Surgical Technique and Difficult Situations for Ulcerative Colitis from Adrian Greenstein

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25.1 Introduction

Surgery for ulcerative colitis and Crohn's disease has benefitted immeasurably from the transition from open to laparoscopic surgery. While traditional open surgery often provides easy visualization of the mesentery in relation to the intestine with short operative times, its well-known disadvantages include wound complications such as infection, disruption, and hernias, as well as a larger incision, worse cosmesis, more postoperative pain, more blood loss, later return of bowel function, later oral intake, and longer hospital stay [1].

Open surgery may also suffer from difficult visualization (specifically in the left upper quadrant and pelvis) – especially in the obese patient. On the other hand in laparoscopic surgery, special attention must be paid to correct orientation of the mesentery to avoid rotation of the bowel or of the mesentery. In particular, one must avoid rotation of bowel with stomas, rotation of the pouch, or herniation of bowel posterior to the mesentery in laparoscopic pouch procedures. Hand-assisted laparoscopic surgery (HALS) has some of the advantages and disadvantages of both and involves a relatively larger incision [2, 3].

Although there may be some difficulty in orientation, HALS does allow for hand dissection of the bowel hand dissection of the congenital adhesions, retraction, and exposure of mesentery, particularly when the bowel is fragile as in severe colitis. It also allows for palpation of masses and/or ureteric stents when the ureter cannot be visualized.

We will describe our technique in subtotal colectomy for ulcerative colitis using advanced laparoscopic methods with special emphasis on the transverse colon and flexures. We perform this technique for nearly all of our patients with ulcerative colitis, even for most of those patients with fulminant disease, and we rarely use hand assistance or a GelPort.

25.2 Preoperative Strategy and Planning

In general, surgery for UC is multistaged with three-, two-, or on occasion one-staged procedures. Fulminating disease, with fever, tachycardia, and elevated white cell count with a left shift, is in general done in three stages. Patients with intractable steroid-dependent disease and on biologic medications such as Remicade, Cimzia, and Humira, with hypoalbuminemia, and with anemia are preferentially done in three stages, but occasionally may be done in two stages in younger patients. Surgery for patients with dysplasia/DALM/ cancer, who are generally in better physical shape but usually older, may be done in two stages. One-stage procedures have been recommended by some surgeons, but should be limited to highly selected cases [1, 4, 5].

It is our preference to do a proximal defunctioning loop ileostomy in all J-pouch procedures. An Isovue enema evaluation of healing of the pouch prior to closure of the Turnbull-type loop ileostomy is routine.

All patients are fully evaluated with regard to ASA level, BMI, and comorbidities. The ileostomy site is always marked in the sitting position if an ileostomy is planned. This must be done by the surgeon or stoma nurse and future management and possible problems, such as hernias, dehydration, and skin irritation discussed in detail with the patient. Bowel prep is controversial, but it is our preference to use cathartics, antibiotics, and high colonic tap water enemas (except for fulminating disease with abdominal tenderness).

In terms of technical approach, there is some controversy regarding the medial to lateral approach vs. lateral approach which is the standard approach in open surgery. Either approach is appropriate provided careful visualization of retroperitoneal structures is carried out and the dissection is done with preservation of the continuity of the sympathetic nerves, the preaortic plexus, the ureters, and the gonadal vessels, all of which lie posterior to the embryonic retroperitoneal plane. Although the medial to lateral approach is technically more demanding, it is probably somewhat faster and more precise, allowing for high/proximal ligation of the colonic vessels when necessary. Obviously, if there is a dysplasia-associated lesion or mass (DALM) or cancer of the colon, vessels should be taken at their origin while mesenteric transection should be close to the colon for benign disease.

25.3 Laparoscopic Technique

25.3.1 Positioning

All patients requiring colonic resection should be placed in stirrups. An orogastric tube is placed and the stomach emptied; it is usually removed at the end of the operative procedure. Care is taken to position the patient using egg crates to protect all pressure points of the arms and legs. Straps are appropriately placed to prevent movement on the operating table during the operative procedure. A plastic warming blanket is placed over the upper chest to maintain a constant temperature. Placement of ureteric catheters is dependent on the discretion of the surgeon, but is advisable for severe cases of ulcerative colitis with fulminating disease and any patients with Crohn's colitis. With the patient in stirrups, we irrigate the rectum and rectosigmoid with an irrigating suction system (28 Foley catheter taped with Steri-Strips to a pool tip suction) using up to 3000 ccs of saline. Irrigation of the rectum is discretionary, but we use this on an almost routine basis during the course of rectosigmoid or rectal dissection prior to transection of the large bowel. This is particularly important when bowel prep has failed to adequately clean the colorectum. Preparation of the skin with ChloraPrep or Betadine is routine for the abdomen and perineum, and per standard technique, antibiotics are given within 30 min of incision.

