



IMMEDIATE RESULTS OF SMALL BOWEL CROHN'S DISEASE SURGERY

A. Anou^{1*}, H. Bendib² and N. Smail³

¹Faculty of Medicine, Blida 1 University - Department of Oncological Surgery, CLCC Blida-Algeria

²Faculty of Medicine, Algiers 1 University – Department of oncological Surgery, Debussy Clinic - CPMC, Algiers -Algeria

³Faculty of Medicine, Algiers 1 University - Department of Epidemiology and Preventive Medicine, Mustapha University Hospital – Algeria

*Corresponding author Tel: 00213 555728214, E-mail: a-anou@hotmail.com

Cite this article:

Anou A., Bendib H., Smail N. (2023), Immediate Results of Small Bowel Crohn's Disease Surgery. African Journal of Biology and Medical Research 6(1), 76-84. DOI: 10.52589/AJBMR-5CDMVIRE

Manuscript History

Received: 17 Feb 2023

Accepted: 7 April 2023

Published: 24 April 2023

Copyright © 2022 The Author(s).

This is an Open Access article distributed under the terms of Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0), which permits anyone to share, use, reproduce and redistribute in any medium, provided the original author and source are credited.

ABSTRACT: *Introduction:* Despite the progress made in the medical management of Crohn's disease (CD), a vast number of patients are operated on at least once in their lifetime. Although this is a mild disease that occurs mainly in young patients with little comorbidity, CD surgery is accompanied by significant postoperative morbidity (PO). This study aims to analyse the PO complications of the small intestine's CD and look for the risk factors for its occurrence. **Patients and methods:** this is a single-centre prospective study that collected 83 files of patients operated on for CD of the small intestine for 28 months (May 2017 - September 2019). All patients had histologic confirmation of CD. Isolated anoperineal and colorectal forms were excluded from this work. PO morbidity is defined by all complications occurring during the first 30 days of PO. A statistical analysis of PO morbidity was performed as a function of 12 parameters: age; sex; comorbidity; history of abdominal surgery; history of surgery for CD; haemoglobin level (Hb <or> at 10 mg/dl); albumin level (<or> at 34g / l); BMI (<or> at 19); ASA score; mode of surgery (cold vs emergency); intra-abdominal abscess; operative procedure (resection-anastomosis vs resection-stoma). Statistical analysis was performed first univariate and then multivariate (SPSS 16 software). **Results:** These were 56 women and 27 men, with a sex ratio of 2. The mean age of the patients was 35 years (13-65). The overall PO morbidity rate was 26%; this morbidity was surgical in 86%, septic in 89.5% and intra-abdominal septic in 50% of cases. Complications were major (CMPO) in 39.5% of cases. The mode of emergency surgery was an independent risk factor for the occurrence of complications ($p = 0.005$). **Conclusion:** Small intestine CD surgery is associated with very high PO morbidity. The mode of emergency surgery is an independent risk factor for the onset of PO complications. Patients who require surgery should be operated on as elective or scheduled surgery. The indications for emergency surgery for CD are sporadic.

KEYWORDS: Crohn's, surgery, morbidity, complications, emergency



INTRODUCTION

Crohn's disease (CD) of the small intestine is the most common localisation of the disease and is associated with a high risk of complications. Despite the progress made in its medical management, particularly the appearance of new drug treatments, nearly 7 out of 10 patients will one day be operated on during their lifetime [1]. It is estimated that about 15 to 20% of patients will require bowel excision surgery one year after diagnosis and 40 to 50% at ten years [2]. Although this mild disease occurs most often in young subjects with few comorbidities, CD surgery is nevertheless accompanied by fairly high morbidity. This work's objective is to analyse postoperative morbidity (PO) and the search for risk factors for its occurrence.

