

# High morbidity after laparoscopic emergency colectomy for inflammatory bowel disease

Saddiq Mohammad Qazi<sup>1</sup>, Jan Skovdal<sup>1</sup>, Lars Kristian Munck<sup>2</sup> & Thue Bisgaard<sup>1</sup>

## ABSTRACT

**INTRODUCTION:** Only limited data are available on subtotal laparoscopic colectomy (STC) in patients with inflammatory bowel disease. We present the first Danish experiences with intended laparoscopic STC for inflammatory bowel disease (IBD). The primary outcome was 30-day morbidity.

**MATERIAL AND METHODS:** The present study is a retrospective single-centre study with consecutive enrolment of patients undergoing intended STC for IBD from 1 January 2005 to 31 July 2009. The results were analysed as either emergency or elective operations. Only the most severe complication was noted for each patient. Data on medical treatment, blood tests and complications and death within 30 days were registered.

**RESULTS:** A total of 32 patients underwent surgery (15 elective and 17 emergency procedures). Patients in the emergency group had significantly more severe disease activity than elective patients. Severe complications were recorded in 47% and 20% of the patients undergoing emergency and elective STC, respectively ( $p = 0.15$ ). The overall morbidity was 72%. One emergency patient died. Five of eight emergency patients and one of three elective patients underwent conversion and experienced a major complication ( $p = 0.55$ ). The overall conversion rate was 32% ( $p = 0.15$ ).

**CONCLUSION:** We found high morbidity and conversion rates in patients undergoing SLC for IBD. A prospective national Danish survey on early postoperative outcome is suggested.

**FUNDING:** not relevant.

**TRIAL REGISTRATION:** not relevant.

Compared with conventional open subtotal colectomy, patients undergoing laparoscopic colectomy benefit from shorter hospitalisation and convalescence periods, a lower long-term risk of mechanical ileus and incisional hernia, and superior cosmetic results [1]. However, in patients with inflammatory bowel disease, data are sparse and there is almost no information on outcome after emergency laparoscopic colectomy [2-5], furthermore no Danish data have previously been published.

The present analysis reports our initial experiences with intended laparoscopic subtotal colectomy after inflammatory bowel disease (IBD). Results were analysed as either emergency or elective operations. The primary outcome was 30-day morbidity.

## MATERIAL AND METHODS

The present study is a retrospective single-centre study on consecutive patients undergoing intended laparoscopic colectomy for IBD (**Figure 1**). The inclusion period was 4.5 years which spanned from 1 January 2005 to 31 July 2009. Patients were identified through the local hospital database (treatment codes KJFH00-KJFH99). Emergency operation was defined as surgery performed within 24 hours (or the first coming weekday) after indication for colectomy had been established. Elective operations were procedures in patients admitted to hospital with the purpose of undergoing surgery. Three experienced laparoscopic surgeons performed the operations. None of the surgeons had experience from more than ten laparoscopic colorectal resections prior to study start, but all had performed between 20 and 40 open subtotal colectomies. Planned open colectomy was performed according to the surgeon's preference and when laparoscopic expertise was not available. Patients undergoing planned open subtotal colectomy were not included in the present analysis.

Data on demographics, length of hospital stay (LOS) before and after operation, immuno-suppressive medical treatment, histopathology, blood-tests (C-reactive protein (CRP) and haemoglobin), indication for surgery, 30-day mortality, readmission, and complications were obtained from hospital files and duration of operation from anaesthesia records. Conversion to open procedure was defined as a procedure described by the surgeon as a conversion. In this study, enlargement of trocar incisions was not regarded a conversion.

Blood test results reflected the last value prior to surgery. Quantification of preoperative systemic steroid treatment was based on the cumulative dose given within the seven days preceding surgery. Furthermore, the preoperative duration of steroid treatment, if any, was registered. Anti-tumour necrosis factor (TNF)-alpha inhibitor (infliximab (5 mg/kg)) was given as a single-dose intravenous infusion if rescue therapy in patients with ulcerative colitis showed a lack of response despite daily high doses of oral prednisolone (75 mg). We registered the number of patients undergoing high-dose steroid treatment within seven days prior to the operation and infliximab treatment within the last three months prior

## ORIGINAL ARTICLE

1) Department of Surgery, Køge Hospital  
2) Gastroenterology, Køge Hospital

Dan Med Bul  
2011;58(12):A4326


 FIGURE 1

Laparoscopic subtotal colectomy in a patient with inflammatory bowel disease.



to surgery. The severity of IBD was calculated according to a validated score system (Clinical Activity Index) [6]. The score ranges from 0 to 29 and any score below four indicates remission.

