Introduction

The term diverticular disease encompasses a spectrum of conditions (diverticulosis, diverticulitis, diverticular bleeding, etc.), which share the underlying pathology of acquired diverticula of the colon. It is believed to occur as a result of outpouching of the mucosa and submucosa through weaknesses in the muscular wall of the colon alongside natural openings where arteries (the vasa recta) penetrate the muscularis layer to reach the mucosa and submucosa. Between 10% and 30% of patients with diverticulosis, a purely anatomic diagnosis that describes the presence of ≥1 diverticula, may develop painful diverticular disease or diverticulitis.

In some respects, symptomatic diverticular disease shares many of the features of irritable bowel syndrome (IBS). IBS is a chronic complex of gastrointestinal symptoms characterized by significant abdominal pain and disturbed defecation. IBS is defined by the Rome III criteria as recurrent abdominal pain or discomfort for ≥3 days a month in the last 3 months that is associated with at least 2 of the following: 1) improvement with defecation, 2) onset associated with a change in stool form, or 3) onset associated with a change in the frequency of stool.

The symptoms associated with symptomatic diverticular disease and IBS overlap significantly; in fact, the concept of “symptomatic diverticular disorder” has been questioned, with some suggesting that it represents coincident occurrence of IBS in patients who happen to have diverticula. More recent evidence suggests that painful diverticular disease may actually be a distinct entity occurring as a result of an interaction between an inflammatory process and neuromuscular function in the colon.

However, the approach to management of these diseases differs considerably. It is important to distinguish between these 2 disease states consistently to avoid inappropriate treatment, particularly when surgical treatment for diverticulitis is under consideration. In this monograph, we will explore the epidemiology, etiology, diagnosis, and treatment of diverticular disease and IBS and then examine pathways that help distinguish these 2 disease states.
**DIVERTICULAR DISEASE AND NOMENCLATURE**

Despite the fact that diverticular disease is one of the most common gastrointestinal diseases in the Western world, much remains to be learned about it; in fact, confusion exists regarding even the naming of the various conditions that fall under the diverticular umbrella. The term “diverticulosis” indicates the presence of colonic diverticula—circumscribed pouches or sacs occurring due to herniation of the mucous membrane of the gastrointestinal tract—which may or may not be symptomatic. “Diverticulitis,” in contrast, is a term that denotes clinically significant and symptomatic diverticulosis. The term “symptomatic (or painful) diverticular disease” is also in common use. “Diverticulitis” describes acute or chronic macroscopic inflammation of the colon and may be associated with pain, bleeding, or colonic inflammation or infections.

**Epidemiology of Diverticular Disease**

Notably, diverticular disease occurs almost exclusively in developed countries; in fact, it has been called a “disease of Western civilization.” The incidence of diverticular disease generally increases with age; estimates suggest a prevalence of <5% of people aged ≤40 years, increasing to approximately 65% in people aged ≥65 years. In general, approximately 80% of people who present with diverticulitis are aged ≥50 years, although recent trends suggest a rising prevalence in younger individuals. Diverticula are less common among vegetarians and others who consume large amounts of dietary fiber. Right-sided disease is significantly more common among Asians and patients aged ≤60 years.

While diverticulosis is very commonly seen in Western countries, only 10% to 30% of patients with diverticular disease experience an episode of overt diverticulitis, of whom a smaller percentage will develop significant complications, including abscess formation, fistulas, and hemorrhage. Mortality and morbidity from painful diverticular disease is significant. In a study conducted in England, more than 500,000 hospital admissions were recorded over a 10-year period; the majority of these admissions were for emergencies. Thirty-day mortality was 5% and 1-year mortality was 20% in this population. Recent estimates suggest that the hospitalization rates for diverticulitis are increasing, particularly among younger people.

**Pathophysiology of Diverticular Disease**

Diverticula are simply small mucosal herniations that protrude through the intestinal layers and the smooth muscle, most commonly in the sigmoid colon (potentially because of increased intraluminal pressure in this region), although they can be found throughout the large bowel. In most patients, multiple diverticula are present, generally ranging from 5 to 10 mm in diameter, although occasionally exceeding 20 mm. These herniations create small pouches lined by the mucosa. The relationship between age and the prevalence of diverticula can be explained by age-related degeneration of the mucosal wall as well as segmental increases in colon pressure that result in bulging at weak points, typically at the insertion of the vasa recta.

