Colonic Diverticulitis in the Elderly

Chien-Kuo Liu[1]*, Hsi-Hsien Hsu[1], She-Meng Cheng[2]

[1]Division of Colorectal Surgery, Department of Surgery, and [2]Department of Radiology, Mackay Memorial Hospital, Taipei, Taiwan.

SUMMARY

Diverticular disease of the colon is a disease that mainly affects the elderly and presents in 50–70% of those aged 80 years or older. The most common complication is colonic diverticulitis. Eighty percent of patients who present with colonic diverticulitis are aged 50 years and older. Diagnosis and treatment of colonic diverticulitis in the elderly is more difficult and complicated owing to more comorbid conditions. Computed tomography is recommended for diagnosis when colonic diverticulitis is suspected. Most patients admitted with acute colonic diverticulitis respond to conservative treatment, but 15–30% of patients require surgery. Because surgery for acute colonic diverticulitis carries significant rates of morbidity and mortality, conservative treatment is recommended in the elderly. Conservative treatment of colonic diverticulitis with antibiotics, bowel rest, possibly including parenteral alimentation, is usually applied for 1–2 weeks. In the absence of a response to conservative treatment, frequent recurrence or complications (abscesses, fistulas, bowel obstructions, and free perforations), surgery is indicated. [International Journal of Gerontology 2009; 3(1): 9–15]

Key Words: colon inflammation, colonic diverticular disease, colonic diverticulitis, elderly

Introduction

Diverticular disease of the colon is a common gastrointestinal disorder, and its prevalence increases with age. Although present in perhaps two-thirds of the elderly, a large majority of patients with diverticular disease of the colon remain asymptomatic. Diverticulitis, the most common complication of diverticular disease of the colon, is a frequent challenge to the clinicians, especially in the elderly. Diagnosis and treatment of colonic diverticulitis in older patients may be more complicated than in young patients because more comorbid conditions are present. Precise diagnosis and accurate treatment of colonic diverticulitis are important topics in geriatric clinical practice. The concepts of treatment for colonic diverticulitis have been changed and reported in recent literature. This article reviews the diagnosis and treatment of colonic diverticulitis in the elderly.

Incidence

Colonic diverticular disease is rare in developing countries but common in Western and industrialized countries such as Taiwan. The prevalence of diverticulitis is largely age-dependent. The disease is uncommon in those under the age of 40, occurring in approximately 10% of this population, while the prevalence increases to 50–70% in those aged over 80 years[1,2]. The prevalence of colonic diverticular disease is similar in men and women. In Western countries, colonic diverticular disease affects the sigmoid and descending colon in more than 90% of patients[3]. In contrast to Western countries, colonic diverticular disease more often affects the cecum and ascending colon in Asians[4]. The incidence of pure right-sided colonic diverticular disease in the Chinese population ranged from 55% to 71%[5,6]. It usually consists of one or more true or false diverticula

Correspondence to: Dr Chien-Kuo Liu, Division of Colorectal Surgery, Department of Surgery, Mackay Memorial Hospital, 92, Section 2, Chung-Shan North Road, Taipei 104, Taiwan.
E-mail: crs.liuck@msa.hinet.net
Accepted: February 14, 2009

(rarely more than 15) in the cecum and ascending colon, developing at an earlier age than left-sided disease[7–9], and it is thought to reflect a genetic predisposition[10]. Interestingly, in the Japanese Hawaiian community, the dominant site has remained right-sided, as it has in the indigenous Japanese population[11], indicating the importance of genetic factors in this form of diverticulosis. Colonic diverticular disease is a common disorder in the elderly. In fact, 15–25% of patients develop symptomatic colonic diverticulitis[12]. Eighty percent of patients who present with colonic diverticulitis are aged 50 years or older[13].

