The Medical and Nonoperative Treatment of Diverticulitis

Heath Beckham, M.D.¹ and Charles B. Whitlow, M.D.¹

ABSTRACT

The success of medical management for diverticular disease depends on the patient's presentation and degree of response to treatment. The patient's presentation can be grouped into categories using classification systems such as the modified Hinchey system. Clinical presentation and diagnostic studies help to group patients. Mild disease can often be managed with oral antibiotics as an outpatient; more severe disease requires hospitalization, bowel rest, and intravenous antibiotics. Interventions such as percutaneous drainage of associated abscesses may allow successful medical management. Probiotics and antiinflammatories may have a supportive role. Indications for elective resections are discussed.

KEYWORDS: Diverticular disease, medical management, antibiotics, percutaneous drainage

Objectives: On completion of this article, the reader should be able to describe the medical and nonoperative treatment of diverticular disease.

Sigmoid diverticulitis is a common disease process that is treated both medically and surgically. Although we may not have good quality prospective outcomes data to support the way we treat diverticulitis, we aren't completely without a rational approach based on observational studies. The decision about whether a patient needs surgical therapy or can be managed medically is largely based on two factors: the severity of disease at presentation and the rapidity and degree of response to those treatments.

DIAGNOSIS

Upon presentation to the clinic or the hospital with signs and symptoms of diverticulitis, a computed tomography (CT) scan should be considered. This imaging modality

can be rapidly obtained, is widely available, and yields reproducible results. The CT scan is superior to a contrast enema in its sensitivity (98% vs 92%) and in the evaluation of the severity of the inflammation (26% vs 9%). It can show other complications of the diverticulitis such as an abscess, phlegmon, adjacent organ involvement, or fistula, as well as identify other pathology such as appendicitis, tuboovarian abscess, or Crohn disease. The two most common signs of diverticulitis on CT scan are bowel wall thickening and fat stranding.¹⁻³

TREATMENT BASED ON STAGES OF DIVERTICULITIS

With the aid of CT scanning, patients can be grouped into categories at presentation based upon their imaging

¹Department of Colon and Rectal Surgery, Ochsner Clinic Foundation, New Orleans, Louisiana.

Address for correspondence and reprint requests: Charles B. Whitlow, M.D., Department of Colon and Rectal Surgery, Ochsner Clinic Foundation, 1514 Jefferson Hwy., New Orleans, LA 70121 (e-mail: cwhitlow@ochsner.org).

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Table 1 Hinchey Classification System of Diverticulitis

Stage	Definition
I	Localized pericolic or mesenteric abscess
II	Confined pelvic abscess
III	Generalized purulent peritonitis
IV	Generalized fecal peritonitis

findings. Hinchey et al⁴ devised a classification system encompassing four clinical stages of perforated diverticulitis, which was later modified. Kaiser et al retrospectively evaluated the management of the patient based on the modified Hinchey classification (stage 0 mild clinical diverticulitis, Ia confined pericolic inflammation, Ib confined pericolic abscess, II pelvic or distant intra-abdominal abscess, III generalized purulent peritonitis, IV fecal peritonitis) at presentation based on clinical, CT, or operative findings. Patients who were in the stage 0 and Ia groups did very well with just antibiotics. Only ~6% of these patients required a semiurgent resection because of an inadequate response to conservative therapy. All patients in stages III and IV underwent an urgent surgical resection. The patients in stages Ib and II were managed with a combination of antibiotics, percutaneous image guided drainage, and surgery. The higher the patient's stage, the less likely they were to avoid resective surgery, both in the short and long term.⁵ Patients with stage III and IV disease should be managed with surgery; patients with stage I or II disease are generally candidates for nonoperative management. See Table 1.

OPTIMAL NONOPERATIVE MANAGEMENT QUESTIONS

Once the patient has been diagnosed with diverticulitis, several more questions regarding their treatment need to be answered. First, should they be hospitalized or treated as an outpatient? Next, which antibiotics should be used and for how long should they be given? Last, what sort of bowel rest will be recommended?

The decision to treat a patient as an inpatient or outpatient is based on clinical criteria, such as the severity of the attack (evaluated by physical exam, laboratories, and CT scan), ability to tolerate oral antibiotics and hydration status, and the comorbidities and reliability of the patient. Mizuki et al⁶ studied the outpatient management of 70 patients with acute diverticulitis. The severity was graded by ultrasound, and those with limited inflammation within a diverticulum to an abscess <2 cm in size were included. They all received 10 days of an oral third-generation cephalosporin. They were initially started on a sport drink for the first 3 days then evaluated. If they worsened, they were admitted. If improved, they were allowed a liquid diet then reeval-

uated on day #7. Once again, if they were worse, they were admitted. If they were improved, they could have a regular diet. Sixty-eight of 70 patients completed the protocol without complications. They found that the cost of this regimen was <20% of the cost of conventional inpatient care of diverticulitis patients.⁶

