For IBD surgical management, laparoscopic approach offers several theoretical advantages over the open approach. However, the frequent presence of adhesions from previous surgery and the high rate of inflammatory lesions have initially questioned its feasibility and safety. In the present review article, we will discuss the role of laparoscopic approach for IBD surgical management, along with its potential benefits as compared to the open approach.

**Key-words:** Laparoscopic approach, Crohn’s disease, ulcerative colitis, ileal-pouch anal anastomosis

**INTRODUCTION**

Despite recent advances in medical treatment, surgical procedure remains a key feature of inflammatory bowel disease (IBD) management, as 70% of patients with Crohn’s disease (CD) and 20-30% with ulcerative colitis (UC) will require surgery in the course of their disease¹. For IBD surgical management, laparoscopic approach offers several theoretical advantages over open approach:

1) IBD patients are often young and active patients, for whom quick return to normal activity and cosmetic results are mandatory,

2) Reduction of adhesions after laparoscopic approach² might facilitate recurrent resection, as CD recurrence is often observed after surgery and half of the patients will require more than one surgical procedure during their lifetime³,⁴,

3) Reduction of pelvic adhesions might also improve postoperative female fertility,

4) Short-term benefits of the laparoscopic approach, demonstrated for malignant disease⁵-⁸ and for diverticulitis⁹, might be also observed for IBD, and

5) Laparoscopic approach might reduce long-term risk of small bowel obstruction and postoperative hernia¹⁰.

However, frequent denutrition of the patient, recent use of steroids, presence of adhesions from previous surgery (rising from multiples steps procedures in UC or recurrences in CD), and the high rate of inflammatory lesions observed (including thickened bowel loops, inflammatory mass, thickened and fragile mesentery, and unexpected fistulas or abscesses) have initially questioned the feasibility and safety of the laparoscopic approach for IBD surgical management. In the present review article, we will discuss the role of laparoscopic approach for IBD surgical management, along with its potential benefits as compared to the open approach.

**CROHN’S DISEASE OF THE SMALL BOWEL**

**Feasibility**

Feasibility of laparoscopic approach for CD surgical management has been initially questioned because of the high rate of inflammatory lesions observed and because of the frequent intra-abdominal adherences rising from iterative procedures for recurrence management. The rate of conversion to laparotomy may be seen as a good criterion to assess this feasibility.

The preliminary experiences of laparoscopic CD management, published as early as 1995¹¹-¹³, reported high conversion rates (up to 19%), probably related to the learning curve. However, more recently, 3 meta-analyses reported a better feasibility with pooled conversion rates ranging from 6% to 11%, which compares favorably to those observed for other pathologies. A prospective study from our institution¹⁴, including 69 patients who underwent an ileocolic resection for CD, identified several risk factors for conversion. In univariate analysis, more than 3 acute flares of CD prior to surgery, male gender, preoperative immunosuppressive medication (azathioprine or 6-
MP), intra-abdominal abscess or fistula, and resection of an additional intestinal segment were identified as potential risk factors for conversion. In multivariate analysis, only intra-abdominal abscess or fistula, and resection of an additional intestinal segment were assessed as independent risk factors for conversion.

SHORT-TERM POSTOPERATIVE RESULTS

To date, the largest reported experience with laparoscopic management of CD from a single center was published in 2009 by the Mount Sinai Medical Center in New York, USA. The authors included 335 laparoscopic resections over a 15 years period, including more than 70% performed for CD of the small bowel. Postoperative mortality was nil and postoperative complication occurred after 13% of the procedure, including 4% that required emergent reoperation. The most commonly observed complications were postoperative bowel obstruction and anastomotic leak.

Two randomized control trials and many comparative non-randomized studies compared the results of laparoscopic and open approaches for selected patients with uncomplicated stenotic form of small bowel CD. The large majority of these studies were included in three meta-analyses with consistent results: as compared to the open approach, laparoscopic approach is associated with similar intra-operative blood loss, the same or lower postoperative morbidity rate, a faster return to bowel function, and a shorter postoperative hospital stay. In those meta-analyses, the pooled conversion rate ranged from 6% to 11% of the procedures. In the light of these results, as the authors of one of the meta-analyses concluded, laparoscopic resection for small bowel CD management appears to be safe for selected patients with non-complicated disease, and offers substantial advantages over the open approach.

LONG-TERM RESULTS

Eshuis et al. assessed and compared long-term risk of recurrence and quality of life after laparoscopic and open approaches for CD surgical management. The prospectively enrolled 78 patients with ileoceleal resection for CD, 30 performed by laparoscopic approach and 48 by open approach. After a mean follow-up of nearly 9 years, neither recurrence rate nor quality of life showed any difference between the 2 groups. Bergamashi et al. later confirmed these results in a retrospective study including 92 patients (39 laparoscopic and 53 open cases). The authors reported that the 5-year recurrence rates were similar in both groups but also that the median time showed no difference between the two groups (48 vs. 56 months). Finally, the Cleveland clinic foundation published in 2008 the long-term follow of a prospective randomized trial. At ten years after index procedure, the authors did not show any difference between the two approaches in terms of recurrence rate or medical medication required.

