Laparoscopic Management of Benign Colorectal Diseases

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Abstract

Background: Laparoscopic colectomy is safe and effective, and in some cases, superior to open surgery, for a range of benign illnesses. The short-term advantages include less gastrointestinal discomfort, decreased wound infection and surgical morbidity, quicker bowel function restoration, and a shorter duration of hospital stay.

Aim of the work & Methodology: evaluate our practice in laparoscopic colectomy by studied 20 patients with benign colorectal disorders admitted to our university hospital between Dec. 2015 and Dec. 2020. Inclusion criteria: 1. Age ranging from 15 to 70 years. 2. Patients with benign colorectal diseases, e.g., diverticular diseases, inflammatory bowel diseases, colonic polyps, rectal prolapse, etc. Exclusion criteria; malignant colorectal tumors and relative contraindication for laparoscopy. We were using classical laparoscopic techniques. Patients were discharged from the hospital when they could tolerate a regular diet. They were followed up at least six months, starting on the 30th postoperative day on a regular visit every two weeks—the data recorded including the intraoperative events and the difficulties and postoperative follow-up.

Results: Technical difficulties are more remarkable for benign conditions than for cancer, especially for patients with inflammatory bowels, such as diverticular disease or inflammatory bowel disease, which frequently involve adjacent structures, peri-colic fibrosis, and lost planes. Surgeons should choose their patients before beginning laparoscopic colorectal surgeries.

Conclusions: Laparoscopic surgery provides numerous advantages over open surgery, including minor discomfort, a shorter hospital stay, reduced morbidity, and a faster postoperative recovery. Our study cannot be utilized in a comparison study since it only evaluates our practice, and the findings may not be generalizable.

Introduction:

Laparoscopic surgery has improved the care given to colorectal resection patients. Multiple laparoscopic surgeries have been developed since the first laparoscopic-assisted colectomy in 1991 to bridge the gap between open and minimally invasive surgery. **(Blackmore et al., 2014)**. Laparoscopic colectomy is a safe and effective treatment option for a variety of benign diseases, and in some cases, it is superior to open surgery. Complex laparoscopic resections for diverticulitis and inflammatory bowel disease produce comparable results to open surgery. Short-term advantages of laparoscopic surgery include less pain, lower wound infection rates, and postoperative morbidity, faster bowel movement recovery, and a shorter hospital stay. **(Smith & Maron 2017)**. Long-term benefits include a lower incidence of incisional hernias, lower adhesions rate, making subsequent operations safer and quicker. Also, it is associated with better cosmetics results when compared to open surgeries **(Parrish et al., 2019)**.

AIM OF THE WORK

To evaluate our practice and the feasibility of using laparoscopy in benign colorectal diseases.

Methodology:

The study was carried out on twenty patients with benign colorectal diseases admitted to the General Surgery Department, University hospital, Menoufiya University between Dec. 2015 and Dec. 2020. Inclusion criteria; 1. Age ranging from 15 to 70 years. 2. Patients with benign colorectal diseases, e.g., diverticular diseases, inflammatory bowel diseases, colonic polyps, rectal prolapse, etc. Exclusion criteria; malignant colorectal tumors and relative contraindication for laparoscopy. Used classical laparoscopic techniques **(Blackmore et al. 2014)** Patients were discharged from the hospital when they could tolerate a regular diet and take only oral analgesia (if required). The patients and their families agreed to the discharge. They were followed up at least six months, starting on the 30th postoperative day on a regular visit every two weeks.

Results:

Demographic data: ten males and ten females.

Table 1; showed the clinical diagnosis, the procedure, intraoperative and postoperative events.