Cause and Pathogenesis

Colonic diverticular disease is acquired by herniation of the colonic wall through low resistance sites in areas of vascular passage, resulting in protrusions of small outpouchings of the mucosa. The etiology of colonic diverticular disease is not well understood. Traditional concepts regarding the cause of colonic diverticular disease include alterations in colonic wall resistance, disordered colonic motility, and dietary deficiencies, especially fibers[14,15]. Epidemiologic studies have demonstrated associations between colonic diverticular disease and diets that are low in dietary fiber and high in refined carbohydrates[16,17]. Low dietary fiber intake results in less bulky stools that retain less water and may alter gastrointestinal transit time, which can increase intracolonic pressure[2]. Pseudodiverticula may develop in response to increased intraluminal pressure. Presently, inflammation is thought to play an important role in colonic diverticular disease. Pathologic evidence shows that patients with symptomatic colonic diverticular disease often exhibit microscopic inflammation of the mucosa close to diverticula[18]. Some experienced colonoscopists have identified asymptomatic diverticular inflammation during screening colonoscopies[19].

The cause of acute colonic diverticulitis remains obscure. Obstruction at the orifice of a diverticulum results in diverticulitis, which is similar to appendicitis, but this theory is unacceptable today. Some authors believe that chronic inflammation precedes clinical colonic diverticulitis[20]. To date, the pathogenesis of colonic diverticulitis is unknown and its relation to colonic diverticular disease is unclear. Possible causes include mucosal prolapse, relative ischemia, bacterial overgrowth, and increased exposure to intraluminal toxins and antigens secondary to fecal stasis[21,22]. Some of these factors are similar to the pathogenesis of inflammatory bowel disease and may be a "bridge" disease between inflammatory bowel disease and diverticulitis[1].

A retrospective study analyzed the aerobic and anaerobic microbiology of intra-abdominal infections that were associated with diverticulitis. The predominant aerobic and facultative bacteria were *Escherichia coli* and *Streptococcus* species. The most frequently isolated anaerobes were *Bacteroides* species (*B. fragilis* group), *Peptostreptococcus*, *Clostridium* and *Fusobacterium* species[23].

Symptoms and Signs

The clinical symptoms of colonic diverticulitis vary with the extent of disease process. The most common symptom of colonic diverticulitis is acute lower abdominal pain. The location varies depending on the site of the involved colon. An abdominal or perirectal fullness, or "mass effect", may be apparent. Stool guaiac testing may be trace-positive. Low-grade fever and leukocytosis are generally present. The white blood cell count usually is elevated with a predominance of polymorphonuclear cells. Immature band forms may be present. Some patients may have dysuria and frequency, which are induced by bladder irritation from the adjacent inflamed colon. In the elderly, the above symptoms may be obscure. Careful physical examination usually reveals localized tenderness and may be associated with guarding and rebound tenderness. Bowel sounds are frequently decreased but may be normal in the early stages or increased in the presence of obstruction. Generalized peritonitis may result from rupture of a peridiverticular abscess or from free rupture of a non-inflamed diverticulum. Patients with free perforation have peritoneal irritation, including a marked abdominal tenderness that begins suddenly and spreads rapidly to involve the entire abdomen with guarding and involuntary rigidity. Peritonitis is an indication for emergency surgical exploration. Hematochezia is rare in colonic diverticulitis and should suggest other conditions. Older patients with colonic diverticular disease are also at risk of ischemic colitis. Features helpful in its differential diagnosis include the presence of thumbprinting on abdominal radiographs and hematochezia, both suggestive of ischemia.

Diagnosis

The diagnosis of colonic diverticulitis is often based on the clinical history and physical examination. Differential diagnosis for acute abdomen should be considered in clinical diagnosis of colonic diverticulitis. Sigmoid diverticulitis may mimic acute appendicitis. Right-sided pain, however, does not preclude diverticulitis because some patients have redundant sigmoid colons, and right-sided diverticula can occur, particularly in Asian populations. Incarcerated hernia, colorectal cancer, ischemic colitis, inflammatory bowel disease, complicated ulcer disease, ovarian cyst or abscess, cystitis, and infectious colitis may also have a similar presentation to colonic diverticulitis in the elderly.

Staging

The severity of colonic diverticulitis is graded by Hinchey's criteria[24]. Stage I is diverticulitis with diverticular wall thickening and strong wall enhancement or a small pericolic abscess. Stage II is associated with a large peridiverticular abscess. Stage III is diverticulitis with perforated diverticulitis and purulent peritonitis, and stage IV is diverticulitis associated with free rupture of diverticulum and fecal peritonitis (Figures 1–4). This classification does not take into account the effects of coexisting conditions on disease severity or outcome. The risk of death is less than 5% for most patients with stage I or II diverticulitis, approximately 13% for those with stage III, and 43% for those with stage IV[25].