Before study start we graded the severity of complications into minor and major complications and predetermined various surgical and medical complications as described elsewhere [7]. The analysis comprised only the most severe complication in each patient. A complication was defined as any unforeseen surgical or medical problem arising during the 30-day postoperative follow-up period. Major complications were defined as severe and potentially fatal complications or those leading to reoperation, excluding skin opening for infection [7]. Readmission and reoperation were recorded with a maximum of one event per patient.

Data are presented as number of patients and median (ranges). We used Fischer's exact test, Mann-Whitney and 95% confidence intervals, as appropriate. The significance level was set at  $p < 0.05$ . Due to the retrospective nature of the study, the Ethical Committee was not contacted for approval and the study was not registered with ClinicalTrials.gov.

*Trial registration:* not relevant.

## RESULTS

During the study period, 111 patients underwent colectomy. Fifty patients were excluded from the analysis due to colectomy for other reasons than IBD (neoplasms, mechanical bowel obstruction, volvulus, ischaemia etc.). Another 29 of the remaining 61 patients were excluded due to preoperatively planned open colectomy.

The present analysis included 32 patients (Table 1) of whom 17 and 15 patients, respectively, underwent emergency and elective surgery (Table 1 and Table 2). Patients undergoing emergency surgery had a signifi-

cantly higher Clinical Activity Index (i.e. were in a poorer condition) ( $p < 0.05$ ), had higher CRP levels ( $p < 0.05$ ), received a higher cumulated steroid dose ( $p < 0.05$ ) and received more anti-TNF-alpha treatment ( $p < 0.01$ ) than elective patients. Postoperative LOS was 12 and nine days, respectively, after emergency and elective operation ( $p = 0.17$ ). Eight (47%) (95% confidence interval (CI) 24-71%) and three patients (20%) (0-40%), respectively, experienced a major complication after either emergency or elective operation (Table 2 and Table 3) ( $p = 0.15$ ). The overall morbidity was 72% (Table 2). The conversion rate was 34%. The conversion rate to open procedure was 47% and 20% after emergency and elective operation, respectively ( $p = 0.15$ ) (Table 1). Five of eight emergency patients and one of three elective patients underwent conversion and experienced a major complication ( $p = 0.55$ ) (Table 3).

## DISCUSSION

This study is the first Danish report on early outcome after SLC for IBD. The results leave much to be desired. Major complications after emergency operations occurred in half of the patients and the risk was more than doubled compared with elective operation. In one third of the patients, the laparoscopic procedure was converted into an open procedure and patients had a prolonged hospital stay with a median duration of 11 days.

The aim of the present analysis was not to compare results with open colectomy for IBD, but to lay open our initial experiences with a view to promoting a national discussion on the organisation and timing of the surgical treatment of patients with IBD.

In the present study, we excluded 48% of all subtotal colectomies during the study period due to planned open procedures. However, the intended laparoscopic procedures described in this study were not biased by selection since inclusion was based only on the presence of a laparoscopic surgeon.

Many studies comparing subtotal laparoscopic colectomies with open colectomies [3-6] have failed to demonstrate significant short-term advantages in favour of the laparoscopic approach in IBD. Our study reflects results from a 4.5-year introductory period from a single centre performing approximately ten laparoscopic operations per surgeon. This is probably too low a number per surgeon and that may have affected our morbidity results. The learning curve for laparoscopic colorectal resections is probably 30 procedures or more [8]. It is well-accepted that a high surgeon and centre volume is positively related to surgical outcome although this is not always clearly demonstrated [9]. A Danish study assessing the organization and early outcome after laparoscopic colectomy (without a stoma) in 1,149 patients found that the potential of minimally invasive laparo-

scopic surgery was not reached, possibly due to the many low-volume departments in Denmark [10, 11].

