

Surgical approach of complicated diverticulitis with colovesical fistula: technical note in a particular condition

Case Report

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Abstract: Background: Diverticular disease of the colon is common in the Western world. With the first episode of diverticulitis, most patients will benefit from medical therapy, but in 10% to 20% of cases some complications will develop, such as intra-abdominal abscesses, obstructions, fistulas. In these conditions it is important to define the most appropriate surgical approach. Discussion: The management of diverticular disease has been successful owing to the advances in diagnostic methods, intensive care and surgical experience, but there is debate about the best treatment for some conditions. Fistulas complicating diverticulitis are the result of a localized perforation into adjacent viscera. In particular, the connection between the colon and the urinary tract is a serious anatomical abnormality that must be urgently corrected before a serious urinary infection results. Indications, timing and surgical procedures are determined by the severity of the disease and the patient's general condition. Summary: Diverticular disease can lead to many complications. One of the most difficult to correct is an internal fistula, such as a colo-vesical fistula. The correct approach in cases where the disorder is clinically suspected has always been controversial, and the guidelines for sigmoid diverticulitis have not established the most appropriate method for diagnosis and treatment. At present, the surgical strategy for these cases requires interruption of the fistula and resection to remove the inflamed colonic segment, with or without primary anastomosis, focusing attention on the construction of the anastomosis to well vascularized and anatomically healthy tissues. It is clear, therefore, that establishing guidelines is difficult, because many pathological situations may be related to diverticulitis, and so, as our experience shows, the surgical approach has to be tailored to the patient's general and local condition.

Keywords: *Diverticulitis • Colo-vesical fistula • Valdoni*

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1. Background

Diverticular disease is common in Western industrialized countries, [1] and its incidence increases with age [2]. It affects approximately one third of the general population over 45 years and two thirds over 85 years [3]. Between 10% and 20% of individuals affected by diverticulosis will eventually have acute diverticulitis or other complications [4].

Patients with diverticulitis can present with uncomplicated or complicated forms of the disease [5]. Uncomplicated diverticulitis refers to an inflammatory process that is limited to the colon, with no secondary manifestations of the disease. Complicated diverticulitis indicates that there are other ongoing processes such as intra-abdominal abscesses, obstructions, fistulas (colo-vesical, colo-vaginal, or colo-cutaneous) or diffuse peritonitis [6].

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There are many classification systems for diverticular disease, but two are commonly utilized. The European Association for Endoscopic Surgeons developed a classification in which diverticulitis is categorized into symptomatic uncomplicated disease, recurrent symptomatic disease, and complicated disease [7]. Another system was developed by Hinchey, [8] where diverticulitis is classified on the basis of local or diffuse abdominal involvement describing various degrees of diverticular perforation.

Even if neither of the two systems can be used as a single-patient evaluation instrument, both are taken into account when studying disease severity, and both have to be considered for the approach and selection of an adequate plan of treatment [9]. Another classification system was developed by Ambrosetti [10] based on CT findings. These criteria allow the stratification of patients into those with mild disease, disease that is manageable with intravenous antibiotics, and severe diverticulitis, which then directs treatment toward percutaneous drainage or surgery.

However, in urgent cases and in complicated diverticulitis, other patient- and disease-related factors must to be considered, and different classification systems are used. Among these are the Mannheim peritonitis index (MPI) [11], Charlson comorbidity index [12], American Society of Anesthesiologists score (ASA) [13], colorectal, physiological and operative severity score for the enumeration of mortality and morbidity (CR-POSSUM) [14], and Cleveland Clinic diverticular disease propensity score (CDS) [15].

The majority of cases of acute diverticulitis can be managed medically, but a quarter of patients with perforation, generalized peritonitis or intra-abdominal abscess require surgical intervention.

Surgical alternatives for emergent left colonic disease have been debated since 1910 when Lockart-Mummery [16] illustrated different approaches: peritoneal lavage and drainage versus acute colonic resection with anastomosis or colostomy.

Emergency surgery can involve a Hartmann's procedure (HP) [17], with resection of the involved segment of bowel, oversewing of the distal rectal stump, and formation of an end colostomy. This procedure allows staged reanastomosis after complete resolution of pelvic inflammation.

Primary resection and anastomosis (PRA) of the affected bowel segment has been used in an attempt to minimize the morbidity and mortality associated with the reversal of Hartmann's procedure [18]. In fact, restoration of bowel continuity has a reported anastomotic-leak rate of up to 30% and a mortality rate of up to 14% [19,20]. Also 20% to 50% of patients live with a permanent stoma [21].

The choice of correct surgical management is influenced by many factors, such as patient age, morbidity, and severity of the disease.

Here, we report our experience with a particularly severe case of complicated diverticulitis and the diagnostic-therapeutic approach that we believed to be the most suitable for this situation.