PATIENTS AND METHODS

This is a prospective single-centre study involving 83 patients operated on for CD of the small intestine over 28 months (May 2017-September 2019). All patients had histologic confirmation of CD. Isolated anoperineal forms were excluded from this study. The patients were operated on for CD resistant to medical treatment or for complications such as stenosis, internal or external fistula, perforation or abscess. PO morbidity was defined by all medical and/or surgical complications occurring during the first 30 PO days. These PO complications were classified by Clavien and Dindo in [3]:

- Grade I: any adverse PO event that does not require medical, surgical, endoscopic or radiological treatment; the only authorised treatments being antiemetics, antipyretics, analgesics, diuretics, electrolytes and physiotherapy.
- Grades II: complications requiring any unauthorised medical treatment indicated in grade I.
- Grade III: complications requiring surgical, endoscopic or radiological treatment (IIIa: without general anaesthesia; IIIb: under general anaesthesia).
- Grade IV: life-threatening complications requiring intensive care (IVa: organ failure; IVb: multi-visceral failure).
- Grade V: death.

PO morbidity was statistically analyzed according to 12 parameters which were: age; sex; comorbidity; history of abdominal surgery other than CD; history of surgery for CD; haemoglobin level (Hb <or> at 10 mg/dl); albumin level (<or> at 34 g / l); body mass index (BMI <or> at 19 kg / m²); ASA score (I vs> I); mode of surgery (cold vs emergency); intra-abdominal abscess; operative procedure (resection-anastomosis vs resection-stoma). The statistical analysis carried out using SPSS 16 software was first univariate, evaluating the age parameter by the Student's test or t-test and the other parameters by the X² test, then multivariate using the Cox model. The results were considered significant when p was <or> equal to 0.05.

RESULTS

The initial characteristics of the 83 patients included were a mean age of 35 years with extremes of 16 to 65 years, a sex ratio equal to 2 (27 men and 56 women) and an ASA I classification of 85% (70/83) cases. Comorbidity was observed in 19% of cases (n = 16). A history of abdominal surgery for a cause other than CD was found in 34% of cases (n = 28) and for CD in 16% (n = 13). Preoperatively, the rate of haemoglobin was < 10 g / dl in 42% of cases (n = 35), serum albumin level < 34 g / l in 36% of patients (n = 30) and BMI < 19 kg / m² in 40 % of cases (n = 33). Surgery was elective in 88% of cases (n = 73). Intraoperatively, 20 operated (24%) had at least one intra-abdominal abscess. The operative procedures performed were of the resection-anastomosis type in 96% of cases (n = 80) and of the resection-stoma type in 4% (n = 03). Twenty-eight complications were identified in 22 patients, corresponding to one 26% overall morbidity rate (Table 1).

Table 1: PO complications of CD in the small intestine

Complication	Number	Percentage
Wall sepsis	9	32%
Anastomotic fistula	7	25%
Postoperative peritonitis	6	22%
Deep collection	1	3,5%
postoperative occlusion	1	3,5%
Pneumopathy	1	3,5%
Urinary tract infection	1	3,5%
Pulmonary embolism	1	3,5%
Metabolic	1	3,5%
Total	28	100%

These were surgical complications in 86% of cases (24/28) and medical complications in the remainder (14%). Septic complications represented a rate of 89 % (25/28), of which 50% (14/28) of intra-abdominal septic complications. According to the classification of Clavien and Dindo, these complications were grade I at 3.5%, grade II at 50%, grade III at 39.5% (IIIa = 3.5%; IIIb = 36%), grade IV at 3.5% and grade V in 3.5%. In univariate analysis, the mode of surgery was significantly associated with PO morbidity (p = 0.003) (Table 2) and was an independent factor of PO morbidity (p = 0.005) in multivariate analysis (Table 3).

**Table 2: Univariate analysis / Factors associated with PO morbidity**

Settings	P
Age	0,2
Sexe	0,9
Comorbidity	0,4
History of abdominal surgery	0,4
History of CD surgery	0,8
Haemoglobin level	0,3
Serum albumin	0,1
BMI	0,6
Score ASA	0,6
Surgery Mode	0,003
Intra-abdominal abscess	0,2
Surgical Gesture	0,2

Table 3: multivariate analysis

	P	OR	IC for OR 95 %
Mode of surgery	0,005	10,600	2,071- 54,243



DISCUSSION

Twenty-eight complications were recorded in 22 patients, some of whom presented several complications at the same time, corresponding to overall morbidity of 26% (22/83), this rate was in line with the figures reported by the literature and which varied according to the authors and the series from 14 to 44% [4-7] (Table 4).

