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Review Article

COLON BENIGN DISEASES MANAGED WITH LAPAROSCOPIC COLON RESECTION-REVIEW

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Abstract:

After proving its place in the treatment of benign diseases, laparoscopic colon surgery as a minimally invasive surgical approach is now expanding in the treatment of cancers. In this review, we will cover the circumstances in which it can be employed in GI disease, as well as the approaches. Up until the end of 2021, the PubMed, Embase, and Google Scholar databases were searched for published studies with English language and human subject's management of benign GI disorders using laparoscopic colon resection. Laparoscopic colon surgery has been utilized for many years and is highly accepted in the medical world as an alternative for benign disease operations. Temporary benefits include much decreased postoperative discomfort, a speedier recovery of bowel function, and a shorter length of stay. As technology advances and clinicians become more at ease and proficient with minimally invasive procedures, these procedures may be offered to patients with increasingly complex issues. With more experience, operative times decrease and keep sizes are reduced, resulting in lower total expenses.

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INTRODUCTION:

Since the introduction of laparoscopic surgery in the early 1990s, Laparoscopy has been shown in multiple multicenter randomized clinical trials (RCTs) to be a safe and feasible approach in colorectal surgery. These studies have focused on benign diseases like diverticulitis and ulcerative colitis (UC), pre-malignant diseases like familial adenomatous polyposis (FAP), and lethal diseases like colorectal cancer [1], [2]. Laparoscopic surgery has several advantages, including a shorter postoperative hospital stay, less perioperative blood loss, less postoperative pain, and cosmetic advantages. Long-term monitoring will almost probably indicate fewer incisional hernias and bindings. However, there are currently insufficient data. Morbidity and oncologic follow-up for open and laparoscopic colorectal surgery have been reported to be comparable [3]. The disadvantages are the longer operating time, greater costs, and the need for an experienced cosmetic surgeon, because it takes at least 20 surgeries to find the finding out curve [4]. Several people endure a combination of physical and psychological concerns for a lengthy period of time following colorectal surgery for cancer. Patients' well-being is unavoidably influenced by signs and symptoms such as exhaustion, discomfort, and altered bowel function, as well as difficulties in social and functional functioning. Assessment of self-reported quality of life is thus critically important in medical examinations, especially given the increased costs of laparoscopy and its cost-effectiveness. Furthermore, it has been demonstrated in cancer studies that assessing quality of life may contribute to better therapy [5].

METHODOLOGY:

Up until the middle of 2021, the PubMed, Embase, and Google Scholar databases were searched for published studies with English language and human subject's management of benign GI disorders using laparoscopic colon resection. Moreover, we included reviews and randomized control studies, we excluded all case reports, in our search strategy we scanned the references list of our included studies for more relevant articles.

DISCUSSION:**Laparoscopic intervention for Inflammatory bowel disease:**

It has been discovered that patients suffering from inflammatory bowel disease (IBD) have a greater lifetime risk of requiring surgical treatment. People with Crohn's disease (CD) have an 80% likelihood of having a colectomy, but patients with ulcerative colitis (UC) have a 30% to 40% chance [6]. Patients are increasingly seeking care from specialized colorectal

facilities that use laparoscopic therapy of IBD due to their relatively younger age and the risk of requiring multiple surgeries. Laparoscopic surgery for IBD has been linked to some transitory benefits similar to those described in colon cancer. Furthermore, academic long-term benefits include less adhesions, lower rates of intestinal blockage, a lower risk of chronic discomfort, and a lower incidence of infertility or accident hernias [6], [7].

The visibility of inflammatory alterations, enlarged mesentery, avoid lesions, and fistulas and abscesses in Crohn's disease affecting the colon makes the laparoscopic technique to surgical therapy more problematic. However, the indications for surgical operation remain the same as with open techniques [7]. According to one testimonial, up to three different minimally invasive procedures, such as diagnostic laparoscopy, diversion procedures, and intestinal resections, can be performed using pure laparoscopic techniques or hand-assisted methods. However, only two randomized controlled trials have been published, with numerous short comparative case series, making it extremely difficult to compare the superiority of laparoscopic procedures to traditional open results [8-10]. Milsom and colleagues randomized 60 CD patients to elective laparoscopic-assisted (n = 31) or open (n = 29) ileocolic resection [8]. They found that the laparoscopic group had a decreased frequency of minor problems (4 versus 8, P0.05), as well as a much faster recovery to preoperative pulmonary function (2.5 versus 3.5 days, P =0.03). Surprisingly, total morphine demands and bowel function recovery did not differ significantly between groups, although operative duration was significantly shorter in the open group (140 45 versus 85 21 mins, P0.0001). As expected, the incision size was significantly less in the laparoscopic group (5.3 1.6 versus 12.7 5.5 cm, P0.0001). Recently, Maartense and colleagues [9] used a similar relative technique with 60 CD patients in a second experiment. Within the laparoscopic resection group, they found substantially shorter hospital stays (5 against 7 days, P =0.008), lower 30-day postoperative morbidity rates (10% versus 30%, P =0.028), and lower overall prices over 3 months (€6412 compared €8196, P = 0.042). Surprisingly, no significant difference in quality of life was detected between the two groups using the SF-36 Health Survey and the Gastro-Intestinal Quality of Life Index. Based on the results of these two randomized controlled trials, it is clear that laparoscopic ileocolic resection for CD is superior to open procedures, as well as providing an evident cosmetic advantage [11]. It should be emphasized that the short-term benefits of laparoscopic surgical procedures for CD have also

