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Editorial

Controversies and Future of Minimally Invasive Surgery for Inflammatory Bowel Disease[☆]



Controversias y futuro de la cirugía mínimamente invasiva en el tratamiento de la enfermedad inflamatoria intestinal

Although surgery for inflammatory bowel disease (IBD) is today well standardized with guidelines for each disease and operation, there are still some controversies remaining about surgery for IBD. The aim of this paper is to discuss briefly some hot controversial topics on surgery for IBD for whom evidence is probably lacking.

Should We Propose Extensive Mesenteric Resection in Patients Operated for Crohn's Disease?

To date, ileocecal resection (ICR) for Crohn's disease (CD) requires resection of the diseased small bowel and the caecum, with a 2-cm margin, but mesentery is most of the time left in place, with either close small bowel resection or for many surgeons, only partial, non-oncologic mesenteric resection. However, a recent study proposed to possibly change the paradigm with an extensive oncologic mesenteric resection, similarly to what is proposed in case of right colonic cancer. In this study, Coffey et al.¹ compared long-term surgical recurrence rates between 30 patients who underwent conventional ICR (without extensive mesenteric resection) and 34 patients in whom resection included also the mesentery. They showed that CD recurrence was significantly higher when the mesentery was left in place (40% vs 2.9% after mesenteric resection, $P = .003$). However, in this paper, mean follow-up was shorter in patients undergoing mesenteric resection (52 vs 70 months). Furthermore, the retrospective nature of the paper suggested possible bias for the analysis of the study. Moreover, the good long-term results observed after side-to-side long strictureplasty² (by definition without any mesenteric resection) questioned about the possible benefit of mesenteric resection in CD. To our knowledge, at least 2

randomized studies (one from US and one from China) are still in progress. Until publication of these studies, it seems difficult without more evidence to propose extensive mesenteric resection for all the patients undergoing ICR for CD.

Total Mesorectal Excision for All Patients Undergoing Abdominoperineal Resection With Definitive End Ileostomy for Crohn's Disease?

Total mesorectal excision (TME) is today the gold standard for surgical treatment of low and mid rectal cancer since its description by Heald. In benign disease, such as CD, TME is most of the time not performed, in order to avoid empty pelvis, for 2 main reasons: risk of sexual disorder, and reduction of pelvic abscess and perineal complications. De Groof et al.³ have recently evaluated outcomes in terms of perineal complications and healing in 37 patients who underwent close rectal dissection (without TME) in comparison with 17 patients who underwent TME for CD. They showed in case of close rectal dissection a higher rate of perineal complications (59.5 vs 17.6% after TME, $P = .007$) and late complications (48.6 vs 11.8%, $P = .014$), leading to lower perineal healing rate at 6 months (51.4 vs 88.2%, $P = .014$). For the authors, the persistent mesorectal inflammatory activity explained these complications observed after proctectomy in CD. On the opposite, filling the pelvis with well vascularized tissue such as omentoplasty (without negative inflammatory impact) allowed to reduce complications with the same adverse effect observed with mesorectum. Although it is the first study on this topic, the clinical results observed in this paper and the in vitro findings are convincing. For this reason, based on these preliminary results, which probably need to be confirmed, performing TME during proctectomy for CD, followed by omentoplasty, seems

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to be a reasonable attitude in order to reduce perineal complications in such patients.

Is There Still a Place for Single-port Surgery in IBD Patients?

Multiport laparoscopy (MPL) approach is today the standard approach for IBD surgery, and especially for ICR, subtotal colectomy and ileal pouch-anal anastomosis (IPAA). More recently, single-port laparoscopy (SPL) approach has been proposed in order to possibly provide better cosmetic results, lower postoperative pain, and maybe shorter length of stay. Spinelli et al.⁴ have compared postoperative outcomes after ICR for CD between 156 MPL and 101 SPL procedures. They reported significant lower pain scores, resulting in lower postoperative analgesia requirement, when SPL procedure was performed. However, there was no difference between MPL and SPL regarding length of stay and postoperative complications rates. Watanabe et al.⁵ have published the first large randomized trial in colonic cancer surgery, in which patients were allocated into MPL (n = 100) or SPL (n = 100) group. They showed no differences between groups in terms of pain score, amounts of analgesia, length of stay, and intraoperative or postoperative complication rates. More recently, we have compared in a multicenter, double-blinded, and randomized controlled trial,⁶ the results of 125 patients who underwent laparoscopic colonic resections for benign or malignant disease, according to the MPL (n = 63) or SPL (n = 62) approach. Similarly, no difference was observed between the 2 groups regarding intraoperative complication rate, postoperative pain, and length of stay. The only difference concerned total length of skin incision, significantly shorter in the SPL group (87 ± 40 vs 56 ± 41 mm, $P = .001$), with more satisfaction about the scar aspect in the same group ($P = .003$). Considering the results of these 2 randomized trials, SPL appears to be a safe procedure, but does not seem to confer any additional benefit other than cosmetic result in comparison with MPL colectomy. Thus, SPL cannot be imposed as a gold standard approach for laparoscopic IBD surgery.

Is Transanal Approach the New Standard for Ileal Pouch-anal Anastomosis in Ulcerative Colitis?

