European Colorectal Congress

28 November – 1 December 2022, St.Gallen, Switzerland

Monday, 28 November 2022

09.50
Opening and welcome
Jochen Lange, St.Gallen, CH

10.00
It is leaking! Approaches to salvaging an anastomosis
Willem Bemelman, Amsterdam, NL

10.30
Predictive and diagnostic markers of anastomotic leak
Andre D'Hoore, Leuven, BE

11.00
SATELLITE SYMPOSIUM
ETHICON

11.45
Of microbes and men – the unspoken story of anastomotic leakage
James Kinross, London, UK

12.15
LUNCH

13.45
Operative techniques to reduce anastomotic recurrence in Crohn's disease
Laura Hancock, Manchester, UK

14.15
Innovative approaches in the treatment of complex Crohn Diseases perianal fistula
Christianne Buskens, Amsterdam, NL

14.45
To divert or not to divert in Crohn surgery – technical aspects and patient factors
Pär Myrelid, Linköping, SE

15.15
COFFEE BREAK

15.45
Appendiceal neoplasia – when to opt for a minimal approach, when and how to go for a maximal treatment
Tom Cecil, Basingstoke, Hampshire, UK

16.15
SATELLITE SYMPOSIUM
Medtronic
Further.Together

17.00
Outcomes of modern induction therapies and Wait and Watch strategies, Hope or Hype
Antonino Spinelli, Milano, IT

17.30
EAES Presidential Lecture - Use of ICG in colorectal surgery: beyond bowel perfusion
Salvador Morales-Conde, Sevilla, ES

18.00
Get-Together with your colleagues
Industrial Exhibition

Tuesday, 29 November 2022

9.00
CONSULTANT'S CORNER
Michel Adamina, Winterthur, CH

10.30
COFFEE BREAK

11.00
SATELLITE SYMPOSIUM
INTUITIVE

11.45
Trends in colorectal oncology and clinical insights for the near future
Rob Glynne-Jones, London, UK

12.15
LUNCH

13.45
VIDEO SESSION

14.15
SATELLITE SYMPOSIUM
BD

15.00
COFFEE BREAK

15.30
The unsolved issue of TME: open, robotic, transanal, or laparoscopic – shining light on evidence and practice
Des Winter, Dublin, IE
Jim Khan, London, UK
Brendan Moran, Basingstoke, UK

16.30
SATELLITE SYMPOSIUM
Takeda

17.15
Lars Pahlman lecture
Søren Laurberg, Aarhus, DK

Thursday, 1 December 2022
Masterclass in Colorectal Surgery
Proctology Day

Wednesday, 30 November 2022

9.00
Advanced risk stratification in colorectal cancer – choosing wisely surgery and adjuvant therapy
Philip Quirke, Leeds, UK

09.30
Predictors for Postoperative Complications and Mortality
Ronan O'Connell, Dublin, IE

10.00
Segmental colectomy versus extended colectomy for complex cancer
Quentin Denost, Bordeaux, FR

10.30
COFFEE BREAK

11.00
Incidental cancer in polyp - completion surgery or endoscopy treatment alone?
Laura Beyer-Berjot, Marseille, FR

11.30
SATELLITE SYMPOSIUM

12.00
Less is more – pushing the boundaries of full-thickness rectal resection
Xavier Serra-Aracil, Barcelona, ES

12.30
LUNCH

14.00
Management of intestinal neuroendocrine neoplasia
Frédéric Ris, Geneva, CH

14.30
Poster Presentation & Best Poster Award
Michel Adamina, Winterthur, CH

15.00
SATELLITE SYMPOSIUM
OLYMPUS

15.45
COFFEE BREAK

16.15
Reoperative pelvic floor surgery – dealing with perineal hernia, reoperations, and complex reconstructions
Guillaume Meurette, Nantes, FR

16.45
Salvage strategies for rectal neoplasia
Roel Hompes, Amsterdam, NL

17.15
Beyond TME – technique and results of pelvic exenteration and sacrectomy
Paris Tekkis, London, UK

19.30
FESTIVE EVENING

Information & Registration **www.colorectalsurgery.eu**

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ORIGINAL ARTICLE

Redo ileocolic resection in Crohn's disease – does time passed since previous surgery matter?