Figure 1. Diverticulum with diverticular wall thickening and strong wall enhancement (arrow), with adjacent strands indicating inflammatory process, consistent with Hinchey stage I disease.

Imaging studies

Imaging studies in patients with colonic diverticulitis play an important role in both diagnosis and assessment of severity. Plain abdomen radiographic series

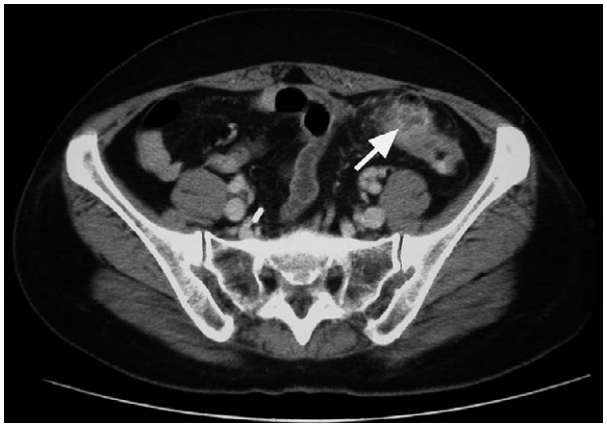

Figure 2. Large peridiverticular abscess (arrow), consistent with Hinchey stage II disease.

Figure 3. Y-shaped extraluminal air (arrow) indicating perforated diverticulitis, consistent with Hinchey stage III disease.

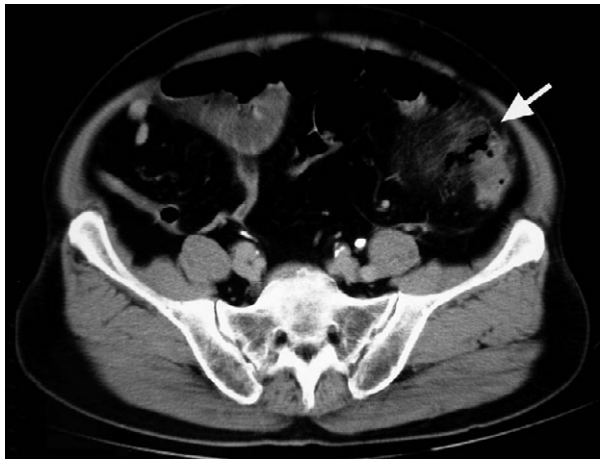

Figure 4. Free rupture (arrow) of diverticulum to peritoneal cavity, with prominent strands due to fecal contaminations, consistent with Hinchey stage IV disease.

should be obtained in all patients with abdominal pain and suspected diverticulitis. Frequently, findings are nonspecific and include small or large bowel dilation or ileus, or evidence of bowel obstruction. An upright chest X-ray is also carried out to identify pneumoperitoneum if perforation is suspected. However, pneumoperitoneum is uncommon and may fail to detect perforation, as microperforations are often sealed by the surrounding mesentery or fat[26].

Although barium enema was used commonly in the past, it is no longer recommended because of the risk of extravasation of contrast material if a perforation has occurred. When used in an acute setting, a water-soluble agent is used to prevent peritonitis if perforation is suspected. Barium enema may cause artifacts if a subsequent computed tomography (CT) is necessary. The barium enema is useful to identify fistulas and differentiate colonic diverticulitis from colorectal cancer.

CT is often obtained during the evaluation of a patient with abdominal illness. CT with intravenous and oral contrast is the test of choice to confirm a suspected diagnosis of colonic diverticulitis[27]. The finding of pericolic fat infiltration or phlegmon is diagnostic[28]. Other criteria suggestive of colonic diverticulitis include a bowel wall thickness >4 mm or peridiverticular abscess formation[2]. Patients who fail to respond despite vigorous medical management or who have a localized abscess should be considered for CT-guided percutaneous drainage (PCD). Patients with abscesses of ≤ 3 cm can be treated with antibiotics alone, those with abscesses approaching 4 cm are best managed with PCD followed by a referral for surgical treatment[29].