It is unknown why only a small percentage of patients with diverticulosis develop symptomatic diverticulitis. Obstruction of the junction between the lumen of the diverticulum and the intestine proper by fecaliths or poorly absorbed food components may prompt bacterial overgrowth, inflammation, mucosal abrasion, barotrauma, and even microperforations. No connection has been observed between symptomatic disease and smoking, caffeine, or alcohol intake, although a lack of exercise may play an indirect role. There is an inverse relationship between dietary fiber intake and the development of symptomatic disease; in fact, some authors consider diverticulitis a “disease of deficiency” like scurvy, in that it is largely avoidable by increasing fiber intake.

Painful or symptomatic diverticular disease may also be associated with fundamental physiologic factors, including increased motility index and increased intraluminal pressure. Recent evidence suggests that painful diverticular disease may be associated with ongoing inflammatory changes that affect neuromuscular function in the colon. In fact, resected tissues from the sigmoid colon of patients with “smouldering” diverticular disease show chronic inflammatory changes. Moreover, some patients have a symptomatic response to anti-inflammatory agents such as mesalazine. Both acute and subtle chronic changes in the colonic microbiota have also been implicated in the pathogenesis of diverticular disease.

**Presentation and Diagnosis of Symptomatic Diverticular Disease**

Symptomatic diverticular disease is, like IBS, a diagnosis of exclusion. Symptomatic diverticular disease is characterized by acute attacks of localized abdominal pain. In general, patients present with colicky pain, although the pain may sometimes be steady (Box 1). Pain may be precipitated by eating and is often relieved by passing flatus or having a bowel movement. Bloating and changes in stool form, particularly constipation, may be observed in some patients. Patients may also have fullness or tenderness in the left lower quadrant or a tender loop of the sigmoid colon, reflecting the propensity of the disease to occur in the sigmoid colon, although as noted previously, Asian patients have predominantly right-sided diverticula and may manifest right-sided pain. Anorexia, nausea, and vomiting may occur. Bowel sounds are often suppressed but may be normal in mild cases. Many of these symptoms overlap with the Rome III criteria for IBS, particularly IBS with constipation (IBS-C) (Box 2).
Irritable Bowel Syndrome?

Box 1: Signs and Symptoms of Symptomatic Diverticular Disease

- Localized abdominal pain in the absence of inflammation (e.g., fever, leukocytosis, peritoneal signs on examination)
- Pain is usually colicky (although may be steady in some patients)
- Pain may be precipitated by eating
- Pain may be relieved by passing flatus or having a bowel movement
- Bloating may be present
- Changes in stool form may occur (usually constipation)
- Fullness or tenderness in left lower quadrant may be present
- A tender loop of the sigmoid colon may be present
- Anorexia, nausea, and vomiting may occur
- Bowel sounds are typically depressed
- Dysuria and urinary frequency may be reported by some patients

Box 2: Rome III Criteria for IBS

- IBS: Recurrent abdominal pain or discomfort ±3 days/month for the past 3 months, associated with ≥2 of the following:
  - Improvement with defecation
  - Onset associated with change in stool frequency
  - Onset associated with change in stool form
- Subtyped by predominant stool pattern:
  - IBS-C: hard or lumpy stools ≥25% of defecations; loose or watery stools <25% of defecations

Box 3: Differential Diagnoses of Symptomatic Diverticular Disease and Diverticulitis

- Acute appendicitis
- Colorectal cancer
- Complicated ulcer disease
- Crohn’s disease
- Cystitis
- Ectopic pregnancy
- Gallbladder disease
- Incarcerated hernia
- Irritable bowel syndrome
- Ischemic colitis
- Mesenteric infarction
- Ovarian cyst, abscess, or neoplasm
- Ovarian torsion
- Pancreatic disease
- Pelvic inflammatory disease
- Peritonitis
- Pseudomembranous colitis
- Renal disease
- Small bowel obstruction
- Ulcerative colitis

Box 3: Differential Diagnoses of Symptomatic Diverticular Disease and Diverticulitis. Adapted from Salzman 2005.

