Diverticular Disease: Eat Your Fiber!

In industrialized nations, diverticular disease affects up to 70% of individuals by 60 years of age, with symptoms that can range from mild gastrointestinal disturbance to incapacitating pain. Diverticular disease appears to be related to increasing affluence and changed diet: Current theory holds that diverticular disease's origin is low-fiber diet. This explains why its incidence is highest and accelerating in the more prosperous countries where intake of fiber has decreased and intake of milled grains and refined sugars has increased over time. Not all patients develop symptoms, but if they do, the most frequent complaints associated with diverticulosis are cramping in the left-lower quadrant, bloating, constipation, and soiling. If diverticula perforate the gut's wall into the pericolic tissue, small and large abscesses, accompanied by bleeding, can form. Fistulization, when it occurs, most often penetrates to the bladder. Treatment addresses symptoms and may require hospitalization. During symptomatic periods, patients do best on low-fiber, bland diets. Once the acute episode or highly symptomatic period resolves or chronic disease is managed, patients should gradually increase dietary fiber to 20 to 30 grams daily or take dietary fiber in the form of bulk stimulants like psyllium.

KEY WORDS: Diverticular disease, Elderly, Fiber.

ABBREVIATIONS: DD = Diverticular disease, GI = Gastrointestinal.

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Diverticular disease—with its symptoms that range from mild gastrointestinal (GI) disturbance to incapacitating pain—appears to be related to increasing affluence, decreased fiber intake, and increased intake of milled grains and sugar. In 1907, 25 cases had been reported. Today, DD affects up to 70% of people living in industrialized nations by age 60.[1,2] Researchers have considered DD a disease of the elderly until recently, when they've noted a startling rise in the number of symptomatic cases requiring treatment in younger people. Experts familiar with the disease expect that this disease's burden will grow as baby boomers enter scenescence.[3] The earlier onset and increasing number of patients have gastroenterologists scurrying to develop new treatment options.

DD varies widely in its presentation. Patients may have diverticulosis (uninflamed diverticula) or diverticulitis (inflamed or infected diverticula), and with each of these, symptoms can range from no symptoms at all, to mild GI disturbance, to incapacitating pain that is a

medical emergency. Few treatment guidelines exist, and those that do are under constant challenge, scrutiny, and revision.[3]

Diverticula: Little Pouches

Diverticula are 0.5 to 1 cm herniations, or little outpouchings, almost always occurring in the wall of the sigmoid and descending colon, generally on either side of the three longitudinal muscle bundles. Current theory holds that DD's cause is low-fiber diets. Decreased dietary fiber intake reduces fecal mass, decreases the size of the lumen, or causes fecal stasis. In this hard, slow-moving intestine, muscular contraction force or pressure is transferred from the lumen's content to the colon's wall. The weakest points in the GI wall are three sites where vessels deliver blood supply. Pressure concentrates at these weak spots, and diverticula form. Often, these are discovered during colonoscopy.[2,4-6]

Clinicians often explain diverticula to patients using a tire analogy: Diverticula look like weak spots in the intestine, akin to when an inner tube pokes through a worn tire tread. Diverticula can be "false" (penetrating some but not all of the musculature) or "true" (penetrating the complete wall). "False" does not imply benign in this case. False diverticula can develop stasis or obstruction in their narrow necks if they fill with undigested food or fecal matter, inviting bacterial overgrowth, hemorrhage, or local tissue ischemia. This process is similar to that seen in appendicitis.[2,4,5] Increasingly, experts believe that fiber deficiency also changes colon microecology. This decreases local immune response, creating low-grade chronic inflammation, and increases the likelihood of acute diverticulitis.[2]

Not all patients develop symptoms, but if they do, the most frequent complaints associated with diverticulosis are cramping in the left-lower quadrant, bloating, constipation, flat- or ribbon-like stool, and underwear soiling. In about one-quarter of diverticulosis patients, inflammation and infection develop, and the diagnosis becomes diverticulitis.[2,4,5,7] The typical diverticulitis patient presents with fever, absence of peristalsis, a tender painful abdomen, and *reflexe musculair* (a protective reflex of the abdominal muscles to palpation).[6] If diverticula perforate the gut's wall into the pericolic tissue, microabscess and bleeding or large abscess formation are possible. Fistulization, when it occurs, most often goes to the bladder.[4,5] Table 1 describes risk factors related to DD.

