has been previously fully described.<sup>1</sup>

### 2. Clinical scenario

The case of a young male patient with uncomplicated Crohn's ileitis refractory to medical treatment is discussed in the weekly indication meeting of your department. Considering the available expertise in advanced laparoscopic surgery, you suggest offering a laparoscopic procedure to the patient. Colleagues from the gastroenterology department argue that the laparoscopic technique imposes risks to the safety of the anastomosis, because of the frail tissue and the long-term systemic therapy with steroids. You decide to search the literature yourself for the best available

evidence on surgical approaches, and repeat the meeting before proceeding to surgery.

### 3. Three-part question

In [patients with Crohn's disease (CD)] is [laparoscopic surgery] associated with [higher surgical morbidity]?

### 4. Search strategy

Medline from inception up to July 2013: ([ileocolic resection] OR [ileocaecal resection] OR [caecectomy]) AND [laparoscopy]. Titles and abstracts were scrutinized; full texts of related articles were retrieved. Only studies written in the English language were considered.

### 5. Search outcome

One hundred and twenty three records were identified. Eleven articles were not in English, 61 were not relevant, 21 were case

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studies, 10 were review articles, 4 dealt with pediatric patient population, 3 did not report on postoperative complications, and 2 regarded robotic-assisted surgery. Eleven articles were considered to provide the best available evidence on this topic.

## 6. Results

The results of the 11 articles are summarized in the [Table 1](#).

## 7. Discussion

Laparoscopic surgery offers a less invasive alternative to open ileocecal resection in patients with CD. The laparoscopic approach presumably reduces surgical stress and the possibility of anastomosis- and wound-related complications in immunosuppressed patients. Further, it may decrease the extent of adhesions, which is of specific importance in a patient population with high possibility of multiple operations for recurrent disease.<sup>13</sup> Nevertheless, although open surgery allows direct tissue manipulation and facile mechanical or hand-sewn anastomosis, laparoscopic ileocecal resection requires mobilization of the right colon and exteriorization of the terminal ileum and proximal ascending colon through a mini laparotomy. These manipulations may compromise the structural and functional integrity, and the blood supply of the bowel. Laparoscopy may further underestimate the extent of the disease, due to the loss of tactile feedback of the affected bowel.

Bemelman et al.<sup>2</sup> provided an early retrospective analysis of 78 patients with CD, subjected to laparoscopic or open surgery in the same time period, matched for demographic characteristics, but with different trends of administration of steroids (19 mg/day laparoscopic vs. 6 mg/day open;  $p < 0.001$ ) and tube feeding (43% laparoscopy vs. 0% open;  $p < 0.001$ ) in the perioperative period. Patient-oriented outcomes were similar for the open and the laparoscopic approach, although hospital stay favored laparoscopy. Their results may however be biased, due to this variation in perioperative care. Operating time favored the open approach, with a mean difference of 34 min ( $p < 0.001$ ). Eshuis et al.<sup>3</sup> published an 8.5-year follow up report of this study, which demonstrated no difference in intestinal disease recurrence (23% laparoscopic vs. 22% open,  $p$ -value not significant). Mean follow up time was 8.3 years for the laparoscopic arm and 8.6 years for the open arm ( $p = 0.38$ ).

Milsom et al. performed the first randomized trial on this subject.<sup>4</sup> This study had however multiple methodological shortcomings (no information on randomization method, not blinded, not reporting on dropouts, as-treated analysis) and fails to provide high quality evidence. Morbidity was 16% and 31% in the laparoscopic and the open treatment arms, respectively, a result which reached statistical significance ( $p = 0.05$ ). The incidence of anastomotic leak was however similar (3% and 0%, respectively), as were the requirements of morphine analgesia. Duration of surgery favored the open approach (85 min vs. 140 min;  $p < 0.00001$ ). The long-term follow up study by Stocchi et al.,<sup>5</sup> reporting on the outcome of 56 patients of the initial study population, demonstrated no difference in endoscopic recurrence and clinical recurrence requiring surgery.

