

The Impact of Disease Pattern, Surgical Management, and Individual Surgeons on the Risk for Relaparotomy for Recurrent Crohn's Disease

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Objective

The authors provide a multivariate analysis of a large single-center experience with limited surgery for Crohn's disease.

Summary Background Data

During the past decade, the aim of surgery for Crohn's disease has shifted from radical operation, achieving inflammation-free margins of resection, to "minimal surgery," intended to remove just grossly inflamed tissue or performing strictureplasties.

Methods

Seven hundred ninety-three cases of resection and/or strictureplasty in 689 individuals with histologically verified Crohn's disease were followed for a mean period of 50 months (range, 5–166 months). Two different end points were analyzed: 1) any relaparotomy for recurrent (or persistent) Crohn's disease and 2) relaparotomy for site-specific recurrence. More than 30 variables of patient/disease characteristics and surgical management were included in a proportional hazard model.

Results

Five parameters were associated independently with the risk for relaparotomy: increased risk coincided with young age at onset of disease, involvement of jejunum, enterocutaneous fistula, or performed strictureplasty, and decreased risk followed ileocecal resection. Site-specific risks of reoperation were calculated on the basis of 1260 intestinal resections or anastomoses performed in these patients. Young age at onset, duodenal and jejunal involvement, presence of enterocutaneous or perianal fistula, and a single surgeon (of 23) were associated significantly with increased risk of regional recurrence but not strictureplasty or inflammation at margins of resection.

Conclusions

Limited surgery for Crohn's disease is not associated with increased risk of regional recurrence requiring reoperation. However, patients with juvenile onset, proximal small bowel disease, and some types of fistulae are at a considerable risk of experiencing early surgical recurrence.

Crohn's disease primarily is considered to be a generalized disease of the entire gastrointestinal tract, for which no curative therapy currently is available.¹ After surgical therapy, almost all patients will experience recurrence if they are observed for a sufficiently long time.^{2,3} Early endoscopic reappearance in most patients after "curative" resection^{4,5} indicates that some degree of recurrence (better: recrudescence⁶) may represent a universal feature of this disease. Wide margins of resection may offer no advantage.⁷ Some evidence suggests that a radical surgical approach may even facilitate recurrence.⁸ Thus, there has been a shift in surgical intervention to a more conservative—even "minimal"—approach.⁹ Using this nonradical and noncurative approach, histologic or endoscopic/radiologic definitions of recurrence have become meaningless. Studies on the rates of recurrence have to rely either on clinical symptoms, which are nonspecific and hard to quantify, or on the rate of reoperation, which—although easily quantifiable—fails to count those patients with a clinical recurrence not requiring reoperation.⁶

Regardless of the definitions and actual patterns of recurrence, surgery performed for proper indications almost is invariably rehabilitating for people disabled by the ravages of Crohn's disease.³ After resectional therapy, most patients regret not undergoing surgery earlier.¹⁰ As long as the perioperative risk is minimal,¹¹⁻¹³ indications to surgery have to be guided by the chances of symptomatic relief and also by the individual perspective of a recurrence-free interval of long duration. Surgeons treating this disease should be aware of any factors that might influence the rate of recurrence to facilitate proper decision making regarding the indication for surgery and the type of intervention. When comparing resectional *versus* nonresectional therapy, site-specific rather than patient-related rates of recurrence should be calculated.¹⁴ To achieve these goals, the current study intended to provide a multivariate analysis of numerous perioperative variables based on a large single-center experience with limited surgery for Crohn's disease.

SUBJECTS AND METHODS

Study Cases

Although data analysis was performed retrospectively, those pertaining to the perioperative period and the patients history were obtained from a prospective registry that includes all patients with Crohn's disease admitted to the Department of Surgery, University of Heidelberg,

since October 1981. Of this registry, all 793 laparotomies performed up until January 1994 for symptomatic, histologically verified Crohn's disease were included in the current analysis, provided at least one intestinal resection or strictureplasty had been undertaken. Mean follow-up was 50 months (range, 5–166 months). For patients not seen at routine outpatient visits, information on reoperations at other hospitals was collected by mailed questionnaires or telephone interviews.

