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Surgical management of adult Crohn's disease and ulcerative colitis patients: a consensus from the Brazilian Organization of Crohn's Disease and Colitis (GEDIIB)

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ABSTRACT – **Background –** Despite optimized medical therapy, contemporary risk of surgery in inflammatory bowel diseases (IBD) after 10 years of diagnosis is 9.2% in patients with ulcerative colitis (UC) and 26.2% in Crohn's disease, (CD) in the biological era. **Objective –** This consensus aims to detail guidance to the most appropriate surgical procedures in different IBD scenarios. In addition, it details surgical indications and perioperative management of adult patients with CD and UC. **Methods –** Our consensus was developed by colorectal surgeons and gastroenterologists representing the Brazilian Study Group of Inflammatory Bowel Diseases (GEDIIB), with the Rapid Review methodology being conducted to support the recommendations/statements. Surgical recommendations were structured and mapped according to the disease phenotypes, surgical indications, and techniques. After structuring the recommendations/statements, the modified Delphi Panel methodology was used to conduct the voting by experts in IBD surgery and gastroenterology. This consisted of three rounds: two using a personalized and anonymous online voting platform and one face-to-face presential meeting. Whenever participants did not agree with specific statements or recommendations, an option to outline possible reasons was offered to enable free-text responses and provide the opportunity for the experts to elaborate or explain disagreement. The consensus of recommendations/statements in each round was considered to have been reached if there was ≥80% agreement. **Results and conclusion –** This consensus addressed the most relevant information to guide the decision-making process for adequate surgical management of CD and UC. It synthesizes recommendations developed from evidence-based statements and state-of-art knowledge. Surgical recommendations were structured and mapped according to the different disease phenotypes, indications for surgery and perioperative management. Specific focus of our consensus was given to elective and emergency surgical procedures, determining when to indicate surgery and which procedures may be the more appropriate. The consensus is targeted to gastroenterologists and surgeons interested in the treatment and management of adult patients with CD or UC and supports decision-making of healthcare payors, institutional leaders, and/or administrators.

Keywords – Crohn's disease; ulcerative colitis; surgery; adults; inflammatory bowel diseases; disease management.

INTRODUCTION

Inflammatory bowel diseases (IBD) are autoimmune disorders characterized by chronic activation of the intestinal immune system. The two specific types of IBD are Crohn's disease (CD) and ulcerative colitis (UC), conditions which share many clinical and histologic findings[1]. Standard, first-line therapeutic approaches include medical management with corticosteroids, immunomodulators and biological agents. Despite optimized medical therapy, approximately 9.2% of UC and 26.2% of CD patients still require surgery either due to medically refractory disease, associated complications or to a need for urgent interventions, with higher rates among cases presenting with more severe and extensive disease[2-4]. In population-based studies, the estimated rates of surgical intervention for medically refractory disease can be as high as 47% after 5 years of IBD diagnosis[5,6].

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In IBD, patients develop variable degrees of symptoms that may vary throughout the disease course, requiring chronic immunosuppression and surgical procedures which aim to alleviate symptoms, improve quality of life, and reduce morbidity and mortality. As an essential principle, any medical or surgical treatment option should be discussed with the patient in a multidisciplinary manner (including gastroenterologists and colorectal surgeons), in an individualized basis according to a rigorous risk-benefit assessment while considering patient preferences[7]. Surgical treatment is usually indicated when medical therapies appear ineffective or are associated to important adverse events including infections and malignancies.

In 2010, the Brazilian Study Group of Inflammatory Bowel Diseases (GEDIIB) published the first Brazilian consensus on IBD aiming to provide comprehensive, evidence-based recommendations on the surgical management of CD and UC[8]. Considering the major scientific developments throughout the past decade, a pragmatic literature review was conducted to supplement the 2010 publication by providing an overview of the most up-to-date consensus statements regarding surgical management of IBD. This consensus provides recommendations to give guidance to the most appropriate surgical procedures in different IBD scenarios. In addition, it details surgical indications, different surgical techniques, and perioperative management of adult patients with CD and UC.

METHODS

This consensus addresses the most relevant information to guide the decision-making process for the proper surgical management of IBD. It synthesizes recommendations developed from evidence-based statements and state of art knowledge. It does not intend to provide the full range of treatment options available, neither does it cover all aspects of the specific conditions. Consensus with experts, especially in healthcare, can synthesize prompt information for clinical assistance, management, research, and policy in healthcare systems while maintaining diversity and independence of opinions, decentralization, and specialization of knowledge.

The GEDIIB represents the Brazilian key stakeholders (IBD surgeons and gastroenterology specialists) who participated and were involved in this process. The consensus targeted general practitioners, gastroenterologists, and surgeons interested in the treatment and management of adult patients with CD or UC. Additionally, it supports the decision-making of health insurance companies, institutional leaders, and/or administrators.

The overall approach to identifying relevant literature was pragmatic given the limited time available. The rapid review approach[9] was conducted to support the recommendations/statements. It was chosen as it constitutes the highest quality method suited to the context of providing the best and most recent evidence. The concern for a timely decision on healthcare and policies is the driving force for this consensus. Additionally, traditional systematic reviews can take years to complete, and a rapid review provides the same quality standards based on the principles of the Cochrane Collaboration. According to its definition, the literature review was systematic, but with some limitations such as database number, study designs, and search period. Existing high-quality guidelines and/or consensus specifically focused on the management of IBD were elected, identified, and synthesized to support the recommendations/statements in this document. To obtain the most recent evidence, the MEDLINE database search was limited to the past five years (from October 2016 to October 2021). The PICOS acronym was used to describe the questions to be answered. Only publications in the English language were considered. Quality appraisal of the guidelines/consensus was conducted using its respective tools (additional methodologies data can be found in supplementary material: PICOS [TABLE S1 TO S15], search strategy [TABLE S16], screening flowchart [FIGURE S1], and quality appraisal [TABLE S17]). The publications that endorsed specific recommendations were captured by "snowballing search" starting from the reference list of the guidelines included in the rapid systematic review.

Surgical recommendations were structured and mapped according to the type of IBD (CD and UC) and classified according to specific phenotypes of each disease, surgical indications, perioperative management and recommended surgical techniques. After structuring the recommendations/statements, the modified Delphi Panel methodology was used to conduct the voting. This consisted of three rounds: two using a personalized and anonymous online voting platform and one face-to-face presential meeting. Whenever participants did not agree with specific statements-recommendations, an option to explain specific reasons was offered to enable free-text responses, providing the opportunity for experts to elaborate or explain disagreement. The consensus of recommendations/statements in each round was considered to have been reached if there was ≥80% agreement[10].

SURGICAL MANAGEMENT OF CROHN'S DISEASE

A) Surgical indications and approach

Recommendations

1. Surgical treatment for CD must consider disease location, severity of symptoms, clinical manifestations, and nutritional status. The decision must be the result of a common agreement between gastroenterologists, surgeons, and patients. **Agreement:** 93.75%[8,11-14].
2. When feasible, a minimally invasive approach, such as laparoscopy, is preferred, particularly for primary procedures for ileocolonic CD. Nevertheless, it may not always be feasible in patients with recurrent or complex disease. **Agreement:** 84.2%[8,11-14].

Surgical indications should be determined based on experienced surgeons' decisions in accordance with clinical findings, endoscopic and imaging methods in medically refractory disease[15]. Typical indications for surgery include patients with localized small bowel disease who are unresponsive or non-compliant to optimized medical therapy or develop specific complications such as stenosis or internal/external fistulas[14]. Absolute indications include perforation, massive bleeding, associated neoplasia (cancer or high-grade dysplasia), bowel obstruction, and abscess/septic complications. Other indications include refractory stenoses, external or internal fistulas (including cases of symptomatic small bowel fistulas after preoperative optimization), refractoriness to optimized medical therapy and refractory extraintestinal complications (such as growth retardation and pyoderma gangrenosum) and perianal fistulas or specific refractory lesions such as inflammatory fissures[14,15]. Whenever planning a surgical procedure for

CD, a recent mapping of the disease location and status (with ileocolonoscopy and/or cross-sectional imaging) should be performed and considered.

Patients with primary, stricturing, and localized CD of the small bowel undergoing surgery should be submitted to a laparoscopic economic bowel resection or video-assisted strictureplasty. Surgical resections should also be considered at an early stage in patients with symptomatic penetrating disease, with internal or external fistulas, or blocked chronic perforation[16]. Strictureplasties may also be preferable instead of resection of long segments of small bowel, in cases of multiple fibrotic strictures, or if the length of the remaining preserved small bowel is short, with a potential reduction in surgical relapse rates[16-18] Patients with a free perforation should undergo an emergency surgical resection of the perforated segment[12].

Patients with recurrent CD may also benefit from laparoscopic surgery, in expert hands, as long as the threshold for conversion to laparotomy is low[14]. Patients with gastrointestinal bleeding who are stable may be treated by endoscopic and/or interventional radiologic techniques, while unstable patients should usually undergo surgical exploration[12]. In cases of CD limited to the distal ileum, early surgery may be considered as an alternative to medical therapy, depending on risk assessment and patient preference[17].

B) Management of abdominal CD

B.1) Preoperative optimization and care

B.1.1) Nutrition

Recommendation

- Perioperative nutritional optimization is mandatory in malnourished patients and diet reintroduction should be started as soon as bowel transit is recovered, according to patients' tolerability it in the postoperative period. **Agreement:** 100%[19,20].

Adequate nutritional status is recognized as an important prognostic factor associated to better outcomes in CD patients undergoing surgical procedures[19,20]. Therefore, preoperative nutritional status should be assessed in all patients and identified deficiencies and malnutrition should be corrected[12,18,20]. Nutritional status can be optimized before surgery by meeting nutritional needs with oral nutritional supplements (ONS) or enteral nutrition if oral diet alone is insufficient[20]. In extremely malnourished patients, or in those with obstructive symptoms, total parenteral nutrition (TPN) can be indicated[20]. A staged procedure, with stomas instead of primary anastomoses, is advised if malnutrition cannot be corrected before surgery[16]. In addition, for better postoperative recovery, compliance with the principles of the Enhanced Recovery After Surgery (ERAS) protocols in the perioperative period is recommended[16,20].