In a high-quality, detailed retrospective report by Bergamaschi et al.,<sup>6</sup> 92 patients with CD were subjected to laparoscopic ( $n = 39$ ) or open surgery ( $n = 53$ ). Although the patient samples were treated in different time periods, they were matched for demographic, disease, and treatment characteristics. Thirty-day morbidity did not differ between the laparoscopic and the open group (10% vs. 9%, respectively). Two of 39 patients subjected to laparoscopic surgery required suture reinforcement of the anastomosis, due to air leak at control colonoscopy, which was only performed in the laparoscopic arm. Similar to previous reports, longer

duration of surgery was registered for the laparoscopic approach (185 min vs. 105 min,  $p < 0.001$ ). Duration of follow up of 84 patients was reported to be similar between the two groups at 5 years, with low possibility of dropout bias. Small bowel obstruction occurred in 11% of the laparoscopic group and in 35% of the open group ( $p = 0.02$ ). Disease recurrence based on an objective disease activity index was registered in 28% and 29% of the laparoscopic and the open group, respectively ( $p = 0.91$ ).

Lowney et al. reported on the perioperative and the 3-year outcome of 113 patients subjected to laparoscopic and conventional ileocecal resection.<sup>7</sup> Surgical morbidity was 19% and 34%, respectively; this difference however did not reach significance. Disease relapse requiring surgery occurred in 3% of the laparoscopic group and 13% of the open group. Strong evidence on more complex disease characteristics in the open treatment arm, with 11 cases of organ fistulization vs. one case in the laparoscopic group, must be taken into account.

In a more recent randomized trial of adequate quality,<sup>8</sup> Maartense et al. reported on 60 patients with CD. Longer duration of surgery was evident for the laparoscopic approach (115 vs. 90 min,  $p = 0.003$ ). Thirty-day morbidity (10% vs. 33%,  $p = 0.03$ ), return to normal diet (4 vs. 5 days,  $p < 0.003$ ), and hospital stay (5 vs. 7 days,  $p = 0.008$ ) favored laparoscopy. In the long-term follow up study by Eshuis et al.,<sup>9</sup> no difference in treatment outcomes was identified with regard to disease recurrence (39% vs. 45%, respectively), intestinal recurrence requiring surgery (7% vs. 12%, respectively) and reoperation for ileus (0% vs. 4% respectively) for the laparoscopic and the open approach.

The meta-analysis by Tilney et al., in 2006 provided pooled evidence of outcomes of low to high quality observational studies,<sup>10</sup> including the randomized trial by Milsom et al.<sup>4</sup> The analysis favored the open approach with regard to operative time (weighted mean difference 30 min, 95% confidence interval 11–48). Anastomotic leak and abscess formation was similar between groups. First bowel movement, return to normal diet and hospital stay favored the laparoscopic approach, heterogeneity being however evident in these outcome measures. The majority of studies were of poor quality, and sensitivity analysis of quality studies was undertaken, which validated the combined estimates of operating time, postoperative ileus and duration of hospital stay. Surgical morbidity was however not considered in this analysis.

A population-based analysis of the National Surgical Quality Program database by Lee et al. provided data on 644 laparoscopic and 1273 open ileocecal resections between 2005 and 2009.<sup>11</sup> Although both major (8% vs. 15%;  $p < 0.0001$ ) and minor complications (9% vs. 13% open,  $p < 0.0001$ ) presented with a lower incidence in the laparoscopic cohort, significant selection bias were inevitable and preclude generalization of results. This study provides however an estimate of operative morbidity in selected patients undergoing laparoscopic surgery for CD.

The most recent study by Makni et al.,<sup>12</sup> provides the outcome of 129 patients with similar demographic and disease characteristics between the laparoscopic and the open treatment arm. In accordance with previous reports, operating time for laparoscopic surgery was longer (158 min vs. 130 min,  $p < 0.001$ ). Although overall morbidity was similar (8% laparoscopic vs. 11% open), there was a trend toward a higher incidence of anastomotic leak in the open group (0% vs. 8%,  $p = 0.06$ ). The duration of postoperative ileus (2.9 vs. 3.4 days,  $p = 0.02$ ) and hospitalization (7 vs. 9 days,  $p = 0.001$ ) was shorter in the laparoscopic treatment group. Small bowel obstruction occurred in 5% and 9% of the laparoscopic and the open treatment arm, respectively ( $p$  not significant). Clinical recurrence required surgery in 19% of the open group and none in the laparoscopic group ( $p = 0.001$ ). A longer follow up period for the open treatment arm should be considered (26 vs. 34 months).

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