been supported by a recent meta-analysis [12]. Finally, long-term results of laparoscopic ileocolic resection for CD have yet to be determined in clinical trials. As a result, claimed long-term advantages associated with the laparoscopic procedure remain theoretical and should not be used to justify choosing this technique over a typical open strategy. The surgical care of UC with minimally invasive procedures is complex and has previously been limited to highly trained laparoscopic surgeons working in specialized locations. Laparoscopic subtotal colectomy, overall proctocolectomy, and restorative proctocolectomy are the three operations now performed [13]. These operations, like open surgical techniques, necessitate the mobilization of the whole colon as well as the removal of a number of critical vascular pedicles. This site of laparoscopic colon surgery has mirrored the advancement of operative experience inside specialized colorectal centers, and has been aided by the development of laparoscopic contemporary technologies. Many early studies on the subject reported significantly inferior postoperative outcomes in UC patients treated laparoscopically compared to those receiving typical open treatments, as well as lengthier surgical periods of around 8 hours [14], [15]. However, data from case-controlled trials have recently revealed that patients undergoing laparoscopic surgical therapy for UC had no poorer results than those undergoing open procedures, despite operational times that have remained to be significantly longer in several series [16]. In fact, many groups have reported shorter postoperative stays in the hospital by around one day in their laparoscopic groups, as well as superior body image data and comparable practical outcomes [17-19]. Larson and colleagues recently found comparable functional outcomes after a median follow-up of 13 months in patients who had had laparoscopic (n = 33) or open (n = 33) ileal pouch-anal anastomosis for UC or familial adenomatous polyposis [19]. Despite several publications confirming the safety and utility of laparoscopic surgery for UC in expert hands, no comparison randomized trial with open surgical treatment has been completed. As a result, the existing level of evidence in literary works is insufficient to establish that one method is superior to another. Nonetheless, the minimally invasive procedure is likely to gain favor among skilled laparoscopists due to its evident cosmetic advantages and perhaps superior temporary results.

Diverticular disease could be treated with laparoscopic intervention?

Diverticulitis of the sigmoid colon has been successfully treated with laparoscopic resection

procedures in recent years [20]. There is good data from a variety of nonrandomized research trials that illustrate the advantages of laparoscopic sigmoid resection in uncomplicated diverticular disease. These advantages include many of the beneficial short-term outcomes associated with laparoscopic colon surgery, as well as reduced postoperative wound and pulmonary complications, as well as lower direct expenses [21-23]. Alves and colleagues recently published the results of a prospective national study involving 332 consecutive patients undergoing laparoscopic (n = 163) or open (n = 169) optional sigmoid resection for diverticular disease [24]. They found that the open group had significantly higher total morbidity rates (16.0% versus 31.4%, P0.001), including more wound complications, abscesses, and fistulas, as well as significantly longer periods of stay in the healthcare institution. Despite the fact that this trial had a large patient option bias due to the lack of randomization, the researchers discovered that open colectomy was an independent risk variable for morbidity using a multiple logistic regression analytic design. As a result, despite the lack of large randomized trials comparing open versus laparoscopic sigmoid colectomy for diverticulitis, there is strong evidence supporting the use of laparoscopy for elective resections based on developed short-term outcomes [20]. However, keep in mind that this conclusion may not always apply to severe diverticular disease. Some studies have found that laparoscopic resection of severe diverticulitis increases morbidity and conversion rates significantly [25]. Such resections are best performed by experienced laparoscopists.

Clostridium difficile was responsible for an estimated 453,000 infections in 2011 and was linked to approximately 29,000 deaths [26]. This increase in incidence is complex, and it has been linked to an increase in antibiotic resistance, which necessitates more extensive antibiotic coverage, a better understanding of treating doctors, and an improvement in the sensitivity of available screening.

