Medical Treatment of Diverticular Disease

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ABSTRACT

The medical treatment of diverticulitis is discussed, including its incidence, stages, and presentation, as are the antibiotic and dietary therapies currently recommended for this disease. Because diverticulitis can be a challenge to treat, several pitfalls are listed in this discussion, including diverticulitis in the immunocompromised, in the young, and in patients who do not have true diverticulitis but who present with some signs and symptoms of the disease.

KEYWORDS: Diverticulosis, diverticulitis, irritable bowel syndrome, antibiotics, high-fiber diet

Objectives: Upon completion of this article, the reader should: (1) have an understanding of the medical (nonsurgical) nature of the vast majority of cases of diverticulitis; and (2) be able to articulate some of the traps and perils of its treatment.

The diagnosis and treatment of diverticular disease continues to challenge surgeons and nonsurgeons. This article primarily addresses the nonsurgical treatment of the disease, with some references to traps for the unwary.

DEFINITIONS

The *Random House Dictionary of the English Language* states that a diverticulum is "... a blind, tubular sac or process branching off from a canal or cavity." It also states that the plural of "diverticulum" is "diverticula."¹ (It is very common to hear or read the mistaken term "diverticuli" which can be a grammatical litmus test for the student, or nonstudent, of our language.) Diverticulitis is the condition wherein "inflammation is superimposed" on the condition of diverticulosis.² Other useful terms related to diverticulitis include "diverticuloma," which is the diverticular mass created from the

phlegmon, or abscess, resulting from the perforated diverticulum.

OVERVIEW

Other authors discuss the etiology and physiology of diverticular disease in this journal issue. We have learned much from the writings and observations of Hinchey, Burkitt, Painter, and others, who deserve credit for key observations about the condition.³⁻⁵ It has been 30 years or so since Burkitt taught the world the advantages of fiber. Interestingly, just recently, a large number of Americans have found some success in losing weight by avoiding carbohydrates and eating fats and proteins almost exclusively. Foods that contain large amounts of fats and proteins are certainly not known for their fiber content. Many of the low-carb dieters are nowadays suffering from constipation, and it will be interesting to see if other ills spoken of by Burkitt will also surface in

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coming years with these patients (appendicitis, hemorrhoids, varicose veins, and so on).

INCIDENCE OF DIVERTICULOSIS

The incidence of diverticulosis can only be presumed. Surely there are no absolutely reliable statistics about the number of people with diverticula. We do know that the incidence of diverticula increases with age and varies tremendously depending on the country or region of the world, with diet as a major causative factor, as taught by Burkitt. Gordon and Nivatvongs mention in their text⁶ that 34.9% of patients from the United Kingdom, over the age of 60, who underwent barium enema were found to have diverticulosis in one series. Only 1.6% of patients of all ages in Iran had diverticulosis as seen on barium enema in another study. However, the physical act of ordering a barium enema selects out a subset of patients who are already having bowel symptoms, and who are therefore not representative of the general population. Gordon and Nivatvongs also cite autopsy data, with a series from China showing only 0.1% of patients with diverticulosis but a series from United Kingdom with fully 37.0% of patients with diverticulosis. These studies certainly can be misleading and imprecise and must depend on the diligence of the pathologist doing the autopsy.⁶ We can conclude only that the incidence of diverticulosis is substantial in modern societies, and diverticulosis is most often seen in older patients who consume low-fiber diets. We can also conclude that in the vast majority of patients with diverticulosis, no symptoms of importance from the diverticula will occur during the lifetime of the patients. The vast majority of diverticula are silent, harmless, and almost a normal finding.

