

Perioperative Management of Crohn's Disease

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1. Introduction

Crohn's Disease (CD) is a chronic relapsing inflammatory disease that affects the entire gastrointestinal (GI) tract from the mouth to the anus, along with extraintestinal manifestations. The inflammation is granulomatous and involves the full thickness of the bowel wall. It is characterized by its skipped lesions pattern, mesenteric fat wrapping and formation of strictures and fistulas. The exact etiology of CD remains unknown; however, it is thought to result from a combination of genetic, immune, and environmental causes [1].

CD can be classified depending on its anatomical location or phenotype. Anatomically, it can be further classified into; ileal disease, colonic disease, ileocolonic disease and upper GI disease. Ileal disease is most common type and is limited to the distal third of the small intestine with or without cecal involvement [2]. Colonic only disease is found in one fifth of patients and is defined as disease between the cecum and rectum without ileal involvement. Ileocolic disease is found in one third of patients and it is defined as disease involving the terminal ileum and the colon. Upper GI CD is the least common subtype, and it is defined as a disease involving proximal to the terminal ileum. Perianal disease is found in about one quarter of CD patients, and it is suggestive of poorer prognosis [3]. Phenotypic classification looks at the disease behavior, which is fistulizing, stricturing and nonpenetrating, non stricturing disease [4]. These disease patterns are not fixed throughout the disease duration and around 20% to 15% of patients change between anatomical and behavioural classifications with time [5].

The incidence of CD varies depending on the geographical distribution. The highest incidence of CD is found in North America, clinicofsurgery.com

followed by Europe and lastly Asia and the Middle East with incidence rates of 20.2, 12.7 and 5.0 per 100,000 person-years respectively [6]. The overall trend overtime is rising worldwide by 75%. Although older studies suggested female predominance of CD [7], recent data show equal sex distribution of the disease [6]. CD has a bimodal age distribution, with the biggest peak in young adults aged 15 to 30 years [8] and a smaller peak between 55 and 80 years of age. The management of CD depends on the clinical manifestation of the disease. Medical therapy with glucocorticoids, immunomodulators and biologics have a degree of efficacy, however, 75% of patients will require surgical intervention at any time in their lifetime. Risk factors for requiring surgery include current smoking, penetrating and stricturing disease behaviour, early steroid use, ileal and jejunal disease, and young age at diagnosis [9]. The aim of the surgical intervention is to manage the symptoms of CD that are refractory to medical therapy or the complications rather than cure.

This review article focuses on the perioperative recommendations and optimization of CD patients who are planned to undergo surgery.

2. Establishing Crohn's Anatomy

For any CD patient who is planned for an abdominal surgery, it is important to establish the disease anatomy and the GI involvement from the upper GI, small bowel, and colon. This will aid in planning the best surgical intervention. Upper GI including the esophagus, stomach and duodenum are best evaluated with an Esophagogastroduodenoscopy (EGD). Cross sectional imaging studies such as CTE and MRE are best modalities for the evaluation of small bowel involvement. MRE in particular, has the advantage of

evaluating the length and transmural involvement of the disease [10]. Moreover, it can identify any related complications such as fistulas, strictures, and abscesses without the risk of radiation ex-

posure. The lower GI; i.e. rectum, colon and terminal ileum, are best evaluated with colonoscopy (Figure 1).

