

REVIEW

Complications of Diverticular Disease – a Quick Overview

Andreea NESTIAN, Andreea DOBROMIRESCU, Ruxandra BABIUC, Lucian NEGREANU

Abstract

Diverticulosis is a chronic acquired disease defined by the presence of diverticular protrusions throughout the wall layers of the digestive tract. Colonic diverticular disease is defined as clinically manifest or symptomatic diverticulosis, either by inflammation, diverticular bleeding or segmental colitis. It is a frequent cause of hospitalization in industrialized countries and also makes a major contribution to health care costs. Due to the spread of the Western-style diet, low in fibre and high in processed foods, the prevalence of diverticulosis is now increasing globally. Obesity is a significant risk factor contributing to the increased prevalence of both diverticular disease and diverticulitis and its complications, particularly in the younger population, previously considered to be at much lower risk than the geriatric population. Diverticulitis occurs when one or more diverticula, together with adjacent colonic tissue, undergo an inflammatory process. Approximately 15% of patients who suffer an episode of acute diverticulitis will experience complications, the most common of which is peridiverticular abscess, which can be complicated by peritonitis. Less common complications are colonic lumen stenosis and fistulae. Being a relatively common disease in the general population, with a constantly increasing prevalence, and also a disease with potentially reducible complications, especially in the case of frail patients with multiple comorbidities, it is necessary not only to update the therapeutic strategies, but also to set up multidisciplinary medical teams in which communication between the specialists involved results in a personalized approach to each case.

Keywords: diverticulosis, diverticulitis, colitis.

Rezumat

Diverticuloza reprezintă o boală cronică dobândită, definită prin prezența de formațiuni diverticulare la nivelul straturilor peretelui tubul digestiv. Boala diverticulară colonică se definește ca diverticuloză manifestă clinic sau simptomatică fie prin inflamație, sângerare diverticulară sau colită segmentară. Aceasta reprezintă o cauză frecventă de spitalizare în țările industrializate și totodată aduce o contribuție majoră la costurile asociate îngrijirilor medicale. Datorită răspândirii dietei de tip occidental, săracă în fibre și bogată în alimente înalt procesate, prevalența diverticulozei este în creștere la nivel global în prezent. Obezitatea este un factor de risc ce participă semnificativ la creșterea prevalenței atât a bolii diverticulare, cât și a diverticulitei și a complicațiilor acesteia, în special în rândul populației tinere, anterior considerată ca având un risc mult scăzut față de populația geriatrică. Diverticulita se instalează atunci când unul sau mai mulți diverticuli, împreună cu țesutul colonic adiacent, suferă un proces inflamator. Aproximativ 15% dintre pacienții care suferă un episod de diverticulită acută vor întâmpina complicații, dintre acestea cea mai frecventă fiind abcesul peridiverticular, care se poate complica prin apariția peritonitei. Complicații mai puțin frecvente sunt stenoza lumenului colonic și fistulele. Fiind o boală relativ frecventă în populația generală, cu o prevalență în continuă creștere, și, de asemenea, o boală cu potențiale complicații redutabile, în special în cazul pacienților țarați, cu multiple comorbidități, este necesară o actualizare a strategiilor terapeutice, dar și a alcătuirii unor echipe multidisciplinare, în cadrul cărora comunicarea dintre specialiștii implicați să aibă ca rezultat o abordare personalizată a fiecărui caz..

Cuvinte cheie: diverticuloză, diverticulită, colită.

Gastroenterology Department of the University of Medicine and Pharmacy "Carol Davila", Bucharest, The University Emergency Hospital, Bucharest, Romania

Corresponding author:

Andreea NESTIAN, University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania
E-mail: andreea.nestian@rez.umfcd.ro

Diverticulosis involves the presence of saccular protrusions of mucosa and submucosa through the muscular layer of the digestive tract wall, formations called diverticula. Although diverticula can exist anywhere along the colonic tract, its most common location is the sigmoid colon. Diverticulosis develops asymptotically in most cases, so only 20% of patients with colonic diverticula will experience colonic inflammation or bleeding¹.