Recurrence is common among patients who suffer a symptomatic episode of diverticular disease; furthermore, increasing evidence suggests that an acute episode may be followed by chronic symptoms, possibly as a result of inflammatory changes around diverticula, although exact incidence is unclear.

Treatment of Symptomatic Diverticular Disease

High-fiber diets are usually recommended to patients with asymptomatic disease in an effort to prevent symptomatic diverticular disease; however, there are no well-designed, randomized, controlled clinical trials to support this strategy. Acutely, in patients with significant pain, tenderness, or fever, outpatient treatment should be initiated with broad-spectrum antibiotics; common choices include metronidazole plus a quinolone, metronidazole plus trimethoprim-sulfamethoxazole, or amoxicillin-clavulanic acid, all for 7 to 10 days. Patients should follow a clear liquid diet for 24 to 72 hours, after which the diet may cautiously include solids. If the patient is hospitalized, he or she should be placed on bowel rest and treated with intravenous fluids and intravenous antibiotics. Between 15% and 20% of patients may require surgery during hospital admission due to a lack of response to conservative medical treatment, particularly among patients who have been hospitalized previously for ≥1 episodes or because of complications of diverticulitis.

As noted previously, symptomatic diverticular disease may be related to inflammatory changes in the colon affecting neuromuscular function. These data suggest that anti-inflammatory agents may have a clinical role in the management of symptomatic diverticular disease. A systematic review of the literature evaluated the efficacy of 5-aminosalicylic acid (5-ASA) in patients with colonic diverticulitis. A total of 6 randomized, controlled clinical trials were identified, which enrolled a total of 818 patients (3 patients with uncomplicated diverticulitis and 3 patients with symptomatic uncomplicated diverticulitis). The results of these studies showed that patients treated with 5ASA had significantly better outcomes and that daily mesalazine was superior to cyclic administration to prevent relapse of diverticular disease.

Given the efficacy of both oral and intravenous antibiotics in the management of symptomatic diverticular disease, it is clear that the colonic microbiota play a role in the pathogenesis and symptomatology of disease. Nonabsorbable antibiotics such as rifaximin may be a useful treatment in diverticular disease. Indeed, several studies have examined the combination of acute rifaximin with long-term mesalazine. In one study of 90 consecutive patients with symptomatic uncomplicated diverticulitis, patients were treated with rifaximin 800 mg/d plus mesalazine 2.4 grams/d for 10 days, followed by mesalazine 1.6 grams/d for 8 weeks. Patients were assessed for constipation, diarrhea, abdominal pain, rectal bleeding, and mucus with stools. Total symptom scores decreased from 1439 to 44 (P<.001). The majority of patients were completely asymptomatic after 8 weeks of treatment.

Accredited by: Purdue University

This material is supported by an educational grant from Salix Pharmaceuticals, Inc.
Probiotics, with and without 5-ASA, have been examined in the prevention of symptomatic diverticular disease recurrence. In a multicenter, prospective, randomized, controlled study, Tursi and colleagues treated patients with symptomatic uncomplicated diverticular disease to remission with rifaximin 800 mg/d plus mesalazine 2.4 grams/d for 10 days, followed by mesalazine 1.6 grams/d for 8 weeks. Patients were subsequently randomized to long-term treatment with mesalazine 1.6 grams/d, Lactobacillus casei probiotic, or the combination of the 2 treatments. Notably, 76.7% of the monotherapy groups and 96% of the combination therapy group remained recurrence-free at 12 months.