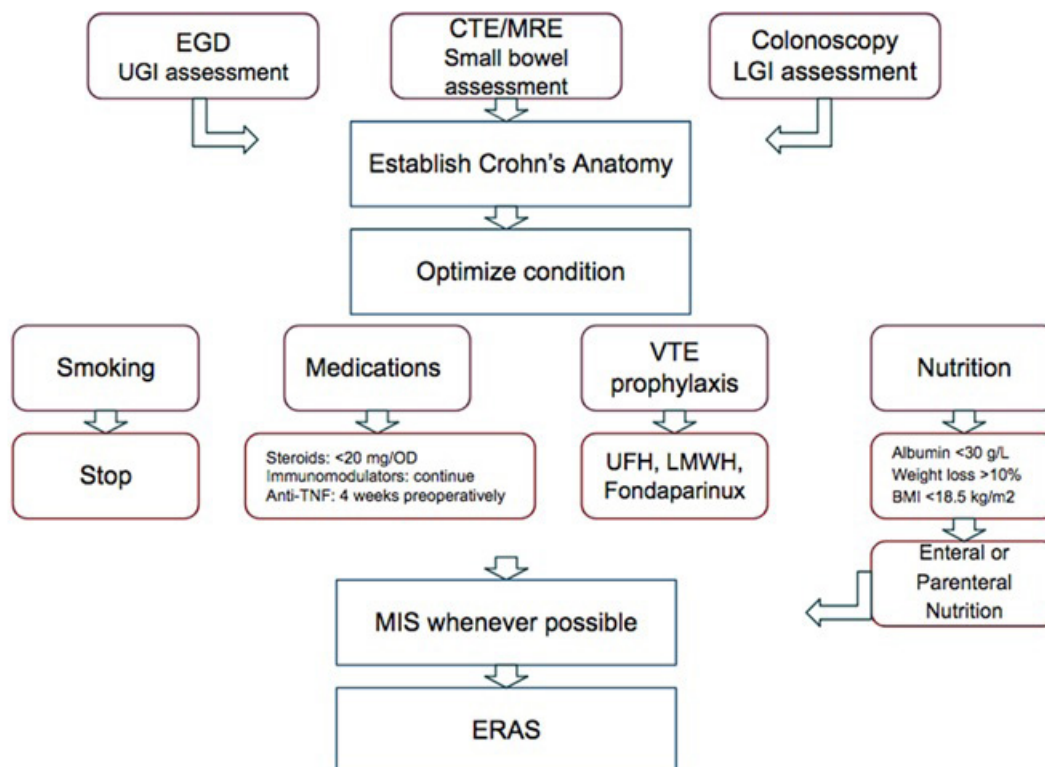


Figure 1

3. Preoperative Optimization

Due to the nature of the disease and the medical agents used to control it, CD patients are at higher risk of postoperative complications, morbidity, and recurrence. Therefore, multiple factors should be considered and optimized prior to surgery which will be discussed further below. In order to achieve this, a multidisciplinary team should be involved. This includes a colorectal surgeon, a gastroenterologist, a nutritionist, a radiologist and a psychologist and stoma nurse whenever required.

4. Smoking

Studies have shown that smoking increases postoperative morbidity, particularly infections and pulmonary complications, as well as increases readmission rate [11]. Also, it has been demonstrated that smoking reduces patients' quality of life postoperatively [12].

Therefore, the ECCO and ASCRS recommend smoking cessation for all CD patients undergoing surgery and postoperatively [13, 14].

5. Venous Thromboembolism (VTE) Prophylaxis

IBD patients are at higher risk of developing VTE, including deep venous thrombosis and pulmonary embolism. The incidence rate is estimated to be 6% [15], and IBD patients are two times more likely to develop VTE compared to the general population [16]. Thus, pharmacological VTE prophylaxis with either unfractionat-

ed heparin, low molecular weight heparin or fondaparinux is recommended for all CD patients admitted to hospital or post-surgery [10, 13].

6. Nutritional Status

Due to their chronic inflammation, reduced oral intake and malabsorption, malnutrition is common in CD patients. Severe malnutrition is defined as serum albumin <30 g/L, weight loss >10% in the last six months, or a BMI <18.5 kg/m² [17]. Such patients should be optimized preoperatively to enhance their recovery, and surgery should be delayed by one to two weeks until nutritional status is improved [18]. Enteral feeds are encouraged initially, and if two thirds of daily requirement cannot be achieved via this route, parenteral supplements should be considered. A meta-analysis by Brennan et al found that CD patients who received enteral or parenteral feeds preoperatively had significantly lower rates of complications compared to patients who did not (20% vs. 60% respectively [19].

7. Medications

Due to the chronic, relapsing natural history of CD, the patients will often be on either remission medication (e.g. steroids) or maintenance agents (e.g immunomodulators or biologics). These patients affect the immune response of the patient and thus, affect the postoperative outcomes. Multivariate analysis of 3860 CD patients showed significant increase in infectious complications, surgical