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Abstract

Aim: Surgical resection for Crohn's disease (CD) remains noncurative, therefore recurrence is a significant problem. Although numerous factors affecting surgical outcomes in redo ileocolic resection have been previously described, no study has considered the relation between the interval of time from initial ileocolic resection to the redo procedure and its effect on surgical outcomes. The aim of this study was to explore this relationship.

Method: A retrospective review of all adult patients undergoing redo ileocolic resection for CD between 2011 to 2020 was conducted. Patients were divided into two groups based on time from initial ileocolic resection. Patients operated within 10 years of their initial surgery (≤10 years) were assigned to the early group, while patients operated >10 years after initial surgery were allocated to the late group. Primary outcome was the 30-day postoperative major complication rate.

Results: Fifty-eight patients underwent redo ileocolic resection, 24 in the early group and 34 in the late group. Apart from older median age in the late group (56 vs. 46.5 years, $p = 0.026$), the groups were similar for patient factors, disease site and behaviour, use of immune-suppressing medication and procedural factors. Significant differences in 30-day postoperative morbidity included longer length of stay (6 vs. 5 days, $p = 0.035$), a higher major complication rate (23.5% vs. 4.1%, $p = 0.04$) and higher readmission rate (26.4% vs. 4.1%, $p = 0.035$) in the late group. The overall complication rate remained nonsignificant (37.5% vs. 61.8%, $p = 0.1$).

Conclusions: Redo ileocolic resection, when performed >10 years from the initial ileocolic resection, may be associated with increased morbidity, specifically higher rates of major postoperative complications, a longer length of stay and more readmissions.

KEYWORDS
30-day morbidity, complications, Crohn's disease, redo ileocolic resection, time

INTRODUCTION

Despite improvements in medical therapy, including the emergence of biological agents, many patients still require repeated surgical resections for recurrent Crohn's disease (CD). Within 1 year of surgery, 90% of patients will have subclinical endoscopic recurrence at the previous anastomosis, 30% will develop clinical recurrence and 5% will require additional surgery [1–3]. Furthermore, within 10 years of their initial ileocolic resection, 55% of patients will suffer from clinical recurrence at the previous anastomotic site or neoterminal ileum and at least 20% will require repeat resection [4].

Redo ileocolic resection in CD is a challenging operation that can be associated with significant morbidity. This type of operation often entails distorted anatomy, multiple adhesions, a foreshortened

mesentery and chronic abscesses or fistulas. When combined with a malnourished and immunosuppressed patient, these features serve as fertile grounds for postoperative complications [5]. Although numerous factors that affect surgical outcomes, such as steroid use, malnutrition and prolonged operating time, have been previously described [6], the relation between the time interval from the primary operation to the redo procedure and its effect on surgical outcomes has yet not been reported. We postulated that patients who were operated on >10 years after their initial surgery might have differences in 30-day postoperative morbidity compared with patients operated on ≤10 years of their initial surgery. Therefore, this study aimed to explore this relationship.

METHOD

In accordance with institutional review board approval, a retrospective chart review of a prospectively maintained database was conducted at an inflammatory bowel disease (IBD) tertiary referral centre. All adult patients who underwent elective redo ileocolic resection with an ileocolic anastomosis for recurrence of CD between January 2011 and December 2020 were consecutively included. Patients undergoing an emergency operation or surgery for dysplasia or malignancy were excluded. Patients who were operated within 10 years (≤10 years) from their initial ileocolic resection surgery were assigned to the early group, while patients operated >10 years after their initial surgery were allocated to the late group. Patient demographics, operative notes, imaging studies and postoperative follow-up notes were reviewed. Patients were discussed in our institutional IBD dedicated multidisciplinary forum prior to surgery. The primary outcome measure was the major complication rate, while secondary outcome measures included postoperative length of stay, readmission rate and overall complication rate. Patients undergoing a second redo procedure (third resection) were also included in both groups. The Montreal classification was used to describe the disease site and behaviour at the time of the redo operation [7]. Patients who were receiving steroid therapy prior to surgery were weaned, if possible, based on their clinical status. Patients who could not be weaned received a perioperative stress dose and were gradually tapered down following surgery. Patients receiving biological therapy received treatment 6 weeks prior to surgery.