**IBS**

IBS is a chronic complex of gastrointestinal symptoms characterized by significant abdominal pain and disturbed defecation. IBS is defined by the Rome criteria as recurrent abdominal pain or discomfort for \( \geq 3 \) days a month in the last 3 months that is associated with at least 2 of the following: 1) improvement with defecation, 2) onset associated with a change in stool form, or 3) onset associated with a change in the frequency of stool (Box 2). It is most commonly classified into 3 subtypes depending on predominant stool form: IBS with constipation (IBS-C), IBS with diarrhea (IBS-D), and IBS with both diarrhea and constipation (IBS-M). Other subtypes used in the literature include IBS-A (alternating diarrheal/constipation pattern) and IBS-U, which describes IBS without a predominant stool form or pattern. As noted above, there is considerable overlap between the symptoms of symptomatic diverticular disease and IBS (particularly IBS-C). Given that the appropriate management paradigms for these 2 disease states differ, particularly with regard to surgical approaches to treatment, it is critical to distinguish them consistently.

**Epidemiology of IBS**

IBS represents a major burden in terms of patient quality of life, work productivity, and health care costs. In North America, IBS is common, with prevalence estimates ranging from 1% to over 20%, when defined using the most stringent criteria, pooled analyses indicate that between 7% and 10% of people have IBS worldwide. Notably, the actual number of patients suffering from IBS is likely to be greater than the reported prevalence, as most patients fail to seek medical attention.

IBS is one of the most commonly diagnosed gastrointestinal conditions in clinical practice and has historically been the primary motivating factor in between 25% and 50% of all referrals to gastroenterologists. IBS also accounts for a significant number of visits to primary care physicians. On the individual level, IBS has a tremendous impact on the patient in terms of physical and psychological wellbeing, the ability to interact socially, and the ability to work. In fact, studies consistently demonstrate that health-related quality of life is consistently lower among patients with IBS than among those with depression or gastroesophageal reflux disease and similar to that seen in patients with diabetes. IBS is associated with significant incremental health care costs, with some studies suggesting annual direct and indirect costs of up to $30 billion, much of which arises from sequential diagnostic tests, invasive procedures, and abdominal operations, despite data suggesting that IBS symptoms almost invariably persist following surgery.

**Pathophysiology of IBS**

The precise cause(s) of IBS is (are) not known; however, it is likely that there are multiple underlying etiologies (eg, altered gastrointestinal motility, visceral hypersensitivity, infection and inflammation, stress, bile acid modulation) that ultimately result in similar symptoms. Of particular note, recent data suggest a role of immune activation and/or low-grade inflammatory processes in the pathogenesis of IBS. For these reasons, IBS remains an area of very active clinical research.

**Diagnosis of IBS-C**

Like diverticular disease, IBS is largely a disease of exclusion. Although the exact definition of IBS remains controversial, IBS is currently defined by abdominal pain or discomfort that occurs in association with altered bowel habits over a period of at least 3 months.

Individual symptoms have limited accuracy for diagnosing IBS, and therefore, the disorder should be considered a symptom complex. Alarm features (eg, anemia, weight loss, family history of colorectal cancer, inflammatory bowel disease, celiac sprue), offer little discriminative value in separating patients with IBS from those with organic diseases. For this reason, in patients who fulfill symptom-based criteria for IBS in the absence of alarm features are usually considered to have IBS.

Routine diagnostic testing with a complete blood count, serum chemistries, thyroid function studies, stool for ova and parasites, and abdominal imaging is generally not recommended for patients with typical IBS symptoms and no alarm features because of a low likelihood of uncovering organic disease. Routine screening for celiac sprue should be considered in patients with IBS-D or IBS-M but not in those with IBS-C, and lactulose breath testing should be considered in patients in whom lactose malabsorption remains a concern despite dietary modification. The value of breath testing for small bowel bacterial overgrowth remains an area of considerable controversy, although recent meta-analyses suggest that this test has diagnostic value.

**Managing IBS-C**

Although the symptoms of diverticular disease and IBS-C can overlap significantly, the pharmacologic management paradigm, aside from increasing fiber intake, differs significantly. Often, the symptomatic overlap between these 2 disease states can be a source of considerable frustration for both health care providers and patients. Fiber, laxatives, antidepressants, lubiprostone, and linaclotide all offer pharmacologic options for the management of IBS; probiotics and diet have also been shown to be effective.