site infections and anastomotic leak in immunosuppressed patients [20]. This included patients on either steroids, immunomodulators and biologics. Patients on steroids prior to surgery have a two times increased risk of anastomotic leak compared to patients who did not receive steroids [21]. A larger study by Nguyen et al found that steroids use was significantly associated with an increased rate of postoperative complications [22]; more particularly, thromboembolic complications and infectious complications (e.g intra-abdominal sepsis and abscesses). Therefore, most guidelines recommend reducing the daily dose of prednisolone to <20mg prior to elective surgery [10, 13, 14]. Moreover, it is recommended that patients who are chronically on steroids should receive a “stress dose” preoperatively [9, 13]. Immunomodulators such as methotrexate, azathioprine and six mercaptopurine, on the other hand, are not significantly associated with increased postoperative short term and infectious complications [23, 24]. Therefore, the discontinuation of these medications preoperatively is not recommended [9, 13]. Lastly, the use of biologics preoperatively remains a topic of controversy. There is no consensus data in the literature that supports or against the use of anti-TNF α agents preoperatively. A Danish cohort study found no significant increase in the postoperative adverse events in patients on anti-TNF α agents [25]. These findings were consistent for patients receiving anti-TNF α twelve or two weeks preoperatively. A study by Lau et al found that the rate of postoperative complications was not significantly increased in the anti-TNF α groups, however, morbidity, infectious complications and readmission were significantly higher with a seventh day preoperative level of 3 μ g/mL [26]. Given the half-life of anti-TNF α agents of maximum ten days for infliximab and fourteen days for adalimumab [17], most centers recommend planning the surgeries four weeks after the last dose of anti-TNF α agents.

8. Surgical Considerations

There are general surgical principles that need to be followed when surgically intervening in a CD patient. The goal of these principles is to prevent complications and reduce morbidities. The major principles will be highlighted here which includes, role of laparoscopic surgery, extent of resection, type of anastomosis and the need for diversion ileostomy.

9. Laparoscopic Versus Open Surgery

Minimally Invasive Surgery (MIS) has been the trend in all modern surgical practices as it is associated with fewer morbidities and early recovery. This is also applied to CD patients whenever possible.

Multiple studies have been conducted to compare the safety and efficacy of laparoscopic surgery in CD patients compared to open approach. Although laparoscopic surgery was 25 minutes longer than open surgery, it is significantly associated with shorter hospital stay, less 30 days’ morbidities and more cost effective than open surgery [27]. The patient’s quality of life was not affected by the

type of surgery. Another study found that laparoscopic surgery is associated with faster recovery of pulmonary and gastrointestinal function [28]. On the contrary, open surgery was associated with increased risk of minor and major complications.

Long term effects on the same group of patients were studied after ten years and it showed that the number of subsequent surgeries, rate of incisional hernia and feasibility of laparoscopic intervention was better in the laparoscopic group. Recurrence of disease, need for medical therapy was the same between the two groups [29].

10. Extent of Resection

Surgical resection should be minimized whenever possible to prevent the feared complication of short bowel syndrome as many of CD patients often require further intervention and resection. This should be balanced with removing the diseased portion and allowing a healthy anastomosis. When comparing limited resection (two centimeters margin) to extended (twelve centimeters margin), an RCT by Fazio et al found no statistically significant difference between the two groups in terms of disease recurrence over a follow up period of 7 years [30]. Moreover, there was no difference in the re-operation rate for disease related complications. On the microscopic level, most studies found that histologically active inflammation at the margin of the resected bowel does not increase the rate of disease recurrence or anastomotic complications [31, 32]. This is regardless whether the inflammation degree is mild or severe. However, the presence of proctitis; inflammatory cells found in the enteric nervous system, is suggestive of a more aggressive disease [33]. Thus, continuation of medical therapy post operative should be considered. Lastly, the extent of mesenteric resection is also of debate. Studies however suggest that re-operation rate is higher in cases where the mesentery is cut flush with the intestine when compared to a more extensive resection [34].

11. Type of Anastomosis

After intestinal resection, there are multiple techniques to restore GI continuity such as side to side stapled anastomosis or end to end handsewn anastomosis. Meta-Analysis studies showed no statistically significant difference in the rate of complications between the two techniques such as strictures, bleeding, re-operation, abscess formation and wound infection [35]. Another RCT showed no difference in the rate of colonoscopic or clinical recurrence with the two types of anastomosis done [36], this however is higher in the presence of cancer [35]. Therefore, most guidelines leave the anastomosis choice to the surgeons’ preference and experience [10, 13, 14].

12. Diversion Ileostomy

The rate of anastomotic leak varies from 1-7% in CD patients after bowel resection and primary anastomosis. This might be challenging for the surgeon to decide whether to create a diversion ileostomy to protect the anastomosis or not. There are a number

of risk factors that have been proven to significantly increase the risk of leak which includes; emergent surgical intervention, operation time of more than 190 minutes, inpatient status of the patient, wound class three and four, smoking, significant weight loss, and steroids use [37]. Having five of these risk factors increases the anastomotic leak risk by 10% and the creation of a diversion anastomosis significantly decreases the risk by half and facilitates percutaneous intervention in 70% of cases.

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