With the advent of improved transducer technology and equipment advances, ultrasound (US) has dramatically expanded its role in the evaluation of diverticulitis. Schwerk et al.[30] evaluated high-resolution real-time US for the diagnosis of acute and complicated diverticulitis. The diagnostic accuracy of a cohort of 130 patients was 97.7%. The echomorphologic features of acute diverticulitis include visualization of a colon segment presenting with local tenderness on gradual compression, which showed hypoechogenic thickening of the wall and a target-like appearance in the transverse view because of inflammatory changes and muscular thickening. US gives more detailed information than CT concerning the bowel wall and visualization of the inflamed diverticulum when using high-frequency transducers[31]. Inferior to CT for indicating the extent of large abscesses and contained or free perforations, US image quality may also be poor in obese patients and overlying gas may hinder the visualization of relevant structures.

Magnetic resonance imaging (MRI)-based colonography is a minimally invasive imaging modality to assess the colon and abdomen. This method is applied mainly for polyp screening and could be an integrative approach for colonic diverticulitis assessment[32]. Advantages of abdominal MRI include superior soft tissue resolution and lack of ionizing radiation. Additionally, the remaining colon can be visualized completely. Compared with spiral CT, the MRI examination takes more than 20 minutes whereas CT requires only several minutes for a complete abdominal scan. Some disadvantages of MRI include: a greater tendency for motion artifacts, lack of tolerance for long durations in patients with major abdominal pain, and difficult monitoring in the severely ill patient. The practicality of using MRI in the management of diverticulitis is evolving. Its role may be important when contrast enemas and CT scanning are equivocal.

Endoscopy

Because of the risk of perforation from either the device or air insufflation, endoscopy is generally avoided in the initial assessment of the patient with acute colonic diverticulitis. Endoscopy use should be restricted to situations in which diagnosis of diverticulitis is unclear. In such cases, limited sigmoidoscopy with minimum insufflation can be helpful to exclude other diagnoses, such as inflammatory or infectious colitis, distal colorectal cancer or ischemic colitis[33]. Because of the high incidence of colorectal neoplasm in the elderly, colonoscopy should always be performed 6–8 weeks after recovery from acute colonic diverticulitis to minimize the possibility of iatrogenic perforation at the site of inflammation and to exclude coexisting colorectal neoplasm.

Treatment

Colonic diverticulitis is categorized as either uncomplicated or complicated. In the uncomplicated group, bowel rest and appropriate antibiotics are usually successful[2]. A subset of these patients can be managed as outpatients. In the complicated group, hospitalization

is indicated. Conservative treatment or surgery depends on the patient's clinical status.

Uncomplicated colonic diverticulitis

For most patients in the uncomplicated group (i.e., immunocompetent patients who have a mild attack and can tolerate oral intake), outpatient therapy is possible. This involves 7–10 days of oral broad-spectrum antibiotic therapy, including coverage against anaerobic microorganisms. A combination of ciprofloxacin and metronidazole often works, but other regimens are also effective. A low-residue liquid diet is commonly recommended, although this approach has not been rigorously studied.

Hospitalization is indicated if the patient is unable to tolerate oral intake or has severe pain requiring narcotic analgesia. Other indications of hospitalization include those who fail to improve despite adequate outpatient therapy, those with significant comorbidity, or when complicated diverticulitis occurs. Based on these criteria, older patients have higher probability of needing hospitalization for adequate treatment. The patient should initially take nothing by mouth. If there is evidence of an obstruction or ileus, a nasogastric tube should be inserted. Broad-spectrum intravenous antibiotic coverage is appropriate[34]. Patients should improve within 2 or 3 days, after which a low-residue diet may be introduced very cautiously. If improvement continues, patients may be discharged with a 7–10 days' oral antibiotics course.

If there is no improvement in pain, fever and leukocytosis within 2 or 3 days, or if serial physical examinations reveal new findings or evidence of worsening, repeat CT imaging is appropriate. PCD or operative intervention may be required. Surgical consultation is considered when the disease does not respond to medical management, abscesses are unable to be drained, fistulas form, obstructions are evident, free perforations occur[35], and when diagnoses are uncertain.

Complicated colonic diverticulitis

Complicated colonic diverticulitis generally refers to the presence of abscess, fistula, bowel obstruction or free perforation. The Hinchey classification is a useful guide to make therapeutic decisions regarding patients with colonic diverticulitis that is complicated by peridiverticular abscess formation.