Statistical analysis

Continuous nonparametric data are presented as median and range, whereas categorical data are presented as percentage of frequency of occurrence. Medians were compared using the Mann–Whitney *U*-test and categorical data were analysed using either Fisher's exact test or the chi-square test. *p*-values of <0.05 were considered statistically significant. All data analyses were conducted using SPPS version 20.0.

What does this paper add to the literature?

Redo ileocolic resection for Crohn's disease, when performed more than 10 years after the initial ileocolic resection, may be associated with increased major postoperative morbidity, readmissions and length of stay. We believe this finding should be taken into consideration in the complex decision-making process when contemplating redo ileocolic resection in patients with Crohn's disease.

RESULTS

A total of 61 patients underwent redo ileocolic resection during the 10-year study period; three patients were excluded as they did not have an anastomosis performed. Twenty-four patients [12 women and 12 men; median age 46.5 (range 23–82) years] comprised the early group. The median time interval between the initial operation and the redo procedure in the early group was 6.5 (range 1–10) years. Fifteen cases were completed laparoscopically (62.5%), six were converted to an open procedure (25%) and three were performed in an open approach (12.5%). The late group comprised 34 patients [18 men, 16 women; median age 56 (range 31–79) years]. The American College of Anesthesiologists (ASA) score, median body mass index (BMI) and preoperative albumin levels, as well as perioperative steroid and biological therapy, were comparable between the two groups. Additionally, disease site and behaviour according to the Montreal classification did not differ between the two groups [7]. The median interval between the initial operation and the redo procedure in the late group was 17 (range 11–53) years. Eighteen patients (52.9%) underwent minimally invasive surgery, 13 (38.2%) were converted to an open procedure and three (8.8%) underwent open surgery. The proportion of patients who had previous open surgery was higher in the late group, but was not statistically significant (20.5% early vs. 44% late, $p = 0.28$). The conversion rate (converted/attempted laparoscopically) was also higher in the late group (28.5% vs. 41.9%) but, again, not statistically significant ($p = 0.49$). Interestingly, the early group had a larger percentage of patients (33.3% vs. 8.8%, $p = 0.037$) for whom our index operation was their second redo procedure (third resection). Additional demographics and operative characteristics are listed in Table 1.

The median operating time was similar between the two groups (220 early vs. 223 min late, $p = 0.34$). There was no mortality in either group. One patient in the early group developed an abdominal abscess due to anastomotic leakage and underwent imaging-guided drain placement that subsequently developed into a persistent fistula from the anastomosis. Two patients in the late group required reoperation after developing peritonitis as a result of anastomotic leakage and required diversion with ileostomy. Both patients underwent closure of the ileostomy within a year. The overall postoperative complication rate was higher in the late surgery group (37.5% early vs. 61.8% late, $p = 0.1$), although this did not reach statistical