End Points

The time of relaparotomy due to recurrent (or persistent) symptomatic Crohn's disease served as an end point. Except for reoperations due to perioperative complications or planned reinterventions, such as closure of enterostomy, any type of relaparotomy for severe colitis, symptomatic intestinal stenosis, or abdominal fistulous disease was included, regardless of histologic proof of recurrence. In addition, all relaparotomies for obviously persistent Crohn's disease, *e.g.*, in excluded rectal segments after temporary ileostomy, were considered "recurrences." In case of repetitive intestinal resection or strictureplasty during relaparotomy, patients could be entered again into the study. This occurred in 104 cases. Thus, the study population consisted of 689 individuals (preliminary data analysis confirmed that results were not different if these repeat cases were excluded). Calculations were performed for two different end points, either relaparotomy for any intestinal recurrence or relaparotomy for regional recurrence. For this purpose, "region" was defined as within ± 10 cm of previous resection/anastomosis. Defining this region in the small intestine was somewhat arbitrary because of the lack of well-defined landmarks (as in the case of the jejunoileal border). Calculations of regional recurrence were based on 1260 different surgical sites of operation (any anastomosis or resected bowel segment was considered to represent a separate site at risk of recurrence). The disease pattern at the time of surgery was evaluated according to the best available evidence of clinical, endoscopic, radiographic, and intraoperative findings. The pattern of disease was considered independent of therapeutic procedures (*e.g.*, presence of jejunal disease in Table 1 does not imply that during operation either jejunal resection or jejunal strictureplasty was performed).

Surgical Technique

Resections were performed at the border of macroscopically detectable disease, with no attempt made to achieve histologically disease-free margins. Since 1984, strictureplasty has been used for smaller ileal and jejunal skip lesions. In many cases of severe perianal or rectovaginal fistulous disease, stool deviation by loop ileos-

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Table 1. PATIENT AND DISEASE CHARACTERISTICS AT TIME OF OPERATION

Parameter	Frequency/Average (for 793 laparotomies)	Any Recurrence*	Site-Specific Recurrence†
Female sex	458 (57.7%)	0.92 (0.66–1.27)	0.85 (0.58–1.24)
Age	34 ± 11 yr (13–80)‡	0.98 (0.97–0.996)§	0.98 (0.96–1.00)
Age at onset of disease	25 ± 11 yr (3–79)‡	0.96 (0.94–0.98)¶**	0.96 (0.94–0.98)¶#
Duration of symptomatic disease	9 ± 6 yr (0–36)‡	1.02 (0.99–1.05)	1.03 (1.00–1.06)§
No. of previous laparotomies for CD	0.8 ± 1.2 (0–7)‡	1.23 (1.07–1.41)¶	1.18 (1.01–1.39)§
Duodenal disease	28 (3.5%)	2.03 (1.10–3.76)§	2.42 (1.36–4.33)¶#
Jejunal disease	71 (9.0%)	2.83 (1.82–4.40)¶††	2.75 (1.82–4.14)¶††
Ileal disease	639 (80.4%)	1.25 (0.80–1.95)	1.16 (0.66–2.04)
Colonic disease	467 (58.9%)	0.88 (0.64–1.22)	0.79 (0.54–1.15)
Rectal disease	137 (17.3%)	1.26 (0.84–1.90)	0.91 (0.54–1.56)
Abdominal abscess	113 (14.2%)	1.09 (0.70–1.69)	0.75 (0.43–1.32)
Perianal fistula	124 (15.7%)	1.28 (0.83–1.99)	1.63 (0.99–2.67)**
Enterocutaneous fistula	91 (11.5%)	1.91 (1.26–2.91)¶#	2.67 (1.74–4.09)¶††
Interenteric fistula	247 (31.1%)	0.86 (0.60–1.22)	0.55 (0.36–0.83)¶††
Retroperitoneal fistula	73 (9.2%)	0.61 (0.29–1.31)	0.71 (0.29–1.73)
Enterovesical fistula	42 (5.3%)	0.50 (0.20–1.21)	0.47 (0.17–1.27)
Enterogenital fistula	47 (5.9%)	0.68 (0.30–1.53)	0.46 (0.15–1.45)
Extraintestinal manifestations	71 (9.0%)	1.73 (1.01–2.98)§	1.20 (0.56–2.59)

* Results are risk ratios (with 95% confidence limits in parentheses) for univariate calculations based on the sample of 793 laparotomies.

