



Laparoscopic Sigmoid Colon Resection

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Laparoscopic sigmoid colectomy is becoming standard practice for surgeons involved in the care of patients with diverticular disease. Like laparoscopic segmental colectomies performed for indications such as cancer, polyps, and Crohn's disease, laparoscopic sigmoid colectomy for diverticular disease is associated with less postoperative pain, smaller incision length, and shorter length of hospitalization when compared with patients undergoing segmental colectomy through conventional midline incision.

The indications for laparoscopic sigmoid colectomy for recurrent diverticulitis have recently come under renewed scrutiny. Classically, elective sigmoid colectomy was performed for those patients who suffered from two documented attacks, or for those who recover from a bout of complicated diverticulitis. With increasing awareness that patients who present with complicated diverticulitis do so most frequently on their first bout, individualized management is necessary for those who have had two uncomplicated bouts. The American Society of Colon and Rectal Surgery has published updated practice parameters for sigmoid diverticulitis in 2006 incorporating the recognition of the above.¹ Still, after the resolution of a single bout, 25% to 30% of patients will suffer a second bout. After a second bout, a patient stands an additional 25% to 30% chance of a third attack. Clearly, the indications for sigmoid resection of diverticular disease do not vary whether the operation is performed laparoscopically or via conventional incision. The presence of a fistula has been shown to not be a contraindication to a laparoscopic approach.²

The results of laparoscopic sigmoid colectomy have been compared with open sigmoid colectomy. Importantly, the rate of recurrent diverticulitis after a laparoscopic resection is equal to that performed through a midline incision.³ Critical to low recurrence rate is creating a distal anastomosis at the level of the rectum as opposed to a segment of retained distal sigmoid colon. Operative times are longer for operations performed laparoscopically. Return of bowel function is generally between 2 and 3 days. Length of stay is a few days shorter after laparoscopic sigmoid colectomy resulting in diminished health care costs. The incidence of wound infection and anastomotic leak is similar between laparoscopic and open oper-

ations.⁴ Conversion of a planned laparoscopic operation to one performed through a conventional incision remains infrequent. Rates of conversion for operations for uncomplicated recurrent disease are below 20%, with higher conversion rates for operations to treat complicated disease. Causes of conversion include: EEA Air leak, hypoxia during pneumoperitoneum, a specimen that is too large to exteriorize, inability to identify anatomy, dense adhesions, fistula, and abscess.⁵

Technique of Laparoscopic Sigmoid Resection for Recurrent Diverticulitis

The satisfactory performance of a laparoscopic sigmoid colon resection mandates adequate mobilization of the left colon to facilitate colon to rectal anastomosis, identification of the left ureter, identification and division of the upper rectum, vascular division, and colon to rectal anastomosis. Although vociferous discussions have ensued debating the relative merits of lateral to medial versus medial to lateral colon mobilization, the use of hand assist devices and techniques, and ureteral stenting, the surgeon dealing with diverticular disease must have all these tools in his armamentarium.

Critical to the performance of a laparoscopic sigmoid colon resection is appropriate port placement and patient positioning (Figs. 1 and 2). For a laparoscopic sigmoid resection, I place the patient on a beanbag table pad and utilize padded stirrups. The patient's thighs should be parallel to their torso to prevent the surgeon's right arm from banging into the thigh. I tuck both arms. The patient's anus must be lined up with the edge of the bed to facilitate endoscopy and passage of the stapler.

I prefer an infra umbilical transverse incision for my camera port. I always place two ports in the right lower quadrant. The most inferior is three fingerbreadths superior and medial to the anterior superior iliac spine. The right upper quadrant port is placed 4 fingerbreadths cranial to the first. A third port is placed 3 fingerbreadths superior and medial to the anterior superior iliac spine in the left lower abdomen. The right-sided ports allow retraction of the colon in a lateral to medial direction. Through the left lower quadrant port, I place a scissor or tissue sealant device to render the colon a midline structure with incision along the white line of Toldt.