25.3.2 Trocar Placement

To establish pneumoperitoneum, a 5 mm Fios Optiview scope is passed through a small incision in the umbilical region or left upper quadrant (if there is a previous umbilical incision). If there is distension, a 12 mm balloon Hasson trocar is placed through a periumbilical incision. 5 mm ports are then placed in the right upper quadrant, and on the left side (and sometimes in the suprapubic position) with a 12 mm port at the ileostomy site in the right lower quadrant. It is our preference to use 5 mm instruments whenever possible in order to minimize the chance of herniation and reduce the need for fascial closure. The future right lower quadrant ileostomy site can be used for extraction of the bowel through a wound protector and passage of the Endo GIA to transect the colon when the 12 mm port is in place. If it is deemed preferable to extract the colon through the midline, the umbilical port site can be extended up or down as a relatively short incision. We generally do not advocate the use of single incision laparoscopic surgery (SILS) for this procedure. Placement of trocars varies considerably, but we have noted our suggested trocar sites (Fig. 25.1).

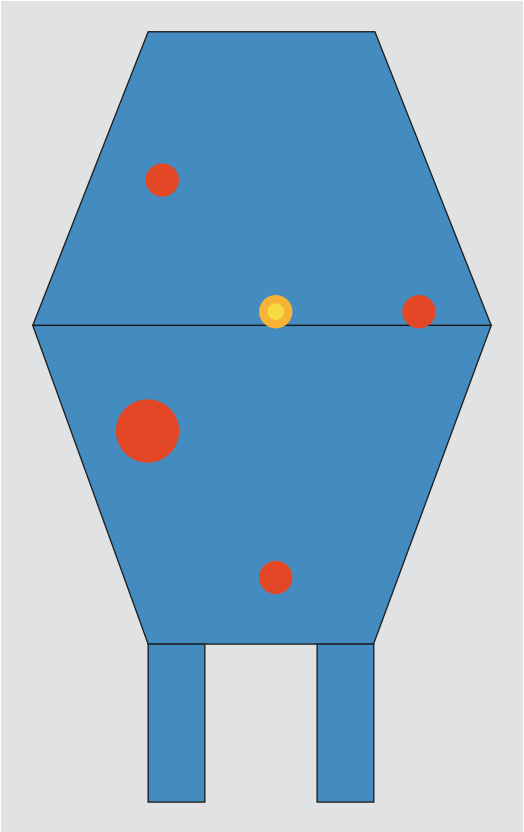


Fig. 25.1 Trocar Placement

25.3.3 Distal Left Colon and Transection at Rectosigmoid Junction

The dissection begins on the left side with the surgeon high on the right side and the assistant low on the left side. The table is inclined with the left

side up in steep Trendelenburg. The small bowel is swept to the right and cephalad. The mesenteric dissection is carried out from medial to lateral using a 5 mm LigaSure or harmonic scalpel. We transect the peritoneum over the medial side of the mesocolon posterior to the marginal artery of Drummond and cephalad to the superior rectal artery in the relatively avascular plane. After defining the plane, care should be taken in this area to identify and visualize and preserve the preaortic hypogastric plexus and nerves. Subsequently, when the embryonic retroperitoneal plane is established by blunt dissection, the ureter and the testicular or ovarian vessels should be identified and preserved. In some patients, these structures cannot be easily identified so it is imperative that one stays anterior to the embryonic plane which is generally not difficult in IBD cases. A blunt instrument is then passed through to the lateral paracolic gutter anterior to the white line of Toldt. The tip is visualized by retracting the colon in an anteromedial direction after which the colon is retracted by the assistant once again in an anterolateral direction with two graspers. Transection of the sigmoid mesentery and vessels is then continued in a cephalad direction. Following this, the dissection is continued downward taking the mesentery to the rectosigmoid colon using the 5 mm LigaSure (Fig. 25.2), and finally, the mesenteric fat is cleaned until the muscular layer of the bowel is visualized. A 60 mm Endo GIA staple load is then used to transect the rectosigmoid colon (Fig. 25.3) and the staple line is air leak tested.