† Results are risk ratios for univariate calculations based on the sample of 1260 sites of intestinal reconstruction (95% confidence limits in parentheses).

‡ Mean ± standard deviation (range).

§ $p < 0.05$.

¶ $p < 0.01$.

¶¶ $p < 0.001$ in univariate analysis.

$p < 0.05$.

** $p < 0.01$.

†† $p < 0.001$ in multivariate analysis.

tomy was performed in preference to primary proctectomy. Only in rare instances was enterostomy used for anastomotic protection.¹⁵ All anastomoses were performed in a single-layer, end-to-end fashion, with interrupted vertical mattress sutures using absorbable suture material (polyglactin 910 or polyglycolic acid, 3-0 or 4-0). To avoid fistula formation, intra-abdominal drains were never used close to anastomoses, and only rarely in cases of (usually extraperitoneal) abscesses. Whenever feasible, omentoplasty was performed in the presence of fistulae or abscesses. There was no change in surgical technique throughout the study period.

Surgeons

Operations included in this study were performed by 23 surgeons all of whom followed the same guidelines of surgical management as listed above. Eight of these surgeons had contributed more than 50 cases and were analyzed separately, whereas the remaining 15 surgeons were grouped together.

Medical Therapy

Patients on long-term corticosteroid therapy (> 3 weeks preoperatively) were continued on them through-

out the inpatient period, with increased doses given perioperatively. During part of the study period (1985–1991), patients without steroids received a routine 3-month course of prophylactic corticosteroid therapy starting on the day of surgery (although being beyond the scope of the current study, this policy did not show any influence on the rate of recurrence). Additional preoperative drug therapy with salicylates or immunosuppressive agents was restarted with the resumption of oral intake. After discharge, decisions on drug therapy were made by the gastroenterologist caring for the patient. Data on further medical therapy during the years of follow-up were incomplete and were not included in the current analysis.

Histologic Margin

Mild, nonspecific inflammatory changes at the margins of resected specimens were discounted. However, all cases with significant inflammation at margins were included as affected by disease, regardless of specificity. Furthermore, both margins of strictureplasties were considered inflamed, even without histologic verification.

Table 2. SURGICAL MANAGEMENT

Parameter	Frequency/Average (for 793 laparotomies)	Any Recurrence*	Site-Specific Recurrence†
Emergency laparotomy	33 (4.2%)	0.96 (0.43–2.19)	0.46 (0.11–1.86)
No. of anastomoses	1.7 ± 1.4 (0–15)‡	1.20 (1.10–1.32)§	1.14 (1.06–1.22)§
Histologic inflammation at margin of resection	490 (61.8%)	1.30 (0.93–1.83)	0.97 (0.65–1.43)
Length of resected specimen	32 ± 22 cm (0–158 cm)‡	0.99 (0.98–0.999)	1.0 (0.99–1.01)
Strictureplasty	82 (10.3%) [204 sites]	2.73 (1.76–4.25)§¶	1.57 (0.96–2.57)
Jejunal resection	18 (2.3%)	1.70 (0.68–4.08)	1.84 (0.58–5.81)
Ileal resection**	130 (16.4%)	1.85 (1.29–2.65)§	1.21 (0.72–2.02)
Ileocecal resection/right hemicolectomy	348 (43.9%)	0.42 (0.29–0.60)§#	0.65 (0.41–1.02)
Segmental resection of colon or rectum**	119 (15.0%)	1.21 (0.80–1.81)	1.05 (0.59–1.88)
Subtotal colectomy with ileorectal anastomosis	85 (10.7%)	0.97 (0.57–1.66)	1.64 (0.88–3.07)
Proctectomy/proctocolectomy	34 (4.3%)	0.55 (0.18–1.74)	0.82 (0.20–3.33)
Resection of previous anastomosis	147 (18.5%)	1.47 (0.99–2.17)	1.04 (0.57–1.89)
Closure of enteric fistula	115 (14.5%)	0.73 (0.42–1.27)	0.32 (0.12–0.88)
Intestinal bypass	11 (1.4%)	1.50 (0.55–4.07)	2.54 (0.80–8.06)

* Results are risk ratios (with 95% confidence limits in parentheses) for univariate calculations based on the sample of 793 laparotomies.