PERFORATING OR RECURRING CD

The large majority of patients included in the previously discussed studies were highly selected patients and therefore did not present any complications rising from a perforating phenotype or intra-abdominal adherences rising from a recurrent disease after previous surgery. In 2009, we reported our experience with laparoscopic management of 54 patients with such complex CD, as compared to 70 patients without complex CD. No difference was shown between the two groups in terms of postoperative mortality, morbidity, or length of hospital stay. However, patients with complex CD had a significantly longer operative time, a higher risk of conversion to open approach, and a higher risk of diverting stoma. These results were consistent with those published in a second study from our institution, which specifically focused on recurring CD, highlighting that laparoscopic approach was safe and effective, even for complex CD.

COLORECTAL IBD

Acute severe colitis

Acute colitis occurs in up to 20% of patients with UC and in 5 to 10% of patients with CD. Both European and American guidelines state that a total abdominal colectomy without digestive Anastomosis should be performed when patients do not respond to medical therapy or present a surgical complication (perforation, hemorrhage, or toxic megacolon).

We reported the results of laparoscopic approach for acute severe colitis surgical management in 40 patients. As compared to 48 patients performed through an open approach, we did not observe any difference between the 2 groups in terms of postoperative morbidity or postoperative recovery. These results were consistent with those reported in other studies. A recent study even reported that laparoscopic total abdominal colectomy was associated with lower intra-operative blood loss and a shorter hospital stay, as compared to the open approach. Furthermore, Seshadri et al. suggested that laparoscopic approach might be associated with a lower rate of long-term complications, including incisional hernia and bowel obstruction. More recently, Fichera et al. published their experience with total abdominal colectomy for refractory colitis performed through a single incision laparoscopic approach with encouraging results. However, further studies are required to confirm the benefits of this emerging technique.

In the light of these results, we routinely managed acute severe colitis through a laparoscopic approach, with the exception of colitis complicated with perforation or toxic megacolon.

ILEAL POUCH-ANAL SURGERY

Ileal pouch-anal surgery is the standard procedure for UC management. It may also be performed in highly selected cases of colorectal CD, as an alternative to end ileostomy.
A meta-analysis, published in 2006 included 10 studies comparing laparoscopic and open approaches for ileal pouch-anal anastomosis (IPAA) for UC. Feasibility of laparoscopic IPAA appeared satisfactory with low reported conversion rates (nil in 5 studies) and lower intra-operative blood loss, as compared to the open approach. Postoperative morbidity showed no difference between the 2 groups, but time to first bowel movement and length of hospital stay were significantly shorter in the laparoscopic group. In one of the largest single center experiences to date, the Mayo Clinic compared short-term outcomes of 100 laparoscopic IPAA (including 97 for IBD) to 200 open IPAA. The authors did not showed any difference in terms of overall postoperative morbidity between the two groups but highlighted a trend toward a lower rate of intra-abdominal abscess after laparoscopic approach.

Data regarding long-term outcomes of laparoscopic IPAA are scarce. A study from the University of Chicago and the Weill Medical College of Cornell University in New York compared long-term functional results and quality of life of open and laparoscopic IPAA and did not highlighted any discrepancy between the two groups. Furthermore, laparoscopic IPAA is associated with less severe intra-abdominal adhesions than open approach, leading to a lower risk of postoperative small bowel obstruction, as suggested in the study from Chicago and an improve postoperative pregnancy rate in women, as very recently published multicenter study from Belgium and The Netherlands.

Finally, most of the published cases of laparoscopic IPAA were performed through an hand-assisted approach, that required an additional Pfannenstiel incision. We reported our experience with a totally laparoscopic technique that appeared feasible and safe with satisfactory conversion rate and acceptable postoperative morbidity.

**CONCLUSION**

Laparoscopic approach for IBD surgical management has demonstrated its safety and efficiency. For CD management, it is associated with improved postoperative outcomes in terms of postoperative morbidity, postoperative recovery, and length of hospital stay, as compared to the open approach. It should therefore be proposed to all patients with uncomplicated CD. In case of perforating or recurring CD, laparoscopic approach is also feasible in experienced hands. For UC management, laparoscopic IPAA is associated with similar short term outcomes compared to the open approach but long-term benefits with improved fertility and reduced risk of small bowel obstruction.

**SUMMARY**

**LAPAROSKOPSKI PRISTUP ZAPALJENSKIM Bolestima creva - Hirurško lečenje**

U hirurškom lečenju zapaljenih bolesti creva (IBD), laparoskopski pristup, teoretski, pruža više prednosti u odnosu na otvoreni pristup. Medjutim, često postojanje adhezija od prethodnih operacija i učestalost zapaljenih promena su inicijalno dovodili u pitanje izvodljivost operacija laparoskopskim pristupom. U ovom pregledu razmatrano ulogu laparoskopskog pristupa kod IBD i potencijalnu korist u porodjenju sa otvorenim pristupom.

**Ključne reči:** laparoskopski pristup, kronova bolest, ulcerativni kolitis, ilealni-pauč analna anastomoza

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