Diverticular Disease: Update

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Opinion statement
Diverticular disease is an extremely common disease entity in our society. The major complication of diverticular disease, diverticulitis, can have quite variable presentations. In the acute setting, treatment is divided into nonsurgical (conservative) or surgical therapy. Cases of mild or “uncomplicated” disease benefit from a conservative approach involving antibiotic therapy. With more severe or “complicated” presentations (abscess, phlegmon, obstruction, fistula, or peritonitis), a more aggressive approach may involve percutaneous abscess drainage or urgent surgical therapy. This also may be required after a failed initial attempt at medical management. The decision regarding elective surgery after successful medical management of diverticulitis is more complicated. The primary goal is to minimize disease recurrence with as little morbidity as possible while maintaining a high quality of life. Recent evidence challenges indications for elective surgery. However, data on the natural history of recurrent diverticulitis are not clear enough to support altering current surgical guidelines. In addition, the increasing use of minimally invasive techniques with favorable outcomes for sigmoid colectomy must be considered. Prior to offering elective colectomy for diverticulitis, it remains important to individualize each case, giving special consideration to age, symptomatology, and recurrence. Ultimately, the decision for elective surgery is made by both the surgeon and a well-informed patient.

Introduction
Diverticular disease has been recognized as a distinct disease entity for more than 100 years [1] and is extremely common in the United States and Europe [2]. Recent estimates of its prevalence are lacking, although studies dating back several decades revealed that up to two thirds of the population develop diverticulosis by the ninth decade [3]. Similarly, estimates of progression to diverticulitis ranging from 10% to 25% in patients with known diverticulosis and an average age of 62 years at presentation are based on earlier studies [3,4]. Reports from Europe suggest that the incidence of diverticulitis is increasing [5], although recent estimates in the United States have shown a minimal increase when assessed by overall admissions for the disease [6]. It seems likely that the disease process is more prevalent today and that the majority of cases are now treated on an outpatient basis.

The etiology of diverticular disease is multifactorial. There is a clear association with aging, as well as a dietary contribution related to lack of fiber intake [7]. In addition, the lifelong work of Neil Painter revealed a link between intracolonic pressures and diverticula formation. Painter et al. [8] noted that increased circular muscle contractions within the sigmoid colon led to increased segmental pressures and an outward force generating diverticular outpouchings. The association between symptomatic diverticular disease and increased colonic pressure has since been confirmed [9]. In addition, there is further evidence indicating that altered motility within the affected portion of the colon may be causative as well [10]. Finally, alterations in collagen cross-linking, as well as increased elastin deposition within the colon wall may contribute to the pathogenesis [11,12].
There is surprisingly little known about the progression or prevention of diverticulosis to diverticulitis. It is presumed that the diverticulitis begins when a fecalith abrades the surface or lodges within a diverticulum. A secondary inflammatory response ensues, with bacterial proliferation and local ischemia leading to perforation with variable degrees of severity and symptoms [13]. It is unclear whether risk factors for the development of diverticulitis actually exist, although there is evidence to suggest that corticosteroids and NSAID medications may predispose to this process or perhaps increase its severity [14].

As the presentation of acute diverticulitis is quite variable, several aspects must be considered when managing these patients. First and foremost is the presenting state of the patient and degree of sepsis. CT scanning is useful to confirm the diagnosis and to assess for possible associated abscess. Using this information and/or physical examination findings, a decision for immediate surgical intervention or conservative medical management is made. There is no reliable classification system for nonoperative diverticulitis. However, an intraoperative classification based on severity of perforation does exist on the basis of clinical findings: 1) a pericolic or mesenteric abscess, 2) a walled off pelvic abscess, 3) generalized purulent peritonitis, and 4) generalized feculent peritonitis [15]. Although not widely utilized, this system may be useful for the surgeon when considering intraoperative management options.

In the majority of acute presentations, medical management is successful. Interestingly, medical treatment options have remained stable over time, with the exception of improved antibiotics and increasing outpatient management. The availability of percutaneous drainage techniques for diverticular abscesses may allow for the avoidance of urgent surgical intervention. However, emergent surgical resection remains necessary in the patient presenting with severe sepsis or diffuse peritonitis, or when attempts at conservative treatment fail. In these settings, surgery usually involves a two-stage procedure with sigmoid resection, end-colostomy, and closure of the rectal stump (Hartmann procedure) [16]. In selected cases, one may consider a single-stage procedure. Current controversy revolves around the need for and timing of elective surgical resection after successful recovery from acute diverticulitis. Most guidelines are based on early reports citing high recurrence rates (25%) after an initial inflammatory episode [4]. This resulted in recommendations for sigmoid resection after one or two documented attacks [17]. More recently, the natural history of this disease is being challenged, and the likelihood of subsequent attacks actually may be less frequent than initially thought. With this in mind, a new era with respect to the timing of surgical intervention for recurrent diverticulitis may be evolving. Unfortunately, the present literature on recurrence is based on admission data only, and it is unclear how frequently repeat episodes occur in the outpatient setting or how a patient’s quality of life is affected after an initial attack. Finally, the increasing use of minimally invasive techniques in the management of diverticulitis is also likely to influence future decision making. The following review concentrates on the current treatment approaches for diverticulitis with special emphasis on surgical considerations.

### Treatment

#### Acute diverticulitis treatment

- As with any disease process, the goal for successful treatment of acute diverticulitis is to return the patient to his or her baseline condition with as little morbidity as possible. Upon acute presentation, two major treatment options are pursued: nonsurgical (conservative) or surgical management, depending on the extent of disease and symptoms.

#### Nonsurgical (conservative) management

- According to multiple studies, conservative management is successful in 70% to 100% of cases [18••,19–21]. Therefore, a conservative approach should be utilized initially whenever feasible.

#### Outpatient management

Uncomplicated diverticulitis is associated with mild to moderate localized abdominal pain without evidence of abscess, obstruction, fistula, or diffuse peritonitis. In an otherwise healthy individual, this usually can be managed on an outpatient basis with oral antibiotics and a full liquid diet for 7 to 10 days [22].