An interesting but unanswered question in the care of patients with diverticulitis is whether antibiotics are always necessary. Hjern et al⁷ published a retrospective study of 317 patients with CT-confirmed diverticulitis where some were treated with antibiotics and others were not. The decision was left to the attending surgeon. The patients not treated with antibiotics had a lower temperature, C-reactive protein (CRP), white blood cell (WBC) count, and milder CT scan findings as a group. One hundred eighty-six of 193 patients were successfully treated without antibiotics, with 7 crossing over to the antibiotics group. Their results show that there are some cases where antibiotics are not indicated and further prospective studies are needed to clarify this issue.⁷

What is the best choice of antibiotics and how long should they be given? There have been multiple controlled studies of antibiotics in intraabdominal infections. The most important factors to consider in selecting antibiotics for diverticulitis are their activity against the most common colonic bacteria, gram-negative rods, and anaerobes. Also, adequate tissue levels must be achieved with an absence of toxicity. For an outpatient oral regimen, a fluoroquinolone such as Levaquin[®] (Ortho-McNeil-Janssen Pharmaceuticals, Inc., Titusville, NJ) or ciprofloxacin, or Bactrim[®] (Roche Pharmaceuticals, Nutley, NJ) plus either Flagyl[®] (Pfizer Pharmaceuticals, New York, NY) or clindamycin is a good two-drug combination. Single-agent regimens choices are Augmentin[®] (GlaxoSmithKline, Brentford, London, UK), doxycycline, or moxifloxacin. There are many one or two drug choices for intravenous (IV) therapy as well. Possible two-drug regimens consist of an aminoglycoside, third-generation cephalosporin, aztreonam, or a fluoroquinolone plus either Flagyl[®] or clindamycin. Single-agent regimen choices are Cefoxitin[®] (Merck & Co., Inc., Whitehouse Station, NJ), cefotetan, moxifloxacin, ampicillin-sulbactam, ampicillin-clavulanate, piperacillin-tazobactam, ticarcillin-clavulanate, imipenem-cilastatin, meropenem, or ertapenem. The patient should be switched from IV to oral therapy when the patient can tolerate a diet and oral medicines. Treating for 7 to 10 days is an acceptable period. Unfortunately, there is no good data about the timing of the transition to oral antibiotics or how long the patient should be treated.

THE TREATMENT OF DIVERTICULAR ABSCESES

Diverticular abscesses are a common complication of acute diverticulitis, occurring in ~15 to 20% of the

cases.⁸⁻¹⁰ The appropriate management of diverticular abscesses is often debated. According to the ASCRS Practice Parameters for Sigmoid Diverticulitis, "Radiologically guided percutaneous drainage is usually the most appropriate treatment for patients with a large diverticular abscess." They recommend hospitalization and IV antibiotics for these patients. If the abscess is <2 cm in diameter, it may resolve with antibiotics alone, whereas larger abscesses should be percutaneously drained. By using this approach, most patients can avoid an emergency operation and a colostomy.³ Other studies have found draining abscesses >4 cm to benefit the patient by reducing the abscess size, pain, fever, and leukocytosis. Ambrosetti et al performed a prospective study of diverticular abscesses and found that pelvic abscesses were more likely to require surgery during the initial admission than mesocolic abscesses. Their recommendations were to drain all pelvic abscesses and mesocolic abscesses that were >5 cm in size, or if no improvement after initial antibiotics.¹¹ A retrospective study comparing the management of abscesses <3 cm and $\geq$ to 3 cm found successful treatment in all 22 patients treated with antibiotics for abscesses <3 cm in size.¹²

OTHER COMPLICATIONS FROM DIVERTICULITIS

Fistulas are another recognized complication from diverticulitis. Both colo-vaginal and colo-vesicle fistulas can occur. The primary treatment for both of these situations is surgical. In a poor-risk patient, nonoperative therapy may be appropriate. Some patients may develop a small bowel obstruction from sigmoid diverticulitis due to a loop of small bowel being involved in the inflammatory process. This may improve with time as the colonic inflammation improves.

A colonic obstruction can also result from diverticulitis, but is more common in the chronic setting than the acute. A relatively new technology in the management of diverticular disease is colonic stents. Self-expanding metal stents (SEMS) have primarily been used to palliate obstructive symptoms in patients with metastatic or inoperable colorectal cancer and as a bridge to surgery in acute, left-sided colonic obstruction.¹³ Their role in management of benign disease is less clear. Complications such as stent migration, perforation, and epithelialization have all been described. The data for SEMS in benign colonic stricture has been limited to multiple small studies looking at the treatment of benign strictures, which have included patients with Crohn disease, radiation, anastomotic, and diverticular strictures.¹³⁻¹⁵ Forshaw et al found that the greatest benefit for SEMS was for patients with anastomotic strictures that had failed other therapies. They also concluded that SEMS should be avoided in the

case of acute diverticulitis due to a high failure rate, but that stenting for acute obstruction to allow delayed elective surgery is usually straightforward and uncomplicated.¹⁴ Small et al concluded that surgical intervention within 7 days after stent insertion would preclude most delayed complications such as stent migration and epithelialization.¹³

