

Therapeutical Options in Sigmoid Diverticulitis. When Should We Operate?

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Rezumat

Opțiuni terapeutice în diverticulita sigmoidiană. Când operăm?

Diverticuloza colonică este o afecțiune benignă, a cărei incidență este în continuă creștere în întreaga lume și îndeosebi în țările avansate economic din vestul Europei. Această dinamică este corelată atât cu tendința generală de îmbătrânire a populației, diverticuloza fiind caracteristică vârstei a treia, cât și cu obiceiurile alimentare actuale. Frecvent, diverticuli colonici determină complicații: hemoragie sau diverticulită, cu abcese pericolice sau peritonită generalizată. În mod logic, există o preocupare pentru elaborarea unui algoritm terapeutic adecvat al bolii diverticulare, preponderența atitudinii conservatoare sau a celei chirurgicale suferind modificări continue. Am analizat opțiunile terapeutice, avantajele și limitele lor, raportându-ne atât la experiența Clinicii de chirurgie "Prof. I. Juvara" a Spitalului "Dr. I. Cantacuzino", cât și la datele cele mai recente din literatura medicală.

Cuvinte cheie: diverticuloză, diverticulită sigmoidiană

Abstract

Colonic diverticulosis is a benign disease whose incidence has been steadily increasing throughout the world, especially in the economically developed countries in Western Europe. This increase is connected to the population ageing process, the diverticulosis being characteristic in the elderly, and with nowadays' eating habits. Frequently, colonic diverticuli may cause complications, such as hemorrhage or diverticulitis, with pericolic abscesses or peritonitis. Consequently, efforts are being made to set up a therapeutic algorithm appropriate for the diverticular disease, the predominance of the conservative or surgical attitude being continuously adjusted. We have analyzed the therapeutic options, their advantages and their limitations, based on both the experience of the "Prof. I. Juvara" Surgical Department of the "Dr. I. Cantacuzino" Clinical Hospital and the latest data in medical literature.

Key words: diverticulosis, sigmoid diverticulitis

Introduction

Colonic diverticulosis and its most frequent complication, diverticulitis appear in an increasing number of cases, due to the population ageing process and the spread of eating habits characteristic to the countries with a high life standard. The therapeutic attitude towards this benign affection is not free of controversy, the most interesting one referring to the importance of elective surgery in the treatment of diverticulitis. We studied a series of patients recently operated on in the "Prof. I. Juvara" Surgical Department of the "Dr. I. Cantacuzino" Clinical Hospital and we set out to analyse the therapeutic

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options, their advantages and limitations, trying to state a few opinions based on both our own experience and the latest data in medical literature.

Materials and Methods

A number of 236 patients diagnosed with colonic diverticulosis have been admitted in our clinic between 2008 and July 2012. Out of these, in 78 cases (33.05%) the patients suffered complications: 65 patients had one or several episodes of diverticulitis, 10 patients had inferior digestive haemorrhage from diverticula and 3 patients were operated on due to the appearance of a peritonitis or retroperitoneal abscess.

In the 65 patients with uncomplicated diverticulitis, the diagnosis was based on clinical examination, correlated with leucocytosis and septic fever. The imagistic explorations were usually the abdominal ultrasonography and barium enema, colonoscopy not being indicated in the acute phase of diverticulitis. As a matter of fact, in the case of 2 patients in which the clinical signs and the ultrasonography had been inconclusive, an iatrogenic perforation occurred during colonoscopy, forcing a Hartmann resection of the affected sigmoid loop, followed by the reintegration of the colon in transit after 6 months. The other patients benefitted from conservatory treatment, consisting of NSAID, a bag of ice applied on the spot and antibiotics of the cephalosporin category in the 2nd or 3rd generation, parenteral administration. Their evolution was favourable with progressive remittance and disappearance of symptoms. However, 8 of these patients have been admitted twice in the above mentioned time span, due to the recurrence of the inflammatory process.

Inferior digestive haemorrhage from diverticula has been proved through colonoscopy in 10 patients. A remarkable fact is that we have identified an element that eases bleeding in 5 cases: 3 patients suffered from coagulation distress secondary to the anti-coagulation NSAID treatment, while the other 2 patients suffered from decompensated hepatic cirrhosis of viral etiology. The treatment consisted of giving the patient haemostatics, antisecretory drugs, interrupting or adjusting the doses of the anti-coagulation or antiagregant treatment and the therapy of the main disease. We considered blood

transfusion to be adequate in only 2 instances, due to severe haemorrhage, the haemoglobin decreasing to 6.9 g/dl and 8.8 g/dl respectively, correlated with the considerable age of the patients: 86 the former and 93 the latter.