The type of diet is a special matter of concern in patients with enteric fistulas. For distal (low ileal or colonic) and low output fistulas, specific oral diets with proximal absorption are typically tolerated. However, patients with proximal and high output fistulas usually require partial or total parenteral nutrition[20].

In patients undergoing surgery for ileocecal CD, severe malnutrition (defined by weight loss >10% within the last 3–6 months, body mass index <18.5 kg/m^2, and/or albumin levels <30 g/L) is associated with increased risk of postoperative complications. Therefore, pre-and postoperative nutritional support should be considered[14].

B.1.2) Preoperative corticosteroids

Recommendation

- The use of steroids is not recommended to maintain remission. Over the course of more than six weeks before surgery, prednisolone at a dose of 20 mg daily or equivalent could lead to increased rates of surgical complications. Tapering corticosteroids is therefore advisable, whenever possible. Those who have recently used chronic steroids and undergo major abdominal surgery should receive perioperative steroid replacement therapy. **Agreement:** 95.3%[16].

Patients receiving corticosteroids before surgery are at increased risk of postoperative complications and may be candidates for diverting stomas, once they increase the risk of anastomotic dehiscences[14,18]. Thus, treatment doses should be reduced with careful consideration of their impact on increasing the disease burden on the patient[18]. The risk of postoperative complications following abdominal surgery was investigated in 1,532 patients with IBD using steroids at the time of abdominal surgery. Preoperative steroids were associated to an increased risk of overall postoperative complications (odds ratio [OR]=1.41 [95%CI 1.07–1.87), as well as an increased risk of postoperative infectious complications (OR=1.68 [95%CI 1.24–2.28). Patients who received higher doses of perioperative oral steroids (>40 mg) had a higher risk of overall complications (OR=2.04 [95%CI 1.28–3.26)[21]. Postoperative intra-abdominal septic complications (IASCs), such as anastomotic leakage, intra-abdominal abscess, or enterocutaneous fistulas, were also increased in patients with previous steroids [OR=1.99 [95%CI 1.54–2.57][22].

B.1.3) Preoperative immunosuppressants

Recommendation

- Thiopurines can be safely used in the perioperative period. **Agreement:** 100%[16].

Huang et al. (2015) evaluated six studies with 2,146 patients with CD and found a pooled OR of 1.07 [95%CI 0.66–1.73], suggesting that previous use of immunomodulators was not a risk factor for postoperative intra-abdominal sepsis complications[22].

B.1.4) Preoperative biological agents

Recommendation

- Preoperative exposure to anti-tumor necrosis factor (TNF) therapy, vedolizumab, or ustekinumab is not associated to an increased risk of postoperative complications in abdominal surgery. Therefore, discontinuation of these agents is not mandatory. **Agreement:** 100%[18].

The evidence is still unclear as to whether higher rates of postoperative complications from abdominal surgery could be associated to anti-TNF therapy. The meta-analysis of Huang et al. (2015) evaluated six studies with 1,833 patients with CD and found a pooled OR of 1.29 [95%CI 0.79–2.11], suggesting that biologics were not a risk factor for postoperative intra-abdominal septic complications[22]. However, Narula et al. (2013) assessed in their meta-analysis the impact of perioperative use of biologics (TNFα antagonists) on postoperative complications such as infections and wound healing in 4,659 patients with IBD. Studies limited to patients with CD demonstrated a statistically significant increase

in infectious (OR=1.93 [95%CI 1.28–2.89) and overall (OR=2.19 [95%CI 1.69–2.84) complications, and a trend towards an increase in non-infectious complications (OR=1.73 [95%CI 0.94–3.17]). The authors speculate that the increased risk is small and may well reflect residual confounding factors rather than a true biological effect[23]. Additionally, a published guideline recommends against biological therapy for at least 14 to 30 days before any planned elective surgery, to minimize the risk of infectious complications and anastomotic leakage[14]. Surgeons should be consulted early when patients are in poor general condition and seem unresponsive to anti-TNF agents[15].

B.1.5) Prophylaxis of venous thromboembolism

Recommendation
- Prophylaxis should be considered in all IBD patients who require surgery due to the increased risk of venous thromboembolic events. **Agreement:** 100%[16].

Patients with IBD have a two-fold increased risk of developing venous thromboembolic events (VTE) and need to be screened for risk factors. Thromboprophylaxis is indicated in IBD patients admitted to hospital for emergency or elective surgery. Low molecular weight heparin is recommended over low dose unfractioned heparin, and risk of IBD-related gastrointestinal bleeding is not increased[24]. It should be highlighted that systemic corticosteroids are associated with a higher risk of VTE among IBD patients (OR=2.2 [95%CI 1.7–2.9; P<0.001) as compared to IBD patients without steroids, while biological therapies presented a 5-fold decreased risk of VTE as compared to steroids (OR=0.267 [95%CI: 0.106–0.674; P=0.005]).

B.2) Localized ileocaecal CD

Recommendation
- In localized ileocaecal CD, surgical treatment can be recommended as a therapeutic option. In cases of recurrent ileocaecal CD after initial treatment with steroids and/or immunosuppressants, surgical resection or biological therapy are recommended. **Agreement:** 85.7%[14,16].

Surgery is the preferred therapeutic option in patients with localized ileocaecal CD with obstructive symptoms, as long as there is scarcity of active inflammation[16,25,26]. Patients with recently diagnosed moderate ileocaecal CD may be offered a surgical resection rather than biological therapy (e.g., anti-TNFα) or immunosuppressants (e.g., thiopurines) after induction of remission. Uncomplicated unexpected terminal ileitis at emergency surgery does not need immediate resection[14].

B.3) Management of penetrating abdominal CD
B.3.1) Intra-abdominal abscess

Recommendation
- Patients with penetrating CD with abscess formation may be managed with antibiotics with or without percutaneous drainage followed by elective surgical resection or medical therapy depending on the clinical features and patient preferences. Risk factors associated with worse postoperative outcomes in penetrating CD are the presence of abscesses at the time of surgery, chronic use of corticosteroids, and impaired nutritional status. **Agreement:** 100%[12,13].

Active CD with a concomitant abdominal abscess should preferably be managed with antibiotics and percutaneous (or surgical) drainage, followed by delayed resection if necessary[16,17,25,27]. In patients with active ileocecal CD with associated abscesses, surgical drainage may be necessary in selected cases[14]. Treatment with biologics in combination with immunosuppressants after drainage should not be delayed in the absence of active infection[28]. In cases of small abscesses (<3 cm), patients may be treated with intravenous antibiotics, although at risk of recurrence, particularly if associated enteric fistulas[19].

There is insufficient evidence to suggest whether surgical or medical therapy is better after complete resolution of a CD-related abdominal abscess. The risks and benefits of each approach should be discussed with the patients aiming fully shared informed decision on further treatment[14].

Recommendation
- When CD complications result in abdominal abscess formation, cross-sectional imaging tests are recommended, especially when the condition is complex, recurrent, or associated with previous surgery. For these cases, magnetic resonance imaging (MRI) is recommended, due to its sensitivity and specificity. **Agreement:** 95.3%[28].

Percutaneous image-guided drainage, preferably radiologically, of well-defined accessible intra-abdominal abscesses is recommended as a first-line approach in stable patients[17-19,29]. Patients with intra-abdominal abscesses complicating CD may be treated initially with intravenous antibiotics and, if possible, undergo image-guided drainage[11]. Percutaneous drainage of abscesses larger than 3 cm could avoid immediate surgery and should be used as a bridging procedure before elective surgery to reduce the need for ostomy and limit bowel resections in malnourished and overall high-risk patients[19]. In case of a response (resolution of the abscess and diet initiation) to antibiotic-associated drainage, biological therapy can be started; otherwise, it may be reasonable to either consider a surgical resection[29].

B.3.2) Medical and surgical treatment of penetrating CD

Recommendation
1. Patients with enteric fistulas which persist despite optimized medical therapy should be considered for surgery. Surgical treatment for internal fistulas requires consideration of clinical manifestations and symptoms. **Agreement:** 100%[12-14].
2. Patients with enterocutaneous fistulas with short tracts and high output require surgical intervention. However, proper timing of surgery must be decided after full preoperative optimization, including nutritional status. Caution must be taken in patients previously submitted to small bowel resection(s), at risk for intestinal failure. **Agreement:** 84.2%[12-14].

Patients with enterocutaneous fistulas should ideally refrain from surgical resection until full clinical optimization by percutaneous drainage of sepsis, adequate nutritional status and wound care are achieved in the short term[14]. While high output fistulas usually require surgery for symptom control, low output enterocutaneous fistulae may rarely be controlled with immunomodulator and biological therapy[11]. Enteroenteric and enterovesical fistulas often re-

quire surgical resection. In enteroenteric fistulas, surgery is strongly recommended, especially if associated with abscess and strictures, and if they cause excessive diarrhea and malabsorption[15,25,30]. Enterovaginal and enterovesical fistulas should be managed jointly with medical control of inflammation and surgical resection[11]. Symptomatic female enterogenital fistulas usually require surgery, such as resection of affected segment with diverting ostomy[17]. In patients with penetrating abdominal CD, surgical management is suggested when there has been an inadequate symptomatic response to optimized medical management[30].

B.4) Management of stricturing abdominal CD

B.4.1) Endoscopic treatment

Recommendation

- Balloon dilation is recommended for the treatment of ileocolonic anastomotic strictures with less than 4 cm of extension, without sharp angulation and no associated fistulas. This procedure can also be indicated for endoscopically accessible ileal strictures. In cases of acute obstruction, we recommend initially medical therapy. In cases of chronic partial obstruction, we recommend surgical treatment with resection of the affected intestinal segment, intestinal bypass, ileostomy, or enteroplasty. Caution should be taken to recurrence, as this may require multiple resections, with the risk of short bowel syndrome and associated metabolic comorbidities. **Agreement:** 85.7%[11,13].

Patients with persisting obstructive symptoms who do not respond to medical therapy alone or decompression, or those with fibrotic strictures, may undergo either surgery or endoscopic balloon dilation[15,17]. Both options are also feasible for upper gastrointestinal CD with gastrointestinal obstruction[15].