Colonic diverticular disease is defined as clinically manifest or symptomatic diverticulosis, either by inflammation, diverticular bleeding, or segmental colitis. Colonic diverticular disease is a common cause of hospitalization in industrialized countries and makes a major contribution to healthcare costs. Due to the spread of the Western-style diet, low in fiber and high in highly processed foods, the prevalence of diverticulosis is now increasing globally.

Obesity is a risk factor that contributes significantly to the increased prevalence of both diverticular disease and diverticulitis and its complications, particularly in the population under 45 years of age, previously considered to be at much lower risk than the geriatric population².

Symptomatic uncomplicated diverticular disease (SUDD) is a term used in the literature to illustrate the presence of digestive symptoms such as pain or altered bowel movements in patients known to have diverticulosis in the absence of the inflammatory process, but this term is not generally accepted in the literature. It is therefore considered that this entity may clinically illustrate the coexistence of irritable bowel syndrome with diverticulosis¹.

Diverticulitis occurs when one or more diverticula, together with adjacent colonic tissue, undergo an inflammatory process. At present, it is generally accepted that there is luminal obstruction, often caused by a fecal or food fragment; this inflammatory process may be acute or chronic³. At the same time, diverticulitis can be classified according to the presence of complications into complicated diverticulitis - 15% of cases - or uncomplicated diverticulitis (in 85% of cases).

Uncomplicated diverticulitis is described as inflammation of the diverticular tissue and surrounding tissues, in the absence of signs of perforation and without the formation of dangerous abscesses.

Complicated diverticulitis involves a progression of the inflammatory process in one of the following directions: superinfection (abscess, peritonitis), perfora-

tion and fistula or stenosis and/or obstruction of the colonic lumen. These complications can be extremely varied and difficult to diagnose. They may be isolated or coexist^{4,1}.

In the absence of complete healing of an episode of acute diverticulitis, it can become chronic, which is called chronic diverticulitis - complicated or uncomplicated. Chronic uncomplicated diverticulitis consists of chronic inflammation of the colonic mucosa, with or without thickening of the wall, in the absence of stenosis. Complicated chronic diverticulitis involves stenosis of the colonic lumen, which may result in obstructive syndrome, as well as fistulae between the colonic segment and other nearby organs, most often the urinary tract⁴.

Approximately 15% of patients who suffer an episode of acute diverticulitis will experience complications, the most common of which is peridiverticular abscess, which can be complicated by peritonitis. Less common complications are colonic lumen stenosis and fistulae¹.

Diverticular hemorrhage is most seen as a complication of diverticulosis, without the inflammatory syndrome associated with diverticulitis⁵.

Complications of diverticulitis often require a multidisciplinary approach, involving specialists in gastroenterology, radiology, and surgery.

The diagnosis of acute diverticulitis is based on three main pillars: a suggestive clinical presentation, accompanied by the presence of increased inflammatory markers, and an imaging evaluation to confirm clinical suspicion. Inflammatory syndrome may be suggested by leukocytosis, elevated C-reactive protein, as well as elevated ESR and fecal calprotectin levels.

The clinical picture of acute diverticulitis is varied and depends on the degree of inflammation and the presence of complications. The main clinical manifestations are abdominal pain (mostly in the left flank), fever, nausea, and vomiting. Other, less common symptoms are constipation, diarrhea, dysuria and urinary urgency⁶.

Abdominal ultrasound is the first investigation to be used in the hospital setting, which can raise suspicion of the diagnosis. Ultrasonographically detectable signs suggestive of acute diverticulitis are: peridiverticular hypoechoic formation with inflammatory appearance, peridiverticular abscess with or without the presence of air bubbles, segmental thickening of the colonic wall of more than 4 millimetres⁷.

Colonoscopy is contraindicated in the acute setting of diverticulitis because of the high risk of perforation,

but may be useful in the subsequent evaluation of chronic complications.

Thus, colonoscopy follow-up at 6 weeks is required in all patients who have not received surgical treatment if they have not had colonoscopy in the last 3 years¹.