The perforation of a peridiverticular abscess was the cause of generalised peritonitis in 2 cases. An interesting fact is that one of these patients had among his recent antecedents a repeatedly operated and recurring right lumbar abscess, whose real source had not been recognized; later on, it was located in a perforated diverticulum on the posterior side of the caecum.

In a 3rd case, the suppuration extended into the retroperitoneum. We found this pathologic situation representative; therefore we shall make a detailed presentation of the case. Along with it, we shall describe an instance in which the surgical treatment of a diverticulitis was decided at the onset of the disease.

Clinical observation 1

A 61-year-old female patient was admitted in our emergency unit due to intense colicative pain, located in the left flank and left iliac fossa, accompanied by diarrhea stools, fever and shivers. The symptoms appeared suddenly one week prior to the admittance, then faded progressively. The clinical examination upon admittance refuted the presence of any signs of peritoneal irritation. The diagnosis of the abscess was based on the increased values of leucocytosis: 40,500/elements/mmc, with neutrophilia: 34,400/mmc; its origin was identified after a computed tomography, which showed a large retroperitoneal abscess on the inferior section of the lower side of the left hemi-abdomen, with gas bubbles suggesting the presence of anaerobic germs (Fig. 1 A, B).

There was a retroperitoneal approach, through the left lumbar area, of the point of maximum fluctuance; this led to the discovery of about 100-150 ml liquid faeces, which were removed using abundant chemical irrigation and drainage of the cavity (which obviously remained open). Exploratory laparotomy did not reveal the existence of intra-peritoneal collections, the effect of the retroperitoneal suppuration was represented by means of agglutination of the greater omentum, ileal ansa and sigmoid colon in the iliac fossa and left flank. The diverticular origin of the abscess was deemed most



Figure 1. (A, B) CT: Retroperitoneal abscess, with aerial images suggesting the presence of anaerobic germs

probable and it was considered adequate to let the left colon rest by means of a transversal temporary terminal colostomy. The effective drainage of the collection and discontinuation of the source which contaminated the cavity with faeces allowed the healing, secondary suture and discharge of the patient, 30 days after the surgical procedure.

Clinical observation 2

A 78-year-old female patient came to the hospital because of colicative pain of moderate intensity, located in the left flank and iliac fossa. The pains were ameliorated by the emission of gases and faeces and sometimes accompanied by minimal rectal bleeding. The symptoms appeared a few weeks before the admittance and had a lingering evolution. Locally, we noticed an increased pain when pressing deeply into the left iliac fossa, where a sensitive hardened and imprecisely bordered area was detected. Among the biological tests, we noticed the leucocytosis: 13,900 elements/mm³, with neutrophils: 11,500/mm³ and RPC:45 mg/l. The high values of the inflammation markers contrasted with the normal ones of the CEA antigen, which had the level of 1.46 ng/ml.

The presumptive diagnostic of sigmoid diverticulitis was only partially confirmed by the imagistic explorations. Starting from 35-40 cm away from the anus, the colonoscopy identified an area of circumferential thickening of the colonic wall, with infiltrative, irregular, friable aspect, stretching axially for about 7-8 cm. It narrowed the colonic lumen almost completely, having a stenosis, occlusive nature. On the CT-scan, this area appeared as an image with an infiltrative aspect, which contained 7-10 cm of the sigmoid colon, as well as its connection with the descending segment.

Practically, the inflammatory or tumour nature of the sigmoid stenosis could not be undoubtedly stated before the procedure, the diagnostic doubt persisting even during the surgical exploration; an infiltrated, thickened area was discovered at the descending-sigmoid junction, with 5-8 mm lymph nodes up to the level of the intermediate group. For reasons of oncological security, as well as for tactical purposes, pertaining to the topography of the stenosis area, a left hemicolectomy was considered to be the best course of action. The aspect of the specimen (sigmoidal wall, evenly thickened over about 8-10 cm axially, with atrophic mucosa and a – probably – diverticular orifice) pointed to the inflammatory nature of the stenosis, confirmed by the histopathology examination. The post-operative evolution contained no remarkable elements.

Results

The clinical cases presented above showed a number of characteristics which are representative of the difficulties of stating a positive diagnosis and choosing a therapeutic conduit appropriate for diverticulitis.