Endoscopic dilatation is considered for patients with short segment, noninflammatory, symptomatic small bowel, and short anastomotic strictures[12,16] and should only be attempted in institutions with surgical backup[16,25].

Balloon dilation is an alternative to surgery to alleviate obstructive symptoms in patients with ileocecal CD or recurrent disease at an ileocolic anastomosis, especially when strictures are shorter than 5 cm, not angulated, accessible to endoscopic examinations, and not associated to inflammation or fistulas[14]. The procedure of choice depends on the local expertise and patient conditions[18]. In cases of long strictures (>20 cm) and multiple strictures within a short segment of the small bowel, patients may undergo bowel preserving surgical techniques such as Finney or Michelassi strictureplasties[14]. Long symptomatic strictures need surgical treatment. However, for long asymptomatic strictures, there appears to have some controversy between surgery, monitoring and biological therapy[29].

B.4.2) Strictureplasty and surgical resection

Recommendation

1. When endoscopic balloon dilation does not offer symptom control, strictureplasty or resection are the recommended surgical options. **Agreement:** 83.7%[12,14,25].
2. Resection of colonic strictures should be considered in patients who cannot be adequately examined with ileocolonoscopy. **Agreement:** 100%[8,12,14,25].

Patients with gastric or duodenal CD who remain symptomatic despite optimized medical therapy should be considered for endoscopic dilation, bypass, or strictureplasty. Jejunal, ileal or ileocolonic CD without existing or anticipated short-bowel syndrome should typically undergo escalation of medical therapy or resection of the affected bowel segments. Patients who are refractory to medical therapy and not amenable to endoscopic dilatation should undergo surgery[19].

For patients undergoing surgery with multifocal disease, or when multiple strictures are present and there is concern about the preservation of bowel length, strictureplasty should be considered[14]. It should be noted that if multiple strictures are close to each other (<10 cm), with adequate remaining healthy bowel, a single resection may be preferable to multiple strictureplasties[11]. Strictureplasty is also a safe alternative to resection in small bowel CD, with similar short- and long-term results. Conventional strictureplasties (Heinekw-Mikulicz or Finney) are recommended when the length of the stricture is <10 cm. However, alternative strictureplasties may be attempted in extensive CD where resection would increase the risk of short bowel syndrome. Longer strictures in symptomatic patients should preferably be treated with early surgery[26]. Strictureplasty or economical resection is recommended when the disease is located in the small bowel[8,12,14,25].

If surgery is needed for localized colonic disease (i.e., less than a third of the colon is involved) segmental resection of the affected part is preferable. In cases of macroscopic disease affecting two separate segments of the colon, two segmental resections can be considered for patients with an established surgical indication. Strictureplasty in the colon is not recommended[25]. In cases of strictures with associated fistulas, bowel resection of the affected segment is recommended[15].

C) Surgical techniques for elective surgery in abdominal CD

C.1) Surgical approach

Recommendation

- Laparoscopic surgery should be offered as the first-line approach in surgery for CD, dependent on appropriate expertise. **Agreement:** 100%[14,16,18].

Patients undergoing surgery for localized terminal ileal CD should undergo a laparoscopic approach. Laparoscopic resection in patients with limited, luminal localized ileocecal CD (less than 40 cm) is a reasonable alternative to infliximab therapy as it results in reduced morbidity, shorter hospital stay, reduction in adhesions and hernia formation, and improved cosmesis[14,16,18]. If appropriate expertise is available, laparoscopic surgery is also preferred for ileocolic resections, particularly for those failing or relapsing after medical therapy, or those preferring surgery over the continuation of medical therapy[11]. In cases of recurrence or complicated CD (stenosis or fistulas), the evidence is unclear as to the technique of choice. Importantly, there is currently no evidence to support the use of single-incision laparoscopic surgery (SILS) in ileocecal CD[14]. Despite feasible, evidence with robotic surgery is also limited in CD.

C.2) Type of anastomosis

Recommendation

- Depending on surgeon's preference and experience, ileocolonic anastomosis can be performed using side-to-side, side-to-end, or end-to-end handsewn or stapled anastomoses. A wide lumen stapled ileocolic side-to-side (functional end-to-end) anastomosis is recommended. **Agreement:** 95.3%[12,16,25].

In cases of primary anastomoses, there is no strong evidence to suggest that one type of anastomosis (stapled vs hand sewn) is superior to the other in terms of complication rates or recurrence. Therefore, the decision-making is at surgeon's discretion[14,19], recognizing that stapled small-bowel or ileocolic side-to-side anastomoses are associated with lower rates of postoperative complications than end-to-end anastomoses[18]. There is insufficient evidence to suggest an association between the anastomotic technique in cases of ileocecal resections and the risk of recurrence. Alternative techniques to those currently employed still require further assessment[14]. Primary anastomosis must be avoided in case of pelvic and peritoneal sepsis, as well as in the presence of severe malnutrition[8]. It is important to mention that the anastomotic technique *per se* is not a risk factor for postoperative intra-abdominal septic complications (OR=0.94 [95%CI 0.58–1.53][22].

The Kono-S anastomosis is an antimesenteric, functional, side-to-side handsewn anastomosis procedure initially described in 2011 to reduce anastomotic recurrences[31]. The main concept of the procedure is to create a robust "supporting column", with interposition between the mesentery and the anastomotic site[32]. Preliminary observational studies have suggested that Kono-S is a safe and feasible technique[32,33]. Results of a meta-analysis of nine studies have shown overall low complication and recurrence rates associated with Kono-S anastomosis, mostly for patients undergoing ileocolic anastomosis. Potential biases arising due to the observational nature of most studies are a matter of concern[31]. Consistent with observational data, a randomized controlled trial has shown positive results comparing the Kono-S anastomosis with conventional treatment (stapled ileocolic side-to-side anastomosis) in patients with ileocolonic CD[34]. Patients undergoing Kono-S anastomosis presented significantly lower rates of postoperative endoscopic recurrence and postoperative clinical recurrence. Importantly, there were no safety issues related to the Kono-S technique. There were no differences between the groups regarding postoperative surgical recurrence. Evidence suggests that the Kono-S is a feasible, safe, and effective type of anastomosis in CD. However, larger randomized controlled trials with longer follow-up are necessary to confirm these findings.

C.3) Segmental versus total colectomy

Recommendation

- A segmental colectomy is recommended when only one segment of the colon is affected. In cases of extensive colonic disease and rectal sparing, total colectomy with ileorectal anastomosis can be recommended. **Agreement:** 100%[12,18].

There are three effective options for patients with Crohn's colitis: segmental colectomy, subtotal colectomy, and total proctocolectomy. In general, the procedure of choice mostly depends on the extent of colonic disease and the weighing of risks and benefits. Patients with two different segments of the colon affected by active CD, in the absence of concomitant perianal disease, should undergo total colectomy with ileorectal anastomosis[8]. For patients with rectal sparing and reasonable sphincter function, subtotal colectomy with ileorectal anastomosis is a feasible option as it offers improved quality of life in the medium term[14]. Total proctocolectomy is associated with a reduced risk of disease recurrence, however, it is also associated with higher complication rates as compared to subtotal colectomy.

C.4) Total proctocolectomy and permanent ileostomy

Recommendation

- Patients with refractory pancolitis may benefit from a defunctioning ileostomy. A total proctocolectomy and permanent end ileostomy is recommended in cases of medically refractory severe rectal disease in association to proximal colitis. **Agreement:** 95.3%[16].

In patients who are refractory to medical treatment, a diverting ostomy should be considered, with proctectomy as the last resort[16]. Patients experiencing failure of both medical treatment and conservative surgery leading to significant and persistent symptoms may require proctectomy/ proctocolectomy[28]. A systematic review and meta-analysis with 1438 refractory colonic CD patients who underwent total proctocolectomy with a permanent ileostomy described clinical and surgical recurrence rates of 28% and 16%, respectively. The median time for clinical and surgical recurrence ranged from 1 to 5.6 years and 2.4 to 9.6 years, respectively. Additionally, the rate of stoma-related complications requiring surgery after total colectomy with a permanent ileostomy was 15.6%, with the most common being skin ulcerations (45%), stoma retraction (21%), stenosis (10%), prolapse (10%), hernia (6%) and small bowel obstruction due to adhesions (6%). A previous history of ileal disease was a relevant risk factor associated with a 3-fold increase in the risk of disease recurrence. In addition, disease complications (fistula or abscess and/or perianal complications), use of biologics before surgery and young age at disease onset or surgery were considered risk factors for disease recurrence[35].

C.5) Restorative proctocolectomy with ileo pouch-anal anastomosis

Recommendation

- Restorative proctocolectomy with ileal pouch-anal anastomosis (IPAA) is only recommended in specific cases (severe pancolitis, with no perianal disease, in motivated young individuals who refuse to undergo a permanent stoma). In patients diagnosed with CD after IPAA, multidisciplinary management is crucial to maintain pouch function, as these patients have considerably higher rates of complications and pouch failure. **Agreement:** 95.3%[8,16].

Patients with CD undergoing IPAA surgery are at higher risk of complications and treatment failure, particularly those with an (unsuspected) diagnosis of CD post-procedure. Thus, to maintain an acceptable pouch function in those patients, intensive multidisciplinary treatment with gastroenterologists is strongly recommended[25]. Restorative proctocolectomy with IPAA may be offered to selected patients with CD in the absence of perianal

or small bowel disease. Nevertheless, increased rates of long-term pouch failure in this patient group should be acknowledged and discussed[20,45]. Although usually reserved for patients with UC, the Kock pouch (also known as a continent ileostomy) may be an option in selected cases of isolated colorectal CD and should only be performed by appropriately trained and experienced surgeons[14].

Incidence of pouch-vaginal fistulas may be as high as 10% in female patients with ileoanal pouches, often associated with complications such as pouch sepsis or anastomotic leaks. Treatment often requires multiple techniques (depending upon the exact presentation) to achieve success, which is to be expected in up to 50% of the cases. Recommended approaches for dealing with technical complications associated to pouch-vaginal fistulas are diversion, pouch revision with or without pouch excision. Other feasible treatment options include endoanal surgical techniques. In cases of patients undergoing revisional pouch surgery for a septic complications, procedures including repair of pouch defects, removal of necrotic and fibrotic pelvic tissues, and advancement of the new (or original) ileoanal pouch are imperative[14].