In general, fiber is effective for relieving global IBS symptoms, but...
there is little evidence that it is effective for relief of abdominal pain. Soluble and insoluble fiber had different effects on global IBS symptoms. Soluble fiber (eg, psyllium, ispaghula, calcium polycarbophil) has been associated with significant improvements in global symptoms (relative risk of symptoms not improving, 1.55; 95% CI, 1.35-1.78). In contrast, insoluble fiber (eg, corn, wheat bran) was no better than placebo (relative risk, 0.89; 95% CI, 0.72-1.11) and, in fact, may be associated with worse outcomes. A systematic review conducted for the ACG guidelines identified 12 randomized, controlled trials evaluating fiber in patients with IBS, most of which were old, had suboptimal design, or failed to differentiate between IBS-C and IBS-D patients. Overall, the relative risk of IBS symptoms not improving with wheat bran was 1.02 (95% CI, 0.82-1.27). In contrast, global IBS symptoms were improved in 4 of 6 studies with psyllium. The relative risk of IBS symptoms not improving with psyllium was 0.78 (95% CI, 0.63-0.96) and the number needed to treat was 6 (95% CI, 3.50). Thus, fiber probably provides only marginal benefits in patients with IBS. As importantly, these data suggest that the various available fiber supplements should not be considered a homogenous class; indeed, if fiber is used at all in IBS-C, it should be soluble.

Few well-designed clinical trials have evaluated the overall efficacy of osmotic laxatives (eg, lactulose, PEG-3350, magnesium hydroxide, milk of magnesia) in patients with IBS, although they are commonly used. Three randomized, double-blind, placebo-controlled studies compared lactulose with placebo in patients with chronic constipation; lactulose was superior to placebo in improving stool consistency and the number of bowel movements per day in all 3 studies. A single, small, sequential study in patients with IBS-C compared symptoms before and after PEG treatment in adolescents with IBS-C. In this study, PEG resulted in a significant improvement in the frequency of bowel movements (P<.05) but was not associated with a significant improvement in pain.

Stimulant laxatives (eg, senna, bisacodyl, cascara) are another option for the management of constipation in patients with IBS. Two recent randomized trials have been conducted evaluating these agents for chronic constipation. In the first, patients with chronic constipation, as defined by Rome III criteria, were randomly allocated to treatment with 10 mg bisacodyl (n=247) or placebo (n=121) once daily for 4 weeks; the primary endpoint was the number of complete spontaneous bowel movements (CSBMs) per week during the treatment period. The mean number of CSBMs increased from 1.1 ± 0.1 in both groups to 5.2 ± 0.3 in the bisacodyl group and 1.1 ± 0.1 in the placebo group (P<.0001). All secondary endpoints evaluated in this trial (number of CSBMs/week, number of spontaneous bowel movements (SBMs), and constipation-associated symptoms) improved significantly with bisacodyl. A separate study evaluated the effects of sodium picosulfate in patients with chronic constipation. In this study (n=367), the mean number of CSBMs/week increased from 0.9 ± 0.1 to 3.4 ± 0.2 in the sodium picosulfate group and from 1.1 ± 0.1 to 1.7 ± 0.1 in the placebo group (P<.0001).

Antidepressants are another option for the management of IBS-C, particularly among those who fail to respond to peripherally acting agents and those in whom abdominal pain is a prominent symptom. While individual clinical trials of antidepressants have failed to show a prominent benefit, meta-analysis suggests that these agents can be effective in patients with IBS. A meta-analysis of 13 randomized, controlled trials that evaluated either TCAs or SSRIs (N=789) found that global symptoms were significantly more likely to improve in patients taking an antidepressant, regardless of type (relative risk of IBS symptoms not improving, 0.66; 95% CI, 0.57-0.78). Among those taking TCAs (9 trials; N=575), the relative risk of IBS not improving was 0.68 (95% CI, 0.56-0.83; NNT=4.0); among those taking SSRIs (5 trials; n=230) the relative risk of IBS not improving was 0.62 (95% CI, 0.45-0.87; NNT=3.5).