Computed tomography imaging allows accurate diagnosis of both the onset of acute diverticulitis and its staging according to the presence and degree of complications and prognosis.

The Hinchey classification, first proposed in 1978 by Hinchey et al and initially used for staging acute perforated diverticulitis to determine surgical management⁸, has subsequently been updated to serve for staging diverticulitis in terms of clinical presentation and lesions detected on CT imaging^{9,10,11,12}.

Current Hinchey classification – adaptation¹¹

	Clinical presentation	CT appearance
Stage 0	Mild form of diverticulitis	Diverticuli and thickened colonic wall
Stage Ia	Localized pericolic inflammation or phlegmon	Localized pericolic soft tissue changes
Stage Ib	Pericolic/mesocolic abscess	Ia changes + mesocolic/pericolic abscess
Stage II	Remote intra-abdominal retroperitoneal or pelvic abscess	Ia changes + pelvic abscesses
Stage III	Generalized purulent peritonitis	Ascites, pneumoperitoneum, thickening of peritoneal membranes
Stage IV	Generalized fecaloid peritonitis	Same as stage III

As a rule, treatment will be tailored according to the specifics of the case, such as the general condition, the patient's immune status and the presence of comorbidities.

The treatment of acute diverticulitis can be divided into two main approaches, depending on its severity: acute uncomplicated diverticulitis is treated conservatively with antibiotics and fasting, while in cases of complicated diverticulitis with abscess or peritonitis, both percutaneous drainage of the purulent collection

and colectomy may be used in cases unresponsive to non-surgical treatment¹³.

Abscess is the most common complication of diverticulitis. It is defined as a localized collection of purulent material, which is formed as a result of the accumulation of food and fecal waste, which undergoes an infectious process.

Risk factors contributing to this complication include old age, history of diverticulitis and low-fiber diet.

The method of choice for the diagnosis and assessment of an intra-abdominal abscess is CT scanning with contrast administered intravenously.

Although there is no unanimity in the literature on the exact treatment regimen, recommendations include:

- for diverticulitis complicated by abscesses less than 3 cm in size: broad-spectrum antibiotic therapy, water-electrolyte balancing with infusion solutions and digestive rest, followed by outpatient antibiotic treatment for 10 days. Persistence of fever, leukocytosis and algic symptoms 48-72 hours after initiation of intravenous antibiotic therapy require reassessment of the case and therapeutic management, with determination of the appropriateness of percutaneous drainage of the abscess.
- for diverticulitis complicated by abscesses between 3-5 cm in size, therapeutic adaptation is required, considering factors such as the patient's general condition as well as anatomical criteria such as the location of the abscess for a possible attempt at percutaneous drainage^{1,14}. Emergency surgical drainage is recommended as a therapeutic option only in cases that do not respond to conservative therapy.
- for abscesses of 5 cm or Hinchey stage II, the preferred approach is a combination of digestive rest and percutaneous drainage of the abscess, guided by ultrasound or tomography.

It should also be noted that mortality increases with the degree of invasiveness of the therapeutic approach, reaching approximately 12% in the case of surgical cure of the abscess¹⁵.

Acute diverticulitis complicated by abscess has an increased risk of recurrence of up to 24%¹.

Peritonitis (Hinchey stages III and IV) is a life-threatening complication of diverticulitis. It can be purulent or fecal. Even in this case, treatment can be conservative if it is localized peritonitis, so the first line

of treatment remains intravenous antibiotics and digestive rest under strict medical supervision.

In the case of generalized peritonitis, there is not yet agreement on the therapeutic management, due to the difficulty of conducting a study including such patients. The choice of one or more factors to determine the indication for surgical exploration is still under discussion, but at present it is considered that the presence of extraluminal air bubbles on imaging is a sign of perforation and requires surgical intervention¹.

The generally accepted practice is conservative treatment and careful monitoring in hemodynamically stable patients, with emergency surgical treatment reserved for patients in sepsis or hemodynamically unstable.