Table 4: PO morbidity of small intestine CD

Study	Year	PO Morbidity
Medarhi [4]	2001	14%
Baratsis [5]	2003	29%
Benichou [6]	2016	44%
Abdallah [7]	2017	40%
Authors	2019	26%

In our series, PO morbidity corresponded, in the majority of cases, to septic complications (89%) and surgical complications (86%); septic complications were in half of the intra-abdominal septic cases (14/28).

The occurrence of surgical complications requiring reoperation was reported as a risk factor for short-bowel syndrome [8]. Septic complications are the most common and are induced by prior infection but can also be triggered by an anastomotic fistula [9]. Some authors have reported risk factors for mortality after surgery for CD, including septic complications, particularly post-anastomosis [10, 11]. Patients with anastomotic complications after bowel resection for CD have a poor long-term prognosis compared to those with a simple PO course [12, 13]. The risk of developing PO complications is determined preoperatively by certain factors, including: weight loss, perforating disease, the presence of an undrained abscess and the prolonged duration of symptoms; in the majority of cases, this risk is not reduced by the surgical technique [12, 14, 15]. The existence of intra-abdominal septic syndrome is a major risk factor for PO mortality [16, 17, 18, 19]; it is the leading cause of death in abdominal surgery, with a PO mortality rate of up to 70 % [20]. Complications are classified according to their severity in relation to the management they require using the Dindo-Clavien classification. This classification includes 5 grades. A grade > 3 is considered a major postoperative complication (MPOC); in our series, the MPOC were very high and corresponded to a rate of 39 % (11/28), multiplied by 4 compared to the speed of MPOC reported in a recent article [21]. In one study, three risk factors associated with the occurrence of MPOC were identified in univariate terms: preoperative malnutrition, high leukocyte count, and the presence of corticosteroid therapy; in multivariate mode, three independent factors significantly linked to the occurrence of MPOC were found: Laparoscopy (protective factor); undernutrition and corticosteroid therapy (risk factors) [12,21]. In our work, the PO complications were lethal in 3,5 % (1/28) and the PO mortality rate was 1% (1/83), corresponding to the rates reported by some authors [4] and falling within the figures reported by several series and which varies from 0 to 7% [4, 5, 10, 11, 15,22] (Table 5).

**Table 5: PO mortality**

Study	Year	PO Mortality
Quandalle	1997	1,5%
Thyri	1998	0,3%
Yamamoto	2000	1%
Medarhi	2001	7%
Bouhnik	2003	<1%
Baratsis	2003	1,3%
Author	2019	1%

In our study, the mode of emergency surgery was a very significant independent risk factor for the occurrence of PO morbidity ($p = 0.005$); in the literature, this parameter is associated with a very high PO morbidity rate and identified by some studies as an independent risk factor for the occurrence of PO complications [15]. It has also been reported that emergency surgery for CD carries a risk of resection of longer segments of the small intestine and a higher probability that an ileostomy will be performed compared to elective surgery [23, 24,25]. The indications for emergency surgery for CD of the small intestine are rare, accounting for approximately 6 to 16% of cases [26]. They are dominated by peritonitis by perforation in the free peritoneum, which represents less than 3% of surgical indications [4] and massive haemorrhages unresponsive to medical treatment [4,26], severe gastrointestinal haemorrhages are rarely observed in localisations of the small intestine, they are mainly the prerogative of rectosigmoid forms of CD [9,27].