† Results are risk ratios for univariate calculations based on the sample of 1260 sites of intestinal reconstruction (95% confidence limits in parentheses).

‡ Mean ± standard deviation (range).

§ $p < 0.001$ in univariate analysis.

|| $p < 0.05$ in univariate analysis.

¶ $p < 0.05$ in multivariate analysis.

$p < 0.001$ in multivariate analysis.

** Excluding ileocecal resections and right hemicolectomies.

Statistical Analysis

Differences were considered significant at $p < 0.05$ (two-sided). Distributions of reoperation-free survival were estimated by the product-limit method.¹⁶ Risk ratios and confidence intervals were based on estimates from the proportional hazards model.¹⁷ Multivariate re-

gression analysis (including all parameters listed in Tables 1, 2, and 3) was performed by stepwise variable selection, with $p < 0.05$ for entry and removal of variables from the model. Calculations were performed by the SAS procedures LIFETEST and PHREG (SAS Institute, Cary, NC).

RESULTS

In approximately half of the cases (47%), the operation analyzed was not the first laparotomy for Crohn's disease, but the second (28%), third (10%), or fourth and more (9%). Because of complex and multifocal manifestations of the disease, more than one intestinal anastomosis was performed on 39% of the patients, three or more anastomoses were performed on 16% of the patients. At the time of surgery, the disease was localized to the small intestine in 38% of the patients and to the large bowel in 17% of the patients; 45% of the patients had both small and large bowel involvement. Details of pattern are listed in Table 1.

Indications for laparotomy were multifactorial in most cases. Besides various types of fistulae or abscesses, indications included symptomatic intestinal stenoses not responding to medical treatment (72%), colitis refractory to conservative management (11%), blind loop syndrome (1.9%), and ureteral obstruction (1.4%). Laparotomy was performed in an emergency setting in 4.2% of

Table 3. IMPACT OF INDIVIDUAL SURGEONS

Parameter	No. of Operations	Any Recurrence*	Site-Specific Recurrence†
Surgeon A	166	0.80 (0.54–1.19)	0.86 (0.55–1.35)
Surgeon B	101	0.96 (0.64–1.45)	0.60 (0.34–1.06)
Surgeon C	75	1.54 (0.88–2.70)	2.20 (1.23–3.92)‡
Surgeon D	69	1.14 (0.62–2.11)	0.82 (0.33–2.02)
Surgeon E	67	1.49 (0.69–3.21)	2.49 (1.14–5.42)§
Surgeon F	63	1.61 (0.74–3.50)	1.44 (0.52–3.98)
Surgeon G	54	1.32 (0.65–2.68)	1.36 (0.55–3.36)
Surgeon H	52	2.84 (1.30–6.20)‡	1.51 (0.47–4.85)
All other surgeons	146	0.96 (0.67–1.39)	1.13 (0.75–1.73)

* Results are risk ratios (with 95% confidence limits in parentheses) for univariate calculations based on the sample of 793 laparotomies.

† Results are risk ratios for univariate calculations based on the sample of 1260 sites of intestinal reconstruction (95% confidence limits in parentheses).

‡ $p < 0.01$ in univariate analysis.

§ $p < 0.05$ in univariate analysis.

|| $p < 0.01$ in multivariate analysis.

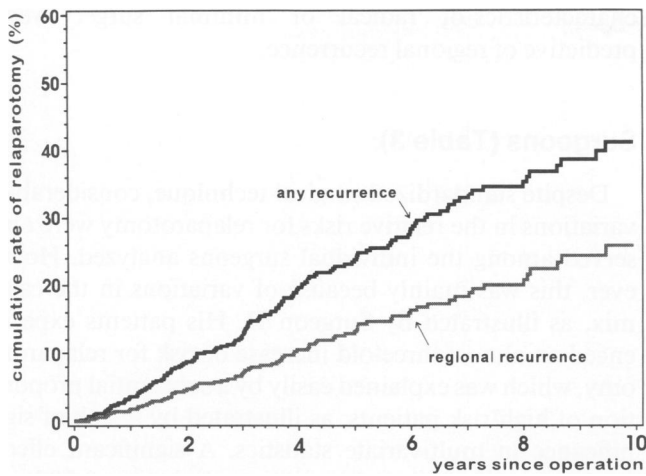


Figure 1. Kaplan-Meier estimate of the overall incidence of relaparotomy for recurrent Crohn's disease at any site vs. regional recurrence (within \pm 10 cm of previous surgery).