Increasingly, surgeons are utilizing hand assist devices to facilitate laparoscopic colon surgery. Use of hand assist can

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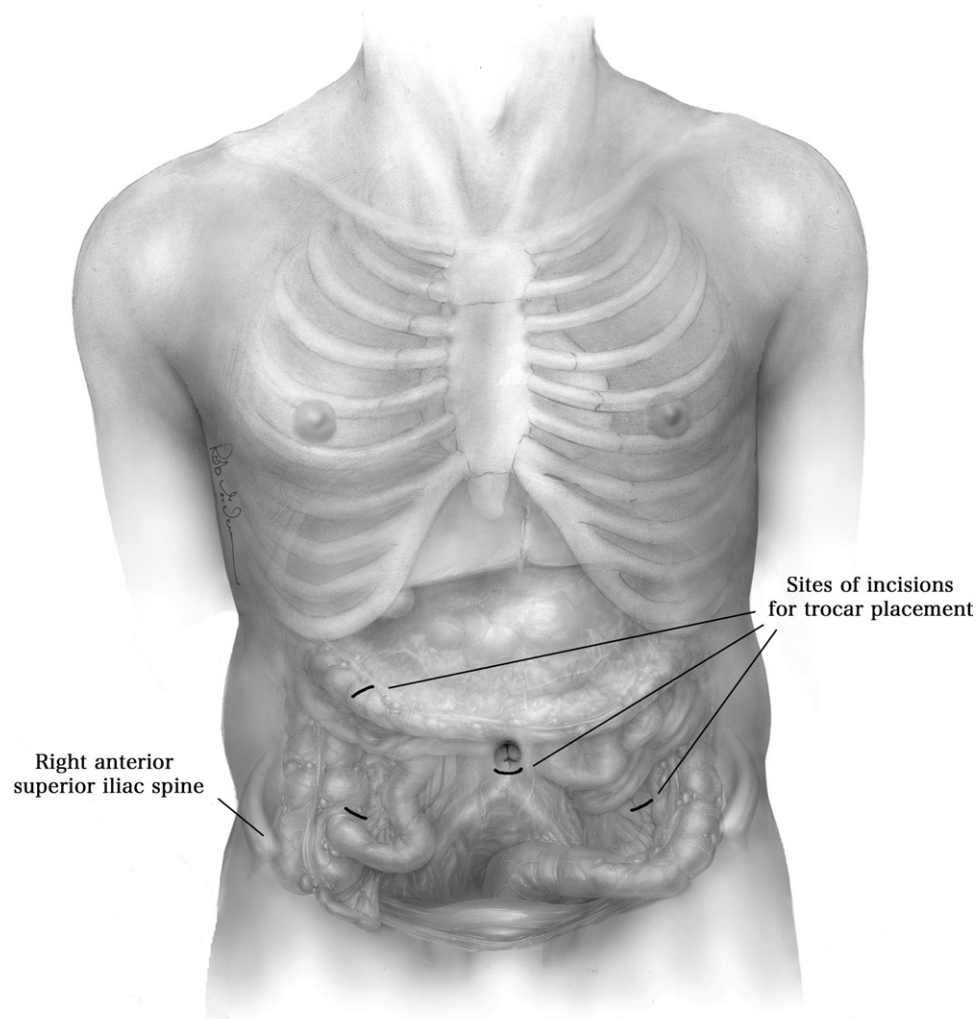


Figure 1 Trocar placement/patient setup.

