

Diverticular disease

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Abstract

Diverticular disease is a common disorder in developed countries and rates continue to rise in the UK. The common symptoms involve acute or chronic inflammation, bleeding or irritable bowel-like symptoms. Despite that in most cases diverticulosis is an age-related process, diverticular disease has a heritable component which is more obvious in younger patients. Recent work has advanced the understanding and management of the disease, challenging longstanding dogmas. According to this, fibre is probably not related to the formation of diverticula, and nuts and seeds do not provoke diverticulitis or bleeding whereas fibre may play a protective role in the prevention of diverticular disease. With regards to the management, diverticulitis is probably an inflammatory process and recent studies suggest that antibiotics may not be needed for acute uncomplicated diverticular disease. Also less invasive surgical approaches in complicated diverticular disease may be feasible, reducing the need of colectomy in many cases. Surgery should be individualized and reserved for the complications of the diverticular disease and not determined by the number of previous episodes of acute diverticulitis. Fortunately the recurrence of diverticulitis cannot be successfully prevented. Finally some patients develop chronic symptoms after acute diverticulitis similar to post infectious irritable bowel and their management can be challenging.

Keywords Abscess; colitis; diverticulitis; diverticulosis; haemorrhage; mesalazine; pericollitis; probiotic; rifaximin

Definitions

- A diverticulum is an acquired herniation of the mucosa, a pouch-like protrusion through the colonic muscle wall at points of weakness, typically at the insertion of vasa recta.
- Diverticulosis is the presence of colonic diverticula.
- Diverticular disease is symptomatic diverticulosis. [Figure 1](#) depicts the taxonomy of diverticulosis.
- Symptomatic uncomplicated diverticular disease (SUDD) is the subtype of diverticular disease in which there are persistent abdominal symptoms (pain, altered bowel habit) attributable to diverticula in the absence of macroscopically overt colitis or diverticulitis.
- Diverticulitis is the clinical syndrome associated with macroscopic inflammation of the diverticula. Chronic diverticulitis includes recurrent episodes of macroscopic overt or low-grade inflammation. Segmental colitis associated with diverticular disease (SCADD) is a form of

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What's new?

- 5-Aminosalicylic acid (5-ASA), rifaximin and probiotics are new therapeutic strategies, but await randomized controlled trial (RCT) evidence
- Risk factors for complications: non-steroidal anti-inflammatory drugs (NSAIDs) and aspirin increase the risk of perforation; aspirin increases the risk of bleeding; nicorandil may be a risk factor for fistulas
- Nuts and seeds do not provoke diverticulitis or bleeding and a low-fibre diet does not lead to the formation of diverticulosis
- Diverticular disease has a heritable component
- Antibiotics may be not needed for acute uncomplicated diverticular disease
- Less invasive surgical approaches may be feasible
- Some patients develop chronic symptoms after acute diverticulitis

chronic diverticulitis that develops in a small subset of patients. It develops in areas marked by diverticulosis that spares the rectum.

Epidemiology and aetiology

The prevalence of diverticulosis increases with age, affecting about 70% of individuals aged 80 years or older but is uncommon in those younger than 40 years. There is no clear gender preponderance. Diverticular disease rates continue to rise: in the UK, the admission rate rose from 0.56 to 1.20/1000/year during the decade 1996 to 2006.

In the United States, in 2009, diverticular disease was the most common inpatient gastrointestinal diagnosis with 283,355 hospitalizations at a cost of \$2.7 billion. The lifetime risk of individuals with diverticulosis developing acute diverticulitis is 1–4%.¹ The rate of recurrence after a medically managed episode of acute diverticulitis varies from 13.3–36% depending on the population studied and the length of follow up applied.² Only 10% of those with recurrence of diverticulitis will have complicated disease.³

In the West diverticular disease affects the elderly, predominantly on the left side of the colon, whereas in Asian populations it affects younger patients in whom right-sided colonic disease is more common.⁴ The pattern of disease changes among migrating populations, suggesting an environmental causal factor. Twin studies show that 40–53% of susceptibility to diverticular disease is due to inherited factors.⁵

A diet low in fibre was thought to cause the formation of diverticula. This hypothesis was based on observational data: the much lower prevalence of diverticular disease in rural Africa compared with Western countries led to the assumption that the lack of dietary fibre predisposed the Western population to diverticulosis. However, a large prospective study based on asymptomatic patients who had screening colonoscopy revealed that fibre intake was not correlated with the presence of diverticula and neither was constipation. On the contrary, increased frequency of bowel movements and higher intake of fibre were

