RESIDENT'S CORNER

# Complicated Diverticulitis

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***CASE SUMMARY:*** A 62-year-old previously healthy man presented with left lower quadrant pain and fever. Physical examination showed left lower quadrant peritonitis. Computed tomography scan showed a pelvic abscess with extraluminal air (Fig. 1). Intravenous antibiotics were started, and CT-guided percutaneous drainage was performed. The drain was removed 1 week after discharge. One week later, he presented with dysuria and pneumaturia and was started on antibiotics. Colonoscopy confirmed diverticulosis with no other mucosal abnormalities. He underwent a successful laparoscopic sigmoidectomy with colovesical fistula takedown.

## CLINICAL QUESTIONS

- What defines complicated diverticulitis?
- Is there a role for nonoperative therapy?
- What is the management of intra-abdominal drains?
- What are the goals of surgery as it pertains to the fistula, and how should we manage the Foley catheter postoperatively?

## BACKGROUND

Acute diverticular disease accounts for 250,000 annual admissions in the United States and an estimated annual health care cost of $3 billion.[1] Approximately 15% of patients with acute diverticulitis develop complicated disease, defined by free perforation, abscess, fistula, or stricture.[2] Contrary to uncomplicated diverticulitis, traditionally, a single episode of complicated diverticulitis has been considered an indication for an operation based on the anticipated high risk for morbidity and mortality with subsequent attacks. Recently, colorectal surgeons have questioned traditional dogma, specifically asking whether complicated diverticulitis can be successfully treated nonoperatively during the acute event and with observation following resolution.

## PRESENTATION AND DIAGNOSIS

Patients with complicated diverticulitis often present with fever and left lower quadrant pain. Those with free perforation may present with diffuse peritonitis and systemic toxicity. Most patients present with either a pericolonic or pelvic abscess. Fistulas, seen in 2% to 18% of patients, may present without a preceding episode. Although the colon can fistulize to any structure in its vicinity, the urinary bladder is the most common bystander. Colovesical fistulas are most frequently seen in men, where fecaluria and pneumaturia are the hallmark signs. In women, colovesical fistulas are typically seen in the setting of a previous hysterectomy. Colovaginal fistulas present with vaginal discharge and/or recurrent urinary tract infections. Strictures develop in approximately 2% of patients. Because of their chronic nature, symptoms are typically gradual, rarely progressing to a complete obstruction. Computed tomography scan is the diagnostic modality of choice, where sensitivity and specificity are reported to be 93% and 96%. It delineates the extent of disease and the feasibility for percutaneous drainage.[3]

## TREATMENT

Management of complicated diverticulitis is approached systematically. First, patients with hemodynamic instability and/or clinical evidence of diffuse peritonitis are taken to the operating room where source control is the top priority. If definitive management with primary anastomosis is undertaken, the proximal transection point should be uninflamed bowel, and, distally, the proximal rectum is the unequivocal target. Those with hemodynamic instability

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**FIGURE 1.** Pelvic abscess with extraluminal air.

should undergo a Hartmann procedure (HP), with the resection margins needing to only be proximal and distal to the perforation. Purulent or feculent peritonitis is preferably treated with primary resection and anastomosis, with the option of proximal diversion. Lambrichts et al[4] showed that primary anastomosis with proximal diversion has similar mortality, lower morbidity, and lower stoma rate at 12 months compared to HP. Although the colostomy created during HP is reversible, in many patients it becomes a long-term colostomy, with a reversal rate of only 30% in a 12-month period.[5]

### Abscesses

Abscesses <4 cm are treated with intravenous antibiotics with excellent success. However, for those who do not progress, repeat imaging should be obtained to ensure that the abscess has not progressed to a size requiring intervention. Those patients with abscesses greater than 4 cm are treated with percutaneous drainage with success rates of about 80%.[6] Abscesses that are not accessible by percutaneous drainage may be candidates for laparoscopic drain placement, which is preferred over transrectal drainage for deep pelvic abscesses.

An important aspect of managing patients in the subacute setting is the management of the drain. In general, drains are kept in place until there are clinical signs of sepsis control. Some advocate that the drain remain in place until the output is benign appearing and under an arbitrary amount, but the data in support of this philosophy are scarce. From a practical perspective, drains should be removed once there is an appropriate clinical response. The contrary should provoke a more conservative approach, obtaining a repeat imaging study to confirm radiographic improvement or lack thereof. Springer et al[7] demonstrated that repeat imaging after percutaneous drainage decreases recurrence rates after the drain is removed. Furthermore, in a recent review, Lambrichts et al[8] found that the timing of drain removal was based on clinical criteria. In the absence of clinical improvement, repeat imaging and drain repositioning may be indicated. Most patients will go on to elective resection after resolution of diverticulitis complicated by abscess, but selective observation in these patients is the subject of current investigation.