the cases because of toxic colon ($n = 7$), free intestinal perforation ($n = 14$), severe bleeding ($n = 4$), or advanced complete ileus ($n = 8$). Perioperative complications in the current series were similar to those reported earlier¹²: uncomplicated course in 89.4%, minor complications in 5.8%, relaparotomy for complications in 4.4%, and mortality 0.4%.

Risk of Recurrence (Fig. 1)

An almost linear relationship could be detected between the time elapsed since operation and the overall incidence of reoperations due to recurrent Crohn's disease at any site (24% and 41% after 5 and 10 years, respectively) or regional recurrence (13% and 26% of patients and 11% and 21% of sites after 5 and 10 years, respectively). Thus, more than half of the recurrences requiring reoperation were at the very same site. There was no apparent trend of diminishing or increasing risk throughout the 10-year follow-up period.

Patient Characteristics (Table 1)

The risk for relaparotomy decreased with increasing age at time of operation (2% risk reduction per year of age) as well as with age at onset of disease (4% risk reduction per year of age; Fig. 2). The latter factor and the duration of symptomatic disease also were associated with a significantly increased risk of site-specific recurrence. Patients with previous surgery for Crohn's disease were more prone to undergo relaparotomy for recurrent disease at any site or at an identical site (23% and 18% increase of risk per each previous laparotomy, respectively). Multivariate analysis revealed only age at onset of symptomatic disease to contribute significantly to the

likelihood of relaparotomy (multivariate risk ratio: 0.97 per year of age [95% confidence interval: 0.95–0.99] both for any and regional recurrence).

Pattern of Disease (Table 1)

Regardless of the type of operation performed, involvement of the proximal intestinal tract (duodenum and jejunum) was found to be a significant risk factor. Enterocutaneous fistulae increased the risk of relaparotomy for any as well as regional recurrence, whereas the presence of an interenteric fistula anywhere in the abdomen decreased the risk of site-specific recurrence. Extra-intestinal disease (ocular, articular, or skin symptoms) contributed to the risk of nonregional recurrence only. Other types of fistulae or septic manifestations of disease were of no importance regarding the risk for relaparotomy.

In multivariate analysis, jejunal involvement and the presence of enterocutaneous fistula were associated significantly with the risk of any recurrence requiring relaparotomy (risk ratio 1.8 [95% confidence interval, 1.0–3.0] and 1.8 [95% confidence interval, 1.1–2.8], respectively). Both parameters also were important for the risk of regional recurrence (multivariate risk ratio 2.4 [95% confidence interval, 1.5–3.8] and 3.2 [95% confidence interval, 2.0–5.2], respectively). In addition, operative sites in patients with duodenal involvement (multivariate risk ratio 1.9 [95% confidence interval, 1.0–3.5]) or perianal fistulous disease (multivariate risk ratio 2.2 [95% confidence interval, 1.3–3.6]) carried an increased risk of regional recurrence, whereas the presence of an interenteric fistula improved prognosis (multivariate risk ratio 0.4 [95% confidence interval, 0.3–0.6]).

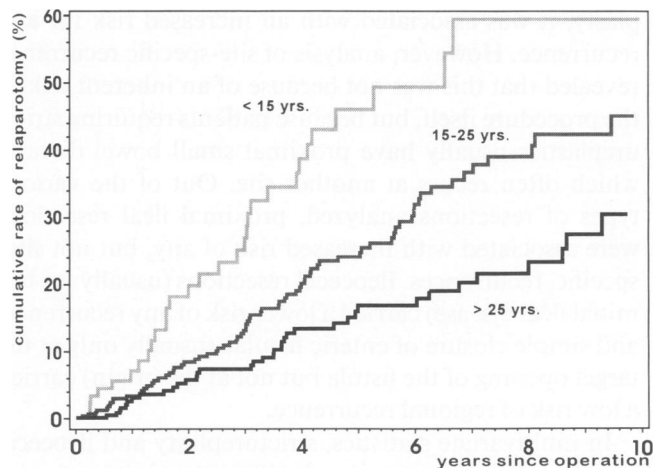


Figure 2. Kaplan-Meier estimate of the overall incidence of relaparotomy, depending on the age of first symptoms of Crohn's disease, demonstrating a significantly increased risk for younger age of onset (log rank analysis: $p = 0.0001$).