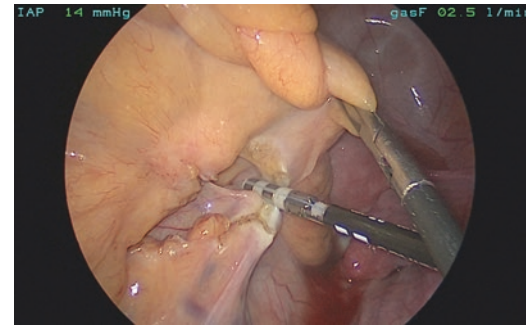


Fig. 25.2 Distal Dissection

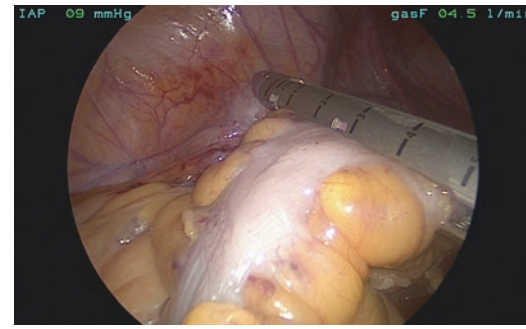


Fig. 25.3 Stapling Rectosigmoid Junction

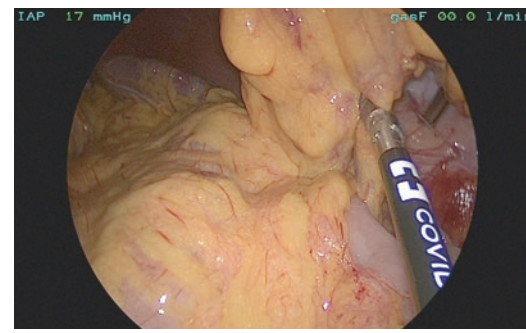


Fig. 25.4 Dissection Splenic Flexure

25.3.4 Proximal Left Colon and Splenic Flexure

Following transection of the colon, the patient is placed in reverse Trendelenburg position, and the division of the mesentery is continued from the site of initiation of the dissection backup in a cephalad direction to the area of the splenic flexure, transecting the left colic vessels (Fig. 25.4) and then the arc of Riolan at the splenic flexure. As the splenic flexure is approached, the surgeon moves to between the legs. Mesenteric transection is continued anteromedially to the ligament of Treitz, being careful to stay anterior to the fourth portion of the duodenum and the pancreas. During the course of this dissection, the lateral attachments of the left colon are taken immediately anterior to the line of the fascia of Toldt using either the 5 mm LigaSure or the harmonic scalpel. The colonic attachments to the diaphragm and spleen are taken down avoiding

traction on the filamentous attachments to the spleen and thus any capsular tears. Capsular tears are not uncommon with open surgery but are rare with the better visibility of laparoscopic surgery. Any accessory spleens, which are not uncommon, should be preserved if the dissection does not compromise the vascular supply to the spleen.

25.3.5 Completion of Splenic Flexure and Lateral Dissection of Transverse Colon

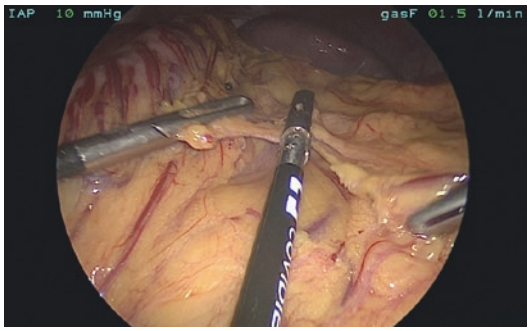
Both surgeon and assistant may work from the right side for this part of the dissection. The assistant elevates the gastrocolic omentum either by lifting it upward from within the lesser sac just to the left of midline and the lesser sac is entered. Ideally, transection is continued below the greater gastroepiploic arcade toward the splenic flexure transecting the epiploic vessels in the avascular plane, meeting our prior dissection of the splenic flexure from the left side (◘ Fig. 25.5). At this point, the mesentery of the splenic flexure has been transected until its junction with the mesentery of the transverse colon. The surgeon and assistant now move to the left side and continue transection of the gastrocolic omentum from the midline toward the hepatic flexure as the patient is placed right side up. The plane of the mesentery superior to the hepatic flexure is defined and transected carefully down to the colon. The colon is lifted anteriorly and dissection continued separating the apex of the flexure from the posterior attachments below the gallbladder and proceeding through the peritoneal reflexion to separate the colon from the proximal duodenum.