Most patients with *C. difficile* associated colitis (CDAC) will respond to standard therapy; however, 3 to 10% of patients will proceed to fulminant colitis, resulting in multisystem organ failure and systemic signs of severe sepsis [27], [28]. Traditional treatment for fulminant CDAC has been total abdominal colectomy with an end ileostomy. Subtotal colectomy allows for the treatment of sepsis with hostile resource control accompanied by continuous resuscitation with the goal of establishing gastrointestinal connection at a later period. While this strategy is supported medical

therapy and has been shown to improve survival in severe fulminant CDAC, death has been reported to be as high as 80% [29]. Attempts have been made to use minimally invasive medical treatments in an attempt to reduce morbidity and mortality following surgical intervention. In 2011, Neal et colleagues reported that in patients with fulminant CDAC, laparoscopic diverting loop ileostomy with antegrade colonic lavage was an alternative to partial colectomy with end ileostomy [30]. The therapy arm of the study included 42 patients, with 90% requiring ICU care, 64% requiring mechanical breathing, and 74% requiring vasopressor assistance. Laparoscopic diversion was successful in 83% of cases, with the remaining patients requiring an open method. The patients received intraoperative colonic lavage through ileostomy with warmed polyethylene glycol 3350/electrolyte solution, as well as postoperative vancomycin colonic flushes every 8 hours for 10 days, in addition to intravenous metronidazole. CDAC was resolved in all patients who underwent diversion and lavage in the study. Three patients required postoperative total abdominal colectomy, two for abdominal region disorder and one for recurrent vasopressor demand. In the perioperative phase, eight patients (19%) died, and one patient experienced CDAC recurrence. Almost 80% of patients had their ileostomies changed around at the time of publication. The authors compared these outcomes to the previous 42 patients treated at their institution for CDAC who underwent total abdominal colectomy and end ileostomy as main therapy. Despite having a similar preoperative APACHE-II score, the patients incurred 50% perioperative mortality and only 19% underwent ileostomy reversal. While there is very little evidence to support this procedure, these findings should encourage greater research into this way of treatment in this high-risk patient population.

Laparoscopic-assisted techniques

Many surgeons would consider a laparoscopic colorectal resection to recommend intracorporeal division and management of the large vascular pedicle involved, with bowel re-anastomosis done either intra- or extracorporeally through a tiny extraction incision created in the abdominal wall. It is important to remember that there is no widely agreed definition of "laparoscopic assistance" or "conversion" from a laparoscopic to an open therapy, resulting in significant discrepancies in reporting of the rates at which they occur and are compared [34]. Different levels of "laparoscopic assistance" can be used depending on the issue or the convenience, such as laparoscopic mobilisation of the left colon and division of the substandard mesenteric pedicle for anterior resection, with subsequent anal dissection

done open through a low midline or pfannenstiel incision, avoiding a high midline injury, which would be much more painful and have a lower cosmesis.

The hand-assisted technique is a hybrid procedure that seeks to deliver the benefits of laparoscopic surgery while minimizing technical complexity and increasing operative time. The authors believe that this strategy can be especially beneficial for surgeons who are relatively new to laparoscopic surgery as a supplement to becoming skilled in completely laparoscopic colorectal surgery. This method entails inserting a customized port into the abdominal wall, which allows the surgeon's hand to enter the abdominal cavity to aid in the procedure while maintaining a pneumoperitoneum and therefore proceeding with laparoscopic visualization of the abdominal contents. Although there is less evidence comparing hand aided and laparoscopic colorectal surgical treatments than there is comparing laparoscopic and open procedures, a Cochrane review of randomised regulated tests concluded that there was a considerable reduction in conversion rates in the hand assisted group, although there was no difference in problems or operating times [35].

Robotic surgeries technique:

Weber et al. described the first use of robotic equipment for minimally invasive colectomy in 2002, echoing previous work in urology and cardiac surgery. Over 50000 robotic prostatectomies were conducted in the United States in 2007 without a doubt [36], [37]. There is no doubt that these robotic devices are significantly more expensive than standard laparoscopic or even open intestinal surgeries, thus the evidence base for these therapies has been strengthened in the future. To date, only one randomised study from South Korea comparing robotic with conventional laparoscopic surgery has been published [38]. This study focused on total mesorectal excision for rectal cancer cells and comprised only 18 patients in each group. This restricted research did suggest that short-term end results for robotic surgical treatment were at the very least equal, with appropriate specimen quality on pathological analysis for oncological standing.

Single-incision laparoscopic surgery (SILS) In colorectal surgery, it was originally characterized in 2008. There are several platforms, instruments, and cameras available, with varying lengths and amounts of angulation and articulation, allowing the surgeon to avoid operating in a single axis. The SILS port site can also be used as a removal excision or stoma site, allowing scarless procedures such as total abdominal colectomy and end ileostomy. Several studies have

been conducted to assess the safety, security, and efficacy of SILS for the treatment of benign colon disease such as diverticulitis, IBD, and delayed transit constipation. SILS has shown comparable outcomes to normal multiport laparoscopy in terms of morbidity, conversion rate, and readmission rate [39], [40].

CONCLUSION:

Laparoscopic colon surgery has been used for many years and is widely acknowledged in the medical community as an alternative for operations involving benign illness. Temporary benefits include much decreased postoperative discomfort, a speedier recovery of bowel function, and a shorter length of stay. As technology advances and clinicians become more at ease and proficient with minimally invasive procedures, these procedures may be offered to patients with increasingly complex issues. With more experience, operative times decrease and keep sizes are reduced, resulting in lower total expenses.

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