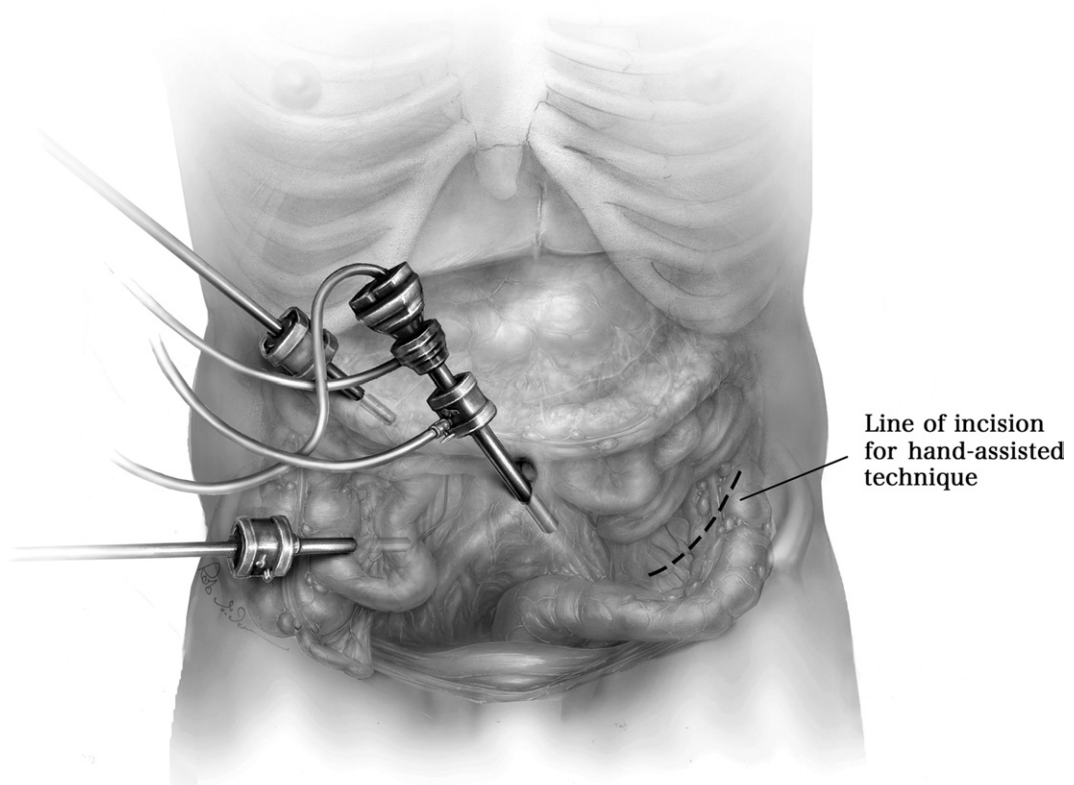
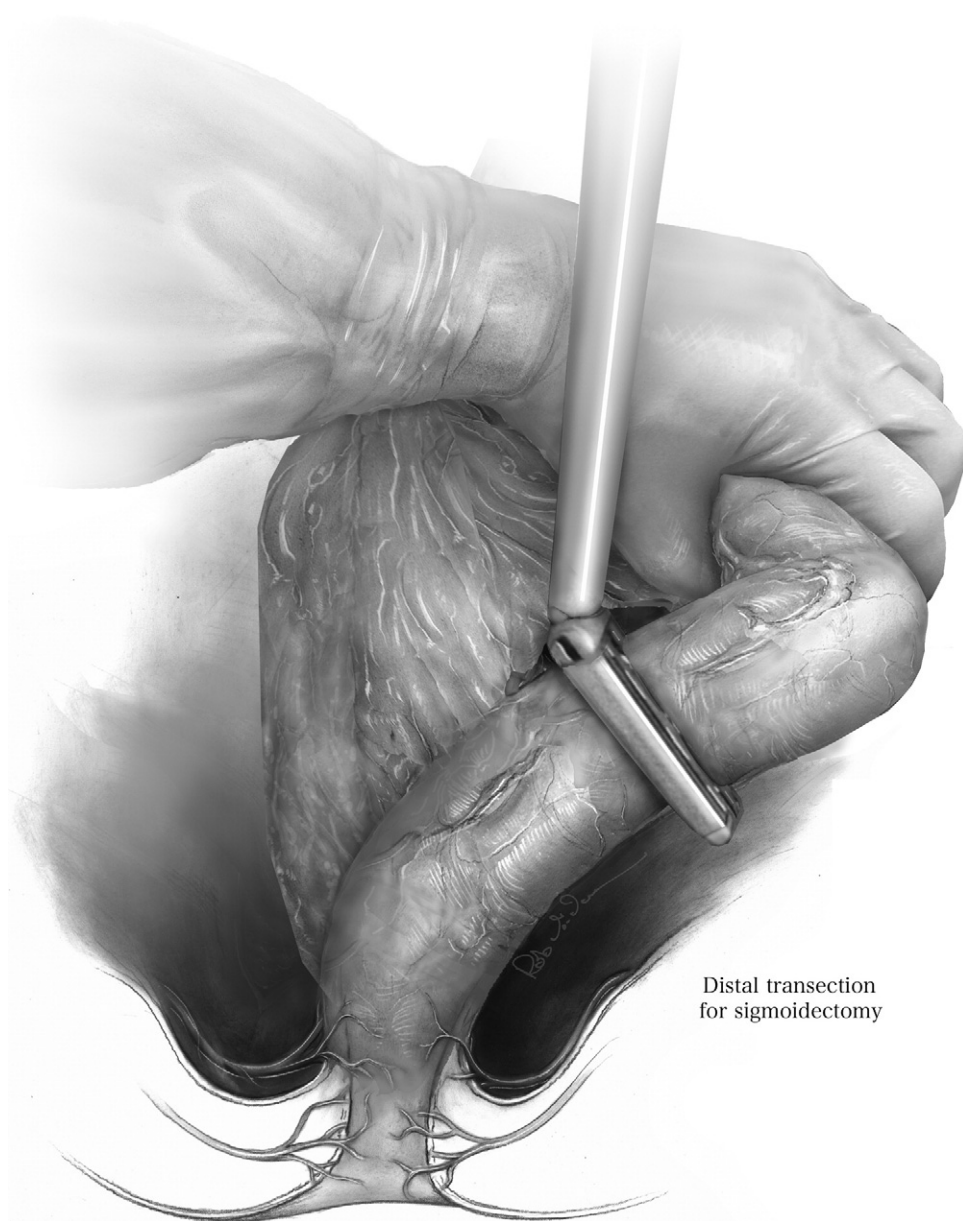