The first patient was admitted and diagnosed during a severe complication (fistula of the diverticula), which caused a retroperitoneal faecal abscess that corresponds to type IIb of the Finncley classification, modified by Sher. According

to it, type I is represented by a pericolic abscess; type II: pelvic, abdominal or retroperitoneal abscess (subtype a: at a distance, which can be CT guided drained; subtype b: with a fistula); type III: generalised peritonitis; type IV: the faecal peritonitis (1).

The second patient underwent radical surgical treatment, which acted against the first identified inflammatory episode of the diverticular disease. However, the necessity of the procedure and the size of the resection were caused by the impossibility of excluding the neoplastic nature of the sigmoid tumour, with any degree of certainty. Neither the available imagistic explorations (colonoscopy, computed tomography), nor the intra-operative exploration could decisively clarify the diagnosis; therefore, we considered the left hemicolectomy a 'safer' procedure for the subsequent evolution of the patient, regardless of the histopathology result.

Both our clinical experience and the data in medical literature confirm the difficulty of differential diagnosis between acute diverticulitis and sigmoid neoplasm, which can pose a real problem when the macroscopic morphologic aspect is very similar. Even the top imagistic explorations, such as the PET-scan are unable to completely solve this issue (2), the only sure diagnosis being, for now, the post-operative histological examination of the specimen.

In the two clinical situations described earlier, the therapeutic action was applied in different stages of the diverticular disease: at the very beginning in one case; addressing a tardy complication, with a potential for severe development and a high risk in the other case. A matter to be discussed is whether the surgical attitude, which doesn't leave room for recurrence or dangerous accidents is advisable, or, on the contrary, if the large resection of the colon may be considered excessive for solving a benign disease.

Discussions

The existence of colonic diverticula has been mentioned in medical literature since the first decades of the last century. Although there are authors who claim that the incidence of diverticular disease only seems to have increased due to its being easier to diagnose using the barium enema, the theses which analyse the connection between the numbers and the socio-economic environment are more convincing. The most widely accepted theory nowadays argues that food intake which is poor in cellulose fibre sources (fruits, raw vegetables, potatoes, whole grain bread), and rich in meat and dairy products, contributes to the formation of diverticula by slowing down the transit and increasing the pressure inside the colon (3). In addition to this, there are epidemiologic arguments, based on significant change in the incidence of the condition in accordance with economic development in a number of African countries, or with the population migration process and the change of eating habits, which is the case with the Asian population in the USA.

The consequences of the variation of pressure are thinning of the muscle layer and narrowing of the colonic

lumen. The main ultra-structural changes are increased dimensions and altered distribution of elastin fibres between the longitudinal myocytes in the composition of the teniae. By this means, areas with a low mechanic resistance are formed; the underlying layers (mucosa and submucosa) may later get through them to the exterior of the colon. In turn, the mucosa suffers from a hypertrophic process, caused by the lymphoplasmacytic inflammation at their lower end (4). As time goes by, the inflammatory process extends to the mesenteric or pericolic fat.

The most frequent complication of diverticulosis is the occurrence of an abscess, which can evolve in several pathological forms: pericolic collection on the antimesenteric border, mesenteric abscess or pyogenic mesenteric lymphadenitis (5). It is notable the fact that the abscess is more likely to be located in an area that has not been affected by a previous chronic inflammation, as it progressively becomes a fibrotic structure which prevents the emergence and centrifugal extension of a collection.

One more potentially severe development is the occurrence of a purulent peritonitis, which can be described through the emergence of a turbid peritoneal exudation and the oedema of both the parietal and visceral layers of the peritoneum, especially on the surface of the colon. Frequently, it is impossible to identify the exact place of the perforation, especially when it is covered by the greater omentum, small bowel or pelvic structures (6).

The most challenging complication is the faecal peritonitis, which is, fortunately, rare; still, its mortality can reach 75% in elderly, very ill patients, due to the circulatory problems caused by endotoxines of the Gram-negative germs and the consequent septic shock (7).

A pericolic abscess or local peritonitis may cause an exterior colonic fistula or one which involves another organ: urinary bladder, vagina, uterus or the small bowel. Colovesical fistulas are the most common, the usual symptoms being dysuria, fever and pneumaturia. Less frequently, there is the microscopic or macroscopic haematuria (8). The symptoms are persistent, the probability of spontaneous closing being quite small, as the pressure inside the colon is higher than inside the urinary bladder, and the fistula rapidly gets an epithelium (9).

