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Laparoscopic Surgery for Inflammatory Complications of Acute Sigmoid Diverticulitis

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ABSTRACT

From March 1995 through March 2000, we treated patients with the laparoscopic approach who had emergent and urgent indications for surgery. We report a series of 17 procedures in 16 patients in the acute category excluding those with active bleeding. One case of morbidity (DVT) but no moralities occurred, with 3 of 17 patients converted to an open approach. The postoperative course and subsequent recoveries compare favorably with the open approach to this disease process. Three other series are discussed for comparison, all showing similar favorable results. We concluded that given sufficient experience in minimally invasive colon surgery, surgeons can manage acute inflammatory complications of sigmoid diverticulitis laparoscopically with potential benefit to the patient.

Key Words: Laparoscopic, Acute, Diverticulitis, Perforation.

INTRODUCTION

Elective laparoscopic surgery of the colon has been widely reported.[1] Following the controversy surrounding laparoscopic surgery for colorectal cancers after anecdotal reports of port site recurrences,[2] chronic diverticulitis remained a mainstream indication for laparoscopic surgery.[3] As the acute gallbladder was initially considered a relative contraindication to laparoscopic surgery, so it has been with minimally invasive colon surgery, there being very few reports[4] of applying a laparoscopic approach to the acute inflammatory complications of diverticulitis.

In recent years, the standard surgical approach to acute sigmoid diverticulitis has changed. Originally a three-stage procedure, a two-stage or even single-stage approach to the unprepped inflamed bowel[5] for resection and reanastomosis is now much more commonly seen. The surgical indications themselves, however, have not changed **(Table 1)**.

Since 1995, we have managed patients requiring emergent or urgent surgical intervention for acute diverticulitis with a minimally invasive approach. This series reports the results of sixteen patients operated upon for the indications outlined **(Table 2)** excluding those who had surgery for hemorrhagic complications of diverticular disease.

METHODS

Sixteen patients underwent seventeen procedures (Hinchey Classification I:10, II:6, III:1, IV:0). The indications were acute nonhemorrhagic complications of sigmoid diverticulitis **(Table 2)**. On presentation, patients were assessed by computed tomography for any evidence of abscess or perforation. Those with a free perforation were taken to surgery. If an abscess was identified, it was, when amenable, drained by radiologically-guided percutaneous techniques with the patient later undergoing interval laparoscopic one-stage resection. Barring these findings, patients were treated with parenteral antibiotics while their clinical, laboratory, and radiologic signs were followed. If all these acute criteria resolved within 48 to 72 hours, the patient underwent

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Table 1.
Indications for surgery in acute diverticulitis.

Acute
Free perforation
Diffuse peritonitis
Complete obstruction
Failed medical therapy in a hospitalized patient
Early recurrence of acute symptoms
Persistent partial obstruction
Massive persistent hemorrhage
Abscess with fistula
Subacute
Recurrent episodes of acute diverticulitis
Diverticulitis in a patient < 40 years of age
Fistula
Recurrent hemorrhage
Chronic pain

Table 2.
Indications for surgery.

Diverticulitis with abscess, undrained	7
Acute diverticulitis, refractory	4
Colovesical fistula	3
Free perforation	1
Obstruction secondary to diverticulitis	1
Early recurrence, abscess found	1

water-soluble contrast enema examination prior to advancement of their diet and discharge to outpatient follow-up on oral antibiotics. Those failing to improve within this time frame underwent similar studies to rule out an occult perforation and were considered for surgery. In this group, fourteen patients underwent fifteen procedures, all under general anesthesia and all procedures initiated laparoscopically.