The reduction in the morbidity of surgery for CD of the small intestine is based on improving the overall management of the disease, which must be done in a multidisciplinary consultation meeting (MCM), bringing together gastroenterologists, colorectal surgeons, radiologists, pathologists, nutritionists and stoma therapists [24]. Starting with setting the right indications for surgery and determining the time for surgery because that is the most important aspect [28]. The occurrence of a complication of CD does not mean emergency intervention. Most emergencies related to inflammatory bowel disease should be treated non-operatively first, emphasising the patient's hemodynamic status. In some cases of life-threatening complications, urgent surgical treatment is mandatory [29]. Medical treatment should be offered as the first line for acute bowel obstruction due to digestive stenosis or inflammation [30]. In the case of intra-abdominal abscess, emergency surgery is only indicated if there is no response to medical treatment and no percutaneous drainage is possible [31]. Percutaneous echo or scan-guided drainage is a good alternative, allowing nutritional assistance for 2 to 3 weeks with antibiotic therapy, followed after six weeks by elective surgery, with the advantage of performing a more economical resection, the possibility of an immediate restoration of digestive continuity [32] and consequently a definite reduction in PO morbidity [33]. Improving the results in terms of PO morbidity also requires good preparation of patients for surgery [34]. Apart from the emergency indication, this preparation should be discussed in two situations: patients who have failed corticosteroid therapy and those who are undernourished. A gradual but rapid withdrawal from corticosteroid therapy is carried out, if it exceeds 20 mg/day of prednisolone and nutritional assistance in the event of severe



undernutrition (serum albumin level $<30\text{g/l}$) for a period of 3 to 4 weeks depending on severity [35,36]. Always preoperatively, optimal preparation includes stopping smoking and alcohol, the absence of colonic preparation, a preoperative fast limited to 2 hours for liquids and 6 hours for solids and a limitation in the use of opioids [37,38]. Intraoperatively, in an emergency situation in an undernourished patient or on corticosteroids and in a septic situation (peritonitis, abscess) a temporary diversion of faeces (protective stoma from a digestive anastomosis or stoma of the two digestive segments) could reduce PO morbidity [39,40]. Postoperatively, early refeeding and mobilisation also reduce the rate of PO complications [37, 38].

Laparoscopic surgery in certain indications (ileocecal resections for dry ileal stenosis resistant to medical treatment) improves the results of CD surgery [41, 42, 43]. It also allows a significant reduction in overall morbidity [44], it has been identified in some studies as an independent factor linked to the occurrence of MPOC not as a risk factor, but as a protective factor [21].

CONCLUSION

Minor intestine CD surgery is associated with very high PO morbidity. The mode of emergency surgery is an independent risk factor for the onset of PO complications, which are sometimes serious (MPOC) involving the life-threatening prognosis of patients. Those who require surgery should be operated on as elective or scheduled surgery as possible; thus giving themselves the time to prepare, particularly nutritionally, because most of the PO complications of CD can be managed medically and operated on if there is an indication outside of the emergency. The indications for emergency surgery for CD are very rare.

Conflict of interest statement: The authors declare no conflict of interest

REFERENCES

- [1]. Solberg IC, Vatn MH, Hoie et al. Clinical course in Crohn's disease: results of a Norwegian population-based ten-year follow-up study. *Clin Gastroenterol Hepatol* 2007; 133: 412-422
- [2]. Bernell O, Lapidus A, Hellers G. Risk factors for surgery and recurrence in 907 patients with primary ileocaecal Crohn's disease. *Br J Surg* 2000; 87:1697-701
- [3]. Dindo D, Demartines N, Clavien P-A. Classification of Surgical Complications A New Proposal with Evaluation in a Cohort of 6336 Patients and Results of a Survey. *Ann Surg* 2004; 240: 205–213.
- [4]. Medarhri J, Elounani M, Echarrab M et al. Maladie de Crohn: Place de la chirurgie en urgence. A propos de 28 cas. *Medicine du Maghreb* 2001 n°90. P 35-38.
- [5]. Baratsis S, Manganas D, Moustafelos P et al. Results of Surgical Treatment of Crohn's Disease. *Annals of Gastroenterology* 2003, 16(4):334-338.
- [6]. Benichou B, Rahili M.A, Bernard J.L et al. Les anti-TNF? : facteurs de risque de complications graves après résection iléo-colique pour maladie de Crohn. *Journal de Chirurgie Viscérale ; Vol 153 - Numéro 4 Supplément 2 - septembre 2016.*
- [7] Abdalla S, Brouquet A. Impact des traitements de la maladie de Crohn sur la morbidité chirurgicale. *Colon Rectum* (2017) 11:140-146