C.6) Fecal diversion without resection

Recommendation

- In patients with complex perianal CD, fecal diversion may reduce symptoms and improve quality of life. A minority of patients will undergo successful stoma closure. **Agreement:** 95.3%[16].

Patients with refractory proctitis or those with perianal Crohn's fistulas may undergo fecal diversion for symptom control[14]. A recommendation for a diversion stoma may be considered in patients with ano- or rectovaginal fistula before subsequent fistula repair in whom rectal involvement cannot be controlled or where first-line local surgical treatment fails[28].

The meta-analysis of Singh et al. (2015) demonstrated data on the effectiveness, long-term outcomes, and factors associated with the success of temporary fecal diversion for perianal CD. Authors described a rate of 63.8% of patients experiencing early clinical response after fecal diversion for refractory perianal CD within 3–6 months. Restoration of bowel continuity was attempted in 34.5% (95%CI: 27.0–42.8) of patients, although fecal diversion was performed as a temporary measure intending to restore bowel continuity in the future. For the remaining patients, suboptimal clinical response and/or patient preference precluded attempting takedown of the stoma. Most attempts at restoration of bowel continuity were made on average between 1–1.5 years after fecal diversion. Closure of stomas with bowel transit restoration was successful in only 16.6% (95%CI: 11.8–22.9). Of those in whom restoration was attempted, 26.5% (95%CI: 14.1–44.2) required re-diversion (without proctectomy) for symptomatic management due to severe relapse. Overall, 41.6% (95%CI: 32.6–51.2) of patients eventually required proctectomy due to failure of temporary diversion (either primary non-response to initial diversion or following a relapse of perianal disease on attempted restoration)[36].

D) Management of complex perianal fistulas in CD

D.1) Preoperative assessment

Contrast-enhanced pelvic MRI is the most indicated procedure for the assessment of complex perianal fistulizing CD. Alternatively, endoanal ultrasound (EUS) may be an alternative once anorectal stenosis has been ruled out. Both MRI and EUS have increased specificity and sensitivity when combined with examination under anesthesia (EUA)[16]. Fistulography is not recommended. EUA comprises the gold standard diagnostic method for patients with confirmed perianal fistulas. It also allows surgical curettage of fistula tracts, abscess drainage and seton placement (preferably in combination with antibiotics such as metronidazole and/or ciprofloxacin).

D.2) Seton placement

Recommendation

- Examination under anesthesia for a precise diagnosis of perianal fistula tracts is recommended, guided by imaging tests aiming identification of associated fluid collections. Seton placement in perianal fistula tracts is recommended to prevent recurrence of perianal sepsis. **Agreement:** 85.7%[8,11].

The approach towards fistulizing perianal CD aims stabilization of the disease burden with effective seton drainage, which offers adequate symptom control. Surgeons should advise on the timing of seton removal, in an individualized basis. However, the evidence on the optimal timing of seton removal is uncertain[8,11,14]. When treating perianal fistulas with anti-TNF agents, seton removal is probably more appropriate after completion of the drug induction phase[16]. Additionally, if abscesses are present, these must be surgically drained and setons placed before anti-TNF treatment induction. Usually, immunosuppressive therapy should be part of the initial management of perianal fistulizing CD[8,11]. Second-line therapy with thiopurines and/or anti-TNFs is recommended in patients who are refractory to antibiotics and have recurrent simple fistulas[16].

Simple fistulas are often treated with fistulotomy, and surgeons should consider seton placement in complex tracts[37]. Setons can also recommended in the initial treatment of Crohn's rectovaginal fistula to control primary tracts, despite controversy in international literature[14].

In cases of severe perianal CD, refractory to medical therapy, patients should be treated by additional procedures such as seton drainage in association with a diverting stoma or proctectomy[15]. Cutting setons are not recommended in perianal fistulizing CD, as they can cause fecal incontinence. In the absence of an abscess, proctitis, or stenosis, fistula tracts are likely to close after the removal of the seton[16]. A perianal abscess can be urgently incised under local anesthesia during an outpatient consultation in the absence of signs of severity; otherwise, if signs of severity are present, emergency drainage should be performed under general anesthesia[19]. If incision of an anal abscess results in patient relief, but complex suppuration is suspected, elective surgery guided by an MRI scan is preferred[28]. Patients with anal suppuration should receive rapid surgical treatment along with initiation of medical treatment with anti-TNF, with or without an immunosuppressant. Treatment with anti-TNF resulting in remission of anal fistula should be continued as maintenance therapy[28].

Medical management of perianal fistulas in CD largely depends on the use of anti-TNFs. Thus, patients should be given optimal conditions for its use. In addition, after starting (or resuming) treatment with anti-TNFs (such as infliximab and adalimumab), it is advisable to concomitantly use an immunosuppressant for at

least 6 to 12 months to increase treatment efficacy as it reduces immunogenicity[28]. For asymptomatic low anal-introital fistulae, surgical treatment is not recommended[25].

D.3) Additional surgical procedures for fistula closure

There is no clear evidence of optimal timing for additional closure techniques except that they should not be performed during active proctitis, but only after remission under medical treatment. Patients may undergo removal of a seton and/or a closure technique if:

- The fistula is well drained with no signs of inflammation.
- Proctitis is absent in endoscopic and/or MRI findings.
- No abscesses or fluid collections (>2 cm) are identified in MRI findings[28].
- Different surgical techniques and alternatives are available aiming fistula closure. The choice of each specific procedure depends on surgeons' experience, location and number of fistula tracts and previous surgical procedures.

D.3.1) Endorectal advancement flap

Anorectal or rectovaginal fistulas without associated proctitis have a 50% healing rate with endorectal advancement flaps. Patients with an active CD with rectal inflammation should be treated medically before and after surgery for relapse prevention[25]. Severe symptomatic rectovaginal fistulas refractory to optimized medical treatment may undergo advancement flap or fecal diversion. However, this evidence must be considered with caution, due to the very low-quality evidence[17,25]. There is also some evidence in favor of advancement flaps for CD-related fistula closure in the absence of stricture or proctitis, although high failure rates and associated risks to continence should be recognized[14,37].

D.3.2) Fibrin glue and anal plug

Fibrin glue injection and anal fistula plugs have been presented as an alternative surgical approach in the treatment of perianal fistulas, aiming to reduce the incidence of recurrence and postoperative fecal incontinence. Fibrin glue may be a promising treatment, but it is of limited efficacy. Therefore, fibrin glue alone cannot be recommended as an effective treatment for complex fistulizing perianal CD[37,38]. Additionally, when compared to conventional surgical treatment, fibrin glue was not significantly different in the treatment of perianal fistulas in CD in terms of reducing the incidence rate of recurrence and postoperative fecal incontinence after surgery[37,38]. However, there is a very small number of studies demonstrating these findings, which reinforces the importance of a longer and more accurate follow-up evaluation in patients treated with fibrin glue to confirm its effectiveness or difference from other surgical treatments. Currently, available evidence does not support the use of anal plugs in perianal fistulas in CD, due to the risks of post-procedure sepsis, although long-term functional consequences are unlikely. It is a continence preserving option in perianal CD[37].

D.3.3) Ligation of the intersficteric fistula tract

Patients with CD and complicated perianal fistulas may benefit from ligation of the inter-sphincteric fistula tract (LIFT), despite limited evidence. LIFT procedure is currently a continence preserving option in perianal CD[37]. However, similarly to other surgical options, it should only be offered to selected patients as long-term results are poor, particularly for complex disease[11]. The meta-analysis of Emile et al. (2020) found that LIFT presents an average complication rate of 13.9%, being the most common complication the wound dehiscence. Fecal incontinence was observed in only 1.4% of the patients[39]. Regarding risk factors associated to failure in fistula closure, authors identified horseshoe fistulas, fistulas associated with CD, and those with a history of previous fistula surgery as at risk for healing.

D.3.4) Video-assisted anal fistula treatment

Video-assisted anal fistula treatment (VAAFT) is a sphincter sparing, minimally invasive technique, with diagnostic and therapeutic phases[40]. It enables internal debridement of the fistula tract with the possibility of identifying additional tracts and closing the external opening with a simple suture. Currently, limitations to its implementation include its high cost, as well as no clear evidence of the most suitable clinical indications or comparative evidence of treatment efficacy[41].

D.3.5) Fistula laser closure

FiLaC (fistula-tract laser closure) is a sphincter-saving technique using a radial emitting laser fiber to obliterate the fistula tract in its full extension, with or without closing the internal opening[42]. Preliminary findings from uncontrolled case series of patients undergoing FiLaC for anal fistulas have suggested promising results in terms of clinical effectiveness and preservation of continence. In addition, it does not seem to induce short-term post-operative sepsis seen in other procedures[43,44]. In a meta-regression analyses age, CD, and supra/extrasphincteric fistulae were predictors of treatment failure. The success rates in favor of FiLaC were comparable, although numerically lower, with other sphincter-preserving techniques. Despite promising results, particularly with regards to its safety profile, currently available evidence is limited due to the nature of the retrospective observational data and highly heterogeneous results, which warrants randomized controlled trials of FiLaC compared to other sphincter preserving techniques[42].

D.4) Stem cell therapy

Allogenic adipose-derived mesenchymal stem cells may offer improved healing in perianal fistulizing CD[14]. Stem cell-based treatments, such as allogeneic and autologous adipose-derived stem cell therapy, could be effective and safe for complex perianal CD-related fistulas. However, these approaches have yet to demonstrate consistent results in properly designed RCTs with long-term follow-ups[18]. Access to commercially available solution and price limits its use in clinical practice currently.

E) Treatment of refractory perineal and pelvic sepsis

Recommendation

Recurrent perineal and pelvic sepsis and symptoms of complex perineal CD refractory to optimized interventions can be controlled by a diverting stoma. **Agreement:** 100%[18,19,28].