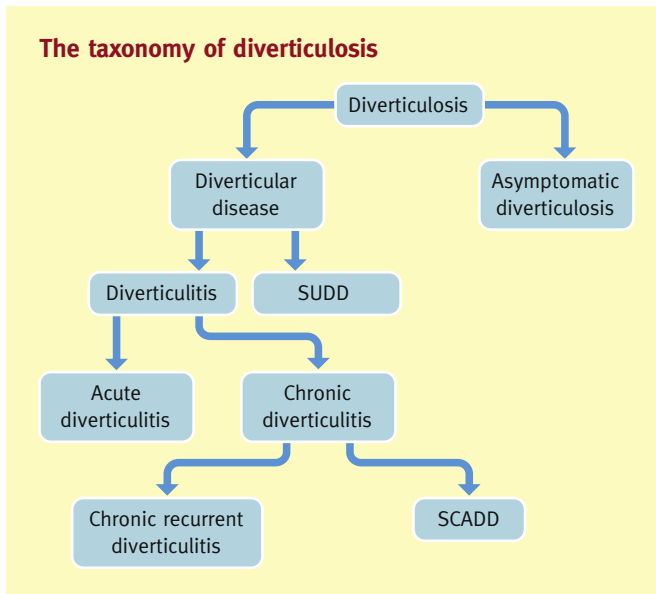


Figure 1

positively associated with diverticulosis.⁶ A large prospective cohort study showed that patients consuming >26 g/day of dietary fibre had a 42% lower risk of hospitalization for diverticular disease compared with those consuming <14 g/day. This suggests that fibre, although probably not related to the formation of diverticula, may play a protective role in the prevention of diverticular disease.⁷

A study of 50,000 men followed up for 18 years showed that the consumption of nuts and seeds did not increase the risk of diverticulitis or bleeding,⁸ but obesity, NSAIDs and aspirin were risk factors.^{9,10} Ingestion of opiates or oral corticosteroids, and tobacco smoking are common in patients presenting with perforated diverticulitis.¹¹

Pathogenesis

The aetiology of colonic diverticula remains unclear. The sigmoid colon is the site of diverticulum formation in 95% of cases, probably because of maximal intraluminal pressure and age-related changes. Occasionally, the descending colon and, less commonly, the whole colon are involved.

Diverticula are thought to develop from age-related degeneration of the mucosal wall and segmental increases in colon pressure resulting in bulging at points of weakness. The taenia coli become shortened because excess elastin causes wall stiffening, resulting in corrugation and thickening of the circular muscle.¹² There is also age-related neural degeneration leading to reduction of neurons in the myenteric plexus, of myenteric glial cells and of the intestinal cells of Cajal.¹³

Whereas the mechanism of the formation of diverticula is poorly understood, the pathophysiological mechanisms for the chronic symptoms of diverticular disease have been investigated. Faecal stasis may lead to altered colonic microbiota and production of abnormal metabolites, resulting in longstanding inflammation. Studies using animal models have shown that remodelling after acute inflammation includes muscular hypertrophy, abnormal motility, visceral hypersensitivity and altered

enteric nerves, which could account for the post-diverticulitis symptoms that resemble irritable bowel syndrome (IBS).^{14,15}

Acute diverticulitis is thought to be caused either by a faecolith trapped within the diverticulum, causing abrasion of the mucosa and resulting in low-grade inflammation, or by microperforation of the sac. These events result in faecal microbiota gaining access to the lamina propria, leading to acute inflammation, usually at the apex of the sac. Involvement of the pericolic or mesenteric fat can lead to an abscess, a fistula, or peritonitis. Prolonged or recurrent inflammation can lead to fibrosis and strictures.

SCADD is a rare inflammatory process of unknown pathogenesis that affects the sigmoid colonic segment associated with diverticular disease. It usually affects elderly patients, predominantly men, and has a benign course. Endoscopic findings reveal a non-specific inflammation in the sigmoid colon, sparing the rectum, in patients who present with abdominal pain and bloody diarrhoea. It can be difficult to distinguish these changes from inflammatory bowel disease. It is essential to identify the location of biopsies and include samples taken proximal and distal to the diverticular segment for comparison.

Course of the disease

Symptomatic uncomplicated diverticular disease (SUDD)

Most diverticulosis follows a benign course; 70–80% of people with diverticulosis are asymptomatic. SUDD is an uncomplicated symptomatic diverticulosis causing symptoms that overlap with those of IBS; this has led to the suggestion that the two disorders may be related.

Complicated diverticular disease

Rectal bleeding occurs in 5% of patients with diverticulosis, resulting from injury to the vasa recta as they are exposed over the dome of the diverticulum. The bleeding is usually painless, self-limiting in 90% of cases, and rarely co-exists with diverticulitis; examination is often normal. In one-third of those who bleed, rectal bleeding is massive; it tends to be sudden and accounts for 30–50% of cases of massive rectal bleeding. Two-thirds of haemorrhages are from the right side of the colon, usually from the neck of a single diverticulum. Low-dose aspirin alone, or together with NSAIDs, significantly increased the incidence to 1.3%, and 3.4%, respectively.¹⁶

Diverticulitis in the Western world presents with left lower quadrant pain in 70% of patients while right lower quadrant pain may occur in patients with a long redundant sigmoid. The classic triad of abdominal pain, leucocytosis and fever (>37.5 °C) is found in only 47% of patients with severe computed tomography (CT) findings. Diarrhoea is a more common symptom during acute diverticulitis whereas constipation suggests underlying obstruction. Patients may also have dysuria secondary to the irritation of the bladder by the inflamed colon. Twenty per cent of patients have a palpable tender mass, distension is common, and low-grade fever, systemic upset and leucocytosis can occur. Right-sided disease can mimic acute appendicitis. Generalized tenderness suggests peritonitis and Gram-negative septicaemia can occur. Twenty-five per cent of patients with diverticulitis develop complications.¹⁷ CT findings show that diverticulitis can be mild/uncomplicated (sigmoid thickening, pericolic fat

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