ETIOLOGY OF DIVERTICULITIS

It is generally believed that a diverticulum will become inflamed if it becomes obstructed. Fortunately, most diverticula do not become obstructed and inflamed. Usually when diverticulitis occurs, it is because of a single inflamed diverticulum. The obstruction of the diverticulum probably occurs because of an inspissated fecalith.⁷ There has been much comment in the past about seeds, popcorn, and nuts and whether those sorts of foods might cause diverticulitis. Seeds and nuts happen to be a fairly good source of dietary fiber, which is to be encouraged, but the fear has been that a small, hard food particle could lodge in a diverticulum and precipitate an attack. Some patients who have diverticulosis claim that they notice symptoms of diverticulitis when they eat seeds or nuts. However, it is possible to have irritable bowel syndrome and diverticulosis, and perhaps the left lower quadrant pain is not necessarily evidence of diverticulitis. There is no hard evidence that

the elimination of seeds, popcorn, and nuts will prevent diverticulitis from occurring, or that using these foods causes diverticulitis.

STAGES OF DIVERTICULITIS

Hinchey and associates classified diverticulitis into four stages⁸:

1. Stage I: A pericolic abscess confined by the mesentery of the colon.
2. Stage II: A pelvic abscess resulting from local perforation of a pericolic abscess. This abscess may be walled off by colon, mesocolon, omentum, small bowel, uterus, fallopian tubes and ovaries, and/or pelvic peritoneum.
3. Stage III: General peritonitis resulting from the rupture of either a pericolic or pelvic abscess into the free peritoneal cavity.
4. Stage IV: Fecal peritonitis resulting from the free perforation of a diverticulum.

For the purposes of this article about the non-surgical treatment of diverticulitis, we will describe patients with primarily Stage I disease. Obviously, Stage III and Stage IV disease both constitute surgical emergencies, and nonsurgical treatment of these stages is generally not an option. A patient with Stage II disease might be considered for nonoperative treatment as well, using some sort of CT-directed drainage of the abscess and antibiotic therapy. (This is discussed elsewhere in this issue.) However, the patient with the small, contained abscess is a good candidate for conservative treatment and will be the focus of this report.

THE TRUE INCIDENCE OF DIVERTICULITIS

Surgical literature is full of wild estimates about just how many patients actually develop diverticulitis. We delude ourselves if we believe that we have absolutely correct data about the incidence of diverticulitis, and this is true for several reasons. First, no doubt there is a fairly large group of patients who develop mild symptoms of diverticulitis and who have antibiotics on hand, self-medicate, and correct the situation without ever seeing a physician. There is a small town in central Utah where it is said that whenever anyone comes down with any sort of an infection or pain in any part of the body, the first thing to try is to take a great big antibiotic pill, meant to treat cattle, to see if the symptoms will go away. If the pain remains, they then go to the local town doctor. But first, they always try the cattle pill. And apparently they often are relieved without even seeing the doctor (noted in a conversation with Dr. Riley Rees, November 1970). Second, the vast majority of patients who come down with mild diverticulitis are successfully treated conservatively and

never make it to the surgeon. A very old paper by Horner described his office practice experience with diverticulitis. He had 364 office patients, over about a 10-year span, who presented with diverticulosis. Of those, 75 developed one or more attacks of diverticulitis. Of the 75, only 3 developed complications that were deemed to be “surgical.” None of the 3 patients required an operation in his series. And he concluded that “If patients with diverticulitis are treated early they rarely become surgical problems.”⁹ It is apparent that surgeons only see the small distillate of a relatively few patients who develop complicated diverticulitis. The vast majority never even see the surgeon.

TYPICAL PATIENT HISTORY OF MILD DIVERTICULITIS

The patient coming down with mild diverticulitis will complain of the gradual onset of lower abdominal pain and perhaps some nausea and vomiting and loss of appetite. A history of mild fever might be elicited as well. Occasionally, the patient will admit to pneumaturia, (air bubbles in the urine) or the passage of fecal-like matter in the urine, and/or dysuria.

PHYSICAL EXAM FOR DIVERTICULITIS

The patient with mild, acute sigmoid diverticulitis usually presents with a tender left lower quadrant. This tenderness can be accompanied by some distention and signs of ileus. At times, a tender mass can be palpated in the left lower quadrant.¹⁰ In the case of a very redundant sigmoid colon, which flops over into the right abdomen, it is possible that the pain might present in the right lower quadrant, but that situation is rather unlikely. It is also possible that a right-sided diverticulum might create a true right-colon diverticulitis, again a very rare condition indeed in the United States or Western Europe.