Lubiprostone is a locally acting, bicyclic functional fatty acid derived from prostaglandin E1 that acts by specifically activating CIC-2 chloride channels on the apical aspect of gastrointestinal cells, eliciting a chloride-rich fluid secretion. Lubiprostone was assessed in an analysis of 1171 patients with IBS-C;46 the primary efficacy endpoint was the percentage of overall responders (moderate or significant relief for at least 2 of the 3 months of the study). The percentage of overall responders with the lubiprostone group was 17.9% vs 10.1% in the placebo group (P=.001). The mean improvement from baseline in abdominal discomfort and pain was also significantly greater among patients who received lubiprostone compared with placebo-treated patients (0.43 vs -0.35; P=.039).

Linaclotide is approved for chronic constipation and IBS-C. A randomized, double-blind, placebo-controlled Phase 3 trial examined the efficacy and safety of linaclotide at a once daily dosage of 290 µg (n=407) versus placebo (n=397) for 12 weeks. In this study, IBS-C patients with an average of <3 CSBMs/week, ≤5 SBMs/week, and abdominal pain ≥3 (0-10 scale) during a 2-week baseline period were randomized to linaclotide 290 µg or placebo for 12 weeks. Significantly more linaclotide patients met the primary and secondary endpoints over the 12-week duration of the trial. In a second study of approximately 800 patients, improvements among linaclotide patients were sustained through 26 weeks of treatment. Overall, linaclotide demonstrated statistically significant improvement compared with placebo at each of the 26 weeks of treatment for abdominal pain as well as for abdominal discomfort, bloating, straining, stool consistency, CSBMs, and SBMs. Diarrhea was the most common adverse event, resulting in the discontinuation of 4% of linaclotide and 0.2% of placebo patients.

**CONCLUSIONS**

As shown in this monograph, there is considerable overlap between diverticular disease and IBS and there are few objective methods for distinguishing among the 2 disease states in clinical practice. In general, IBS is more often seen in younger patients and women, whereas diverticular disease should be more strongly suspected in older male or female patients. Diverticular disease is usually episodic, short-lived, and often responds to treatment with fiber, laxatives, antibiotics, or surgical removal of the diverticular segment. In contrast, IBS is usually chronic and recurrent.
References

Painful Diverticular Disease or Irritable Bowel Syndrome?

If you wish to receive acknowledgement of participation for this activity, please complete the post test, evaluation form, and request for credit and fax pages 7-11 to 973-867-3684.

Please select the one best answer by circling the appropriate letter.

1. The term “diverticulitis” describes:
   a. The presence of colonic diverticula
   b. Clinically significant and symptomatic disease
   c. Acute or chronic macroscopic inflammation of the colon
   d. Segmental colitis

2. Which of the following has been hypothesized to be a mechanism for symptomatic diverticular disease?
   a. Increased production of flatus
   b. Chronic inflammatory changes
   c. Functional constipation
   d. Functional diarrhea

3. The relationship between diverticular disease and fiber intake is:
   a. Inverse
   b. Direct
   c. Direct in patients aged <50; inverse in patients aged ≥50
   d. Diverticular disease is unaffected by fiber intake

4. Which of the following is the only demographic factor that has been shown to be related to the development of diverticular disease?
   a. Smoking
   b. Alcohol
   c. Lack of exercise
   d. Caffeine

5. What percentage of patients with diverticulosis develop diverticulitis?
   a. 10% to 30%
   b. 20% to 40%
   c. 30% to 50%
   d. 40% to 60%

6. The term “diverticulosis” refers to:
   a. The presence of colonic diverticula
   b. Clinically significant and symptomatic disease
   c. Acute or chronic macroscopic inflammation of the colon
   d. Segmental colitis
7. What percentage of patients who present with diverticulitis are aged ≥50 years?
   a. 40%
   b. 50%
   c. 70%
   d. 80%

8. True or false: daily 5-ASA is superior to cyclic administration of 5-ASA to prevent relapse of diverticular disease?
   a. True
   b. False

9. Rifaximin treatment resulted in asymptomatic disease in the majority of patients with diverticular disease after ____ weeks of treatment.
   a. 2
   b. 4
   c. 6
   d. 8

10. What is the relative risk of symptoms not improving in patients with IBS who receive soluble fiber?
    a. 1.25
    b. 1.55
    c. 1.95
    d. 2.05
Purdue University College of Pharmacy respects and appreciates your opinions. To assist us in evaluating the effectiveness of this activity and to make recommendations for future educational offerings, please take a few minutes to complete this evaluation form.