TABLE 1 Patient characteristics

	Early group ($n = 24$)	Late group ($n = 34$)	p-value
Age (years), median (range)	46.5 (23–82)	56 (31–79)	**0.026**
Male, *n* (%)	12 (50)	18 (52)	0.99
BMI (kg/m^2), median (range)	23.6 (17–32.4)	23.4 (17–31.4)	0.69
ASA grade, *n* (%)			
1, normal healthy patient	1 (4.1)	1 (2.9)	0.8
2, mild systemic disease	22 (91.6)	33 (97)	0.36
3, severe systemic disease	1 (4.1)	0	–
4, life threatening	0	0	–
Preoperative albumin (g/dl), median (range)	4 (3.2–4.8)	3.9 (3.3–5)	0.61
Smoker, *n* (%)			
Never	17 (70)	22 (64.7)	0.77
Former	5 (20.8)	8 (23.5)	0.99
Current	2 (8.3)	4 (11.7)	0.99
Montreal classification			
Age at diagnosis, *n* (%)			0.3
A1 (≤16)	3 (12.5)	1 (2.9)	
A2 (17–40)	18 (75)	30 (88.2)	
A3 (>40)	3 (12.5)	3 (8.8)	
Behaviour, *n* (%)			0.89
B2 stricturing	18 (75)	25 (73.6)	
B3 penetrating	6 (25)	9 (26.4)	
Location, *n* (%)			0.09
L3 ileocolic	18 (75)	31 (91.1)	
L3 + L4 ileocolic + upper gastrointestinal	6 (25)	3 (8.8)	
Indication for surgery, *n* (%)			
Stricture	16 (66.6)	28 (82.3)	0.16
Fistula	1 (4.1)	1 (2.9)	0.8
Stricture and fistula	3 (12.5)	4 (11.7)	0.83
Abscess/chronic leak	3 (12.5)	1 (2.9)	0.15
Bleeding	1 (4.1)	0 (0)	–
Perioperative medical treatment, *n* (%)			
Steroids	9 (37.5)	9 (26.4)	0.4
Immunomodulators	2 (8.3)	4 (11.7)	0.99
Biologicals	10 (41.6)	17 (50)	0.7
Infliximab	1 (4.1)	6 (17.6)	
Humira	3 (12.5)	1 (2.9)	
Cemzia	2 (8.3)	7(20.5)	
Entiviyo	2 (8.3)	–	
Stellara	2 (8.3)	3 (8.8)	
Time from previous surgery (years), median (range)	6.5 (1–10)	17 (11–53)	**<0.00001**
Surgical approach, *n* (%)			0.55
Laparoscopic	15 (62.5)	18 (52.9)	
Laparoscopic converted to open	6 (25)	13 (38.2)	
Open	3 (12.5)	3 (8.8)	
Previous open surgery, *n* (%)	7 (20.5)	15 (44)	0.28

TABLE 1 (Continued)

	Early group ($n = 24$)	Late group ($n = 34$)	p-value
Second redo ileocolic (third resection), *n* (%)	8 (33.3)	3 (8.8)	**0.037**
Conversion, converted/attempted lap., *n* (%)	6/21 (28.5)	13/31 (41.9)	0.49
Duration of surgery (min), median (range)	220 (121–311)	223 (150–386)	0.34
Concurrent procedures, *n* (%)			
Small bowel resection	5 (20.8)	11 (32.3)	0.33
Take down of fistula	7 (29)	10 (29.4)	0.98
Drainage of abscess	4 (16)	1 (2.9)	0.06

Note: Bold text in the p-value column indicates statistical significance.

Abbreviations: ASA, American Society of Anesthesiologists; BMI, body mass index; lap., laparoscopic.

TABLE 2 Postoperative outcomes

	Early group ($n = 24$)	Late group ($n = 34$)	p-value
Length of stay (days), median, (range)	5 (2–8)	6 (3–21)	**0.035**
Postoperative complications, Clavien–Dindo, *n* (%)			0.1
None	15 (62.5)	13 (38.2)	0.06
Grade I–II	8 (33.3)	13 (38.2)	0.7
Grade III–IV	1 (4.1)	8 (23.5)	**0.04**
Death	0	0	–
Readmission, *n* (%)	1 (4.1)	9 (26.4)	**0.035**
Reoperation, *n* (%)	0 (0)	2 (5.8%)	0.51
Complications			
Ileus requiring TPN, *n* (%)	3 (12.5)	6 (17.6)	0.72
Abdominal abscess requiring percutaneous radiological drainage, *n* (%)	1 (4.1)	6 (17.6)	0.68
Abdominal abscess not requiring drainage, *n* (%)	1 (4.1)	1 (2.9)	0.99
Surgical site infection, *n* (%)	1 (4.1)	4 (11.7)	0.37
Anastomotic leak, *n* (%)	1 (4)	2 (5)	0.99
Enterocutaneous fistula, *n* (%)	1 (4)	2 (5)	0.99
Thrombosis, *n* (%)	2 (8.3)	0 (0)	0.16
Bleeding, *n* (%)	0 (0)	2 (5)	0.51
Small bowel obstruction, *n* (%)	0 (0)	1 (2.9)	0.99
Urinary retention, *n* (%)	0 (0)	1 (2.9)	0.99

Note: Bold text in the p-value column indicates statistical significance.