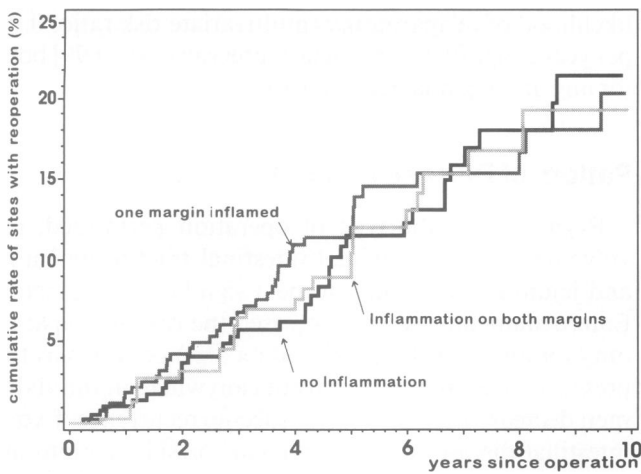


Figure 3. Lack of influence of histologic inflammation at the margins of resection on the site-specific risk for relaparotomy (log-rank analysis: $p = 0.87$).

Surgical Management (Table 2)

Emergency procedures due to complete intestinal obstruction, severe bleeding, toxic colon, or free perforation were not associated with the risk of recurrence. Presence of histologic evidence of inflammation at one (observed in 43.3% of the cases) or both margins of resection (in 18.5%) was without any consistent or significant effect (Fig. 3). After operations with multiple anastomoses, there was a marked increase in the risk for relaparotomy for any as well as regional recurrence (20% and 14% increase of risk per each anastomosis, respectively). On the other hand, extensive resections were associated with a lower risk of any recurrence (1% risk reduction per each centimeter of resected specimen), but not with the risk of site-specific recurrence.

When the operation performed included a strictureplasty, it was associated with an increased risk for any recurrence. However, analysis of site-specific recurrence revealed that this was not because of an inherent risk of the procedure itself, but because patients requiring strictureplasties usually have proximal small bowel disease, which often recurs at another site. Out of the various types of resections analyzed, proximal ileal resections were associated with increased risk of any, but not site-specific, recurrences. Ileocecal resections (usually for terminal ileal disease) carried a lower risk of any recurrence, and simple closure of enteric fistulae (usually only at the target opening of the fistula but not at the origin) carried a low risk of regional recurrence.

In multivariate statistics, strictureplasty and ileocecal resection turned out to be significantly associated with the risk for relaparotomy for any recurrence (risk ratio 1.8 [95% confidence interval, 1.1–3.0] and 0.4 [95% confidence interval, 0.3–0.6], respectively). None of the

characteristics of “radical” or “minimal” surgery were predictive of regional recurrence.

Surgeons (Table 3)

Despite standardized surgical technique, considerable variations in the relative risks for relaparotomy were observed among the individual surgeons analyzed. However, this was mainly because of variations in the case mix, as illustrated by Surgeon H. His patients experienced an almost threefold increase of risk for relaparotomy, which was explained easily by a substantial proportion of high-risk patients, as illustrated by a lack of significance in multivariate statistics. A significant effect could be verified by multivariate analysis ($p = 0.008$) in only one case (regional recurrence for Surgeon E).