LABORATORY AND X-RAY TESTS FOR DIVERTICULITIS

One should expect an elevated white cell count, and a left shift, as the most basic of laboratory tests for diverticulitis (although the CBC might be normalized somewhat by antibiotics taken before the patient presents to the doctor). Also, the urinalysis might be abnormal, with evidence of urosepsis, especially if the patient has developed a colovesical fistula. The patient might benefit from flat plate and upright plain x-rays of the chest and abdomen, looking for free air and ruling out bowel obstruction. The very best imaging choice, when considering acute diverticulitis, is the CT scan, which is safe, noninvasive, and especially useful because it tells us what is going on outside the lumen of the bowel as it evaluates extramural inflammation. Features such as the presence

of diverticula, bowel wall thickening, soft tissue masses (phlegmon), pericolic fluid collections (abscess), so-called “dirty fat” which occurs in the adipose tissue surrounding the bowel—these features are very useful in making the diagnosis of diverticulitis. Also, if a pericolic abscess is found, it is often possible to do a CT-directed drainage of the abscess. This can eliminate the need for immediate surgery and make it possible for the surgeon to do a simple, one-stage resection and anastomosis.¹¹ Aside from the gold standard of CT scan, one might consider a contrast enema, which can, at times, be helpful in making the diagnosis. It is highly recommended that barium be avoided, because of the risks of extravasation, and that a water-soluble agent be chosen instead, gently administered. Because diverticulitis is mainly an infection/inflammation outside of the lumen of the bowel, it is possible that any contrast enema will underestimate the true extent of the disease.¹² Contrast enemas should generally be postponed until several weeks after symptoms have resolved. Other diagnostic tests, such as ultrasound or endoscopy are less useful when considering acute diverticulitis. However, endoscopy is very useful, several weeks after the acute attack has subsided, to exclude a major concern, namely the occult sigmoid colon cancer. The endoscopist must be very careful to avoid excessive insufflation and to use gentle technique in advancing the scope in a patient with recent diverticulitis.

DIFFERENTIAL DIAGNOSIS OF DIVERTICULITIS

The most important alternative to diverticulitis is colon cancer. If a cancer is causing the symptoms, it usually is obstructing or perforating. The typical “diverticulitis” symptoms are more associated with perforating cancer, with a localized abscess. (An obstructing carcinoma, on the other hand, would present with nausea, vomiting, distention, and have less associated pain.) Ruling out a malignancy is of critical importance, since in many cases of early diverticulitis, it will not be necessary to do surgery at all, whereas if a malignancy is present, early surgery is the proper treatment. If a contrast enema study is done, the key to the diagnosis of diverticulitis is an intact colonic mucosa. Other radiographic points are the length of the narrowed segment (usually diverticulitis is longer than is cancer), the presence of a mass in the wall of the bowel, and the presence of diverticula around the narrowed segment.¹³ It is possible that the contrast enema is nondiagnostic, and that the attempts at endoscopy are unsuccessful in visualizing the mucosa at the site of the stricture. Occasionally, only by resecting the diseased bowel can one be certain that carcinoma is ruled out. Other diseases can mimic diverticulitis, including Crohn’s disease, ulcerative colitis, and ischemic colitis. Although unlikely, it is always possible to have two

diseases, superimposed, which can become very confusing. Given the high incidence of diverticulosis, a patient can have diverticulitis and an adjacent cancer. Or it could happen that a patient could have diverticulitis and ischemic colitis. Such combined possibilities are unusual and confusing, and certainly can delay the more important diagnosis. The main concern, always, is that a cancer can be lurking within an area of diverticular disease and might possibly be missed.