Figure 2 Hand port placement.



Distal transection
for sigmoidectomy

Figure 3 Identification and division of the top of the rectum.

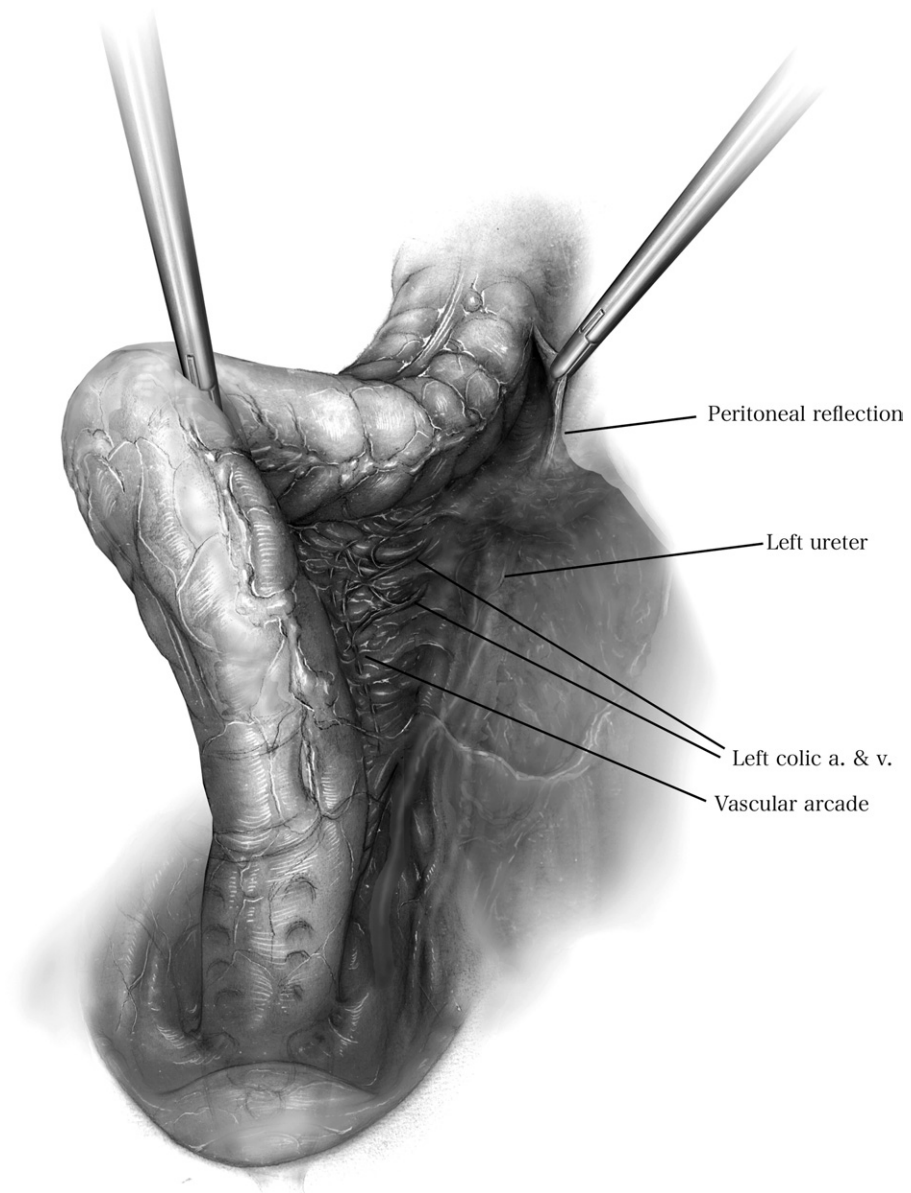
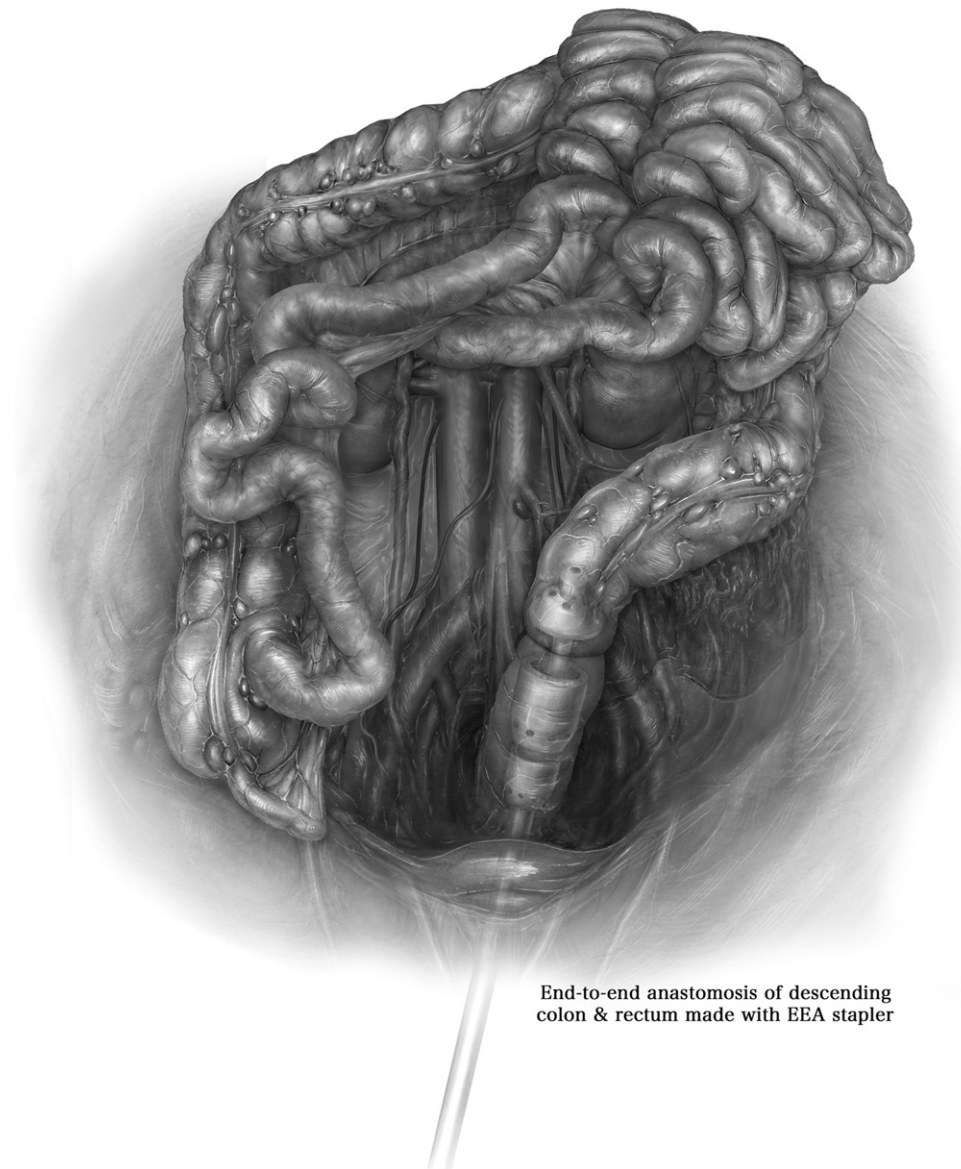