Discussion:

Laparoscopic surgery has been around for about 40 years. It is now the standard for many surgical procedures. While Kurt Semm first described it in 1981 for appendectomy, it took another ten years for colon resection. In recent years, laparoscopy has become more common in colon surgery. **(Delaplain & Jafari 2019).**

Regarding diverticular disease, we managed seven cases laparoscopically in our study. The average ASA score was 2, with ASA 2 being the most frequent (71%). One patient was ASA 3 (14.2%), and one was ASA 1 (14.2%). The most frequent procedure was laparoscopic Hartmann's procedure LHP (n=4: 57.1%) followed by LS Laparoscopic Sigmoidectomy (n = 3; 42.8%). There were no intraoperative problems throughout the procedure. Four patients were diagnosed as Hinchey II-III and underwent laparoscopic Hartmann's procedure. The mean operative time was 203.75±12.5 minutes. The range was from (100-215) minutes. The mean time to return bowel movement was 3.5 days, and the mean hospital stay was 12.5 days which is slightly higher than in study done by Turley et al., which was 8.9 days., While in another study comparing laparoscopic vs. open HP, operative times are the same between the two groups (132 ± 65 vs. 124 ± 52 minutes, p=0.72), LHP was associated with a lower incidence of wound infection (68.6% vs. 80.6%, p=0.02) **(Turley et al. 2015).** In the elective setting, we offered surgery to three patients with recurrent attacks. When the disease significantly impacted patients' quality of life, including recurrent hospital admissions or persistent abdominal pain. All these patients (2 males and one female) underwent laparoscopic sigmoidectomy without diverting ileostomy. The mean operative time was

173.33±36 minutes, bowel function returned after 2.3±0.57days, and hospital stays were 9.33±2.5 days. Due to the case selection in our study, the conversion rate was 0%. Conversion rates have been found to range between ten and sixty-nine percent **(Neale 2018).** Follow-up was performed, and no recurrence of diverticulitis occurred in our study. We prefer to perform Trans-anal anastomosis. Others perform extracorporeal anastomosis through a mini-laparotomy. The mortality rate was zero. We had no cases of anastomotic leaks, this rate ranges from 0–5.5% **(Anania et al., 2014).**

Three patients (one male and two females) underwent Laparoscopic Rectopexy (LR), with a mean operative time of 105.00 minutes, compared to 90-110 minutes in other studies. The average length of hospital stay was 7.33±0.57 days, compared to 2 days in Emile's study. The mean return of the bowel = 2.3±0.57 days. Conversion rates were Zero in this study, although they ranged from 0–12% in previous studies **(Emile et al. 2016)**. Similar results in a study done by Abdelreheem et al. in 2017 compared open versus rectopexy **(Abdelreheem et al. 2017)**. The average follow-up period was six months. After surgery, one patient developed constipation, which was relieved by the laxative. There have been no reports of mesh-related complications like infection or erosion recorded. When the mesh or the rectum is directly fastened to the presacral fascia, the major problem that may occur is bleeding owing to rupture of the presacral veins. Because the veins exit straight from the bones, such bleeding is difficult to stop. For the first 10-15 minutes, apply direct pressure on the affected area. If this fails, titanium thumbtacks inserted into the bone can be used to tamponade the veins. Dissection in the presacral region frequently causes excessive bleeding and should be avoided **(Rakinic 2018)**. Fortunately, no massive bleeding happened in this study, and the range of blood loss was 100-200 ml (mean 150±50ml). During the surgery, should preserve the pelvic nerves and neurovascular bundle. Absorbable tacks secure the mesh to the pre-sacrococcygeal fascia. The peritoneum should be closed bilaterally to avoid mesh exposure. No recurrence is detected during the follow-up period.

