

AGA SECTION

American Gastroenterological Association Institute Guideline on the Management of Acute Diverticulitis



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This document presents the official recommendations of the American Gastroenterological Association (AGA) Institute on the management of acute diverticulitis. Acute diverticulitis, defined as clinically evident macroscopic inflammation of a diverticulum or diverticula, occurs in approximately 4% of patients with diverticulosis; roughly 15% of those patients will have complicated disease, defined as an abscess, perforation, fistula, or colonic obstruction, and 15% to 30% will experience recurrence. Acute diverticulitis is the third most common inpatient gastrointestinal diagnosis in the United States, costing more than \$2 billion annually, and is a common outpatient and emergency department diagnosis as well. The most recent US gastroenterology society practice guideline on diverticular disease was published in 1999;¹ the literature on this disorder has grown considerably since then, with data challenging some prior traditional recommendations. Given the significant burden of disease and the evolving scientific literature, the AGA has identified acute diverticulitis as a priority for an updated guideline. This guideline does not address other manifestations of diverticular disease, such as symptomatic uncomplicated diverticular disease, diverticular bleeding, and segmental colitis associated with diverticulosis, and does not examine the prevention of incident diverticulitis or the management of complicated disease. Reference to surgical society and international guideline recommendations is made when appropriate.

This guideline was developed by the AGA's Clinical Guidelines Committee and approved by the AGA Institute Governing Board. It was developed using a process described elsewhere.² Briefly, the AGA process for developing clinical practice guidelines incorporates Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology³ and best practices as outlined by the Institute of Medicine.⁴ GRADE methodology was used to prepare the accompanying technical review on focused questions and their related specific populations, interventions, comparisons, and outcomes.⁵ Optimal understanding of this guideline will be enhanced by reading applicable portions of the technical review. The quality of available evidence on each

question was first judged by the technical review panel of content and methodological experts (Table 1). Reasons justifying grading are detailed in the following text when appropriate. The guideline authors, none of whom have any potential financial or professional conflict of interest on the topic, met with the technical review panel to discuss the evidence. The guideline authors subsequently met privately and drafted recommendations, taking into account the quality of evidence as well as the balance between benefits and harms, patient preferences, and resource utilization. Such pertinent considerations are also detailed in the following text when relevant. The strength of the recommendations was categorized as strong, conditional, or no recommendation according to GRADE terminology (Table 2). The draft recommendations were then opened to public comment, edited, and approved by the Governing Board of the AGA (Table 3).

Recommendations

Question 1. Should Antibiotics Be Routinely Used in Patients With Acute Uncomplicated Diverticulitis?

The AGA suggests that antibiotics should be used selectively, rather than routinely, in patients with acute uncomplicated diverticulitis. (Conditional recommendation, low quality of evidence).

Until recently, antibiotics have been the unquestioned cornerstone of treatment of patients with acute diverticulitis, consistently recommended in prior guidelines, textbooks, and expert reviews. The emerging belief that acute diverticulitis may be more inflammatory than infectious, as well as increasing concerns about the overuse of antibiotics have led to preliminary investigations into the necessity of antibiotics.

Abbreviations used in this paper: AGA, American Gastroenterological Association; CT, computed tomography; GRADE, Grading of Recommendations Assessment, Development and Evaluation; NSAID, nonsteroidal anti-inflammatory drug.

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Table 1. GRADE Categories of Quality of Evidence

High	We are very confident that the true effect lies close to that of the estimate of the effect.
Moderate	We are moderately confident in the effect estimate. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Our confidence in the effect estimate is limited. The true effect may be substantially different from the estimate of the effect.
Very low	We have very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect.

Two recent randomized trials and 2 systematic reviews have reported no clear benefit and questioned the routine use of antibiotics, as does this guideline, suggesting selective and individualized use. It is important to emphasize that the current data are of low quality, and recommendations could change as further studies are performed. Further, the patients studied were inpatients with uncomplicated disease confirmed by computed tomography (CT); therefore, the results should not be generalized to complicated patients (ie, those with abscesses or fistulas), those with signs of severe infection or sepsis, immunosuppressed patients, or patients with other significant comorbidities. This recommendation is conditional due to the low quality of current evidence. Additionally, outpatient management without antibiotics has not been studied, although we would expect these patients to have generally milder disease and logically equal or better outcomes.

Table 2. GRADE Categories of Strength of Recommendation

	For the patient	For the clinician
Strong	Most individuals in this situation would want the recommended course of action and only a small proportion would not.	Most individuals should receive the recommended course of action. Formal decision aids are not likely to be needed to help individuals make decisions consistent with their values and preferences.
Conditional	The majority of individuals in this situation would want the suggested course of action, but many would not.	Different choices will be appropriate for different patients. Decision aids may well be useful helping individuals making decisions consistent with their values and preferences. Clinicians should expect to spend more time with patients when working towards a decision.