- [8]. Maggiori L, Panis Y. Surgical management of IBD from an open to a laparoscopic approach. *Nat Rev Gastroenterol Hepatol*. 2013;10(5):297-306
- [9]. Labayle D, Fischer D. Traitement médical de la maladie de Crohn. *Estomac-intestin*, 1er éd, 12-c, 1985.
- [10]. Thiry L, Iderne A, Meyer CH. Les aspects du traitement chirurgical de la maladie de Crohn. *Méd. Chi. Dig.* 27, 137-141, 1998.
- [11]. Quandalle P, Gambiez L. Traitement chirurgical de la maladie de Crohn de l'intestin grêle. *Ann. Chir*; 51, n° 4, 303-313, 1997.
- [12]. Lesalnieks I, Kilger A, Kalisch B. Treatment of the anastomotic complications in patients with Crohn's disease. *Int J Colorectal Dis* (2011) 26: 239–244.
- [13]. Iesalnieks I, Kilger A, Glass H et al. Intraabdominal septic complications following bowel resection for Crohn's disease: detrimental influence on long-term outcome. *Int J Colorectal Dis* (2008)23:1167–1174
- [14]. Post S, Betzler M, von Ditfurth B et al. (1991) Risks of intestinal anastomoses in Crohn's disease. *Ann Surg* 213:37–42
- [15]. Yamamoto T, Allan RN, Keighley MR. (2000) Risk factors for intraabdominal sepsis after surgery in Crohn's disease. *Dis Colon Rectum* 43:1141–1145
- [16]. Tay GS, Binion DG, Eastwood D et al. Multivariate analysis suggests improved perioperative outcomes in Crohn's disease patients receiving immunomodulator therapy after segmental resection and/or strictureplasty. *Surgery*. 2003; 134(4): 565-72
- [17]. Anou A, Hadi F, Bouchahda F, Bensafar S, Smail N, Benhabyles N. Les Réinterventions précoces après chirurgie abdominale. *Annales Algériennes de Chirurgie*. Tome 48-N°1- janvier 2017 ; p 37-41.
- [18]. Gedik E, Söylemez K, Girgin S et al. Relaparotomies: Why is Mortality Higher? *European Journal of Trauma and Emergency Surgery*. December 2009, Volume 35, Issue 6, pp 547–552
- [19]. Bunt TJ. Urgent relaparotomy: the high-risk, no-choice operation. *Surgery*. 1985 Sep; 98(3):555-60.
- [20]. Unlap HR, Kamer E, Onal MA. Analysis of early relaparotomy after lower gastrointestinal system surgery. *Surgery Today* 2008; vol 38, Issue 4:p 323-328
- [21]. Grigioni S, Maillochon E, Savoye G et al. Identification de facteurs associés à la survenue de complications majeures postopératoires après traitement chirurgical de la maladie de Crohn. *Nutrition clinique et métabolisme* 28 (2014) S67–S240
- [22]. Bouhnik Y, Panis Y. Prise en charge médico-chirurgicale de la maladie de Crohn fistulisante : traitement médical ou chirurgie? *Gastroenterol Clin Biol*. 2003; 27(Suppl 3): S98-103
- [23]. Mulier S, Penninckx F, Verwaest C et al. (2003) Factors affecting mortality in generalized postoperative peritonitis: multivariate analysis in 96 patients. *World J Surg* 27:379–384
- [24]. Celentano V, O'Leary D.P, Caiazzo A. Longer small bowel segments are resected in emergency surgery for ileocaecal Crohn's disease with a higher ileostomy and complication rate. *Techniques in Coloproctology* (2019) 23:1085–1091.
- [25]. Nordlinger B, Saint-Marc O. Free perforation. In: Michelassi F, Milsom JW, editors. *Operative strategies in inflammatory bowel disease*. New York: Springer-Verlag, 1999, p 369–73.
- [26]. Berg DF, Bahadursingh AM, Kaminski DL et al. Acute surgical emergencies in inflammatory bowel disease. *Am J Surg*. 2002;184(1):45-51.