Coloenteric fistulas are usually complex, often involving the urinary bladder and the skin, which explains the diversified symptoms. The involvement of the vagina becomes possible after a hysterectomy, due to the direct mechanical contact of the sigmoid with the bottom of the posterior vagina. Fistulas are small, intermittent and elimination of faeces in this way is reduced.

The imagistic diagnosis of the diverticulitis begins with a simple X-ray, which may show the existence of abdominal abscesses or aerial images, caused by an occlusive syndrome of the small bowel or of the colon. A barium enema shows the presence and location of the diverticula (Fig. 2) or of their complications: 'stack of plates' images characteristic of the inflammatory colonic processes or axially stretched, irregular areas of stenosis (Fig. 3). There is some controversy regarding how advisable it is to push the barium inside the colon when it



Figure 2. Barium enema: suggestive images of diverticula in the descending and sigmoid colon



Figure 3. Barium enema: tight axial stenosis of the descending colon

suffers from an acute inflammatory process, which has a high risk of abscess, fistula or perforation. A solution may be to use hydrosoluble substances, which are less aggressive towards the peritoneum, in case of a pre-existence or appearance of a fistula (10).

Abdominal ultrasonography could show the difference between an inflammatory area with a solid pattern and the cavity of an abscess which contains liquid that makes it

transonic. The advantages of the method are the wide accessibility and the lack of irradiation, but its actual possibility of indicating a clear diagnosis is reduced. The main limitation is the dilatation of the surrounding loops, which have an abundant liquid and gas content and which usually causes the almost total hiding of the areas of interest. Scintigraphy using galium-leukocytes has led to results which are superior to those reached using radiological or ultrasound methods (11).

Nowadays, the best diagnostic method is the computed tomography (12), (13), which can deftly identify a peridiverticular abscess, the existence of extra-lumen pathologic fluids, a fistula or septic determinations from a distance. A classification of the severity of diverticulitis has been made based on tomographic criteria (14). According to this classification, moderate diverticulitis is characterized by the thinning of the colonic wall on an area which is larger than 0.5 cm² or by the inflammation of the perirectal fat, while the severe form is diagnosed when at least one of the following changes is also present: abscess, the presence of air and/or contrast substance outside the colon.

Helical computed tomography is characterized by values of sensibility, specificity and predictive value of more than 99% (15), but its limited accessibility and high costs severely reduce its practical applicability.

Colonoscopy is the most commonly used method for visualising the colonic lesions directly, the internal orifices of the diverticula being easy to identify (Fig. 4). Still, the existence of an acute inflammatory process is a relative contra-indication due to the high risk of direct or pressure-induced perforation.

One of the things of great importance for surgeons is to decide when to recommend the procedure and which surgical technique is most appropriate to deal with acute diverticulitis in different stages of evolution. By studying the medical literature, one may notice a difference of approach in favour of the conservative attitude, which is consistent with the general tendency of the past few years, of continuously reducing the

number of organ resections, as the quality of life is nowadays essential for judging the value of any procedure. The necessity of surgical treatment, which has been considered compulsory after the second acute diverticulitis episode, is now unclear (16).

The changes in the therapeutic approach don't stop here though. A well-established principle, which imposed a restrictive alimentation, based exclusively on clear liquids or even the interruption of oral alimentation during the acute diverticulitis episode is nowadays considered irrelevant for the patient's healing (14). Far from favourably influencing the diverticular inflammatory process, the diet seems to actually increase the amount of time spent by the patient in the hospital.

As for the conservative approach towards acute diverticulitis without complications, the classic attitude consisted of the administration of a wide spectre antibiotic, such as Ertapenem, without significant differences between the results of the usual, 7-day treatment and the shorter, 4-day treatment (17). Still, the latest studies question the use of antibiotherapy, stating that it neither reduces the duration of the inflammatory process nor the incidence of recurrences or complications (18); its use should be limited to such cases of acute diverticulitis that present complications. Encouraging results regarding the prevention of the recurrences have been obtained mostly by using classic NSAID, similar to the 5-acetyl-salicylic acid (19), (20).

The most delicate problem of the therapeutic algorithm is when to recommend surgery, which should be considered after the first conservatively-treated episode of acute diverticulitis. The risk of future recurrences of the acute inflammatory phenomena is quite high, their occurrence being almost regular; a large meta-analysis that gathers the results of 21 studies published between 1983 and 2005, based on 24,862 patients revealed that the frequency of recurrences varied between 43% and 86%; 18.6% of these patients needed hospitalization (21).