Question 2. Should a Colonoscopy Be Performed After an Episode of Acute Diverticulitis Confirmed by CT Scan?

The AGA suggests that colonoscopy be performed after resolution of acute diverticulitis in appropriate candidates to exclude the misdiagnosis of a colonic neoplasm if a high-quality examination of the colon has not been recently performed. (Conditional recommendation, low quality of evidence).

Observational studies of cohorts of patients with imaging-proven diverticulitis who subsequently underwent colonoscopy detected a small number of colorectal cancers (15 cases/1000 patients) and advanced adenomas (38 cases/1000 patients). Absence of a mass lesion on CT scan does not exclude the possibility of an underlying colonic neoplasm. Evidence of alternative, non-neoplastic explanations for the index presentation, such as inflammatory bowel disease or ischemic colitis, was either infrequently identified or not reported in the systematic review. Although an increased risk of recurrent diverticulitis or colonic perforation is a concern in patients undergoing colonoscopy after an episode of acute diverticulitis, this was not reported as an adverse event in the available literature. Although not directly addressed in the existing studies, factors that may influence a decision to perform a colonoscopy after an episode of acute diverticulitis include (1) timing and completeness of a prior colonoscopy, (2) comorbidities, (3) persistent symptoms of abdominal pain or diarrhea, and (4) patient preferences. The risks of colonoscopy may be higher in patients with chronic diverticulitis, acute recurrent diverticulitis, or complicated diverticulitis. The optimal timing of colonoscopy after an episode of acute diverticulitis is uncertain, but the severity and duration of the episode are relevant considerations. Intervals of 6 to 8 weeks after resolution of acute diverticulitis are commonly followed.

Question 3. Should Elective Colonic Resection Be Performed After an Initial Episode of Acute Uncomplicated Diverticulitis?

The AGA suggests against elective colonic resection in patients with an initial episode of acute uncomplicated diverticulitis. The decision to perform elective prophylactic colonic resection in this setting should be individualized. (Conditional recommendation, very-low quality of evidence).

Approximately 20% of patients with acute uncomplicated diverticulitis experience a recurrent episode of diverticulitis in the following 5 years. The risk of future diverticular complications and need for emergency surgery among patients treated medically without colonic resection

Table 3. AGA Recommendations on the Management of Acute Diverticulitis

Recommendation	Strength of recommendation	Quality of evidence
The AGA suggests that antibiotics should be used selectively, rather than routinely, in patients with acute uncomplicated diverticulitis.	Conditional	Low
The AGA suggests that colonoscopy be performed after resolution of acute diverticulitis in appropriate candidates to exclude the misdiagnosis of a colonic neoplasm if a high-quality examination of the colon has not been recently performed.	Conditional	Low
The AGA suggests against elective colonic resection in patients with an initial episode of acute uncomplicated diverticulitis. The decision to perform elective prophylactic colonic resection in this setting should be individualized.	Conditional	Very low
The AGA suggests a fiber-rich diet or fiber supplementation in patients with a history of acute diverticulitis.	Conditional	Very low
The AGA suggests against routinely advising patients with a history of diverticulitis to avoid consumption of seeds, nuts, and popcorn.	Conditional	Very low
The AGA suggests against routinely advising patients with a history of diverticulitis to avoid the use of aspirin.	Conditional	Low
The AGA suggests advising patients with a history of diverticulitis to avoid the use of nonaspirin NSAIDs if possible.	Conditional	Very low
The AGA recommends against the use of mesalamine after acute uncomplicated diverticulitis.	Strong	Moderate
The AGA suggests against the use of rifaximin after acute uncomplicated diverticulitis.	Conditional	Very low
The AGA suggests against the use of probiotics after acute uncomplicated diverticulitis.	Conditional	Very low
The AGA suggests advising patients with diverticular disease to consider vigorous physical activity.	Conditional	Very low

is low (<5%). From a patient perspective, the potential need for a colostomy for recurrent diverticulitis is of particular concern. Importantly, approximately 10% of patients managed with elective sigmoid resection after an episode of acute diverticulitis experience short-term complications of surgery, including wound infection, anastomotic leak, and cardiovascular/thrombotic events. Such postoperative risks are increased in patients older than 65 years of age. Long-term complications of abdominal distention, cramping, altered defecation, and fecal incontinence are reported in 25% of patients after elective surgery. A reduction in risk of recurrent diverticulitis after elective surgery may exist, but the magnitude of this benefit is difficult to ascertain based on limited data. The rates of recurrent diverticulitis appear to be higher in younger patients and the operative risks are lower, but the data do not support elective surgery in this subgroup when presenting with acute uncomplicated diverticulitis. Similarly, recent retrospective data have challenged existing recommendations for elective surgery in patients with repeated episodes of acute diverticulitis.^{6,7} In addition to age, patient-specific factors such as access to medical care for recurrent diverticulitis, immunosuppression, operative comorbidities, and patient preference should be considered in decisions regarding elective surgical management of recurrent diverticulitis. Results of ongoing randomized trials comparing surgical with conservative therapy for patients with recurrent diverticulitis are awaited.

