

# Laparoscopic Surgery for Diverticular Disease Complicated by Fistulae

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## ABSTRACT

**Objectives:** Elective laparoscopic surgery for recurrent, uncomplicated diverticular disease is considered safe and effective; however, little data exist on complicated cases. We investigated laparoscopic sigmoid resection for diverticulitis complicated by fistulae.

**Methods:** We conducted a retrospective review of patients who underwent laparoscopic treatment of enteric fistulae complicating diverticular disease performed by 4 surgeons at the Mount Sinai Medical Center.

**Results:** From 1994 to 2004, 14 patients underwent elective laparoscopic sigmoid resections for diverticular disease complicated by enteric fistulae. Patients' mean age was 62 and 4 were female. Multiple fistulae were present in 21%. Types of fistulae included 8 colovesical, 5 enterocolic, 2 colovaginal, 1 colosalpingal, and 1 colocutaneous. All patients successfully underwent sigmoidectomy, and 14% required additional bowel resections. No cases were proximally diverted. Conversion to open was necessary in 36% of cases, all due to dense adhesions and severe inflammation. The mean operative time was 209 minutes, and the mean blood loss was 326 mL. Two (14%) postoperative complications occurred, including one anastomotic bleed and one prolonged ileus. No anastomotic leaks or mortalities occurred. The mean postoperative stay was 6 days.

**Conclusion:** Laparoscopic management of diverticular disease complicated by fistulae can be performed effectively and safely. The conversion rate is higher than traditionally accepted rates of uncomplicated cases of diverticulitis and is associated with severe adhesions and inflammation.

**Key Words:** Diverticulitis, Laparoscopic surgery, Fistula.

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## INTRODUCTION

Enteric fistulae complicate diverticular disease in up to 20% of cases.<sup>1</sup> Elective laparoscopic surgery for recurrent, uncomplicated diverticular disease is considered safe and effective; however, little data exist for disease complicated by fistulae.<sup>2-4</sup> Traditionally, complicated diverticulitis has been regarded as a contraindication to laparoscopic colectomy. However, the indications for laparoscopic surgery are ever evolving. This study describes a series of patients who underwent laparoscopic-assisted sigmoid resection for diverticulitis complicated by fistulae.

## METHODS

A retrospective review was performed of patients who underwent elective laparoscopic treatment of diverticular disease complicated by enteric fistulae. All operations were performed by a group of 4 laparoscopic surgeons at the Mount Sinai Medical Center in New York, New York. Records were reviewed with respect to patient demographics, medical and surgical history, operative details (operative time, type of fistula, conversion rate), and postoperative course (complications, length of stay). Comparisons were made using Student's t-tests (SPSS version 11.0, Chicago, IL). Our institutional review board approved this study.

All patients were diagnosed preoperatively with enteric fistulae due to diverticular disease. All operations reported were started laparoscopically. No cases were performed using the hand-assist method. In all cases, a sigmoidectomy was performed with primary intracorporeal anastomosis using a circular end-to-end stapling device.

## RESULTS

During a 10-year period (1994 through 2004), 14 patients were identified who underwent elective laparoscopically assisted sigmoid resections for diverticular disease complicated by enteric fistulae. The mean age was 62, and the male/female ratio was 10:4. Four (29%) patients had previous abdominal surgery, including 2 hysterectomies. The types of fistulae encountered are listed in **Table 1**. Most patients had colovesical fistulae, and 21% had multiple fistulae. A history of previous abdominal operations did

**Table 1.**  
Types of Fistulae

Colovesical	8
Enterocolic	5
Colovaginal	2
Colosalpingal	1
Colocutaneous	1

not correlate with having multiple fistulae ( $P>0.05$ ). Patients with enterocolic fistulae typically presented with chronic intermittent abdominal pain, and patients with colovesical fistulae usually presented with recurrent urinary tract infections or pneumaturia. Three patients who presented with stool per vagina had colovaginal or colosalpingal fistulae.

All cases were initially started laparoscopically, and all patients successfully underwent sigmoid resection. The 5 enteroenteric fistulae were managed by segmental resection of involved bowel in 3 and primary repair of bowel in 2. In the 8 patients with colovesical fistulae, the bladder was repaired primarily in 3 patients and left to heal without primary closure in 5. All these patients had bladder decompression by Foley catheter postoperatively. The vaginal cuff was left alone in the 2 patients with colovaginal fistulae, and the fallopian tubes were left intact in the patient with a colosalpingal fistula. No cases required proximal diversion. Five (36%) cases were converted to open, all due to dense pelvic adhesions and severe inflammation resulting in difficult dissections. Conversion to open did not correlate with a history of previous abdominal operation or the presence of multiple fistulae ( $P>0.05$ ). Patients who were converted did have a higher mean body mass index (BMI); however, this was not statistically significant (**Table 2**). In addition, the most senior surgeon in the group had the lowest conversion rate (13%).