A diverting stoma may offer an alternative to extensive resection or proctocolectomy in complex perianal CD and it may allow time for adaptation and acceptance of a permanent stoma. Thus, despite low rates of fistula healing and stoma closure, diverting stomas can be currently recommended. Moreover, observational studies support a combined medical and surgical approach to control sepsis and luminal activity.

F) CD management as an incidental finding from appendicitis

Recommendation
- Resection of terminal ileitis identified by laparoscopy or laparotomy for suspected appendicitis is not recommended, due to the high risk of intra-abdominal septic complications. **Agreement:** 90.5%[16,25].

In patients undergoing laparotomy for suspected appendicitis, the finding of a terminal ileitis resembling CD does not warrant resection[26]. In cases of acute appendicitis in CD, Quaresma et al. (2021) reported that most studies included in their systematic review demonstrated a high rate of complications after an appendectomy or ileocaecal resection. This finding should be interpreted considering some limitations due to the small sample size and low-quality evidence of the studies. Therefore, the authors recommended that, in the absence of complicated disease and suspected CD in acute appendicitis surgery, a macroscopically normal appendix and the terminal ileum should be preserved. In case of complicated disease (inflammatory mass, ischemia, perforation, or obstruction), ileocecal resections are recommended[45].

G) Upper gastrointestinal CD

Recommendation
- Strictureplasty and Roux-en-Y bypass can be effective surgical approaches in cases of CD of the antrum and duodenal bulb. If technically feasible, strictureplasty has better outcomes for stenoses of the second and third duodenal portions. Duodenal resection or pancreatoduodenectomy are options used as a last therapeutic resource. **Agreement:** 81%[16].

Fistulas of the duodenum are usually secondary to CD of an adjacent organ and require surgery to remove the affected segment with the primary or secondary repair of the duodenum. In cases of primary duodenal CD, obstruction is the most common indication for surgery. If endoscopic balloon dilatation fails to provide symptom relief, strictureplasty or gastrointestinal bypass surgery are recommended surgical options[14].

SURGICAL MANAGEMENT OF ULCERATIVE COLITIS

A) Surgical indications and approach

Recommendations
1. Indications for elective surgical treatment in UC include refractoriness to optimized medical therapy, associated high-grade dysplasia or neoplasia, non-adenoma-type lesions with dysplasia in the surrounding flat mucosa, stenosis, growth retardation, physical disability, psychosocial dysfunction, or intolerable adverse events to medication. **Agreement:** 88.9%[46-49].
2. Patients with UC with surgical indications are most likely to benefit from laparoscopic surgery. **Agreement:** 83.3%[46,47,49,50].

There are several major recommendations for different patient populations concerning elective surgery in UC. First, patients with visible polypoid or nonpolypoid dysplasia that is completely excised endoscopically should undergo endoscopic surveillance. Second, patients with visible dysplasia not amenable to endoscopic excision, invisible dysplasia in the flat surrounding mucosa, a visible dysplastic lesion, or colorectal adenocarcinoma should undergo total proctocolectomy with or without IPAA. Third, patients with invisible dysplasia should be referred to an experienced endoscopist for a new ileocolonoscopy using high-definition colonoscopy with chromoendoscopy with targeted and repeated random biopsies within 3 to 6 months. Fourth, patients with confirmed invisible multifocal, low-grade dysplasia or any invisible high-grade dysplasia should be eligible for surgery. Patients undergoing elective surgery may receive restorative proctocolectomy with IPAA, total proctocolectomy with end ileostomy, or with continent ileostomy[51].

It is recommended that patients having 20 mg/day of prednisolone for at least 6 weeks (or those being treated with anti-TNF) should undergo a staged procedure, initially with a subtotal colectomy and temporary end ileostomy. A laparoscopic approach is preferred when appropriate skills are available[49]. Colectomy should be considered in patients with severe UC who seem unresponsive to intravenous corticosteroids while presenting with worsening clinical symptoms, or those who are unresponsive to infliximab or cyclosporin[47].

In urgency setting, surgical treatment is mostly indicated for massive hemorrhage or bowel perforation. Relative indications for surgery include severe UC and toxic megacolon unresponsive to active medical treatment (such patients should undergo surgical intervention early). In patients with medically refractory disease, an appendectomy may reduce the need for proctocolectomy, but this is still restricted to research protocols[51].

B) Perioperative management of refractory moderate to severe UC

B.1) Nutrition

Recommendation
- Preoperative nutritional support is recommended in severely malnourished patients. Iron supplementation is recommended when iron-deficiency anemia is present. **Agreement:** 100%[19,48].

Correction of altered body composition and nutritional imbalances is recommended preoperatively, despite limited evidence. Currently, available evidence does not support routine enteral or parenteral nutrition for improving surgical outcomes for patients with UC[48]. Nutritional status can be optimized before surgery by meeting nutritional needs with enteral nutrition if oral diet alone is insufficient[20].

B.2) Preoperative corticosteroids

Recommendation
- When feasible, a dose reduction of corticosteroids before urgent or elective surgery is recommended (below 20 mg/day for prednisolone but preferably below 10 mg/day) as steroids are associated to an increased risk of postoperative complications. **Agreement:** 95.5%[14].

Corticosteroids should be discontinued before restorative proctectomy or proctocolectomy as patients receiving 20 mg/day of prednisolone for at least 6 weeks are at increased risk for early and pouch-specific complications. If weaning is not possible, surgery should be postponed[48]. Corticosteroids should also be tapered after colectomy for patients with acute severe colitis (ASC). In addition, clinicians should be aware of the morbidity associated with prolonged adrenal suppression in some patients[14].

Preoperative steroids use significantly increases the likelihood of postoperative complications in patients with IBD. This risk of postoperative complications following abdominal surgery was investigated in 1,532 patients with IBD using steroids at the time of abdominal surgery. They demonstrated an increased risk of all postoperative complications (OR=1.41 [95%CI 1.07 to 1.87), as well as an increased risk of postoperative infectious complications (OR=1.68 [95%CI 1.24 to 2.28) among patients on steroids. Patients who received higher doses of perioperative oral steroids (>40 mg) had a higher risk of total complications (OR=2.04 [95%CI 1.28 to 3.26[21].

B.3) Preoperative immunosuppressants

Recommendation

- Postoperative complications are not impacted by preoperative treatment with thiopurines or cyclosporine. **Agreement:** 100%[48].

B.4) Preoperative biological agents and small molecules

Recommendation

- A three- or modified two-stage approach with delayed pouch construction are recommended in patients with preoperative exposure to biologics, as there can be an increased risk of early and late complications. Patients receiving biologics should avoid restorative proctocolectomy in a single stage. **Agreement:** 95.5%[48].

It should be noted that patients previously exposed to biological agents are at increased risk of pouch-specific complications. Thus, a 3-stage or a modified 2-stage approach with delayed pouch construction could be considered, as these strategies present lower leak rates, may reduce costs and hospital length of stay[48,52]. Narula et al. (2013) assessed in their meta-analysis the impact of perioperative use of biologics (TNFα antagonists) on postoperative complications such as infections and wound healing in 4,659 patients with IBD. Overall infections comprised the most common complication within 30 days of surgery. Studies in patients with UC did not demonstrate a significant increase in infectious (OR=1.39 [95%CI 0.56–3.45]), non-infectious (OR=1.40 [95%CI 0.68–2.85]), or overall complications (OR=1.10 [95%CI 0.81–1.47])[23]. However, due to surgical complexity, staged procedures are recommended. A safety study of tofacitinib in patients with rheumatoid arthritis, aged ≥50 years and with at least one known cardiovascular risk factor, revealed a significantly increased risk of venous thromboembolic events in patients treated with 10 mg twice daily tofacitinib compared with patients treated with anti-TNF agents. This risk was not observed in patients treated with 5 mg twice daily tofacitinib. Data on postoperative complications in patients using tofacitinib are scarce. Special attention for thromboembolic events is needed[53] (see item B.5).

B.5) Prophylaxis of venous thromboembolism

Recommendation

- Hospitalized patients with active UC are at high risk of venous thromboembolic events (VTE) during flares. Therefore, we recommend prophylactic anticoagulation. In postoperative patients exposed to tofacitinib therapy, we recommend prolonged prophylaxis of venous thromboembolism. **Agreement:** 91%[48,51,54].

Ulcerative colitis *per se* is considered an important risk factor for postoperative venous thromboembolic events, followed by age and obesity[55]. Preoperative exposure to tofacitinib may impose a risk to UC patients in the postoperative setting. Locations of VTE include portomesenteric venous thrombosis, internal iliac vein, and pulmonary embolism. There can be an increased risk of VTE in medically treated UC patients taking tofacitinib, despite evidence is concentrated in rheumatoid arthritis. Consideration should be given to prolonged VTE prophylaxis on hospital discharge in these cases[53]. Systemic corticosteroids are associated with a higher risk of VTE among IBD patients (OR=2.2 [95%CI 1.7–2.9; P<0.001). Biological agents are associated to a 5-fold decreased risk of VTE as compared to steroids (OR=0.267 [95%CI: 0.106–0.674; P = 0.005])[56].

C) Surgical options for elective surgery in UC
C.1) restorative proctocolectomy with IPAA

Recommendations

1. In patients with medically refractory UC, restorative proctocolectomy with IPAA comprises the most used surgical option. **Agreement:** 88.9%[46-48].
2. This procedure can be performed with conventional (open) or minimally invasive approach. A diverting loop ileostomy may be considered as it may reduce the consequences of an anastomotic leak. **Agreement:** 100%[46-48].
3. The type of anastomosis should be left to the surgeon's discretion. Stapling or hand sewn IPAA can provide comparable functional results, and mucosectomy is not always required. **Agreement:** 94.4%[46-48].

Restorative proctocolectomy with IPAA comprises the standard surgical option for elective surgery[15]. In medically refractory and steroid-dependent patients, despite the risk of complications, reconstructive surgery may be offered as it has been shown to improve quality of life[48]. A staged approach IPAA should usually be considered in patients treated with corticosteroids or biologicals[51]. A diverting loop ileostomy is generally recommended as part of a restorative proctocolectomy[49]. Surgical resection of the colon and rectum should be offered to patients who have chronically active symptoms despite optimal medical therapy. Because both IPAA and a total proctocolectomy with end ileostomy are equally effective in improving quality of life, the procedure of choice should be decided based on patients' preferences[11]. In addition, patients undergoing colectomy with concomitant UC and primary sclerosing cholangitis should be advised of an increased risk of pouchitis to support decision-making regarding the formation of an ileal pouch or a permanent ileostomy after total proctocolectomy[11].