FOLLOW-UP

Follow-up of patients with diverticulitis is needed. A colonoscopy or flexible sigmoidoscopy should be performed several weeks after the resolution of symptoms to confirm the diagnosis and rule out other causes of the colonic inflammation such as cancer, Crohn disease, ulcerative colitis, or ischemia. Once the colon has been imaged, there are some lifestyle modifications that might alter the chance of recurrence of diverticulitis. Some modifiable factors associated with an increased risk of diverticular disease are constipation, smoking, physical inactivity, treatment with nonsteroidal anti-inflammatory drugs, and obesity.^{16,17} A high-fiber diet might lower the risk. A low fiber diet has long been associated with the development of diverticulosis of the colon.¹⁸ Fiber supplementation has been found to be beneficial in some studies,¹⁹⁻²³ though not making a significant difference in others.^{24,25} Given its relative safety and benefit to overall colorectal health, fiber supplementation to patients with diverticular disease should be recommended. Without any good evidence, certain foodstuffs such as nuts, seeds, popcorn, and corn have long been implicated in the development of diverticulitis and are often advised against by physicians. They were thought to provoke diverticulitis or diverticular bleeding by causing luminal trauma. In a large prospective study of men without known diverticular disease, Strate et al found that nut, corn, and popcorn consumption did not increase the risk of diverticulosis, diverticulitis, or diverticular bleeding.²⁶

PROBIOTICS, ANTIINFLAMMATORIES, AND ANTIBIOTICS

The use of probiotics to prevent recurrence has also been studied. Probiotics are thought to work by altering the local microflora in and around the diverticula of the colon and improve immune responses, thus potentially having a beneficial effect on the microscopic colitis associated with the diverticula.²⁷ One study found that the duration of remission was longer after treatment with the probiotic (14.1 months) than without the probiotic (2.43 months).²⁸ In another study, three groups of patients were followed for one year: one group received mesalamine daily, a second received probiotics plus Vitamin B, and a third received mesalamine and probiotics. Significantly more patients remained

asymptomatic in the third group than did the other two.²⁹ Though these studies were small and without control groups, they suggest probiotics may have a positive effect on the recurrence of symptomatic diverticular disease. Nonabsorbable antibiotics have also been studied in the setting of symptomatic uncomplicated diverticular disease. These studies have shown a benefit for cyclic rifaximin.^{30–34} Antiinflammatory agents have been studied as well. There have been several studies that evaluated the efficacy of mesalamine alone or mesalamine plus rifaximin. Mesalamine alone has been shown to be useful in the treatment of symptomatic uncomplicated diverticular disease.^{35–37} Mesalamine in combination with rifaximin has been shown to be superior to mesalamine alone in relief of symptoms and recurrence of diverticulitis.^{38,39}

WHEN TO OPERATE ON DIVERTICULITIS ELECTIVELY

One of the most debated areas in the management of diverticulitis is the timing and necessity of an elective operation for diverticulitis. After an episode of complicated diverticulitis managed nonoperatively, colonic resection should be recommended. The unanswered question is when to operate on patients with uncomplicated diverticulitis. Using a statistical model, Salem et al recommended surgical resection after the fourth attack.⁴⁰ However, Richards and Hammitt in 2002 recommended waiting until after the third attack.⁴¹ We do know that the most severe attack is usually the first as 53 to 78% of patients will present with perforation at their initial presentation.^{42–44} On the other hand, a recent study showed that of patients having an emergent colon resection, almost one-third of them had prior manifestations of diverticulitis and confirmed that their postsurgical morbidity and mortality, length of stay, hospital charges, and colostomy rate were significantly higher as compared with patients having an elective colon resection.⁴⁵ Whether younger patients (<50 years old) have more severe disease is not clear. But we do know that because of their longer lifespan compared with the older patient with diverticulitis, younger patients will have a higher risk of recurrence. The take-home point is that this decision should be made on a case-by-case basis taking into account the age of the patient, other medical comorbidities, the frequency and severity of the attacks, and the persistence of symptoms. The number of attacks should not be the main factor in surgical management. Although there are conflicting data, the current recommendations based on ASCRS practice parameters are that “elective resection should typically be advised if an episode of complicated diverticulitis is treated nonoperatively.” Further studies are needed in this area to define the natural history of recurrent diverticulitis.

CONCLUSIONS

The management of diverticulitis is multifaceted. Upon the initial presentation, CT scan findings are a good prognosticator. Most Hinchey stage I and II disease can be managed nonoperatively, whereas stage III and IV disease will likely require surgery. Percutaneous catheter drainage is useful for most diverticular abscesses larger than 2 to 3 cm, but not required. After resolution of symptoms, all patients require colonic visualization to confirm the diagnosis and rule out other pathology. Dietary restrictions after resolution of symptoms are no longer needed and fiber supplementation should be recommended. Most patients with uncomplicated diverticulitis can be successfully managed for more than two attacks, whereas most patients with complicated disease should undergo a colonic resection. The decision to operate electively on a patient with recurrent uncomplicated diverticulitis should be made on a case-by-case basis.³

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