### How well did this activity meet the following learning objectives?

<table>
<thead>
<tr>
<th>Learning Objective</th>
<th>High Impact</th>
<th>Moderate Impact</th>
<th>No Impact</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe the pathophysiology, presentation, clinical features, and treatment of painful diverticular disease</td>
<td>Knowledge</td>
<td>Competence</td>
<td>Performance</td>
<td>Patient Outcomes</td>
</tr>
<tr>
<td>Describe the pathophysiology, presentation, and treatment of irritable bowel syndrome (IBS)</td>
<td>Knowledge</td>
<td>Competence</td>
<td>Performance</td>
<td>Patient Outcomes</td>
</tr>
<tr>
<td>Differentiate between painful diverticular disease and IBS in clinical practice</td>
<td>Knowledge</td>
<td>Competence</td>
<td>Performance</td>
<td>Patient Outcomes</td>
</tr>
</tbody>
</table>

### Impact of the Activity

- Please indicate which of the following American Board of Medical Specialties/Institute of Medicine core competencies were addressed by this educational activity (select all that apply):
  - Patient care or patient-centered care
  - Practice-based learning and improvement
  - Interpersonal and communication skills
  - Employ evidence-based practice
  - Interdisciplinary teams
  - Professionalism
  - Quality improvement
  - Medical knowledge
  - System-based practice
  - Utilize informatics
  - None of the above

- The content of this activity matched my current (or potential) scope of practice.
  - No
  - Yes, please explain

- Was this activity scientifically sound and free of commercial bias* or influence?
  - Yes
  - No, please explain

---

* Commercial bias is defined as a personal judgment in favor of a specific product or service of a commercial interest.
Painful Diverticular Disease or Irritable Bowel Syndrome?

- The educational activity has enhanced my professional effectiveness in treating patients...
- The educational activity will result in a change in my practice behavior...
- How will you change your practice as a result of participating in this activity (select all that apply)?
  - Create/revise protocols, policies, and/or procedures
  - Change the management and/or treatment of my patients
  - This activity validated my current practice
  - I will not make any changes to my practice
  - Other, please specify: ______________________________

- What new information did you learn during this activity?

- Please indicate any barriers you perceive in implementing these changes.
  - Lack of experience
  - Lack of resources (equipment)
  - Lack of time to assess/counsel patients
  - Lack of consensus of professional guidelines
  - Lack of opportunity (patients)
  - Lack of administrative support
  - Reimbursement/insurance issues
  - Patient compliance issues
  - No barriers
  - Cost
  - Other ______________________________

- If you indicated any barriers, how will you address these barriers in order to implement changes in your knowledge, competency, performance, and/or patients' outcomes?

- Comments to help improve this activity?

- Recommendations for future CME/CPE topics.

To assist with future planning, please attest to time spent on activity:

I spent ______ hours on this program.
REQUEST FOR CREDIT

If you wish to receive acknowledgement of participation for this activity, please complete this request for credit and fax to 973-867-3684.

Please do not use abbreviations. We need current and complete information to assure delivery of participation acknowledgement.

Degree (please mark appropriate box and circle appropriate degree):

☑ MD/DO ☑ PharmD/RPh ☑ NP ☑ PA ☑ RN ☑ Other

Full Name (please print clearly)

Last Name: ____________________________ First Name: ____________________________ Middle Initial: ______________

Street Address: ____________________________

City: ____________________________ State or Province: ____________________________ Postal Code: ____________________________

Phone: ____________________________ Ext: ____________________________ Fax: ____________________________

Specialty: ____________________________

E-mail Address: ____________________________

Signature is required to receive statement of credit.

Signature: ____________________________ Date: ____________________________

Attestation to time spent on activity is required.
Purdue University College of Pharmacy designates this enduring material for a maximum of 1.0 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

☑ I participated in the entire activity and claim 1.0 AMA PRA Category 1 Credit(s)™.

☑ I participated in only part of the activity and claim _______ credits.