2. Case report and operative technique

A 68-year-old man presented with abdominal pain localized in the hypogastric and left iliac fossa. He had a history of recurrent cystitis in the previous 4 months, recent onset of fever, and pneumaturia. Clinical examination did not reveal any disease findings, but fecaluria was noted on urination. Abdominal and pelvic ultrasound studies showed adherence in Douglas pouch involving the sigmoid and bladder wall. A CT scan (Figure 1) revealed a colovesical fistula caused by complicated sigmoid diverticulitis.



Figure 1. The CT scan shows fistula between the anterior-superior wall of the bladder and the sigmoid colon secondary to diverticulitis.

The patient underwent surgery; the exploratory phase showed advanced diverticular disease in the distal descending colon and sigmoid with a voluminous colovesical fistula that was successively interrupted by the resection of the involved portion of the bladder and the suture of the bladder wall. Methylene blue was used for the control of suture resistance.

After parieto-colic detachment with visualization of the ipsilateral ureter, a colo-epiploic detachment and mobilization of left colic angle were executed. The inferior mesenteric vein was then ligated and sectioned at its confluence with the splenic trunk. The inferior mesenteric artery (IMA) was skeletonized (Figure 2) according to Valdoni's technique [22]. The IMA origin was identified on the anterior aortic wall, and the left colon was medially pulled,

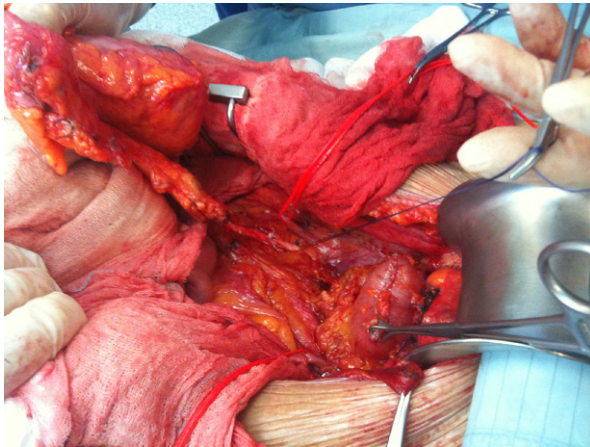


Figure 2. Colovesical fistula is interrupted by resection of the involved portion of the bladder and the suture of bladder wall. The left colon angle is mobilized, and the inferior mesenteric artery is skeletonized.

exposing the posterior margin of mesentery to view. The IMA adventitia was opened with scissors at the level of the posterior wall of the vessel where branches did not emerge, and the procedure was finished in the mesenteric part with ligation and sectioning of every vessel directed to the left colon and sigmoid (Figure 3).

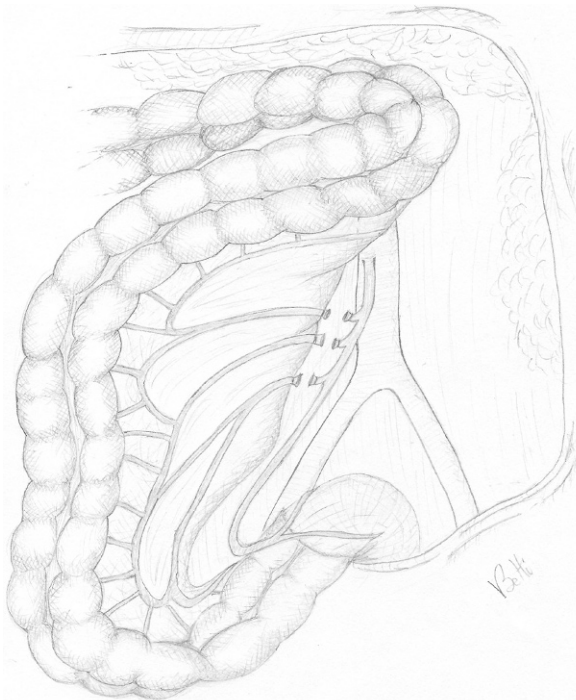


Figure 3. According to Valdoni's technique, all the branches of the inferior mesenteric artery (IMA) to the left and sigmoid colon are divided. The dissection is extended up to the sacral promontory, and the proximal rectal mesentery is sectioned to the two distal IMA branches.

In this way, the sacral promontory was reached, and the proximal rectal mesentery was sectioned to the level of the two distal IMA branches. Intestinal resection was executed proximally almost 5 cm below the splenic flexure and distally 1 cm below the recto-sigmoid junction.

Intestinal continuity was restored by a manual colorectal lateral-terminal anastomosis in dual layers without resorbable material (Figure 4). A Foley catheter was positioned for almost 10 days. The hospital stay was 16 days. The postoperative course was uncomplicated and without urinary tract infections. During an 18-month follow-up period, the patient did not have recurrent fistula.