Transanal approach (TA) has been initially considered for the treatment of low rectal cancer, with the intent to overcome the difficulties observed during laparoscopic TME, especially in a narrow pelvis. In a similar way, TA is now proposed in some IBD expert centers for proctectomy and IPAA in ulcerative colitis (UC) patients. In 2016, 2 studies suggested the feasibility and safety of TA proctectomy for IPAA for either completion proctectomy after subtotal colectomy⁷ or primary IPAA.⁸ More recently, De Buck van Overstraeten et al.⁹ published the first large study which aimed to compare surgical outcomes of 97 IPAA with TA to 119 with standard laparoscopic approach. They showed that TA-IPAA is a safe procedure which seems to be associated in case of morbidity with less severe morbidity, lower conversion rate, and shorter length of stay than standard laparoscopy. However, a randomized study is still

lacking (same situation than TME for rectal cancer !) before considering TA as the best approach for IPAA.

Is There a Place for Less Invasive Surgery in Ulcerative Colitis Patients?

Today, the gold standard of surgery for UC is restorative total colectomy with IPAA. The only alternative is total colectomy with ileorectal anastomosis (IRA) which can be proposed in selected patients with UC (i.e. subnormal rectum, short history of UC, no previous treatment for proctitis, no dysplasia or cancer). Guidelines recommend to perform both operations, especially IPAA, by laparoscopy, in order to reduce postoperative complications and to preserve female fecundity, thanks to a reduction in visceral and pelvic adhesions.¹⁰⁻¹²

However, times are changing, and new studies have recently been published in the literature, proposing new surgical approaches in UC patients. Segmental colectomy (SC) instead of IRA or IPAA has been recently proposed by Khan et al.¹³ in 25 UC patients with colonic cancer, with the idea that in aged and high-risk patients, SC could represent an attractive option. During long-term follow-up (7 years), none of patients treated by SC developed a metachronous cancer in the retained colon. Also, need for reoperation and survival rate were both similar to what observed in this study in the 34 UC patients who underwent IPAA. In order to provide more evidence suggesting the feasibility of SC in selected patients with UC. We recently conducted a multicentric study with 72 UC patients undergoing SC. Our study suggested that SC is feasible without a high risk of postoperative severe colitis and low risk of reoperation for colitis or cancer, provided that no active colitis was present at the time of SC (unpublished results). Thus, and even if more evidence are still needed, SC can probably be proposed in aged patients with colonic cancer and without active colitis.

Another less invasive surgical option is represented by appendectomy for refractory UC. The modulating effect of an appendectomy on the disease course of therapy-refractory ulcerative colitis have been recently evaluated in 30 patients.¹⁴ This strategy seems to be effective in one-third of therapy-refractory UC patients, with a substantial proportion of patients demonstrating complete endoscopic remission after 1 year: after 12 months, 9 patients (30%) had lasting clinical response, of whom 5 (17%) were in endoscopic remission. After a median of 13 weeks (range 7–51), pathological response (on 28 patients) was seen in 13 patients (46%). Appendicular inflammation was highly predictive of pathological response when compared with no inflammation or extensive ulcerations (85% vs 20%, $P = .001$). Thus, and because appendectomy is a minor surgical treatment without high risk for the patient, this strategy is very promising. However, only a randomized study will be able to answer the question of the future place of appendectomy in refractory UC patients. Moreover, as we have already shown in our study¹⁵ evaluating the effect of appendectomy on colitis and colonic neoplasia in an animal model of colitis and a cohort of patients with UC, appendectomy without appendicitis seems associated with an increased rate of colonic high-grade dysplasia (HGD) or cancer.

Last less invasive surgical option concerns patients with acute colitis for whom surgery is indicated. In this case, guidelines recommend to perform only one operation: laparoscopic subtotal colectomy (LSC) with end ileostomy. The only question remaining after subtotal colectomy is what to do with the rectal stump: sigmoidostomy? Closed rectal stump with Hartman's? Recently, a simple loop ileostomy instead of subtotal colectomy has been proposed by Russel et al.,¹⁶ with the idea that LSC could be associated with higher risk of postoperative complications because of the heightened inflammatory state, nutritional deficiencies and immunocompromised state. For these reasons, authors hypothesized that rescue diverting ileostomy might be a variable alternative, in order to ensure patient optimization before definitive surgery. Among 19 patients with UC undergoing diverting ileostomy, only 2 (12%) required urgent/emergent colectomy. And at the end of follow-up, 4 UC patients (22%) avoided colectomy. All the other patients improved their nutritional status before undergoing an elective laparoscopic IPAA. Authors concluded that rescue diverting loop ileostomy in the setting of severe, refractory IBD-colitis is a safe and effective alternative to emergent colectomy, with acceptably low complication rates and affords patients time for medical and nutritional optimization before definitive surgical intervention. This strategy of loop ileostomy is also promising but needs probably more evidence in patients for whom rescue subtotal colectomy can save the life. Thus, it seems difficult, with only one retrospective study, to propose this attitude in acute colitis refractory to medical treatment.

In conclusion, surgery for IBD patients is continually in evolution. The truth of today has probably a very short half-time. And tomorrow, new advances will be proposed. However, among the new strategies discussed in this short review, some will probably be confirmed in the near future, and some others definitely abandoned! If we take a risk and propose one that probably will stay and one that will disappear, we will propose segmental colectomy, as a good alternative to IPAA in aged patients with colonic cancer... and ileostomy, as a dangerous procedure in severe acute colitis patient. For some other options (mesenteric resection, TME for CD, transanal approach, appendectomy), results are promising, but more evidence is strongly needed. And for single port, it is maybe the beginning of the end...

Conflict of Interest

No financial disclosure or conflict of interest.

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