Pouch surgery should be performed in specialized tertiary referral units, preferably in high-volume centers as these are associated with lower complication rates and higher rates of pouch preservation following complications. The more common pouch configuration is the J pouch, but S pouches can be used in selected cases. It is recommended that the maximum length of the anorectal mucosa between the dentate line and the anastomosis should not exceed 2 cm in IPAA[49]. There are no age restrictions for performing an IPAA, as long as the patient maintains a satisfactory functional anal sphincter[49].

C.2) Total proctocolectomy with permanent end ileostomy

Recommendation

- Patients with risk of pouch failure or inadequate pouch function (risk of anal incontinence due to limited sphincter function) may benefit from total proctocolectomy with end ileostomy. In patients with distal rectal high-grade dysplasia or neoplasia, a total proctocolectomy with permanent end ileostomy is recommended. Decision-making should be made according to patients' preferences. **Agreement:** 86.4%[46,48].

Patients with associated low rectal cancer or high-grade dysplasia, should undergo total proctocolectomy with permanent end ileostomy, as oncologic principles with distal and radial margins are mandatory[8]. In patients with impaired anal continence, IPAA is contra-indicated due to the risk of fecal incontinence and worse quality of life.

C.3) Total colectomy with ileorectal anastomosis

Recommendation

- Total abdominal colectomy with ileorectal anastomosis may be considered in selected patients. **Agreement:** 95.5%[51].

Although ileorectal anastomosis is associated with an increased risk of adverse outcomes (e.g., rectal dysplasia/cancer), it may be offered as an option to patients with UC with rectal preservation[48]. An ileorectal anastomosis can also be a reasonable alternative to IPAA. Advantages of the former include reduced morbidity and preserved female fecundity, which must be weighed against the need for rectal surveillance and subsequent proctectomy in 50% of cases[49].

D) Fertility and delivery modes

Recommendation

- For women with UC with previous subtotal colectomy and ileostomy, we recommend discussing inherent fertility risks associated to proctectomy and IPAA. Laparoscopic techniques are recommended aiming reduction of infertility. **Agreement:** 95.5%[11].

Expert opinion

- The risk of pregnancy complications, such as low newborn weight, prolonged labor, delivery-related complications, or the need for an unplanned cesarean section, is not increased after IPAA. **Agreement:** 95.5%[57,58].

Infertility can occur in women with UC, especially after surgical procedures such as IPAA or total. Proctocolectomy, due to pelvic adhesions. An available option to address this issue is assisted reproductive technology (ART). Women with UC showed no significant difference in pregnancy rates (OR=0.99 [95%CI 0.63–1.55) and live birth rates (OR=0.88 [95%CI 0.67–1.17) per cycle of ART compared with the general population. However, they had a reduced number of live births (HR=0.36 [95%CI 0.14–0.92) after IPAA failure[59]. Average infertility rates in the pre-IPAA stage were 20% and 63% in the post-IPAA stage, with a relative risk of infertility of 3.91 (95%CI 2.06–7.44)[60].

Pouch dysfunction may transiently occur during the third trimester of pregnancy, with post-partum function reverting to pre-pregnancy status regardless of the type of delivery[57]. Although the purported function-preserving advantage of cesarean section over vaginal delivery has not been proven, current long-term evidence suggests that vaginal delivery may impair post-IPAA function, and is not recommended[61].

Patients undergoing IPAA are at increased risk for impaired fecundity. Thus, a discussion regarding alternative surgical options (such as subtotal colectomy and end ileostomy or ileorectal anastomosis) for fertile female patients is warranted. In addition, a laparoscopic approach is preferred as it is associated with better preservation of female fertility[49].

E) Complications related to IPAA:
E.1) Anastomotic leaks

Recommendation

- The development of an anastomotic leak or bowel obstruction following surgery may be treated surgically if necessary. **Agreement:** 95.5%[15].

E.2) Pouchitis – acute, chronic, and refractory

Recommendation

- When an IPAA is performed, pouchitis comprises a common complication, and is classified by its response to antibiotic treatment. Pouchitis must be diagnosed based on clinical, endoscopic and histological features. **Agreement:** 91%[51,62].

Pouchitis is associated with several possible risk factors in extensive UC, including primary sclerosing cholangitis, being a non-smoker, ANCA-positive serology, and use of non-steroidal anti-inflammatory drugs[62]. Pouchitis may also be a late postoperative complication in UC patients[15]. Patients undergoing colectomy with coexistent primary sclerosing cholangitis are also at higher risk of pouchitis, warranting multidisciplinary discussion between IPAA or permanent ileostomy[11]. The differential diagnosis largely depends on early pouchoscopy, which is recommended in symptomatic patients with pouch dysfunction[62].

Patients with pouchitis should receive antibiotics as first-line therapy[15]. Treatment is generally successful with metronidazole or ciprofloxacin. Although there is no clear definition of the optimal alternative, adverse events are less common with the latter. In addition, antidiarrheal drugs may reduce the number of daily liquid stools, independently of the occurrence of pouchitis[62].

In refractory chronic pouchitis, alternatives to be considered are oral budesonide and topical tacrolimus. Biologics such as infliximab or vedolizumab are effective first-line treatment options[62]. The meta-analysis from Poo et al. (2022) compared the efficacy and

tolerability of treatment options in the management and prevention of acute and chronic pouchitis. They confirmed that antibiotics remain the mainstay of treatment and add weight to current guideline recommendations. Probiotics may deserve a more prominent role. For chronic pouchitis, metronidazole followed by probiotics had a statistically significant effect in inducing remission and probiotics proved to be superior to placebo in the prevention of pouchitis[63].

E.3) Pouch failure

Recommendation

- Multidisciplinary decision-making should be employed to manage pouch failure. Furthermore, possible causes of pouch dysfunction include anal pouch stenosis, pouch fistula, efferent limb [S-pouch] dysfunction, long rectal cuff and chronic presacral sepsis. **Agreement:** 91%[48,49].

Failure of the ileoanal pouch must be monitored in the long term. The meta-analysis of Alsafi et al. (2022) demonstrated the prevalence of pouch failure in patients over the age of 18 who have undergone a restorative proctocolectomy[64]. After 10 years of follow-up, the prevalence of pouch failure was 5%, while in the follow-up greater than 10 years this prevalence increased to 9%, with a pooled estimated prevalence in all periods of 6%[11,64].

F) Surgery in acute severe colitis (ASC)

Recommendations

1. A subtotal colectomy with end ileostomy is recommended in emergency surgery. Surgery is indicated for patients with ASC if no clinical improvement is observed within 2-4 days of optimized medical rescue therapy or massive hemorrhage. A toxic megacolon requires immediate surgical intervention. **Agreement:** 83.3%[19,46].
2. We recommend avoiding delays (>5 days of intensive care) in surgical indications as there can be an increase morbidity and mortality. **Agreement:** 83.3%[19,46].
3. Damage control principles recommend emergency colectomy for unstable patients and patients with colonic perforations. **Agreement:** 100%[19,46].

Patients with UC require emergency surgical intervention in cases of acute bowel perforation, major bleeding unresponsive to optimized medical therapy[54], bowel obstruction, and toxic megacolon. The procedure must be performed upon multidisciplinary discussion along with the patients consent, who should be previously informed of risks of complications and stomas[8]. In complicated UC (severe acute and refractory colitis), both open and laparoscopic approaches (subtotal colectomy and ileostomy) are appropriate in an emergency setting, according to the patient's clinical status[19]. In cases of ASC and signs of colonic distension, patients should be closely monitored with regular clinical follow-up and daily abdominal radiographs until clear clinical and radiographic improvement. These patients should undergo colectomy if there are clinical signs of toxic megacolon or worsening dilatation on abdominal radiography[14]. Patients with ASC with no response to 5 mg/kg of infliximab for 3 to 5 days after the first infusion may receive an accelerated induction regimen after surgical evaluation to determine whether emergency colectomy is necessary[11]. Surgery is generally recommended in cases of poor response to second-line therapy or rescue therapy with infliximab or cyclosporin for up to 5 days. Immediate surgery should be performed in cases of free perforation, life-threatening hemorrhage in unstable patients, peritonitis, or if the patient has massive bleeding[19]. Importantly, patients undergoing delayed or previously postponed surgeries are at increased risk for surgical complications; thus, early referral and direct involvement of specialized colorectal surgery and stoma care teams is warranted[11]. In cases of worsening ASC, patients may undergo a "rescue" diverting loop ileostomy to avoid an emergent total abdominal colectomy, mostly in units with no surgical expertise before referral[51].

F.1) Postoperative complications in acute severe colitis

Subtotal colectomy with an end ileostomy and rectal stump left in situ is the usual initial surgical treatment in patients ASC. Management of the rectal stump has been largely determined by surgeon preference on options including mucous fistula, subcutaneous placement or closure (stapling or hand-sewn)[65]. One of the most concerning adverse outcomes is rectal stump dehiscence. One study aimed to assess the incidence of morbidity and mortality related to rectal stump management after subtotal colectomy for UC in a local cohort plus a meta-analysis[65]. Mucous fistula was associated with lower pelvic sepsis/rectal stump dehiscence, as well as lower stump leak rates; however, mucous fistula and subcutaneous placement were associated with a higher incidence of wound infections. For pelvic abscess/sepsis, outcomes were worse in patients receiving stapled/hand-sewn management. Overall mortality was low, and no difference was identified between management alternatives. The study has not found evidence of clear-cut differences in complication rates between different management techniques of the rectal stump management. Results were consistent with another systematic review of patients undergoing emergency colectomy in UC, showing that the subcutaneous placement of the rectal stump was associated with the lowest pelvic sepsis rates and wound infection was lower in patients undergoing intra-abdominal closure of the rectal stump[66]. In this study, subcutaneous placement of the rectal stump was associated with the lowest rates of pelvic sepsis, complications, and mortality, at the expense of a higher wound infection rate.