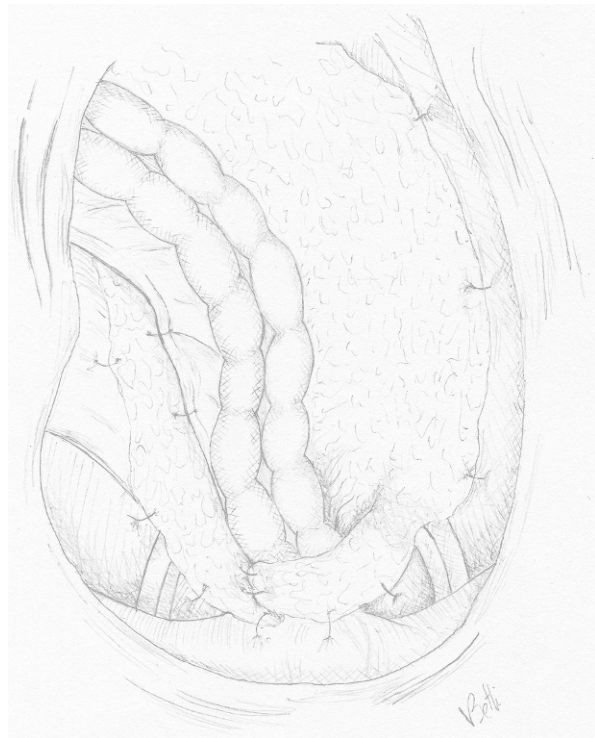


Figure 4. Restoration of intestinal continuity and omentoplasty of the anastomoses.

3. Discussion

Colo-vesical fistulas caused by diverticulitis are the most common fistulas of the bladder and can be due to two mechanisms [23]: direct extension and rupture of diverticular abscess in the bladder (more frequent) or direct perforation of the diverticulum that adheres to bladder (more rare).

Signs of colo-vesical fistulas can be nonspecific and not easily detectable, but in almost all cases the "pre-fistula syndrome" is present: pain in inferior abdominal quadrants, dysuria, and tenesmus of the bladder [24].

The correct diagnostic approach in cases of a clinical suspicion of colo-vesical fistula has always been controversial, and even guidelines for the treatment of sigmoid diverticulitis proposed by Society of Colon and Rectal Surgeons' Task Force have not established the most appropriate method for diagnosis and treatment of colo-vesical fistula [25]. Garcea *et al.* [26] in a study of 90 cases of colo-vesical fistulas indicate that barium enema, colonoscopy and CT scan should be routinely used, and surgery is the only possible treatment.

In our case, we decided to perform a colonic resection with a primary anastomosis. However, the extension of diverticular disease to the entire descending colon made a mechanical terminal-lateral anastomosis (Knight-Griffen terminal-lateral anastomosis), and therefore, we decided on a manual colorectal terminal-lateral anastomosis.

We want to emphasize the success of a technique widely known, still effective, and worthy of being applied in modern surgery. In fact, Valdoni's technique [22] can guarantee effective vascularization of the rectal stump in a situation as delicate as the one described and, therefore, with a lower risk of anastomotic leakage. IMA skeletonization seemed the most adequate technical interventional approach on the basis of current evidence in the literature [27,28], even if it is not universally indicated and accepted in sigmoid resection for diverticulitis.

Altered blood flow of one or both intestinal stumps is a determining factor for intestinal anastomotic leakage [29]. When the IMA is ligated, morphological and functional

characteristics of middle and inferior hemorrhoidal arteries [30,31] do not always guarantee a prompt and effective compensation of blood flow to the proximal rectum, in particular for elderly patients with atherosclerotic insufficiency of hypogastric arteries [32,33]. In preserving natural blood flow to the rectum, IMA skeletonization allows the maintenance of a vital bowel and a reliable anastomosis with good functional results [34]. So, IMA preservation seems to have an important role in the reduction of anastomotic fistulas in sigmoid resection for diverticulitis.

In a study of 465 left colectomies performed by Ghavami [35] according to these principles, only one anastomotic fistula occurred that required surgical treatment. In particular, the author reports that the quality of this result was due to sufficient vascularization of the superior rectal artery associated with the absence of tension in the section of inferior mesenteric vein and the systematic lowering of the left angle.

The advantages of this approach are the confection of the anastomosis with well vascularized and anatomically healthy tissues and the avoidance of performing a covering stoma even in presence of a localized inflammatory process.

At present, the surgical technique of colic resection for acute diverticulitis is well established, but the most effective approach to different complications and particular clinical conditions is more difficult to determine [36]. Our experience shows that a tailored approach allows overcoming unusual circumstances related to complicated diverticulitis [37].

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