This study comprised five patients who had Laparoscopic Reversal of Hartmann's Procedure (LRHP). The time interval between the original operation and the colostomy reversal was between six and twenty-four months. The average age of the patients was 61.4 years (range, 53 to 67 years). Five individuals had laparoscopic surgery without requiring a temporary ileostomy. One late conversion to open laparotomy was necessary due to extensive adhesions in the lower abdomen. Due to poor optical vision and several small intestinal perforations, the laparoscopic adhesiolysis could not be continued. Previously published data indicated that this method converts at a rate of between 15% and 23.5 percent. Reversal following rectal cancer surgery is technically more difficult than reversal following diverticulitis surgery **(Park & Chi 2012)**. The average duration of surgery was 260.00±50 minutes. In a research published in 2021 by Panaccio et al., he discovered that the mean operational time for laparoscopic vs open Hartmann reversal was 180.5 35.1 minutes in the laparoscopic group and 225.2 48.4 minutes in the open group (p-value 0.089) **(Panaccio et al. 2021)**. The most difficult case had dense adhesions and fibrotic stricture of the rectal stump. Bowl function has been restored (2.8±0.83) days. The estimated blood loss was 200±8 ml. The average length of stay in the hospital was 12.42 days (range, 8 to 26 days). The prolonged time is a shortcoming of our method that will be addressed. In our investigation, we explored the abdominal cavity and performed adhesiolysis on four patients using the optical trocar technique. The colostomy site was

used as the initial port insertion location on one occasion. This is a safe and easy approach that enables adhesiolysis surrounding the colostomy to be performed under direct view. This technique, however, cannot be used to determine the severity of abdominopelvic adhesion before colostomy removal. Surgeons should not be afraid to do a temporary ileostomy to correct an unstable anastomosis, as this is not seen as a failure of laparoscopic surgery.

Regarding colonic polyps, in our study, laparoscopic segmental colon resection was done in 3 cases: Laparoscopic Anterior Rectal resection (LAR) in 2 patients and Laparoscopic Sigmoid resection (LS); in one patient. The 1st case was a recurrent rectal polyp after one year of excision endoscopically. The patient underwent colonoscopic tattooing to the polyp (flat polyp) site, and then segmental laparoscopic resection with direct colorectal anastomosis was done. The other 2 cases are for multiple colonic polyps. The surgery was performed smoothly in those patients with the main operative duration of 120.00±0.0 for LS and 122.50±10.6 for LAR. The bowel habits returned after one day in LS and 2.5±0.7 in LAR, and none of them needed ICU admission. The mean postoperative hospital stay was six days in LS and 8.50±0.71 in LAR. Similar to other studies **(Dulskas et al. 2017)**. Histopathology has shown benign for all cases, hyperplastic polyps (n = 2), tubular adenoma (n = 1). The hyperplastic polyps (Small, multiple, on RT side) and the adenoma, described as (sessile, tubular, low-grade dysplasia, measure about 1.2 cm in size).

One ICU female patient, 76 years old, was diagnosed by CT with ischemic colitis at the recto-sigmoid junction in our study. Conservative management is failed, and the patient underwent LHP. The operational duration was about 200 minutes. The main problem during the surgery is how to determine the level of resection. The estimated blood loss was 400 ml during the surgery. The patient received two units of blood, and Returned bowel function occurred after three days. Mean hospital stay of 12 days related to ICU. We didn't need a second look.

One male patient, known to have Ehler Danlos syndrome, is 15 years old, with recurrent attacks of generalized abdominal pain on and off. Unnoticed sigmoid perforation occurred during colonoscopy, and the next day (after 24 hours), a laparoscopic exploration and the LHP were performed. Later, he developed adhesive intestinal obstruction that did not improve on conservative treatment and was carried back to the theatre for adhesiolysis. The biopsy revealed Crohn's disease. The mean operative duration for the Hartman procedure was 160 mins, and bowel function returned on the fourth day, the estimated blood loss was 500 ml, and the hospital stay was ten days.

Complications: There were two superficial wound infections (10 percent). Both were posted laparoscopic reversal of the Hartman procedure and managed conservatively by local wound care and antibiotics. Three patients (15 percent) had postoperative ileus, two of them after the Hartman procedure (acute diverticulitis and colonic perforation in the Crohn's patient) and the third after reversal of the Hartman as she had electrolyte disturbance. There were zero major complications in total (0 percent) and, no postoperative death was reported.