Operative and postoperative characteristics are listed in **Table 3**. The mean postoperative stay was 6 days (range,

**Table 2.**  
Comparison of Laparoscopically Completed Versus Converted Cases

	Completed (n=9)	Converted (n=5)	
Presence of multiple fistulae	2 (22%)	1 (20%)	* $P<0.05$
Previous abdominal operations	2 (22%)	2 (40%)	* $P<0.05$
Mean body mass index (kg/m <sup>2</sup> )	28.0	29.7	* $P<0.05$

**Table 3.**  
Operative and Postoperative Characteristics

Mean operative time (min)	209 (range, 78 to 309)
Mean blood loss (mL)	326 (range, 40 to 500)
Mean postop length of stay (days)	6 (range, 3 to 13)
Proximal diversion (%)	0
Reoperation (%)	0
Mortality (%)	0
Morbidity (%)	14 (2/14)

3 to 13). No mortalities occurred, and two 30-day postoperative complications occurred for a morbidity rate of 14%. One patient had self-limiting anastomotic bleeding found on sigmoidoscopy on postoperative day one that resolved without intervention. The other complication was a prolonged ileus, requiring nasogastric decompression in a patient who was eventually discharged on postoperative day 13. No patients required reoperation, and no anastomotic leaks or other septic complications occurred in the postoperative period. One late complication occurred 2.5 years after the initial colectomy, which was an incarcerated incisional hernia requiring emergent laparotomy. This patient had a colovesical fistula and was one of the conversions to open in this series.

## DISCUSSION

Elective laparoscopic colectomy is becoming an increasingly more popular alternative to standard laparotomy for uncomplicated diverticular disease. Advantages include better pain control, more cosmetic incisions, shorter hospital stay, lower in-hospital morbidity, and earlier return to activity.<sup>3,5</sup> These benefits of minimally invasive techniques in uncomplicated diverticular disease have been extensively demonstrated in multiple studies, including prospective trials.<sup>5,6</sup> However, complicated diverticulitis has historically been a contraindication to laparoscopic resection because of difficult dissections, longer operative times, higher complication rates, and high conversion rates.

In our series, laparoscopic surgery was successful in two thirds of the patients. In all converted cases, dense adhesions or a large inflammatory phlegmon precluding safe and effective dissection. Studies investigating conversion during laparoscopic colectomy also cite obesity and operative complications, such as excessive bleeding, inadvertent visceral injury, and hypercapnia, as common reasons for conversion.<sup>7,8</sup> However, none of these were a

factor influencing conversion in our series. We also did not find a correlation between conversion with previous abdominal surgery or the presence of multiple fistulae. Because our series is small, any conclusions regarding these correlations should be made with caution. We also found a relationship between conversion rate and surgeon experience, also demonstrated in others' studies of laparoscopic colectomy.<sup>7,8</sup>

Published conversion rates in uncomplicated disease range from 5% to 14% in large multicenter studies.<sup>4,5</sup> As expected, our conversion rate is higher, owing to the complexity of the operation required when fistulae are involved. Bartus et al<sup>9</sup> had a similar conversion rate (25%) in their recent review of 36 patients with fistulae complicating diverticular disease. However, this series consisted of patients undergoing hand-assisted laparoscopic colectomy. Menenakos et al<sup>10</sup> had only 1 conversion in their series of 18 patients. Other series<sup>11–13</sup> inclusive of enteric fistulae from Crohn's disease report conversion rates of 5% to 33%. These conversion rates underscore the complicated nature of these cases but certainly will decrease as laparoscopic surgery gains acceptance for disease complicated by fistulae and surgical experience increases. In addition, the evolution of instrumentation that better dissects, handles, and coagulates dense and inflamed tissue will certainly only improve the operation.

Two patients in our series had 30-day postoperative complications. Both complications responded to conservative management. There were no anastomotic leaks or other septic complications. We can infer from this that laparoscopic anastomoses can be safely created, even in the face of fistulous disease. The late complication of an incarcerated ventral hernia in the patient that was converted calls attention to the benefit of laparoscopic surgery in avoiding incisional hernias. Our acceptable complication rate is comparable to others' published series.<sup>9–11,14</sup> Menenakos et al<sup>10</sup> had a 27.7% complication rate, including an anastomotic leak, and Bartus et al<sup>9</sup> reported an 8% morbidity rate with no leaks.

## CONCLUSION

Despite the retrospective design of this study, we believe it demonstrates that diverticular disease complicated by fistulae can be managed by laparoscopic surgery. Although our series is small, we have shown that laparoscopic surgery is safe and feasible. The conversion rate is higher than in reported uncomplicated cases of diverticulitis and is associated with severe adhesions and inflammation interfering with safe laparoscopic dissection.

Larger, prospective studies are needed to truly compare this to traditional open repair.

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