Question 4. Should a High-Fiber Diet, Rather Than a Regular Diet, Be Advised in Patients With a History of Acute Diverticulitis?

The AGA suggests a fiber-rich diet or fiber supplementation in patients with a history of acute diverticulitis. (Conditional recommendation, very low quality of evidence).

There are no studies that address whether dietary or supplemental fiber intake reduces the risk of recurrent acute diverticulitis. Risk reduction for recurrent diverticulitis is extrapolated from a study examining patients without a prior history of diverticulitis (incident diverticulitis). Risk reductions for diverticular complications and surgery are based on a single, small case-control study. The benefits of fiber for chronic abdominal pain in patients with diverticulosis are inconsistent and do not necessarily imply benefit in terms of recurrent diverticulitis. Although both the certainty and the magnitude of benefit of fiber in patients with acute uncomplicated diverticulitis are difficult to ascertain based on very low-quality evidence, the intake of a high-fiber diet or fiber supplementation is unlikely to pose a substantial risk to patients. In light of the very low-quality evidence base, patient preferences and side effects of fiber such as abdominal bloating should be considered when counseling a patient. A differential benefit of dietary fiber

intake compared with fiber supplementation is unknown, as is the optimal daily dose of fiber necessary to achieve benefit. The benefit of fiber in patients with recurrent or complicated diverticulitis is also undefined.

Question 5. Should Consumption of Nuts and Popcorn Be Avoided in Patients With a History of Acute Diverticulitis?

The AGA suggests against routinely advising patients with a history of acute diverticulitis to avoid consumption of nuts and popcorn. (Conditional recommendation, very-low quality of evidence).

The relevant data on the consumption of nuts and popcorn and subsequent diverticulitis outcomes are derived from observational studies of incident episodes of diverticulitis. There are few data on consumption of these products and subsequent recurrence of diverticular disease. The key study reported modest estimates of relative risks (range, 0.55–1.13) and has a high degree of statistical uncertainty (95% confidence intervals that surround 1.0). In the absence of more compelling evidence, it seems that advising patients to avoid these items is not useful.

Question 6. Should Aspirin Be Avoided in Patients With a History of Acute Diverticulitis?

The AGA suggests against routinely advising patients with a history of acute diverticulitis to avoid the use of aspirin. (Conditional recommendation, very-low quality of evidence).

The relevant data on the use of aspirin and subsequent diverticulitis outcomes are derived from observational studies of incident episodes of diverticulitis. There are few data on use of aspirin and the subsequent recurrence of diverticular disease. The observational studies indicate a slightly increased risk of occurrence of any episode of diverticulitis (relative risk, 1.25; 95% confidence interval, 1.05–1.47); however, the estimate of risk of complicated diverticulitis is less certain (relative risk, 1.13; 95% confidence interval, 0.61–2.10). Among those with a history of diverticulitis, the effect of aspirin on non-diverticular diseases may be more relevant. There are modest protective effects of use of aspirin on overall mortality and nonfatal myocardial infarction that are in part tempered by a modest increase in gastrointestinal bleeding.

The value of aspirin as secondary prevention in established coronary artery disease is well established and in this setting would outweigh any increased risk of recurrent diverticular disease. The value of aspirin as a primary preventive measure is less certain and would require more individualized decision making.

Question 7. Should Nonaspirin Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) Be Avoided in Patients With a History of Acute Diverticulitis?

The AGA suggests advising patients with a history of diverticulitis to avoid the use of nonaspirin NSAIDs if possible. (Conditional recommendation, very-low quality of evidence).

The relevant data on the use of nonaspirin NSAIDs and subsequent diverticulitis outcomes are derived from observational studies of incident episodes of diverticulitis. There are few data on use of nonaspirin NSAIDs and the subsequent recurrence of diverticular disease. The observational studies indicate a moderately increased risk of occurrence of any episode of diverticulitis and complicated diverticulitis.

Question 8. Should Mesalamine Rather Than Placebo Be Used in Patients With a History of Acute Uncomplicated Diverticulitis?

The AGA recommends against the use of mesalamine after acute uncomplicated diverticulitis. (Strong recommendation, moderate quality of evidence).