Abbreviation: TPN, total parenteral nutrition.

significance, as shown in Table 2. The major complication rate was higher in the late group (4.1% vs. 23.5%, $p = 0.04$). The median length of stay was 6 (range 3–21) days in the late group compared with 5 (range 2–8) days in the early group ($p = 0.035$). The readmission rate was also found to be higher in the late group (4.1% vs. 26.4%, $p = 0.035$), while the reoperation rate was comparable between the two groups (0% vs. 5.8%, $p = 0.51$). Multivariate regression analysis did not show any significant statistical factor associated with an increased risk for major complications (Table 3).

Analysis of the interval between surgeries for both groups showed an overall trend of moderate correlation ($r = 0.6$) towards shorter intervals and earlier surgical intervention over time (Figure 1). Stratification by year of surgery showed some difference in the distribution between the groups, with the majority of patients (58.8%) in the late group being operated on during the initial period of the study (2011–2016) compared with the majority of patients in the early group (66.6%) who were operated on in the later period (2017–2020) ($p = 0.06$) (Figure 2).

TABLE 3 Multivariate analysis of demographic and perioperative factors as risk factors for major postoperative complications in Crohn's disease patients undergoing redo ileocolic resection

Factor	Standard error	95% CI	*p*-value
Age	0.003971	−0.7763 to 1.560	0.6243
Gender	0.1062	−0.009951 to 0.006035	0.2613
Time from previous surgery (years)	0.1089	−0.3346 to 0.09301	0.1951
Perioperative steroids	0.07874	−0.07606 to 0.3625	0.6033
Perioperative biologicals	0.1058	−0.1997 to 0.1173	0.8956
BMI	0.01624	−0.1990 to 0.2269	0.9228
Preoperative albumin	0.1350	−0.03427 to 0.03110	0.4242
Surgical approach	0.05680	−0.3805 to 0.1628	0.6393
Tertiary surgical intervention	0.1276	−0.08754 to 0.1411	0.2319
Operative time	0.001147	−0.4114 to 0.1023	0.0820
Additional bowel resection	0.1253	−0.0002693 to 0.004350	0.3090

Abbreviation: BMI, body mass index; CI, confidence interval.