Since 1978, gastroenterologists have used the Hinchey Classification, which describes perforations of the colon, to grade DD. Sher et al. introduced modifications in 1997.[18,19] When computed tomography (CT) became more accessible in the mid- to late-1990s, gastroenterologists gravitated to its use as the chief diagnostic tool because of its ability to provide better image detail. Consequently, classifying DD has reverted to a simpler paradigm. Patients are generally classified as having:

- Recurrent symptomatic disease
- Symptomatic complicated disease or
- Complicated disease, generally including hemorrhage, abscess, phlegmon (purulent inflammation and infiltration of connective tissue), fistula, perforation, stricture, purulent and fecal peritonitis, or small-bowel obstruction pursuant to postinflammatory adhesions

Depending on the diagnosing clinician, the terminology used to describe the disease will vary. This creates some difficulty in comparing research studies.

Increasingly, clinicians use magnetic resonance imaging (MRI) to diagnose. It reduces the patient's exposure to radiation with similar sensitivity and specificity to CT scan, and is more likely to identify fistula. It also reduces the risk of iatrogenic perforation that accompanies colonoscopy.[4,5,20]

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Treatment

Once DD is diagnosed, the patient's signs, symptoms, and disease severity are important in choosing treatment, but so are the treating clinician's preferred approach and the patient's preference.[6] Some clinicians and patients are

Table 1. Risk Factors for Diverticular Disease

Age	• Incidence increases steeply with age beginning at age 40 • In patients younger than 50 years of age, DD is a more virulent disease
Diet	• DD is associated with a history of low-fiber diet
Gender	• Predominantly male before age 65, female after age 65
Geography	• Most common in industrialized nations • Less common in Asian countries and almost nonexistent in rural Africa, where it tends to occur on left-lower quadrant
Medication use	• Chronic use of nonsteroidal anti-inflammatory drugs doubles the risk for DD, and quadruples perforation risk • Opioids and corticosteroids increase perforation risk • Calcium-channel blockers reduce perforation risk • Laxative overuse may weaken gastrointestinal musculature
Obesity	• Striking increase in incidence among the obese, especially before age 40
Physical activity	• Risk of developing DD is inversely proportionate to activity level
Smoking	• Contradictory findings, but most experts consider smoking a contributor

Source: References 18-17.
Abbreviation: DD = Diverticular disease.

conservative in their preferences, while others will want to progress to surgery as soon as reasonably indicated.

In acute, uncomplicated, and mild DD, most prescribers assume that infection is probable. They select a broad-spectrum antibiotic with activity against colonic bacteria including *Bacteroides, Peptostreptococcus, Clostridium,* and *Fusobacterium* species, and prescribe for 7 to 14 days. Most clinicians treat conservatively, recommending a bland, easily digestible diet. After the episode resolves, follow-up is critical and should include colonoscopy within four to six weeks and tests to rule out malignancy or other GI complications.[5,6] Additionally, clinicians should emphasize prevention, including improving dietary intake, weight reduction, smoking cessation, increased physical activity, and a review of medications that may contribute.[21-23]

Fever, inability to eat or drink, pain requiring narcotics, or systemic symptoms indicate that hospitalization for four to seven days or more is prudent. Patients may also complain of difficult or painful urination, fecaluria (passage of stool in urine) or pneumaturia (passage of gas in urine), which all suggest fistula. Clinicians usually prescribe intravenous antibiotics, using a third-generation cephalosporin, aminoglycoside, or monobactam with an anaerobic agent.[5,6] Gut rest (nothing by mouth) and hydration are started. If abscess or blockage occurs, clinicians may try CT-guided percutaneous drainage or move directly to surgical intervention. Patients who have fecal or purulent peritonitis are at high risk, as up to 35% die.[24]