### Fistulas

Most fistulas arising from the sigmoid colon are diverticular in nature. Malignancy and Crohn's are rare causes. The pathophysiology involves direct extension into the target organ.[9] The diagnosis is based primarily on history. Although there are many diagnostic modalities described in the literature, CT scan with enteral contrast is the modality of choice. The colon and target organ should be properly interrogated because the findings may influence the overall management scheme. Colonoscopy in this setting is helpful for defining anatomy and excluding malignancy or Crohn's disease.

The goals of surgery are to meticulously separate the colon from the target organ. En bloc removal of the target organ is not needed in the absence of malignancy. The bladder is the most commonly affected target organ. Although there is no standard management of the remaining bladder defect, most defects are pinpoint in size and do not require repair, whereas larger defects are closed. In addition, although the bladder can be interrogated intraoperatively by instilling dyed saline, this is not routinely performed because most fistulas are undetectable.[10] Last, to separate the bladder defect from the newly created coloproctostomy, some have advocated for an omentoplasty to prevent fistula recurrence. The procedure is straightforward and adds very little to the time of the operation. The omental flap can is based on the gastroepiploic arcade, most commonly the right, given the ease of entering the lesser sac to the left of the Falciform ligament. Although it is a reasonable option, especially in those patients where a bladder repair is undertaken, the level of data is low, predominantly based on expert opinion.

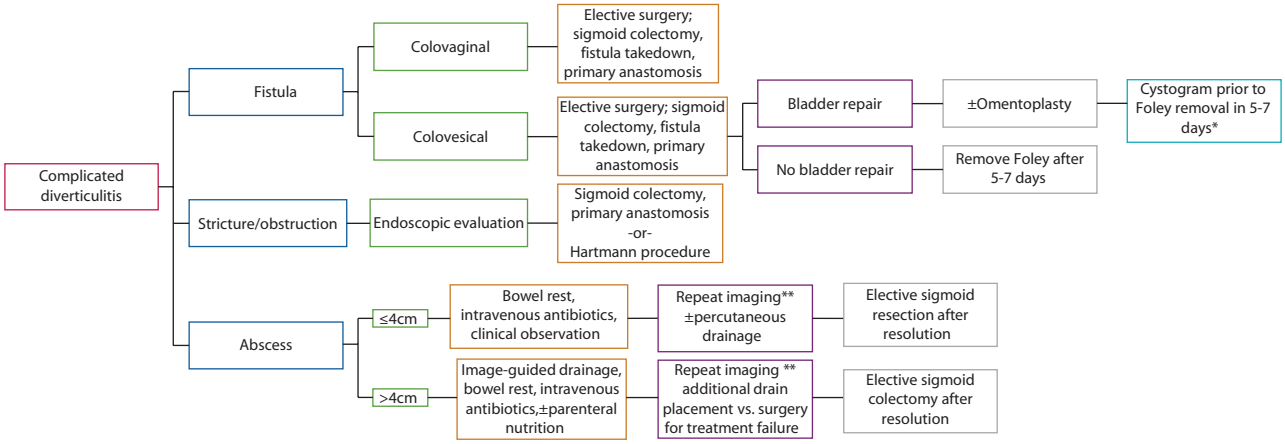
Similarly, there is no standard postoperative Foley catheter management for these patients. Although the vast literature consists predominantly of retrospective studies and expert consensus, a 5- to 7-day period is an appropriate time to remove the catheter without clinical sequelae. In addition, postoperative contrast studies are generally not required before catheter removal, but may be obtained after repair of a bladder defect.[11]

### Strictures

Patients with strictures present with a progressive change in bowel pattern that may culminate in an obstruction. Computed tomography scan will typically show a stricture with associated diverticular disease and perhaps dilation of

the proximal bowel. In the absence of diverticula, one must suspect cancer. Preoperatively, a flexible sigmoidoscopy will allow an assessment of the stricture and biopsies if necessary. Nonetheless, the treatment is resection with primary anastomosis or HP in unfavorable conditions. It should be noted that resection should follow oncologic principles in the case that a malignancy is suspected and/or cannot be excluded. A colonic stent may ameliorate the urgency of operative intervention, allowing a future, single-stage operation. However, to date, there is no literature in support of this practice and, in general, stents for benign disease are inadvisable.[12]

## EVALUATION AND TREATMENT ALGORITHM




*Foley catheter management dictated by results. **Performed in the setting of clinical failure.

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