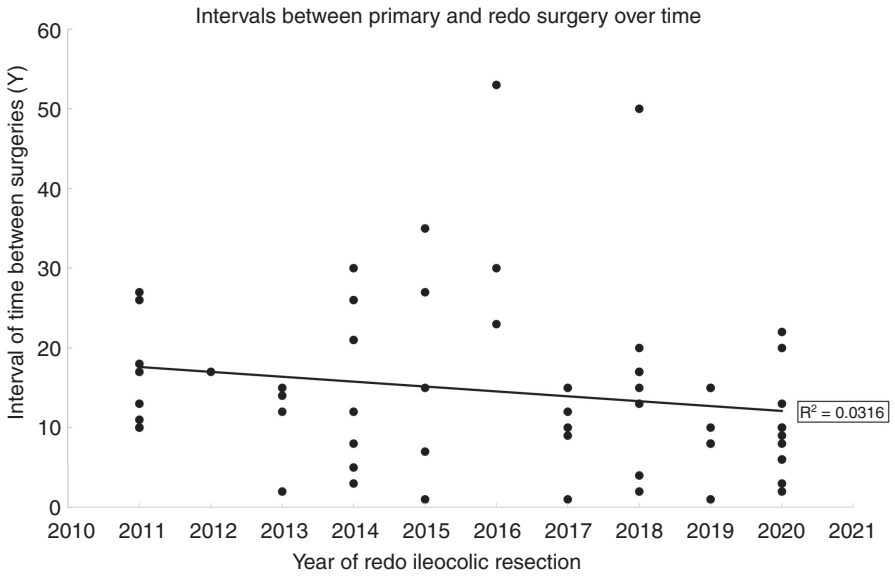

FIGURE 1 Time interval between primary and redo surgery over time

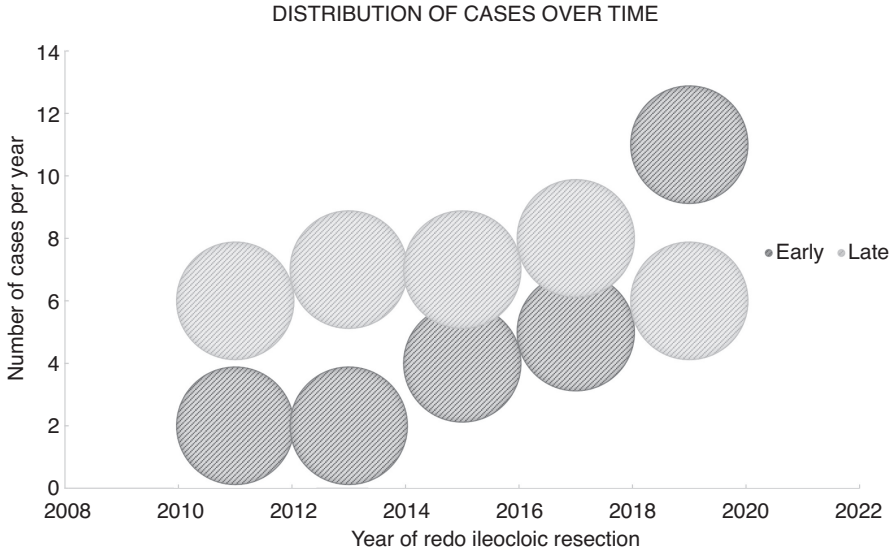

FIGURE 2 Distribution of cases over time

DISCUSSION

Crohn's dsease, originally described as 'regional ileitis', is a chronic relapsing IBD [8]. Unfortunately, surgical resection of the diseased bowel is not curative, and postoperative recurrence remains a significant problem for a substantial number of patients [9]. Various patient-, disease- and procedure-related factors have been previously shown to affect surgical outcomes in redo ileocolic resection [6,10]. However, previous studies have never investigated the time interval from the initial ileocolic resection to redo resection as one of these factors. This study aimed to explore the relation between the interval of time from the primary operation to the redo procedure and its effect on surgical outcomes in an IBD referral centre.

Although results may vary among publications, roughly 50% of patients who undergo ileocolic resection will require redo ileocolic resection within a 10-year period, and this number has remained fairly consistent over the years [11–14]. It is for this reason that we chose the commonly cited 10-year landmark as our cutoff value between the late and early groups for this study.

In our study, apart from the expected older median age in the late group (56 late vs. 46.5 years early, $p = 0.026$), the two groups were similar in terms of patient factors, disease site and behaviour, use of immune-suppressing medication and procedural factors. However, we did find significant differences in certain 30-day postoperative morbidity parameters. The length of stay (6 vs. 5 days, $p = 0.035$), major complication rate (23.5% vs. 4.1%, $p = 0.04$) and readmission rate (26.4% vs. 4.1% $p = 0.035$) were all higher in the late group. In addition, although more patients in the late group had previous open surgery (44% vs. 20.5%, $p = 0.29$), this difference remained nonsignificant and did not manifest in a substantially higher conversion rate (41.9% vs. 28.5%, $p = 0.49$). These findings appear to imply that the added morbidity in the late group may be attributed to the severity of the underlying disease itself rather than any association with the previous open surgery. This result is also supported by the fact that the early group comprised more patients undergoing tertiary resection (33.3% early vs. 8.8% late, $p = 0.037$). Therefore, according to previously published data, we would have expected to see an effect of higher leak and conversion rates, which was not apparent in the early group in this study [10,15]. Again, this implies that the added morbidity in the late group is more related to the underlying disease burden that developed over time.