Technical difficulties: are higher for benign conditions than cancer, especially for patients with inflammatory bowels, such as diverticular or inflammatory bowel disease, which frequently involve adjacent structures, peri-colic fibrosis, and lost planes. Surgeons should choose their patients before beginning laparoscopic colorectal surgery. Can somewhat explicitly explain our unexpected poor conversion rate. Perhaps a good patient selection explains this low incidence of anastomotic leak. LS appears to be the most straightforward procedure, in harmony with other reports, followed by laparoscopic hemicolectomies. With increasing experience, laparoscopic rectal resections are suggested as the next step after LS and laparoscopic right colectomies. So, regarding laparoscopic low anterior rectal resection, the need for transection of the rectum low in the pelvis and problems narrow space make this procedure technically difficult. Also, this technique requires mobilization of the splenic flexure to allow tension-free anastomosis. Finally, the LHR procedure scored the most significant overall difficulty. There are two main reasons for this apparent difficulty: significant adhesions that make access to the left iliac fossa and exposure difficult, and the need to mobilize the splenic flexure to achieve a tension-free anastomosis, which adds to the procedure's complexity. If access to the abdomen is deemed difficult, direct optical trocars may be advantageous.

Conclusion:

Laparoscopic surgery provides numerous advantages, including minor discomfort, a shorter hospital stay, reduced morbidity, and a faster postoperative recovery. The laparoscopy is continuously expanding and secure in skilled hands to many complicated intraabdominal colorectal operations. Technical difficulties are higher for benign conditions than cancer, particularly when treating patients with inflammatory bowel disorders. We strongly recommend that only in high-volume facilities and through a well-trained laparoscopic group can LHR be conducted safely. Our study cannot be used in the comparative study, as it assesses our practice only, and our results may not generally be applicable.

Abbreviations:

LHP; laparoscopic Hartmann procedure. LS; Laparoscopic Sigmoidectomy. LR; laparoscopic Rectopexy. LAR; Laparoscopic Anterior Resection. LRH; laparoscopic reversal of Hartmann. OT; Operating Time. EBL; Estimated Blood loss.

Declarations:

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Authors’ contributions

MS, AZ, HE, AG, AA participated in the study conceptualization, research design. MS, AA performed operations. AA performed the data acquisition. AA drafted the manuscript. All authors have read and

approved the final manuscript.

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None.

Availability of data and materials

The data are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study was approved by the Menoufiya University Hospital Committee under reference number 24545 /9-2015. All procedures performed in studies involving human participants were in accordance with the ethical standards of the Ethics Committee of Menoufiya University Hospital and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from all individual participants included in this study.

Consent for publication

The authors have agreed to submit it in its current form for consideration for publication in the Journal.

Competing interests

The authors declare that they have no competing interests.

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Table:

Table 1
the clinical diagnosis, the procedure, intraoperative and postoperative events.

Diagnosis	N.	Procedure	OT Mean±SD	Ileus Mean±SD	EBL Mean±SD	Stay Mean±SD
Acute diverticulitis	4	LHP	203.75±12.5	2.5±1.29	212.5±85.39	10.50±5.06
Chr. Diverticular	3	LS	173.33±36.86	2.3±0.57	183.33±104.08	9.33±2.51
Rectal prolapse	3	LR	105.00±5.00	2.3±0.57	150.00±50.00	7.33±0.57
Polyposis	1	LS	120.00±0.0	1.00±0.0	150.00±70.71	6.00±0.0
	2	LAR	122.50±10.6	2.5±0.7	150.00±12.3	8.50±0.71
Ischemic colitis	1	LHP	200.00±0.0	3.00±0.0	400.00±0.0	12.00±0.0
Colonic perforation	1	LHP	160.00±0.0	4.0±0.0	500.00±0.0	10.00±0.0
Reversal of Hartmann's	5	LRH	300.00±50.5	2.8±0.83	210.00±89.44	12.40±2.07

LHP; *laparoscopic Hartmann procedure.* ***LS;*** *Laparoscopic Sigmoidectomy.* ***LR;*** *laparoscopic Rectopexy.* ***LAR;*** *Laparoscopic Anterior Resection.*

LRH; *laparoscopic reversal of Hartmann.* ***OT;*** *Operating Time.* ***EBL;*** *Estimated Blood loss.*