Others have reported a morbidity of 35% and a conversion rate of 5% after colectomy for IBD when surgery was performed by dedicated high-volume laparoscopic surgeons (> 500 laparoscopic colonic resections) [12]. Unfortunately, the authors but did not discriminate between elective and emergency procedures or between minor and major complications [12]. In our study, five of eight patients with major complications after emergency operation were converted to open operation (Table 3). This may reflect patients being in a poor preoperative clinical condition. Only one of three patients with major complications after elective operation was converted into open operation. We observed a considerable, albeit statistically insignificant, overweight of major complications after emergency operation compared with elective operations which may be explained by statistical type II error. Only few studies have compared outcome after emergency laparoscopic subtotal colectomy with elective subtotal colectomy for IBD [2]. Nash et al compared minimally invasive surgery (laparoscopic and hand-assisted laparoscopy) with open surgery in 68 patients, of whom 31 were IBD patients, requiring emergency surgery. They found no significant differences in morbidity

and concluded that minimally invasive surgery was as safe as open surgery in an emergency setting.

Laparoscopic colectomy has been regarded as a safe, but technically demanding procedure in patients with IBD [1, 3-5, 13, 14]. In a recent Danish retrospective study [15] reporting results from laparoscopic ileocecal resection for Crohns disease (n = 19), the authors found that the outcome after laparoscopic approach was not superior to that of open surgery. A Cochrane review including 25 randomized controlled trials (n = 3,526 patients) compared outcomes for laparoscopic and open malignant colorectal resections [16]. The results favoured laparoscopic resection in terms of a lower morbidity, shorter LOS, less postoperative pain, shorter duration of postoperative ileus and higher short-term quality of life [16]. However, the meta-analysis included only one IBD study. In a study by Fowkes et al (32 patients with ulcerative colitis), a 37% morbidity rate was reported. A single surgeon performed all operations during a five-year period. As in the present study, half of the operations were elective and half emergency procedures [17].

It has been suggested that a laparoscopic approach compared with an open approach may per se offer lower long-term morbidity, especially regarding the risk



TABLE 1

Patient characteristics in 32 patients undergoing emergency or elective subtotal laparoscopic colectomy for inflammatory bowel disease.

	Emergency (n = 17)	Elective (n = 15)	Total (n = 32)
<i>Patient demographics</i>			
Age, years, mean (range)	50 (15-79)	46 (18-78)	47
Male/female, n	8/9	5/10	13/19
Body mass index, kg/m <sup>2</sup> , mean (range)	23 (16-32)	30 (21-37)*	26*
Previous abdominal surgery, n	5	1	6
Preoperative hospital stay, days, mean (range)	12 (1-36)	0 (0-0)*	2
Postoperative hospital stay, days, mean (range)	12 (4-70)	9 (5-33)	11
Clinical Activity Index, mean (range)	11 (6-20)	5 (3-8)*	7
Se-C-reactive protein, mg/l, mean (range)	13 (3-470)	6 (2-15)*	13
Se-albumin, g/l, mean (range)	39 (22-48)	42 (36-46)*	39
Se-Hgb, mmol/l, mean (range)	7,3 (5,7-9,8)	8,7 (7,0-9,6)*	8
<i>Medical treatment</i>			
Steroid treatment within 7 days, n	14	6*	20
Cumulative steroid administration last week, mg, mean (range)	313 (0-525)	0 (0-350)*	123
Length of current steroid treatment, days, mean (range)	3 (0-605)	0 (0-44)	2
Biological, n	6	0*	6
<i>Diagnosis</i>			
Crohns disease, n	2	0	2
Ulcerative colitis, n	13	15	28
Indeterminate colitis, n	2	0	2
<i>Surgical treatment</i>			
Laparoscopic, n	9	12	21
Converted from laparoscopic to open, n	8	3	11
Duration, minutes, mean (range)	204 (86-300)	222 (100-373)	221

Hgb = haemoglobin; n = number of patients; Se = serum.

\*) p < 0.05.