THE "DIVERTICULITIS" TRAP

There are patients who present with soft signs and symptoms of diverticulitis but who may not, in fact, be suffering from the disease. Occasionally, these patients are taken to surgery and undergo sigmoid resection none-the-less; perhaps some of these operations are unnecessary. Gordon and Nivatvongs allude to this possibility in their textbook, stating there is poor correlation between the symptoms that patients are having and the amount of disease found in the pathology specimens. They relate the following: "The correlation between symptoms and pathologic findings is poor, for one third of resected specimens fail to show evidence of inflammation."¹⁴ Perhaps some of the specimens lack inflammation because of extensive antibiotic treatment. However, inflammation is lacking in at least a few of the pathology specimens because there is, and was, no diverticulitis. An occasional sigmoid colectomy might be performed mistakenly because of irritable bowel syndrome, which can produce left lower quadrant pain. Usually, diverticula are not a major feature of irritable bowel syndrome, but it is possible to have diverticulosis and irritable bowel as well. And there is no doubt that occasionally surgeons are overzealous in recommending colectomy.

When making this mistake, we subject our patients to substantial and unnecessary risks of colectomy and usually end up with someone who still has symptoms of irritable bowel, including pain. Sigmoid colectomy is a poor choice for irritable bowel syndrome. Patients with this syndrome can present with distention, tenderness, and even the suggestion of a mass in the left lower quadrant. However, usually there is no leukocytosis, no left shift, no fever, no peritoneal sign.

Patients suffering from irritable bowel syndrome are not in danger and must be reassured and treated conservatively with antispasmodics, fiber, and so on. These patients often are under stress, and sometimes the symptoms improve by addressing the underlying stress.¹⁵ Irritable bowel syndrome is a trap, waiting to catch the unwary surgeon. Breen and associates¹⁶ confirmed this concern: they studied 100 patients who had undergone elective surgery for diverticulitis. Eighty-two patients were available for follow-up. Of those, 24% did not have evidence of diverticulitis when the specimen

was examined by pathology. This subgroup of patients was less likely to have a good result. The patients in particular who seemed to continue to have postoperative symptoms were those who had had bowel management problems for more than 1 year preop and those who had abdominal pain not localized to the left lower quadrant.

SPECIAL CONCERNS OF AGE

The classic teaching about patients with diverticular disease who are under the age of 40 has been that their version of diverticulitis is especially virulent and is often associated with perforation, abscess, and other complications. It was said that these younger patients required an urgent operation to prevent the serious complications of diverticulitis.¹⁷ That aggressive approach has more recently been challenged as unnecessary. Dr. Neil Hyman, from the University of Vermont, gave an excellent address on this subject at the annual 2003 American Society of Colon and Rectal Surgeons meeting in New Orleans, LA. He reported a series of 762 patients with diverticulitis who had been seen at his institution from 1990 to 2001. Of those, 259 were less than 50 years of age. Of the 259, 63 required an urgent operation, leaving 196 to be managed medically. Of the 196, eventually 41 did have surgery. However, of the 41, only 1 patient required an urgent operation. One hundred fifty-five have had no surgery. He concluded that the routine recommendation of sigmoid colectomy is not indicated for the young patient who has had a single episode of diverticulitis.¹⁸ These patients are really being treated no differently than the older patients in this series from Vermont concerning when surgical resection is recommended. It has been common, in the past, to tell patients about the horrors of a colostomy and the advantages of an elective resection, especially if the patient is younger than 50. If it is true that only 1 patient in 196 will possibly require a colostomy, and if the usual surgeon has a 5 to 10% morbidity rate and up to a 1% mortality rate with elective sigmoid colectomy, it certainly is reasonable to be less aggressive in recommending surgery to this group of younger patients.

SPECIAL CONCERNS OF IMMUNOCOMPROMISED PATIENTS

The immune-compromised patients comprise another group that requires special consideration. These patients fail to manifest the classic signs and symptoms of diverticulitis, such as fever and pain. Thus the correct diagnosis and treatment in such patients is delayed. Medical treatment of these patients tends to be less successful than in the immunocompetent. These patients are less successful at walling off infection and tend to more often present with free air. It is recommended that this group of patients be handled in a very aggressive