During surgery, surgeons clean the perotineal cavity and remove bleeding pouches and fistulas. They may

need to perform colon resection, or a temporary or permanent colostomy. Complications from open-abdomen surgery are common, and increasingly, surgery for DD is done laparoscopically with good results. Once patients improve, they can switch to oral antibiotics.[5]

In those patients for whom DD creates chronic discomfort and recurrent acute episodes, the traditional approach has been surgery after two episodes. Recently, however, experts have proposed that most complications occur during the first DD episode, and after that DD is a more benign, lingering condition.[25,26]

Researchers are also pursuing several new, less-invasive treatment strategies. Some researchers have seen good results using nonabsorbable mesalamine and related compounds.[17,27,28] There is growing interest in rifaximin, an oral nonsystemic rifamycin derivative that is similar to rifampicin. It has broad-spectrum activity, and remains in the GI tract. Its lack of systemic absorption may allow long-term use, although most experts promote its intermittent use at this time. In patients who are hepatically impaired, it must be used with caution, as systemic exposure may increase.[29-31]

Some experts suggest that there is a role for probiotics, since they seem to stabilize the intestinal mucosa, compete metabolically with proinflammatory organisms, and stimulate immune response. A few studies, most small, have documented improvement with probiotics in DD patients. Additional study is needed to support their use.[30-32]

Immunocompromised patients (those with autoimmune disease, organ transplantation, or receiving corticosteroids or chemotherapy) can present with smoldering, indolent DD. Complicated by nature, these comorbidities elevate risk of perforation, abscess, or infection. Some surgeons advocate early surgery for these patients. Others, citing the high rate of postsurgical complications in these patients, believe a conservative approach is warranted.[34,35]

Dietary advice depends on the patient's progress and is completely opposite depending on whether the DD is active or resolved. In long-term care facilities, involving the dietitian can help identify appropriate diets and sources of fiber that are palatable for the resident. During symptomatic periods, patients do best on low-fiber, bland diets. Once the acute episode or highly symptomatic period resolves or chronic disease is managed, patients should gradually increase dietary fiber to 20 grams to 30 grams daily, or take dietary fiber in the form of bulk stimulants like psyllium. Increasing fiber gradually over four weeks is reasonable and should not cause disease relapse.[5] Patients should avoid GI stimulants—laxatives and enemas are contraindicated unless a physician prescribes them. In the past, clinicians warned patients to avoid high-residue foods such as nuts, seeds, berries, or popcorn. The clinicians believed that small, hard particles could lodge in diverticula and exacerbate the disease. Studies, however, have not confirmed this assumption.[36]

All health care clinicians should educate patients, families, and each other about fiber, stressing that we all need 20 to 30 grams of fiber daily for good health.

Implications for Consultant Pharmacists

When diverticulosis or diverticulitis occurs in a long-term care resident, consultant pharmacists must be vigilant. Certain trends have been noted about diverticular disease in the elderly:

- Initial symptoms and signs—particularly tenderness and local rigidity—may be less pronounced in elders who have diminished sensorium, and the disease may be "silent" until it has advanced and complications are imminent.[35,36]
- Comorbidities frequently make management more difficult.[37,38]
- Response to treatment may be slower, perforation more likely, and postoperative morbidity and mortality greater.[38,39]
- Fever is often absent, and an elevated white-blood count is observed in fewer than 50% of elders with diverticulitis.[37]

Since chronic use of several medications increases risk, careful drug regimen review can identify problems. Often, finding medications to address pain or comorbidities is a balancing act.

End Note

Americans consume far less fiber than they should, averaging 11 to 13 grams daily. One problem is that most people have no idea what's in their food; more than half of Americans think steak is a significant fiber source and almost as many believe the same for potato chips.[38] All health care clinicians should educate patients, families, and each other about fiber, stressing that we all need 20 to 30 grams of fiber daily for good health. In addition to preventing diverticulosis and its complications, increased fiber intake helps prevent or control many other health conditions. When a patient has diverticulosis, pharmacists can work well with dieticians to help find ways for the patient to develop better dietary habits.

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