DISCUSSION

Overall recurrence rates found in the current study are well in accordance with reports published previously, some with a more prolonged follow-up, but most of them on smaller series^{13,18} (for overview of published series up to 1990 see reference 6). In addition, it is not surprising that most of the recurrences observed were located at previous anastomoses, usually just proximal to it.^{4,19} We were unable to identify the biphasic pattern of recurrence previously considered to represent two different types of the disease.^{20,21}

Although population-based studies suggested juvenile onset to be associated with a high frequency of surgical intervention,²² this is the first study to verify that manifestation of disease at a young age is associated independently with a worse prognosis. This detrimental effect persisted into adulthood, *i.e.*, age at operation or duration of symptoms was less important than age at first symptoms. However, it cannot be excluded that differences may diminish for follow-up periods beyond the first 10 years after operation.²³

Disease pattern generally is analyzed according to the traditional subdivision into colonic disease, ileocolic disease, and that limited to the small bowel.^{6,24} Probably because of small numbers, previous studies have been unable to demonstrate the prognostic importance of involvement of proximal segments of small intestine, as found in the current series. In the majority of cases, proximal disease also was associated with multiple-site involvement, *e.g.*, just 5 of 71 patients with jejunal disease did not have more distal manifestations. If included in the analysis, multiple-site involvement (like multiple anastomoses) was associated with poor prognosis, as reported by others.^{2,18,24} However, this was not an independent risk factor in multivariate analysis. As suggested previously for clinical but not surgical recurrence,²⁵ ex-

traintestinal manifestations of disease were found to be independent predictors of surgical recurrence.

In a study of 770 patients, Greenstein et al.²⁶ introduced the concept of two clinical forms of Crohn's disease, *i.e.*, perforating (in case of any fistula, abscess, or free perforation) and nonperforating disease. They provided evidence that patients with perforating disease tend to experience earlier recurrence and that recurrences follow the same pattern as primary manifestations. In accordance with data from the Cleveland Clinic,²⁷ we are unable to provide support for this classification. We found enterocutaneous fistulae and concomitant perianal fistulae, but no other form of abscess or fistula or true perforation to be associated with early recurrence. Interenteric fistulae were even linked to an improved prognosis. In addition, there was no trend toward repetition of clinical patterns in case of recurrence. Previously, we had demonstrated that perforating disease is unrelated to perioperative complications.¹²

The surgeon risk factor has been well established in studies on the rate of recurrence after resection of colorectal cancer.²⁸ No reports on this issue have been published for Crohn's disease. Our observation that even with a standardized technique in a single center, differences are detectable between individual surgeons should encourage inclusion of this variable in future studies, especially in those with multicenter involvement.⁸

Probably the most interesting findings in the current study are related to the various aspects of "minimal surgery."⁹ For many years, it has been accepted by most surgeons performing resections in Crohn's disease that there is no need to achieve histologically free margins.^{6,7} However, a recent study of 164 patients with a 3-year follow-up indicated that multiple anastomoses in inflamed tissue may carry a very high risk of early symptomatic recurrence.¹⁸ Using different end points, longer follow-up, and a larger sample, the current study does not support these data. Performing anastomoses in bowel segments with histologic signs of specific or non-specific inflammation at the resection margin did not influence the risk for reoperation, particularly not for site-specific recurrence. Although the number of anastomoses was associated significantly with increased rate of recurrence in univariate statistics, this was almost exclusively due to numerous anastomoses in cases of multiple strictureplasties for proximal skip lesions.

Despite recent reports on extensive experiences with strictureplasties,²⁹⁻³¹ none of the multivariate studies on recurrence of Crohn's disease have included substantial numbers of this procedure.^{13,18,25} Our data suggest that strictureplasty is associated with an increased risk for reoperation related to the underlying pattern of disease rather than the procedure itself. Strictureplasty probably should not be the first choice in cases in which a single resection may be performed without sacrifice of too

much small bowel, such as in terminal ileal disease. However, strictureplasty appears to be as safe as resectional therapy when site-specific rates of recurrence are considered, which is well in accordance with a previous study from Birmingham.¹⁴ Because of the complexity and variability of clinical manifestations, performing randomized trials in surgery for Crohn's disease rarely is attempted.¹⁹ Even without such a definite confirmation, "minimal" or "limited" surgery for Crohn's disease should be considered to represent a well-established standard of treatment. The observation that out of 689 patients included in the current series, only 1 developed overt short bowel syndrome after numerous laparotomies may provide additional support for this concept.

The problem of recurrence after surgical therapy for Crohn's disease will not be resolved surgically. However, up until now, no drug has been available with proven efficacy for the maintenance of remission.³² The current data may help to identify subgroups of patients most in need of adjuvant medical therapy, such as those with juvenile onset, proximal small bowel involvement, and enterocutaneous fistulae.

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