



# Laparoscopic ileocolic resection, division of entero-entero fistula, and intracorporeal anastomosis

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**Abstract:** Inflammatory bowel disease can be complicated for both open and laparoscopic surgery. This video will detail the important steps and thought processes that are helpful in completing these surgeries in a laparoscopic fashion. The techniques described here have been learned from hundreds of IBD patients over the last 25 plus years of clinical practice. Midway through this experience, the author switched to an intracorporeal anastomosis. This has benefited patients in many ways, and it has become standard of practice in these complicated Crohn's patients.

**Keywords:** Crohn's disease; fistula; intracorporeal anastomosis

Received: 15 March 2019; Accepted: 03 April 2019; Published: 30 April 2019.

doi: 10.21037/ales.2019.04.02

View this article at: <http://dx.doi.org/10.21037/ales.2019.04.02>

## Introduction

This is an 18-year-old female who presented with obstructive Crohn's disease. She has been on biologics for several years. Physical examination revealed a palpable RLQ with slight abdominal distention. CT scan revealed an entero-entero fistula. Preoperative colonoscopy was normal. The terminal ileum was not intubated. The author strongly suggested preoperative colonoscopy on all patients. It is important to know the status of the colon downstream from the active disease. It also gives a good idea if there is an ileo-sigmoid fistula. A standard mechanical bowel prep is utilized including intravenous antibiotics administered one hour preop. General anesthesia, oro-gastric stomach decompression during surgery, and a Foley catheter are utilized. The patient is placed supine unless a known ileo-sigmoid fistula is present, in which case the patient is in modified lithotomy position. In this case, the patient was supine.

## Operative techniques (Figure 1)

### Step 1

The surgeon should get a complete understanding of the surgical anatomy. Run the bowel from cecum to ligament of Treitz. In general, it is safer to grasp the mesentery instead

of the bowel itself. I have found less chance of bowel injury that way. The surgeon must use gentle technique here, as the bowel and mesentery in IBD patients can be very fragile. Make sure you look at both sides of the bowel wall. This is not the place to "hurry" the procedure.

### Step 2

In this patient, an entero-entero fistula is present. There are patient advantages to take down and divide fistulas intracorporeally. First, and most important, the size of the extraction incision will be much less if the fistula has already been divided. There is always a surgical plane between the two mesenteries involved in the fistula, which makes separation and division possible. The most important principle is to make sure the bowel is not narrowed when placing the stapler. Occasionally, the fistula is too large and wide to be divided with a stapler. In these uncommon situations, I usually divide the fistula with a scissors and hand-sew the opening closed.

### Step 3

Dissection: I prefer a medial to lateral dissection whenever possible. The important information is whether the



**Figure 1** Laparoscopic ileocolic resection for fistulous Crohn's disease with intracorporeal anastomosis (1).

Available online: <http://www.asvide.com/article/view/31395>

inflammatory process lifts off the retroperitoneum. If not, in general, a lateral to medial approach is safer in that situation. In this video, even though there is an inflammatory mass and fistula, the medial to lateral dissection is straightforward. It does require exposure and identification of the duodenum and IVC. This is not cancer, so the dissection of the ileocolic vessels is higher than would be if for malignancy. This actually makes exposure of the proper retroperitoneal fascial plane easier.

#### Step 4

Dissection: It is important to remain in the proper surgical plane above the retroperitoneal fascia. The ureter is deep to the fascia, and unless the patient has had previous surgery, it is never (anatomically) above the fascial plane. So while I don't specifically look for the ureter (I frequently see it beneath the fascia), I do look for the fascia and make sure it is intact. In general, the dissection plane is higher than one thinks. I try to dissect on the posterior side of the mesentery rather than the anterior side of the fascia. I like to use the 10 mm bipolar device, as it is more robust than the 5 mm bipolar instrument. However, this is just surgeon's preference. I do take the dissection to the lateral attachments as clearly seen in the video.

#### Step 5

Colon Division: I divide the bowel at a 90-degree angle. If the dissection has been complete posteriorly, the 60 mm stapler usually goes across the whole colon. While I am not concerned if it takes two applications to divide the colon, as data points to

one staple load as being better and less risky. I do not over sew the staple lines. The advantage of early bowel division is that any ischemia to the end of the bowel will be noticed before the anastomosis has begun. I do not use ICG because the bowel always has good color or I won't do any anastomosis.