The surgical treatment of choice is colonic resection, but the type of procedure should be chosen according to the experience of the referring surgeon.

Stenosis is a stigma of chronic diverticulitis. It is most commonly found in the sigmoid colon and is often associated with colovesical fistula. Differential diagnosis with stenotic neoplasia is of major importance in these patients¹.

The therapeutic indication for obstructive stenosis is elective surgery when the acute inflammatory episode is in complete remission¹³.

Fistulas account for 2% of all complications of acute diverticulitis and form between the colonic wall and another organ when inflammation associated with recurrent episodes of diverticulitis produces adhesions or microperforations of the wall. Fistulas have a prevalence between 4 and 20% in patients with diverticulitis and are more commonly found in male patients, those with previous abdominal surgery and immunosuppressed patients.

The most common type of fistula is colovesical fistula, followed by colovaginal fistula, then colotegumentary and coloenteric fistula, the prevalences of which are not known.

The treatment of choice is surgical. In the case of colovesical fistula, closure of the fistula with bladder wall suture and sigmoid resection followed by colorectal anastomosis is preferred¹³.

In some cases, it may be useful to mount a self-expandable metal stent (SEMS) as a first-line procedure to facilitate colonoscopy and thus obtain biopsies to exclude possible malignancy and also to delay possible surgery.

Diverticular hemorrhage may be occult or, much less commonly, frank hemorrhage. It is estimated that

about 35% of lower gastrointestinal bleeding is diverticular in origin¹⁶.

This bleeding originates from traumatic or chemical injury to an intraparietal branch of the marginal artery at the level of the diverticular dome or neck⁵. In most cases, diverticular hemorrhage occurs in the absence of acute diverticulitis, but it may also be present during an inflammatory episode¹.

The principles underlying the management of diverticular bleeding are resuscitation, diagnosis, stopping the bleeding and preventing its recurrence.

The investigation of choice for diagnosis is colonoscopy, which has the advantage of potentially accurately visualizing the source of bleeding and the possibility of immediate intervention to control it. Disadvantages include the need for an experienced endoscopist and the relative urgency of the procedure, which can be a barrier to proper preparation for the procedure and thus jeopardize it.

At the same time, there is the problem of the lack of a standardized protocol by which endoscopic stratification of diverticular bleeding stigmata can be performed^{5,13}.

Other methods of locating the source of bleeding are CT angiography in haemodynamically unstable patients or those who cannot tolerate colonoscopy preparation. This technique has a sensitivity of 79 to 100% and a specificity of 85-100% in the diagnosis of a hemorrhage, but in the case of diverticular bleeding, its intermittent nature can pose diagnostic problems.

Scintigraphy is the most sensitive method for diagnosing lower GI bleeding, due to the retention of labeled erythrocytes in the circulation, which makes it possible to repeat the investigation within 24 hours in the case of intermittent bleeding^{13,5}.

The treatment of diverticular bleeding depends on its severity. Angiographic treatment is indicated in patients with persistent bleeding who have experienced episodes of haemodynamic instability and in whom volumetric resuscitation has been attempted.

The procedure may include hemostasis by embolization or infusion of vasoconstrictive agents into the vessel where the source of bleeding is previously located.

Surgical approach is indicated when bleeding cannot be controlled by endoscopic or angiographic methods and in hemodynamically unstable patients despite resuscitation efforts. Elective surgery is also recommended in those with recurrent diverticular bleeding. Segmental colectomy is preferable in patients in

where the source of bleeding has been accurately identified endoscopically or by angiography.

If hemodynamic instability requires emergency surgery and the source vessel cannot be identified, the procedure of choice is subtotal colectomy with terminal ileostomy⁵.

CONCLUSIONS

To summarize, it can be stated that acute diverticulitis is a pathological entity that requires special medical attention and close collaboration between physicians from several specialties, as its complications carry a high degree of morbidity and mortality.

The staging of complications, if present, and the adaptation of the therapeutic approach according to their degree, are vital steps to be followed in the proper management of the patient with acute diverticular disease.

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