It appears common practice to perform, in subtotal colectomy and end ileostomy for UC, a rectal stump closure at the rectosigmoid junction, above the peritoneal reflection[67,68]. This alternative is thought to avoid disturbance of the pararectal planes and disruption of the pelvic nerves, as well as reduce the difficulty of future pelvic dissection in case of future procedures[67] Subtotal colectomy with a closed rectal stump and end ileostomy should be the procedure of choice in ASC and that mucous fistula should be abandoned due to patient dissatisfaction and potential wound infections and complications.

CONCLUSION

The surgical management of IBD is associated to several specific and relevant details to consider different treatment choices. Multidisciplinary decisions are key in the pre, peri and postoperative management of IBD, both in acute and chronic setting. In this consensus, we highlight the different surgical indications, timing, approach, and techniques, aligned with perioperative and postop-

erative medication. We are aware of the limitations of studies in the surgical field in both CD and UC. We encourage future research to consolidate new insights to the surgical treatment of IBD.

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Authors' contribution

Zabot GP, Imbrizi M, Cassol OS, Quaresma AB, Gonçalves Filho FA, Baima JP, Saad-Hossne R: methodology, literature review, recommendations decision making, writing and review. Kotze PG: final review of the manuscript. Rolim AS, Carmo AM, Alves Junior AJT, Santos CHM, Sobrado Junior CW, Miranda EF, Albuquerque IC, Souza MM, Kaiser Junior RL, Parra RS: recommendations decision making.

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RESUMO – Contexto – Apesar da terapia medicamentosa otimizada, o risco contemporâneo de cirurgia nas doenças inflamatórias intestinais (DII) após 10 anos do diagnóstico é de 9,2% em pacientes com retocolite ulcerativa (RCU) e de 26,2% na doença de Crohn (DC) na era biológica. **Objetivo –** Este consenso visa detalhar as orientações para os procedimentos cirúrgicos mais adequados em diferentes cenários da DII. Além disso, detalha as indicações cirúrgicas e o manejo perioperatório de pacientes adultos com DC e RCU. **Métodos –** Nosso consenso foi desenvolvido por cirurgiões colorretais e gastroenterologistas representantes da Organização Brasileira de Doença de Crohn e Colite (GEDIIB), com a metodologia de revisão rápida sendo conduzida para respaldar as recomendações. As recomendações cirúrgicas foram estruturadas e mapeadas de acordo com os fenótipos da doença, indicações cirúrgicas e técnicas. Após a estruturação das recomendações, a metodologia modificada do Painel Delphi foi utilizada para conduzir a votação por especialistas em cirurgia de DII e gastroenterologia. Esta consistiu em três rondas: duas com recurso a uma plataforma de votação online personalizada e anônima e uma reunião presencial. Sempre que os participantes não concordavam com afirmações ou recomendações específicas, era oferecida uma opção de delinear possíveis razões para permitir respostas em texto livre e dar a oportunidade para os especialistas elaborarem ou explicarem a discordância. O consenso de recomendações/declarações em cada rodada foi considerado alcançado se houve concordância ≥80%. **Resultados e conclus**ão – Este consenso abordou as informações mais relevantes para orientar o processo de tomada de decisão para o manejo cirúrgico adequado de DC e RCU. Ele sintetiza recomendações desenvolvidas a partir de evidências e conhecimento de alto nível. As recomendações cirúrgicas foram estruturadas e mapeadas de acordo com os diferentes fenótipos da doença, indicações para cirurgia e manejo perioperatório. O foco específico do nosso consenso foi dado aos procedimentos cirúrgicos eletivos e de emergência, determinando quando indicar a cirurgia e quais procedimentos podem ser os mais adequados. O consenso é direcionado a gastroenterologistas e cirurgiões interessados no tratamento e manejo de pacientes adultos com DC ou RCU e apoia a tomada de decisões de pagadores de saúde, líderes institucionais e/ou administradores.

Palavras-chave – Doença de Crohn; colite ulcerativa; cirurgia; adultos; doenças inflamatórias intestinais; tratamento.

Supplementary material of the Brazilian Consensus in Ulcerative Colitis and Crohn's disease – surgical treatment

Defining the question to be answered in the rapid review

The acronym PICO-S (patient, intervention, comparator, outcome, and study design) indicated in TABLES S1-S9 describes the question to be answered regarding the surgical treatment of adult patients with Crohn's disease (CD).

TABLE S1. PICO strategy on criteria for the indication of elective surgery.

P	Adults (≥18 years) with abdominal CD
I	Elective surgery
C	Not applicable
O	Criteria for indication of elective surgery
Type of study	International guidelines and/or consensus published after 2016

Question: What are the criteria for indication of elective surgery in abdominal CD in adults, according to international guidelines and/or consensus?

TABLE S2. PICO strategy on management of abdominal CD.

P	Adults (≥18 years) with abdominal CD
I	Surgical management
C	Not applicable
O	• Nutrition • Prophylaxis of venous thromboembolism events (VTE) • Sepsis control • Corticosteroids • Immunosuppressants • Anti-TNF • Anti-integrin • Anti-interleukin
Type of study	International guidelines and/or consensus published after 2016

Question: How to clinically manage the abdominal CD, according to international guidelines and/or consensus?

TABLE S3. PICO strategy on management of abdominal CD in cases the of fistulizing disease.

P	Adults (≥18 years) with luminal CD of small intestine and colonic
I	Management of perianal or rectovaginal fistulizing disease
C	Not applicable
O	• Management of intra-abdominal abscess • Percutaneous drainage guided by imaging • Clinical treatment of intra-abdominal abscess • Surgical treatment of intra-abdominal abscess
Type of study	International guidelines and/or consensus published after 2016

Question: How to surgically manage the abdominal fistulizing CD, according to international guidelines and/or consensus?

TABLE S4. PICO strategy on management of abdominal CD - Stenosing disease.

P	Adults (≥18 years) with small bowel and colonic CD
I	Management of Stenosing CD
C	Not applicable
O	• Endoscopic treatment • Surgical Treatment (Stenoplasty and Resection)
Type of study	International guidelines and/or consensus published after 2016

Question: How to surgically manage the stenosing CD, according to international guidelines and/or consensus?

TABLE S5. PICO strategy on management of abdominal CD - Anal stenosing disease.

P	Adults (≥18 years) with small bowel and colonic CD
I	Management of CD - Anal stenosing disease
C	Not applicable
O	• Clinical and surgical treatment of anal stenosing disease
Type of study	International guidelines and/or consensus published after 2016º

Question: How to clinically and surgically manage the anal stenosing disease, according to international guidelines and/or consensus?

TABLE S6. PICO strategy on the management of CD as an incidental finding of appendicitis.

P	Adults (≥18 years) with small bowel and colonic abdominal CD with acute appendicitis
I	Management of Crohn's disease as an incidental finding of appendicitis.
C	Not applicable
O	Clinical and surgical treatment of CD as an incidental finding of acute appendicitis
Type of study	International guidelines and/or consensus published after 2016

Question: How to manage CD clinically and surgically as an incidental finding of appendicitis?

TABLE S7. PICO strategy on elective surgery techniques in abdominal CD.

P	Adults (≥18 years) with abdominal CD
I	Elective surgery
C	Not applicable
O	Surgical techniques for abdominal CD • Surgical access • Temporary ostomy (for the preservation of anastomosis) • Primary anastomosis • Laparoscopic resection • Type of anastomoses • Segmental colectomy • Derivation (no resection) • Total proctocolectomy with definitive ileostomy • Total proctocolectomy with ileoanal pouch • Total colectomy with ileorectoanastomosis • Fertility and delivery routes
Type of study	International guidelines and/or consensus published after 2016

Question: What are the elective surgery techniques for abdominal CD, according to international guidelines and/or consensus.

TABLE S8. PICO strategy on elective surgery techniques in CD with complex perianal fistula.

P	Adults (≥18 years) with luminal CD
I	Elective surgery for disease with complex perianal fistula
C	Not applicable
O	Surgical techniques for disease with complex perianal fistula • Seton placement • Endoanal flap advancement • Fibrin glue • LIFT (Ligation of the intersphincteric fistula tract) • Anal plug • VAAFT (Video-assisted anal fistula treatment) • FILAC Laser (laser closure tract) • Stem Cells: allogeneic and autologous • Intestinal diversion • Total proctocolectomy with ileostomy
Type of study	International guidelines and/or consensus published after 2016

Question: What are the elective surgery techniques for the abdominal CD with complex perianal fistula, according to international guidelines and/or consensus?

TABLE S9. PICO strategy on the treatment of refractory pelvic sepsis in CD.

P	Adults (≥18 years) with perianal fistulizing CD
I	Refractory pelvic sepsis treatment
C	Not applicable
O	• Clinical and surgical treatment of refractory pelvic sepsis
Type of study	International guidelines and/or consensus published after 2016

Question: How to treat CD refractory pelvic sepsis clinically and surgically?

The following acronym PICO-S (1) indicated in tables S10-S15 describes the question to be answered regarding the surgical treatment of adults with ulcerative colitis (UC).

TABLE S10. PICO strategy on the criteria for indication of elective surgery in UC.

P	Adults (≥18 years) with active UC
I	Elective surgery
C	Not applicable
O	Eligibility criteria for indication of elective surgery
Type of study	International guidelines and/or consensus published after 2016

Question: What are the criteria for indication of elective surgery in UC, according to international guidelines and/or consensus?

TABLE S11. PICO strategy on the perioperative management of refractory moderate to severe UC.

P	Adults (≥18 years) with refractory moderate to severe UC
I	Perioperative management
C	Not applicable
O	• Nutrition • Prophylaxis of VTE • Corticosteroids • Immunosuppressants • Anti-TNF • Anti-integrin • Anti-interleukin • JAK inhibitors
Type of study	International guidelines and/or consensus published after 2016

Question: How to clinically manage the perioperative phase of the refractory moderate to severe UC, according to international guidelines and/or consensus?

TABLE S12. PICO strategy on elective surgery techniques for refractory moderate to severe UC.