#### Step 6

Ileal Division: I usually go about 3–4 inches proximal to the disease to make sure I have grossly cleared the inflammatory process. I divide the peritoneum just below the bowel wall and pass an instrument under direct vision through the mesentery. If the bowel is obstructed, the surgeon has to be careful not to injure the mesenteric side of the ileum. Once a path is made beneath the ileum, it is easy to pass a stapler and divide the intestine. Once again, I do this early in the dissection so that if any ischemia is present, it is noticed and the bowel re-resected. After the ileum is divided, it is easier to divide the ileal mesentery. I divide the peritoneum of the ileum to get good exposure to the blood vessels, so the energy of the bipolar device is applied directly to the blood vessels. These vessels are fragile, and the assistant must exercise care in applying traction to the mesentery. It is easy to cause bleeding here. Once the specimen is completely dissected, it is gently "stored" in the pelvis for extraction after the anastomosis is completed.

#### Step 7

Anastomosis construction: Assuming both ends of the bowel are viable, the base of the ileocolic mesentery is identified, along with the cut end of the ileocolic vessels. Now is the time to confirm complete hemostasis. If there is any question about hemostasis, the ileocolic vessels are endo-looped. Once hemostasis confirmed, the cut end of the ileal mesentery is followed up to the bowel wall. If this is done, it is impossible to twist the anastomosis. While I prefer an isoperistaltic anastomosis, it is reasonable to perform an antiperistaltic anastomosis as well. It is surgeon's preference.

The two ends of the bowel should lie next to each other without graspers holding them. That will ensure no tension. If the bowel is obstructed and markedly dilated, I will place a laparoscopic bulldog clamp upstream about 10 cm from the planned anastomosis to diminish any intestinal spillage.

#### Step 8

Anastomosis Construction: Two enterotomies are made

each one about 2.5 cm from their respective ends. I prefer to use the 5 mm hook electrode on 20 watts of cutting current. The cutting waveform is less traumatic than the cautery current. Other devices can be used as well to make the enterotomy. The key here is to make the hole just large enough for the stapler jaws. I place the ileal portion onto the thin jaw. It can be held in place by the assistant's grasper, while the colon is placed onto the thicker jaw. Once the bowel is captured, each limb is brought up to its full length on the jaws of the stapler. Once proper positioning is affirmed, the stapler is activated. The assistant then grasps the end of the cut bowel and elevates it. This will prevent unnecessary spillage of any liquid bowel content into the abdomen. This is an important maneuver, and liquid bowel content spill should be kept to an absolute minimum. The video demonstrates this nicely.

### Step 9

**Anastomosis Construction:** The posterior staple line is visualized to be sure there is not bleeding. If bleeding is seen, it can be controlled with bipolar electric energy, sutures or hemostatic clips. The surgeon should not use monopolar electric energy. Suturing is begun behind the staple line; otherwise a gap could be present. There are multiple ways to suture and multiple materials as well. There is no level one evidence for advantage of one over the other. I prefer to sew away from myself. In that way, I can move the bowel to 90-degree angles to the suture needle. It facilitates the suturing. I was trained in full thickness suturing, but I know that many surgeons do not include the mucosa. It usually takes 5–6 throws to complete the first layer. Once again, I was trained in two layer bowel closures, so I place a seromuscular suture as I did in open surgery. I like to use a synthetic material that slides easily. That will allow me to place 3 sutures before pulling the material through. There are multiple ways to make intracorporeal knots as well. I have used this technique for more than 25 years.

### Step 10

**Extraction:** While there are multiples places the bowel can be extracted, the Pfannenstiel, muscle-splitting incision seems to be the one with the less incisional hernia rate and less pain associated with it. I do protect the extraction site with a plastic bad to decrease the incidence of wound

infection (less than 1%). As the anastomosis has already been completed, it is not necessary to change to clean instruments for closure of the extraction site.

## Acknowledgments

*Funding:* None.

## Footnote

*Conflicts of Interest:* The author has completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/ales.2019.04.02>). The author has no conflicts of interest to declare.

*Ethical Statement:* The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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## References

1. Salky B. Laparoscopic ileocolic resection for fistulous Crohn's disease with intracorporeal anastomosis. *Asvide* 2019;6:124. Available online: <http://www.asvide.com/article/view/31395>

doi: 10.21037/ales.2019.04.02

**Cite this article as:** Salky B. Laparoscopic ileocolic resection, division of enter-entero fistula, and intracorporeal anastomosis. *Ann Laparosc Endosc Surg* 2019;4:44.