25.3.6 Right Hemicolectomy

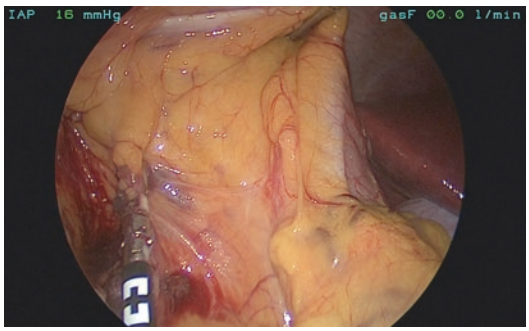
At this point, we commence with a standard medial to lateral dissection of the right hemicolon with both the surgeon and assistant on the patient's left-hand side. The cecum and ascending colon are elevated by the assistant anteriorly and to the right, and the ileocolic vessels and the right colic vessels are transected with preservation of the branches to the terminal ileum, once again being careful to enter and remain in the embryonic plane and to display and preserve the ureter and gonadal vessels. The mesenteric transection is now continued (completed) past the lower part of the descending duodenum and the proximal part of the third transverse portion of the duodenum (◘ Fig. 25.6). After successful medial mesenteric dissection, the posterior peritoneal abdominopelvic attachments of the distal ileum and cecum (cecum and distal ileum) should be taken down. On occasion it may be preferable to take down the lateral attachments anterior to the fascia of Toldt prior to dissection of the ileocecal area, and this is clearly at the discretion of the surgeon.

25.3.7 Completion of Transection of the Mesentery of the Transverse Colon

At this point, we are left with just the mesentery of the transverse colon. Ideally, it is possible to



◘ **Fig. 25.5** Opening Lesser Sac



◘ **Fig. 25.6** Dissection Right Colon

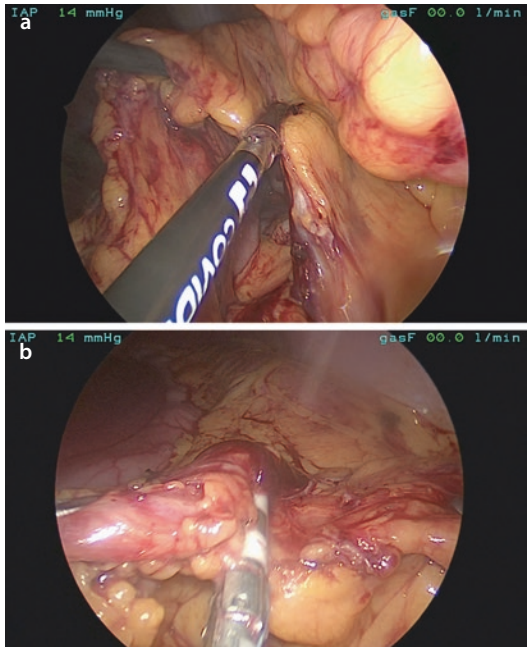


Fig. 25.7 Dissection Transverse Colon

orient the bowel in such a way as to clearly visualize mesentery. In some cases, it is easier to lift it anteriorly and superiorly, while in other cases, it is better to let the transverse colon hang inferiorly from its mesentery (Fig. 25.7). In addition, placement of the 5 mm camera through a right-sided port may provide better visualization of the mesentery as the umbilical port is often directly anterior to the transverse colon. Once the mesentery is clearly and safely visualized, one simply advances from proximal to distal along the mesentery until the mesenteric dissection of the splenic flexure is encountered. A #7 JP is placed in the pelvis adjacent to the stapled off rectal stump.

25.3.8 Intestinal Extraction and Transection of the Terminal Ileum

Extraction of the colon may be carried out through a midline incision at the umbilicus, a Pfannenstiel incision, or an oblique right or left lower quadrant incision. We prefer to extract the colon or rectum through the ileostomy site after the 12 mm ports have been enlarged to accommodate two fingers and a small wound protector has been placed to stretch the site. The colon is extracted in a distal-to-proximal direction. In cases of very edematous, fragile, dilated colon, it is important to ensure that the size of the ileostomy canal is adequate even if it needs to be enlarged at both the skin and fascial levels. If the cecum enlarges and becomes filled with liquid stool, an opening may be made in the colon and a pool suction introduced into the cecum to aspirate the liquid. The mesentery to the terminal ileum is carefully examined. The cockscomb is excised, the ileum is transected 1 cm proximal to the ileocecal valve, and the specimen is removed (Fig. 25.8). The openings in the fascia of the ileostomy canal are sutured as needed to tighten the area, and an end Brooke ileostomy is created. It is critical to confirm that the mesentery is oriented correctly prior to creation of the ileostomy, and reinsufflation of the abdomen must be performed if there is any doubt.

Fig. 25.8 Final Specimen

25.4 Conclusions

Laparoscopic surgery has improved our management of ulcerative colitis. Results are dependent upon surgical expertise, training, and experience. Nevertheless, most procedures in this country continue to be done via traditional open techniques. The training and number of experienced laparoscopic colorectal surgeons must be increased to meet the challenge of transition to laparoscopic colorectal surgery.

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