The prediction factors which are statistically significant for the recurrence of an episode of acute diverticulitis are: young age (which suggests the existence of an ultra-structural defect of the colonic wall), the initial occurrence of a retroperitoneal abscess (which was the case in the second patient we have presented), family antecedents of a diverticular disease, a length of more than 5 cm (22) of colonic wall involved in the process and the severity of the initial episode, judged by CT criteria.

Using this data, it was possible to state more clearly the recommendation of elective surgery in patients with a high risk of recurrences. They could be grouped into several categories: absolute: patients who have had one or several episodes of diverticulitis, confirmed by a CT, in which the clinical distress persisted, unaffected by the conservative, anti-inflammatory treatment; patients who suffer from continuous, persistent pain in the left flank and lower quadrant after the first crisis; those with immunosuppressive conditions and young patients (less than 50 years old) with episodes of diverticulitis in their family. Aside from these, the following may be regarded as firm indications: the occurrence of a pelvic



Figure 4. Colonoscopy: internal orifice of a diverticulum

abscess or, in young patients, the occurrence of an episode of severe diverticulitis or of two episodes of moderate diverticulitis, according to the above mentioned CT criteria. The recommendation to undergo surgical treatment should be individually evaluated for patients over 50, depending on the number and the severity of the recurring episodes, in connection with the risk of the procedure (23). To conclude, the complete answer to the title question "When should we operate?" should also contain information referring to "Who should we operate on?"

As for the technique of the procedure, there is a general agreement in medical literature regarding the advantages of laparoscopic resection, which represents a safe method (24, (25,26), the risk of appearance of an anastomotic leakage being of 1.5% (27). Still, the indication of laparoscopic sigmoidectomy is limited in patients who have had 3 acute inflammatory episodes at most (28), as the conversion rate increases significantly above this value (29).

The quality of life after the sigmoid resection, quantified according to the GIQLI scale (Gastrointestinal Quality of Life Index) (30) has improved significantly, the index value increasing after the procedure in most patients (31,32), as high as 88% of respondents in some studies (33).

The forms of diverticulitis with complications continue to benefit from classic procedures, some of the techniques belonging to the beginnings of modern surgery, such as the one described by Henri Hartmann in 1921; their value and utility remains unchanged in certain situations (34). According to the Hinchey classification, the 1st stage requires antibiotherapy in selected cases; the 2nd stage – antibiotics and CT-guided drainage of abscesses larger than 3 cm; the 3rd stage – the possible approaches are laparoscopic drainage and irrigation of the peritoneal cavity, laparoscopic resection with a protective stoma above or the Hartmann procedure. In the 4th stage, sigmoid resection is compulsory, either by laparoscopic way or Hartmann-type (35).

The fistulas involving the urinary bladder require a 2-layers suture, protected by the drainage of the bladder with a Foley for 7 days; the vaginal ones may be sutured or may spontaneously close, while the coloenteric ones demand resection of the affected loops, with primary anastomosis.

Conclusions

The surgical indication in the two cases that have been analysed in detail was not the result of following the therapeutic protocols accepted in nowadays' medical world, but (as it may often happen) was imposed by the particularities of each patient: the impossibility of proving the non-neoplastic nature of the sigmoid tumour - the former, the occurrence of the retroperitoneal abscess - the latter. We must however state the fact that in this case we deem necessary, at a time of subsequent surgery, to perform the resection of the affected colonic loop, this approach being consistent with the recommendations of medical literature.

The therapeutic options for sigmoid diverticulitis are, at the moment, varied, depending on numerous facts. The

value of elective surgical treatment remains undeniable, but its indication cannot be generalized to encompass all the patients who suffered from one or two episodes of acute uncomplicated diverticulitis (36).

This therapeutic strategy is consistent with the general tendency of modern surgery, in which the importance of mini-invasive techniques is increasing, while the morphologic and functional preservation of organs is considered essential.

All these taken into consideration, we believe that each case should benefit from a personalized therapeutic approach. The earlier the diagnosis is established, the better the lesions will be managed, usually by an adequate and especially timely treatment for each inflammatory episode. Modern antibiotics and anti-inflammatory drugs are able to master the inflammatory episodes, so that evolutions as dramatic as those presented in the article become less frequent (37).

Practically, surgery will continue to be the indication for treating severe septic complications. Depending on the presence of abscesses or fistulas in the nearby organs, the surgeon should proceed to drain the collections and/or to perform a deviation of the transit, by means of a protective colostomy, followed by a subsequent reintegration, conditioned by the healing of the initial lesions. As a rule, the time interval required before conversion can be performed is of at least 6 months after the first intervention.

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