- [27]. FAIK M. Principes et indications du traitement chirurgical de la maladie de Crohn. *Espérance médicale*. Tome 6, n° 50, p : 252-54. Mai 1999.
- [28]. Kosmidis C, Anthimidis G. Emergency and elective surgery for small bowel Crohn's disease. *Tech Coloproctol* (2011) 15 (Suppl 1): S1–S4.
- [29]. Carlos Augusto Gomes, Mauro Poddab, Sabrina Carpanez VeigaC et a. Management of inflammatory bow diseases in an urgent and emergency scenario. *j coloproctol (rio j)*. 2020; 40(1):83–88
- [30]. Strong S.A, Koltun W.A, Hyman N.H et al. Practice Parameters for the Surgical Management of Crohn's Disease. *Dis Colon Rectum*. 2007;50(11):1735-1746
- [31]. Lefèvre J. Chirurgie de la maladie de Crohn (recommandations ECCO-ESCP – 2017)
- [32] Wu JS, Birnbaum EH, Kodner IJ et al. Laparoscopic-assisted ileocolic resections in patients with Crohn's disease: are abscesses, phlegmons, or recurrent disease contraindications? *Surgery*. 1997; 122:682-9
- [33] Jawhari A, Kamm A, Ong C et al. Intra-abdominal and pelvic abscess in Crohn's disease: results of non-invasive and surgical management. *British Journal of Surgery* 1998, 85, 367–371
- [34]. Spinelli A, Bazzi P, Sacchi M, et al. Short-term outcomes of laparoscopy combined with enhanced recovery pathway after ileocecal resection for Crohn's disease: a case-matched analysis. *J Gastrointest Surg*. 2013; 17(1):126-132.
- [35] Post S, Betzler M, von Ditfurth B, Schürmann G, Küppers P, Herfarth et al. Risks of intestinal anastomoses in Crohn's disease. *Ann Surg*. 1991 Jan; 213(1):37-42
- [36] Michelassi F, Block GE. Surgical management of Crohn's disease. *Adv Surg*. 1993; 26:307-22
- [37]. Gustafsson UO, Scott MJ, Schwenk W, et al. Guidelines for perioperative care in elective colonic surgery: Enhanced Recovery After Surgery (ERASR) Society recommendations. *World J Surg*. 2013; 37(2):259-284
- [38]. Gustafsson UO, Scott MJ, Hubner M, et al. Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERASR) Society Recommendations: 2018. *World J Surg*. 2019 Mar; 43(3):659-695. doi: 10.1007/s00268-018-4844-y
- [39] Mege D, Bege T, Beyer-Berjot L, Loundou A, Grimaud MD, J.-C C. Brunet, Berdah S. Does faecal diversion prevent morbidity after ileocecal resection for Crohn's disease, a temporary faecal diversion is indicated in high-risk patients. *ANZ J Surg* (2015). <https://doi.org/10.1111/ans.13034>
- [40] Brouquet A, Blanc B, Bretagnol F et al . Surgery for intestinal Crohn's disease recurrence. *Surgery* (2010). Volume 148, Issue 5: 936–946
- [41] Alves A, Panis Y, Bouhnik Y et al. Risk factors for intra-abdominal septic complications after a first ileocecal resection for Crohn's disease: a multivariate analysis in 161 consecutive patients. *Dis Colon Rectum*. 2007 Mar; 50(3):331-6
- [42] Milsom JW, Hammerhofer, KA, Böhm B et al. A prospective, randomized trial comparing laparoscopic vs. conventional surgery for refractory ileocolic Crohn's disease. *Dis Colon Rectum*. 2001 Jan; 44(1):1-8; discussion 8-9
- [43] Maartense S, Dunker MS, Slors JF et al. Laparoscopic-assisted versus open ileocolic resection for Crohn's disease: a randomized trial. *Ann Surg* 2006; 243: 143-9
- [44] Tan JJ, Tjandra JJ. Laparoscopic surgery for Crohn's disease: a meta-analysis. *Dis Colon Rectum*. 2007 May; 50(5):576-85