TABLE 2

30-day outcome after emergency and elective operation in patients undergoing subtotal colectomy for inflammatory bowel disease.

	Emergency (n = 17)	Elective (n = 15)	Total (n = 32)
<i>Major complications, n</i>			
Intra-abdominal haemorrhage	2	0	2
Mechanical bowel obstruction	1	0	1
Deep wound dehiscence	1	1	2
Pulmonary complication	2	0	2
Sepsis	1	1	2
Intraabdominal absces	0	1	1
Multi organ failure	1	0	1
Total (CI)	8 (24-71%)	3 (0-40%)	11 (19-50%)
<i>Minor complications, n</i>			
Wound bleeding	0	1	1
Wound infection/necrosis	0	3	3
Urologic complication	1	1	2
Stoma separation	3	3	6
Total (CI)	4 (6-41%)	8 (27-80%)	12 (22-53%)
<i>Overall complications, n</i>			
Total major and minor complications (CI)	12 (47-94%)	11 (47-93%)	23 (56-88%)
<i>Post-operative course, patients, n</i>			
Readmission	1	3	4
Reoperation	6	3	9

CI = 95% confidence interval.

TABLE 3

30-day complications in patients undergoing laparoscopic and converted subtotal colectomy for inflammatory bowel disease (number of patients).

	Emergency		Elective		Total
	laparoscopic	converted	laparoscopic	converted	
Major complications	3	5	2	1	11
Minor complications	3	1	6	2	12
Total	4	6	8	3	23

of ventral hernias and mechanical bowel obstruction (20% in laparoscopic versus 64% in open surgery, follow-up period 2-4.5 years) [3], and short LOS [4, 6] although evidence from randomised trials is lacking. A recent British retrospective study by Randall et al reported outcome after open emergency colectomy for severe ulcerative colitis (n = 80) [18]. There was an overall 30-day morbidity rate of 28% (no discrimination between major and minor complications). Furthermore, the authors found that delayed surgery > 8 days in patients not responding to medical treatment was associated with a significantly increased risk of postoperative complications [18]. In our study, patients undergoing emergency operations were hospitalised for a median of 12 days prior to surgery. Their preoperative physical condition was significantly worse than that of patients undergoing elective operation. Radical surgical treatment may be delayed in patients who initially received medical rescue

therapy to avoid subtotal colectomy, and the optimal timing for surgery may be missed. In our department and in collaboration with medical gastroenterologists, we have now taken the initiative to lower the surgical threshold.

Our patients received high-dose steroids in addition to infliximab which may have deteriorated the early surgical outcome [19]. Our findings and those of others [18] indicate that a shortening of the preoperative period and perhaps of the duration of steroid treatment before emergency operation may be important to reduce post-operative morbidity.

In our study, the postoperative hospital stay was 11 days. In contrast, Andersen et al demonstrated a two day postoperative stay after open colonic resection for colonic cancer, with a multimodal rehabilitation program [20]. The absence of fast-track regimes in our department, the fact that many of our patients were in an acute poor condition and that they were offered in-hospital training of stoma care may, in part, explain this discrepancy.

Our results may call for a future prospective national survey that focuses on timing of operation, morbidity, LOS and mortality. The study should be stratified for surgical procedure (laparoscopic, conversion, open operation) and number of surgical departments to establish the evidence needed to improve outcome in patients undergoing subtotal colectomy in IBD. Thus, future national results may promote further high-vol-

ume centre-specialization for the treatment of these patients. Although our study does not give high class evidence, the present results stress the importance of a close joint collaboration between medical and surgical gastroenterologists to reduce the need for emergency surgery in patients with IBD, to minimise steroid therapy, and to optimise the timing of inevitable operations and thereby reduce the risk of a poor outcome.

In conclusion, our early outcome results after SLC for IBD were problematic. The results may, in part, be explained by a delayed timing of operation, the effects of a learning-curve and thus perhaps inadequate surgical technique at the time the study was performed. A prospective national survey on early postoperative outcome and the number of surgical departments performing subtotal laparoscopic colectomy for IBD is suggested.