Given the inflammatory changes present histologically in acute diverticulitis, mesalamine, an anti-inflammatory agent that is effective in patients with ulcerative colitis, has been fairly well investigated in patients with acute diverticulitis; 6 studies have evaluated more than 1800 patients. The currently available evidence, moderate in quality and more robust than for most of the other agents evaluated in this guideline, does not suggest efficacy in reducing the risk of recurrence, resolution of pain, or need for surgery in this specific population. The role of this agent in patients with multiple recurrent/relapsing diseases or patients with symptomatic uncomplicated diverticular disease has not been addressed in this guideline, and this recommendation does not apply to those populations.

Question 9. Should Rifaximin Rather Than Placebo Be Used in Patients With a History of Acute Uncomplicated Diverticulitis?

The AGA suggests against the use of rifaximin after acute uncomplicated diverticulitis. (Conditional recommendation, very-low quality of evidence).

Rifaximin, a nonabsorbable oral antibiotic, has been studied in this population in one unblinded study that was terminated early. Although this trial reported a numerical reduction in recurrence rates, the results were

not statistically significant and its effect is still uncertain (in addition to its costs and potential adverse events). Therefore, we suggest conditionally (due to the very low quality of evidence) against its routine use in this population to reduce recurrence rates, pending further study. Similar to the (potential) role of mesalamine, the efficacy of rifaximin in patients with chronic recurrent symptoms and symptomatic uncomplicated diverticular disease has not been addressed in this guideline, and this recommendation does not apply to those populations.

Question 10. Should Probiotics Rather Than Placebo Be Used in Patients With a History of Acute Uncomplicated Diverticulitis?

The AGA suggests against the use of probiotics after acute uncomplicated diverticulitis. (Conditional recommendation, very low quality of evidence).

One small trial evaluating the use of probiotics in patients with a history of diverticulitis reported a numeric, but not statistically significant, reduction in recurrence, and another unblinded trial had similar findings. Due to the very low quality of evidence, and the current uncertainties of the role of the microbiome in diverticulitis (and the impact of specific agents/species), the AGA suggests against the routine use of probiotics in this population, pending further study.

Question 11. Should Vigorous Physical Activity Rather Than Regular Activity Be Encouraged in Patients With a History of Acute Diverticulitis?

The AGA suggests advising patients with diverticular disease to consider vigorous physical activity. (Conditional recommendation, very low quality of evidence).

The relevant data on physical activity and subsequent diverticulitis outcomes are derived from observational studies of incident episodes of diverticulitis. There are few data on physical activity and the subsequent recurrence of diverticular disease. A large observational study of 47,288 men indicated a modest decreased risk of occurrence of any episode of diverticulitis among those with vigorous activity levels.

Conclusion

The management of acute diverticulitis has undergone meaningful changes over the past decade, including more judicious use of antibiotics and surgery as well as preliminary and ongoing investigations into medical therapies to decrease symptoms and reduce recurrence. However, the majority of the evidence is currently of poor quality, and

most of our recommendations are therefore conditional. Areas that should be priorities for future research include the following:

- Identifying patients who will benefit from antibiotics and those in whom it can safely be withheld.
- Evaluating medical therapies, such as anti-inflammatory drugs, antibiotics, or probiotics, and dietary interventions that may decrease symptoms and complications and/or reduce recurrence rates after an episode of acute diverticulitis.
- Identifying risk factors for recurrent diverticulitis to better target potential medical interventions to populations most likely to benefit.
- Quantifying the yield, risks, and timing of colonoscopy after an episode of acute diverticulitis.

References

1. Stollman NH, Raskin JB. Diagnosis and management of diverticular disease of the colon in adults. *Am J Gastroenterol* 1999;94:3110–3121.
2. AGA Institute clinical practice guideline development process. <http://www.gastro.org/practice/medical-position-statements/aga-institute-clinical-practice-guideline-development-process>. Accessed March 29, 2015.
3. Sultan S, Falck-Ytter Y, Inadomi JM. The AGA Institute process for developing clinical practice guidelines part one: grading the evidence. *Clin Gastroenterol Hepatol* 2013;11:329–332.
4. Graham R, Mancher M, Wolman DM, et al. *Clinical practice guidelines we can trust*. Washington, DC: Institute of Medicine; The National Academies Press, 2011.
5. Strate LL, Peery AF, Neumann I. American Gastroenterological Association Institute technical review on the management of acute diverticulitis. *Gastroenterology* 2015;149:1950–1976.
6. Feingold D, Steele SR, Lee S, et al. Practice parameters for the treatment of sigmoid diverticulitis. *Dis Colon Rectum* 2014;57:284–294.
7. Morris AM, Regenbogen SE, Hardiman KM, et al. Sigmoid diverticulitis: a systematic review. *JAMA* 2014; 311:287–297.

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Conflicts of interest

All members were required to complete disclosure statements. These statements are maintained at the American Gastroenterological Association Institute (AGA) headquarters in Bethesda, Maryland and none of the disclosures were potentially related to the content of this guideline.