manner, with early surgery the rule rather than the exception.¹⁹

NONSURGICAL TREATMENT OF DIVERTICULITIS

The vast majority of patients with diverticulitis will be successfully treated without surgery. The comparison can be made to Crohn's disease, in that both Crohn's disease and diverticulitis sometimes require surgical intervention for complications of the condition, but not necessarily for the condition itself. According to Sanford's *Guide to Antimicrobial Therapy 2003*, some of the offending organisms of diverticulitis include Enterobacteriaceae, *Pseudomonas aeruginosa*, *Bacterioides* sp., and enterococci. It is recommended that for "mild diverticulitis," which is treated on an outpatient basis, a good first-choice drug is trimethoprim/sulfamethoxazole, double-strength, given twice a day for 7 to 10 days. Another good first-choice drug combination is oral ciprofloxacin, 500 mg twice a day. Oral metronidazole, 500 mg every 6 hours, is added to either regimen for anaerobic gram negative bacilli. Each regimen is continued for 7 to 10 days. An alternate drug combination is amoxicillin/potassium clavulanate 500 mg/125 mg three times a day for 7 to 10 days. The oral antibiotics should be started as soon as possible after confirmation of the diagnosis.

For more severe diverticulitis, which is more likely to be treated surgically, the recommendation is for a variety of broad-spectrum intravenous antibiotic regimens. Sanford's *Guide* recommends ampicillin/sulbactam 3 g IV every 6 hours, or piperacillin/tazobactam 3.375 g IV every 6 hours (or 4.5 g IV every 8 hours), or ticarcillin/clavulanate 3.1 g IV every 6 hours or ertapenem 1.0 g IV daily. Other alternate drugs suggested for IV therapy include cefoxitin, cefotetan, or a combination of ciprofloxacin and metronidazole.²⁰ For the less severe (Hinchey Stage I) cases, in addition to the antibiotics, the patients should be placed on a bland, low-residue diet for a few days, until symptoms resolve, and then encouraged to eat a high-fiber diet. Nuts and seeds are probably not harmful to these patients, once they are free of pain. Today, a CT scan is usually done fairly quickly after the patient presents with symptoms. If symptoms resolve as hoped, further work-up with endoscopy and contrast enema can be done in a leisurely manner, after the patient is more comfortable and able to tolerate these tests. (Four to six weeks after resolution of pain is a good time to do this work-up). After the work-up has excluded cancer and confirmed diverticulitis, patients who become asymptomatic are told to return as needed, if and when symptoms recur.

Not all patients should be treated outside the hospital for diverticulitis. A patient who is unreliable, unable to care for himself or herself, unable to tolerate a

liquid diet, or immunocompromised should be admitted for care. If a patient comes from an isolated, rural area where nearby help is unavailable, hospitalization might be required as well. However, the vast majority of patients with simple diverticulitis can and should be treated as outpatients. If a patient requires hospital admission, he or she should be discharged as soon as it is medically prudent to do so. If a patient is able to keep down liquids but cannot tolerate oral antibiotics for some reason, home nursing care with IV antibiotics can be arranged. This makes medical and fiscal sense.

Many of these patients will be quite uncomfortable during the first several days of antibiotic treatment and should be offered some oral pain medication. Narcotics are effective and have no contraindications in this situation. Antispasmodics have no published role in the treatment of diverticulitis.

The patient who has mild diverticulitis should rapidly improve with conservative treatment. If, after 48 hours or so, there is not a significant lessening of abdominal pain and other symptoms, it is worthwhile to reconsider the possibility of a persistent phlegmon, an expanding abscess, or a progression of disease into the realm of the surgical.

SUMMARY

Diverticulosis is a disease of modern man, one that continues to cause significant morbidity and mortality. The vast majority of diverticulitis is treatable without surgery. Surgery should be offered sparingly and only for those patients who have recurrent attacks of true, documented diverticulitis, who have a serious complication of the disease, or who are in a special category, such as the immunocompromised.

AUTHOR'S NOTE

The opinions or assertions contained herein are the private ones of the author and are not to be construed as official or reflecting the views of the United States Air Force, the United States Army, the Uniformed Services University of the Health Sciences, or the US Department of Defense.

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