The approach to the peritoneal cavity was, in all, by the open, Hasson, technique. Four additional ports were placed, one in each quadrant. Three of the four were 5 mm in size with the fourth, in the right lower quadrant, being a 12-mm port. Dissection was by sharp, blunt, and ultrasonic shears techniques as indicated. Following transection at the peritoneal reflection with a linear cutting endoscopic stapler distal to the diseased segment, the sigmoid colon was exteriorized through a left lower quadrant mini-laparotomy incision at the trocar site. Transection at the peritoneal reflection assured the complete removal of the distal-most portion of diverticular-bearing colon. The diseased segment was then transected from the proximal bowel and the stump either converted to an end colostomy (Hartmann) at that location or replaced within the peritoneal cavity following measurement for and placement of the anvil of a circular stapling device. The fascia was then closed, pneumoperitoneum reestablished and, under direct vision a low anastomosis created with transrectal placement of the stapling device. All anastomoses were leak tested under sterile instilled saline and insufflation with air by a sterile rigid proctoscope. Drains were then placed and the 12-mm port site fascia closed.

Table 3.
Procedures.

Resection with primary reanastomosis	9
Resection and end colostomy (Hartmann)	3
Resection, repair fistula, anastomosis	3
Irrigation and drainage	1
Irrigation and colostomy	1
Conversion	3/17 (17%)

Three of the fifteen cases were converted to an open approach, two with Pfannenstiel incisions and one with a midline incision. All three cases were in patients presenting with acute colovesical fistulas. The indication for conversion was, in all three, the inability to delineate a safe dissection plane between the colon, the abscess, and the urinary bladder.

RESULTS

Of the seventeen procedures **(Table 3)**, three involved colovesical fistulas, and patients had to be converted to the open approach. No deaths occurred, but one major case of morbidity did occur, a deep venous thrombosis that presented following the patient's discharge. This was managed with a Greenfield (IVC) filter to allow for the planned reanastomosis in this two-stage procedure.

The postoperative length of stay ranged from 3 to 45 days. The patient with the 45-day stay who was morbidly obese had been operated upon for the preoperative

indication of perforated diverticulitis into the abdominal wall resulting in a necrotizing fasciitis requiring twice daily packing changes in the Intensive Care Unit (ICU) for over a month, the patient eventually making a full recovery. The average postoperative length of stay was 7.2 days, 4.6 days excluding the single outlier, with a median of 3.5 days.

DISCUSSION

Several small series have been published outlining minimally invasive approaches to acute diverticulitis. These approaches have ranged from laparoscopic peritoneal lavage in diffuse peritonitis with a sealed perforation[6] in eight patients to a variety of surgical procedures including resection as well as lavage in 39 patients[3] (selected from a larger series of 164 patients to match the presenting pathology described herein) and standard resections, laparoscopically performed in eighteen.[7] The conversion rates were similar in this series as in these reports.

No evidence existed of septic complications secondary to a pneumoperitoneum and gross purulent infection; indeed, no wound complications occurred in these patients and the majority of patients had a shorter postoperative length of stay than that of patients in reported series of open surgery.[8] The two patients with colovesical fistulas converted to a Pfannenstiel incision had a shorter recovery period (3, 4 days) than the single patient converted to a midline incision (11 days). In Franklin's series,[4] colovesical fistula was successfully addressed laparoscopically and, with additional experience, and a certain degree of comfort with laparoscopic closure of potential vesicle enterotomies, it may be in our future cases as well. When doubt exists regarding tissue planes, however, conversion to a laparotomy remains a safe course of action and, with a low transverse incision, can preserve some of the benefits of the minimally invasive approach. Although not used at our institution at the time of this series, the technique of hand-assisted laparoscopic surgery via a sleeve may be useful in performing the most difficult part of the dissection without sacrificing the demonstrated benefits of the minimally invasive approach.

With adequate experience in minimally invasive colon surgery, surgeons can use minimally invasive techniques in the majority of patients with complex diverticulitis. Either patients can be drained and downstaged for later interval resection, or, if necessary, approached directly by laparoscopic surgery with minimal morbidity. Besides the benefit of a quicker recovery, the risks of later morbidity, such as incisional hernias in infected incisions, is minimized.

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