For patients with Hinchey stage I and II colonic diverticulitis, treatment begins with antibiotics with or without PCD, and surgery may be postponed to achieve a delayed elective one-stage resection. This protocol has been proven effective to decrease the morbidity and mortality compared with an emergency Hartmann procedure. In 1986, Saini et al.[36] found that PCD of a diverticular abscess allowed a one-stage resection with primary anastomosis in seven of eight patients. This study changed the management of colonic diverticulitis. PCD of abscesses in colonic diverticulitis seems to be more of a benefit in the elderly patients with larger abscesses. With abscesses >4 cm, PCD should be attempted. If the abscess is not amenable to PCD, then antibiotics alone should be tried[37]. Reported failure rates for attempted PCD range from 15% to 30%[38]. The decision to operate can be more difficult in an older patient with an abscess from perforated diverticulitis. If the patient is stable, one can often avoid the morbidity of an emergency procedure by antibiotic treatment alone or with additional PCD[37]. Delaying the operation to allow inflammation to subside decreases the surgical complication rate. Most surgeons regard PCD as a temporary procedure and not a definitive treatment. Broderick-Villa et al.[39] evaluated 2,366 patients who recovered from acute diverticulitis; only 13% had a recurrence, and there was no difference in a small group of 35 patients treated with PCD only. In this study, they also reported that the old patients had a lower recurrence, whereas higher comorbidity was associated with higher recurrence. This supports the idea that elective resection after PCD is not mandatory in elderly patients who have completely recovered from their episode of diverticulitis, even if an abscess had been present. Clinicians should carefully evaluate the necessity of an elective resection for colonic diverticulitis in an older patient with comorbidity.

The standard treatment for Hinchey stage III and IV colonic diverticulitis for the last several decades has been a Hartmann resection. Advantages include the removal of the septic focus, relative ease, and safety. The primary disadvantage is the requirement of a second major surgical procedure to close the stoma, which translates into a significant probability that the stoma will be permanent[40]. Because of more comorbidities in the elderly, a second major operation will not be performed and a permanent stoma will cause disability. In recent studies, one-stage colon resection with or without a proximal loop stoma was shown to be a preferred operation in Hinchey stage III and IV colonic

diverticulitis because of a low morbidity and mortality in the closure of loop stomal operation[41,42].

Peridiverticular abscesses can progress to firm fistulas between the colon and adjacent organs in up to 10% of the patients. Colovesical fistulas are more common in men, while colovaginal fistulas are more common in women. Surgical treatment is usually a one-stage colon resection with takedown of the fistula, primary resection, bladder repair, and omental interposition.

Intestinal obstruction is uncommon in colonic diverticulitis, occurring in approximately 2% of patients. Colon strictures may occur because of repeated inflammation. Symptomatic strictures are generally self-limited and respond to conservative treatment. As with the treatment for Hinchey stage III and IV colonic diverticulitis in the elderly, complete obstruction may require one-stage colon resection with or without loop stoma. Closure of loop stoma is a second minor operation compared with a second major operation after a Hartmann resection[43,44].

Although the American Society of Colon and Rectal Surgeons[45] and the Scientific Committee of the European Association of Endoscopic Surgery[46] recommend that elective prophylactic surgical resection should be performed after two episodes of uncomplicated colonic diverticulitis, there is accumulating evidence in the literature that questions this recommendation. Janes et al.[47] reviewed the literature and determined that there is no evidence to support this recommendation. They found that despite improved medication and surgical techniques, surgery for diverticular disease had a high complication rate, and a substantial number of patients experienced recurrent or persistent symptoms after bowel resection. The obvious prevalence of persistent symptoms after successful surgeries for diverticular disease may be an additional reason to carefully discuss prophylactic surgery with patients[48].

Conclusion

Colonic diverticulitis is a common disease in older patients, and conservative treatment is appropriate in patients without complications. For Hinchey stage I and II colonic diverticulitis, the recommendation is to treat with antibiotics with or without PCD and delay surgery to achieve an elective one-stage resection. Elective resection must be carefully evaluated in the elderly patient with complicated colonic diverticulitis and more comorbidities. For Hinchey stage III and IV colonic diverticulitis, a one-stage colon resection with or without loop stoma is recommended.

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