P	Adults (≥18 years) with refractory moderate to severe UC
I	Elective surgery
C	Not applicable
O	• Total proctocolectomy with ileal (reconstructive) • Total proctocolectomy with ileostomy • Total colectomy with ileorectoanastomosis • Surgical access • Temporary ostomy (for the preservation of anastomosis) • Primary anastomosis • Laparoscopic resection • Type of anastomosis • Fertility and delivery routes
Type of study	International guidelines and/or consensus published after 2016

Question: What are the elective surgery techniques for refractory moderate to severe UC, according to international guidelines and/or consensus?

TABLE S13. PICO strategy on complications related to the ileal pouch in severe UC.

P	Adults (≥18 years) with severe UC
I	Not applicable
C	Not applicable
O	Complications related to the ileal pouch: • Fistulas and dehiscence of anastomosis • Pouchitis (acute, chronic, and refractory) • Ileoanal pouch failure
Type of study	International guidelines and/or consensus published after 2016

Question: What are the complications related to the ileal pouch in severe UC, according to international guidelines and/or consensus?

TABLE S14. PICO strategy on the criteria for indication of urgent and emergency surgery in acute severe colitis (ASC).

P	Adults (≥18 years) with ASC
I	Urgent and emergency surgery
C	Not applicable
O	Criteria for indication of urgent and emergency surgery
Type of study	International guidelines and/or consensus published after 2016

Question: What are the criteria to indicate an urgent and emergency surgery in ASC, according to international guidelines and/or consensus?

TABLE S15. PICO strategy on complications related to total colectomy in urgency and emergence setting in ASC.

P	Adults (≥18 years) with ASC
I	Not applicable
C	Not applicable
O	Complications related to total colectomy in urgency and emergency • Intra-abdominal abscesses • Rectal stump dehiscence • Complications of ostomy
Type of study	International guidelines and/or consensus published after 2016

Question: What are the complications related to total colectomy in the urgency and emergence setting of patients with ASC, according to international guidelines and/or consensus?

Eligibility criteria of the rapid review

Inclusion criteria:

- Guidelines and/or international consensus with recommendations for the surgical treatment of adults (≥18 years) with CD or UC;
- Guidelines and/or consensus in English;
- Guidelines and/or consensus published in the last 5 years (from November 2016 until December 2021).

Exclusion criteria:

- Guidelines and/or consensus published before November 2016;
- Reviews of guidelines and/or consensus.

Search strategy

The search strategy was conducted on MEDLINE (National Library of Medicine of the United States and Medical Database of the National Institutes of Health, using the PubMed interface). TABLE S16 describes the search strategy used in the search for the electronic database. The total number of articles found may vary depending on the date of the search.

Screening of studies

The selection of title and abstract according to eligibility criteria was carried out through the Rayyan® Platform. The selected publications were evaluated in full text based on the inclusion and exclusion criteria. Two independent researchers screened the studies in a blinded fashion way and, in case of divergence, the decision was made with a third reviewer. The screening flowchart can be found in FIGURES S1.

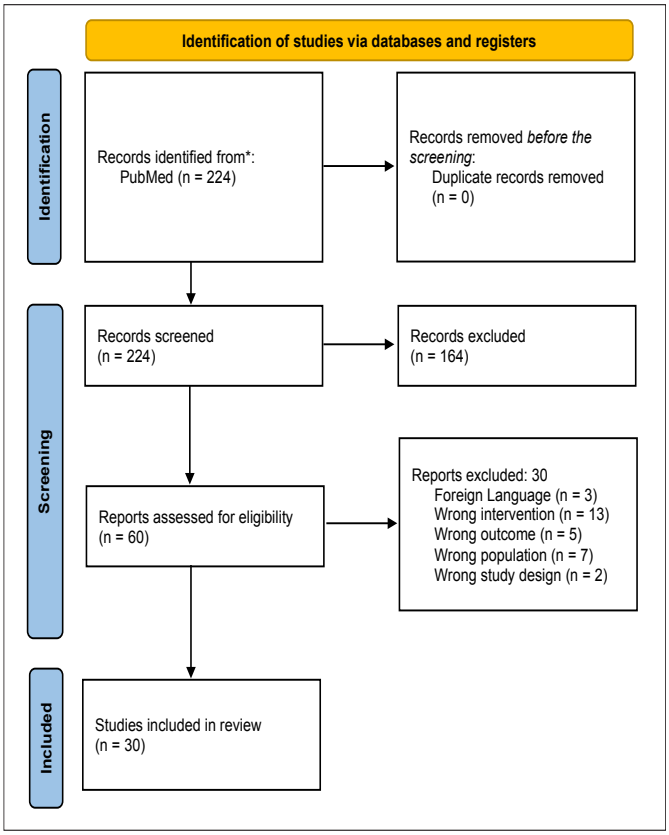

FIGURE S1. Screening flowchart of DC and UC studies.

Data recovery and extraction

The studies that met all the inclusion criteria and did not meet any of the exclusion criteria were retrieved electronically via the journal's website or appropriate database. The description of the studies includes the following data:

- Author, year;
- Recommendation according to the eligible variable;
- Quality of the evidence;
- Instrument used for the quality appraisal.

TABLE S16. Search strategy.

Disease	Search strategy	Results (titles)
DC	("inflammatory bowel disease "[Title] OR "IBD" [Title/Abstract] OR "Crohn" [Title] OR "DC" [Title/Abstract]) AND ("treatment" OR "management" OR "surgery" OR "surgical") AND ("consensus" [Title] OR "guidelines" [Title]) AND ((y_5 [Filter]) AND (English [Filter]))	119
UC	("inflammatory bowel disease" [Title] OR "IBD" [Title/Abstract] OR "ulcerative colitis" [Title] OR "UC" [Title/Abstract]) AND ("treatment" OR "management" OR "surgery" OR "surgical") AND ("consensus" [Title] OR "guidelines" [Title]) AND ((y_5 [Filter]) AND (English [Filter]))	103

Search conducted on December 7, 2021.

Quality assessment of the included studies

The Appraisal of Guidelines for Research & Evaluation Instrument (AGREE II) was used to evaluate the quality of the guidelines and/or consensus included in the pragmatic literature review. This instrument was developed to address the issue of variability in the quality of practice guidelines. Overall, researchers point out that the results of an AGREE II appraisal should be viewed with caution, as different guideline assessors may interpret the items and scoring system differently[48]. Therefore, AGREE II results were not used as an exclusion criterion in the current review but serve as an indicator of the quality of the reviewed guidelines. The assessment of the included studies using AGREE-II can be found in TABLE S17.

TABLE S17. Quality assessment of the Guidelines/Consensus by the AGREE-II Tool.

Authors	Title	Domain 1 score	Domain 2 score	Domain 3 score	Domain 4 score	Domain 5 score	Domain 6 score	Overall assessment
Adamina et al., 2020	ECCO guidelines on therapeutics in crohn's disease: surgical treatment	100.0	61.1	87.5	100.0	8.3	100.0	76.2
Bemelman et al., 2017	ECCO-ESCP consensus on surgery for Crohn's disease	66.7	61.1	81.3	100.0	33.3	100.0	73.7
Biroulet et al., 2016	French national consensus clinical guidelines for the management of Crohn's disease	66.7	61.1	33.3	83.3	0.0	50.0	49.1
Bouchard et al., 2018	Management of anoperineal lesions in Crohn's disease: a French National Society of Coloproctology national consensus	66.7	66.7	54.2	100.0	8.3	50.0	57.6
Brown et al., 2018	The Association of Coloproctology of Great Britain and Ireland consensus guidelines in surgery for inflammatory bowel disease	66.7	66.7	87.5	100.0	50.0	100.0	78.5
Choi et al., 2017	Second Korean guidelines for the management of ulcerative colitis.	72.2	38.9	68.8	77.8	37.5	58.3	58.9
de Simone et al., 2021	WSES-AAST guidelines: management of inflammatory bowel disease in the emergency setting	100.0	66.7	72.9	94.4	45.8	100.0	80.0
Gionchetti et al., 2016	3rd European evidence-based consensus on the diagnosis and management of Crohn's disease 2016: part 2: surgical management and special situations.	66.7	61.1	87.5	100.0	8.3	100.0	70.6
Holubar et al.,	The American Society of Colon and rectal surgeons clinical practice guidelines for the surgical management of ulcerative colitis.	66.7	66.7	87.5	100.0	50.0	100.0	78.5
Lamb et al., 2019	British Society of Gastroenterology consensus guidelines on the management of inflammatory bowel disease in adults	100.0	100.0	100.0	100.0	95.8	100.0	99.3
Lee et al., 2017	Association of coloproctology of Great Britain and Ireland Consensus Exercise on Surgical Management of Fistulating Perianal Crohn's Disease	66.7	66.7	14.6	61.1	0.0	100.0	51.5
Lightner et al., 2020	The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Surgical Management of Crohn's Disease	66.7	66.7	89.6	94.4	54.2	100.0	78.6
Magro et al., 2017	Third European Evidence-based Consensus on diagnosis and management of ulcerative colitis. Part 1: definitions, diagnosis, extra-intestinal manifestations, pregnancy, cancer surveillance, surgery, and ileo-anal pouch disorders.	77.8	61.1	70.8	88.9	62.5	83.3	74.1
Matsuoka et al., 2018	Evidence-based clinical practice guidelines for inflammatory bowel disease	83.3	61.1	66.7	83.3	50.0	66.7	68.5
Park et al., 2018	Second Korean guidelines for the management of Crohn's disease	88.9	72.2	85.4	88.9	58.3	58.3	75.3
Sood et al., 2019	Diet and inflammatory bowel disease: the Asian Working Group guidelines	66.7	50.0	27.1	61.1	0.0	50.0	42.5
Spinelli et al., 2021	ECCO Guidelines on therapeutics in ulcerative colitis: surgical treatment.	100.0	61.1	87.5	100.0	8.3	100.0	76.2
Steinhart et al., 2019	Clinical practice guideline for the medical management of perianal fistulizing Crohn's Disease: the Toronto Consensus	77.8	72.2	79.2	72.2	66.7	83.3	75.2
Wei et al., 2017	Management of Crohn's disease in Taiwan: consensus guideline of the Taiwan Society of Inflammatory Bowel Disease	55.6	38.9	25.0	61.1	37.5	8.3	37.7

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