Figure 4 Vascular division.



End-to-end anastomosis of descending colon & rectum made with EEA stapler

Figure 5 Creation of colon to rectal anastomosis.

be especially helpful for the surgeon faced with a patient with colovesicle fistula. Finger fracture of the fistula can be performed through the future specimen extraction site. Palpation of the upper rectum to ensure it is soft, division of vascular pedicles, and splenic flexure takedowns are all facilitated by use of hand assist. There are three widely utilized hand access sites. I utilize a left lower quadrant muscle splitting incision oriented along skin tension lines (Fig. 3). This incision has the advantage of being located far from the camera and the top of the rectum. One's hand placed through this incision has some room to move in the abdomen and does not obscure the camera. Pfannenstiel or lower midline incisions can also be utilized. Each of these incisions has the advantage of enabling the anastomosis to be created under direct vision through the wound.

The top of the rectum is an important landmark in the performance of a laparoscopic sigmoid colon resection. The transection point of the rectum must be at or distal to the point where the teniae become confluent. The rectum must be soft here as well. A window is created at the transection point via blunt dissection. I utilize a hand assisted approach to allow

the palpation of the rectum, to create the window in the mesorectum, and to gently guide the passage of the stapler across the rectum.

The inferior mesenteric artery and the sigmoid colic artery can both be divided by one of two methods: Endoscopic vascular stapler or a tissue sealant device. We feel it is prudent to always have an endoloop ready in the operating room should vascular division fail. If arteries are calcified, we prefer stapling devices over tissue fusion instruments. The left ureter must be identified clearly before vascular division (Fig. 4). The need for ureter identification is independent of medial to lateral or lateral to medial mobilization of the colon. I have a low threshold to employ ureteral stents and choose to do so any time I sense there may be residual inflammation in the pelvis.

The anastomosis of the colon to the rectum can be readily performed under direct vision through a lower midline incision or a Pfannenstiel incision (Fig. 5). As I place my hand through a left lower quadrant incision, it is easier to create the anastomosis laparoscopically. We pay careful attention not to twist the colon and confirm the colon orientation before firing the stapler. We always test

the anastomotic integrity via an air test after the anastomosis is created.

References

1. Rafferty J, Shellito P, Hyman N, et al: Practice parameters for sigmoid diverticulitis. *Dis Colon Rectum* 49:939-949, 2006
2. Bartus CM, Lipof T, Shahbaz Sarwar CM, et al: Colovesicle fistula: Not a contraindication to elective laparoscopic colectomy. *Dis Colon Rectum* 48:233-236, 2005
3. Thaler K, Weiss EG, Noguera JJ, et al: Recurrence rates at minimum 5-year follow-up: Laparoscopic versus open sigmoid resection for uncomplicated diverticulitis. *Surg Laparosc Endosc Percutan Tech* 13:325-327, 2003
4. Senagore AJ, Duepre HJ, Delaney CP, et al: Cost structure of laparoscopic and open sigmoid colectomy for diverticular disease: Similarities and differences. *Dis Colon Rectum* 45:485-490, 2002
5. Vargas HD, Ramirez RT, Hoffman GC, et al: Defining the role of laparoscopic-assisted colectomy for diverticulitis. *Dis Colon Rectum* 43:1726-1731, 2000