**CORRESPONDENCE:** *Saddiq Mohammad Qazi*, Department of Surgery, Køge Hospital, 4600 Køge, Denmark. E-mail: [Saddiqqazi@gmail.com](mailto:Saddiqqazi@gmail.com)

**ACCEPTED:** 16 August 2011

**CONFLICTS OF INTEREST:** Disclosure forms provided by the authors are available with the full text of this article at [www.danmedbul.dk](http://www.danmedbul.dk).

#### LITERATURE

1. Lindberg LJ, Rosenberg J, Achiam MP. Laparoscopic and open subtotal colectomy for inflammatory bowel disease. *Ugeskr Læger* 2010;172:2292-5.
2. Nash GM, Bleier J, Milsom JW et al. Minimally invasive surgery is safe and effective for urgent and emergent colectomy. *Colorectal Dis* 2010;12:480-4.
3. Seshadri PA, Poulin EC, Schlachta CM et al. Does a laparoscopic approach to total abdominal colectomy and proctocolectomy offer advantages? *Surg Endosc* 2001;15:837-42.
4. Dunker MS, Bemelman WA, Slors JF et al. Laparoscopic-assisted vs open colectomy for severe acute colitis in patients with inflammatory bowel disease (IBD): a retrospective study in 42 patients. *Surg Endosc* 2000;14:911-4.
5. Bell RL, Seymour NE. Laparoscopic treatment of fulminant ulcerative colitis. *Surg Endosc* 2002;16:1778-82.
6. Rachmilewitz D. Coated mesalazine (5-aminosalicylic acid) versus sulphasalazine in the treatment of active ulcerative colitis: a randomised trial. *BMJ* 1989;298:82-6.
7. Bisgaard T, Kehlet H, Bay-Nielsen MB et al. Nationwide study of early outcomes after incisional hernia repair. *Br J Surg* 2009;96:1452-7.
8. Schlachta CM, Mamazza J, Seshadri PA et al. Defining a learning curve for laparoscopic colorectal resections. *Dis Colon Rectum* 2001;44:217-22.
9. Kehlet H, Laurberg S. Gastrointestinal surgery – why specialisation? *Ugeskr Læger* 2006;168:1519-21.
10. Schulze S, Iversen MG, Bendixen A et al. Laparoscopic colonic surgery in Denmark 2004-2007. *Colorectal Dis* 2008;10:869-72.
11. Tøttrup A. Laparoscopic surgery in inflammatory bowel disease. *Ugeskr Læger* 2010;172:2287.
12. Marceau C, Alves A, Ouaisi M et al. Laparoscopic subtotal colectomy for acute or severe colitis complicating inflammatory bowel disease: a case-matched study in 88 patients. *Surgery* 2007;141:640-4.
13. Pokala N, Delaney CP, Senagore AJ et al. Laparoscopic vs open total colectomy: a case-matched comparative study. *Surg Endosc* 2005;19:531-5.
14. Naidu MN, Trang AC, Salky BA. Laparoscopy in Crohn's disease. *Clin Colon Rectal Surg* 2007;20:329-35.
15. Laursen SB, Knudsen T, Poornorooy P. Laparoscopy-assisted ileocolic resection in Crohn's disease. *Ugeskr Læger* 2010;172:2288-91.
16. Schwenk W, Haase O, Neudecker J et al. Short term benefits for laparoscopic colorectal resection. *Cochrane Database Syst Rev* 2005;(2): CD003145.
17. Fowkes L, Krishna K, Menon A et al. Laparoscopic emergency and elective surgery for ulcerative colitis. *Colorectal Dis* 2008;10:373-8.
18. Randall J, Singh B, Warren BF et al. Delayed surgery for acute severe colitis is associated with increased risk of postoperative complications. *Br J Surg* 2010;97:404-9.
19. Yang Z, Wu Q, Wu K et al. Meta-analysis: pre-operative infliximab treatment and short-term post-operative complications in patients with ulcerative colitis. *Aliment Pharmacol Ther* 2010;31:486-92.
20. Andersen J, Hjort-Jakobsen D, Christiansen PS et al. Readmission rates after a planned hospital stay of 2 versus 3 days in fast-track colonic surgery. *Br J Surg* 2007;94:890-3.