Recurrence of CD after ileocolic resection is known to show time-related progression [1]. In accordance with the natural history of the disease and the findings of this study, we presume that, over time, the burden of the disease increases, which in turn adds to the difficulty of the operation and may increase the probability of surgical complications. Therefore, we believe that the time elapsed since the previous resection may serve as an indirect indicator for the burden of recurrent disease. When plotting the intervals between surgeries in both groups over time we have seen an overall trend ($r = 0.6$) towards shorter intervals and earlier surgical intervention (Figure 1). This result is consistent with the recent findings of the Dutch LIR!C trial showing that patients with short segment disease may benefit from early surgical resection as a reasonable alternative to biological therapy [16,17]. We also plotted the distribution of cases in both groups over time and found that more cases from the early group were operated on in recent years compared with the late group (Figure 2). Furthermore, when stratifying the number of patients to the pre-LIR!C trial era (2011–2016) we discovered that only 33.3% of patients in the early group were operated on during this time period compared with 58.8% of patients in the late group. In the post-LIR!C trial era (2017–2020) we found that 66.6% of patients in the early group were operated on in these years compared with 41.7% of patients in the late group. These differences, although indicating a substantial trend towards earlier surgery in recent years, did not amount to statistical significance ($p = 0.06$). Although the LIR!C trial focused only on primary ileocolic resection, we assume that these developments in practice were projected (and perhaps amplified) to redo ileocolic resection as these patients have already, by definition, failed medical therapy at least once before.

In contrast to common misperceptions, it appears that patients who had their initial operation >10 years ago might not have more benign disease or recur later, but may actually harbour more disease burden that develops over the years until they eventually need surgery. In turn, this feature may be associated with more major postoperative complications and higher morbidity in patients operated on later, as shown in our study. We believe this fact should be an additional consideration in the already complex decision-making process when contemplating resection in CD patients who have had a previous operation.

This study is limited, to some extent, by its retrospective nature and somewhat small number of patients. This is due to the fact that the number of redo ileocolic resections is obviously much lower than the number of primary ileocolic resections and is expected to become even more infrequent in this era of biologicals [18]. Regression analysis did not show statistically significant factors, most probably due to the small cohort of patients. Nonetheless, this study is the first to discuss the relation between the interval of time from the initial ileocolic resection to the redo procedure and to show its effect on surgical outcomes.

CONCLUSIONS

Redo ileocolic resection, when performed >10 years after the initial ileocolic resection, may be associated with increased 30-day morbidity, specifically, higher rates of major postoperative complications, a longer length of stay and higher 30-day readmissions compared with earlier surgical intervention. These considerations should be included in shared decision-making among the surgeon, gastroenterologist, and patient.

CONFLICT OF INTEREST

MRF: no relevant financial disclosures. IK: no relevant financial disclosures. NH: no relevant financial disclosures. TS: no relevant financial disclosures. SDW: no relevant financial disclosures for this study. Other disclosures for Dr. Wexner: royalties for intellectual property

licence from Medtronic, Karl Storz, Intuitive; consulting fees for consulting from Intuitive, Medtronic, Stryker, Takeda, Astellas, Baxter, ARC/Corvus, Livsmed and Olympus.

AUTHOR CONTRIBUTIONS

MRF - Conception and design of the work; acquisition, analysis, and interpretation of data; Drafting, designing and revising of the manuscript. IK – Statistical analysis and interpretation of data; Drafting and revising of the manuscript. NH - Statistical analysis and interpretation of data; revising of the manuscript. TS – Acquisition of data. SDW - Conception and design of the work; interpretation of data, designing and revising of the manuscript.

ETHICAL APPROVAL

This study was approved by the Institutional Review Board (IRB) at Cleveland Clinic Florida.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

TWITTER

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