Treatment of acute diverticulitis with open abdomen technique

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Massimo Antropoli*, Ferdinando Fusco*, Antonio Brillantino*, Michele Lanza*, Giovanni Monte*, Antonio Maria Cricrì*, Francesco Scardi*, Francesca Romana Ciorra*, Ester Marra**, Maurizio Castriconi*

**UOC Chirurgia D'Urgenza Azienda Ospedaliera "Cardarelli" di Napoli, Naples, Italy*
*** AOP di Napoli Dipartimento di Medicina e Chirurgia Scuola di Medicina Napoli, Policlinico "Federico II", Napoli, Italy*

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AIM: *The aim of this study is to highlight our experience about the use of open Abdomen's technique as strategy for the management of complicated colon diverticulitis with a delayed anastomosis or colostomy.*
MATERIALS AND METHODS: *Thirty patients, with III and IV Hinchey stage, have been undertaken to a surgical procedure with Open Abdomen technique and application of Ab-thera device. A second surgical look was made after 48-72 hours in order to evaluate the possibility to do an anastomosis or colostomy.*
RESULTS: *No deaths in patients with anastomosis were reported, but one case of leakage at the 8th day and one case of micro pulmonary embolism had been displayed. Elderly patients were discharged between the 15TH /18th day. One patient affected by lymphoma was sent in haematology department for other treatment.*
DISCUSSION: *Today trend is to treat the diverticular disease with colic and paracolic abscess by a medical therapy and percutaneous drainage under CT scan or ultrasound view. With III and IV of Hinchey scale we perform the resection with anastomosis or colostomy. The open abdomen technique allows the surgeons to make the decision of colostomy or anastomosis in the second surgical look at 48-72 hours after the first treatment with irrigation and aspiration during AB-Thera.*
CONCLUSION: *The Open Abdomen technique is a valid therapeutic alternative approach for patients with acute diverticulitis disease in III and IV Hinchey grade. This therapeutic approach gives important advantages in patients with delayed colostomy.*

KEY WORDS: Diverticulitis, Damage Control Surgery, Open Abdomen

Introduction

In western countries the prevalence of diverticular disease of the colon increased in the last century till to became today one of the five gastrointestinal diseases in North America [1,2]. Its prevalence is increasing all around the world, mainly because of the changing of our lifestyle [3]. New pathological knowledges have explained the role of different pathogenetic factors in its development and have taken to new therapeutic approaches [4].
The prevalence of diverticular disease depends on the age and it has been seen that occurs in 10% of the population under 40 [5,6].
In 10-25% of patients with diverticular colic disease, the illness becomes diverticulitis and about 25% will developed a complicated diverticulitis [7,8].
A great percentage of the mayor complications is represented by perforation and this pathology represents 0,5% of surgical treatment in emergency [7-9].
Despite the high prevalence of this pathology, the treatment is an object of controversy.

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Correspondence to: Massimo Antropoli, Via 4 Novembre 106, 81043 Capua (CE). (e-mail: massimoantropoli@gmail.it)

Without the surgical strategy in case of complicated diverticulitis the morbidity is >50% and mortality from 15 to 25% [10-12]. For this reason, same study advice to do a colic resection in patients at high risk and with recurrent diverticulitis.

The results of surgery in complicated diverticulitis are difficult to classify because it is impossible to compare different works. It depends on the fact that risk factors have not been well defined yet, so the different studies cannot be compared according to the importance of comorbidities, which have a great importance on the past surgical way.

The aim of this study is to show the results of the management of complicated colon diverticulitis in the last five years in emergency surgery of Cardarelli Hospital, and to evaluate the outcomes of strategies adopted for the treatment of these cases with Open Abdomen technique in association with a delayed anastomosis at 48 hours.

Diverticular disease is a typical disease in western countries especially in the USA and Europe, but rarely in Africa [13]. Sigmoid tract represents the most affected tract of the colon. The Hinchey scale represents the classification of diverticular disease [14]. Computed tomography (CT) is the gold standard for diverticulitis diagnosis. The size and range of abscess formation and the severity of the peritonitis classify complicated diverticulitis [15]. Each case should be classified on the base of clinical and computed tomography (CT) findings and then treated appropriately. Most patients with uncomplicated diverticulitis (stages 0–Ia) can be treated conservatively. Diverticulitis with a localized abscess (stages Ib–II) is generally resolved with conservative treatment. If the abscess is larger or conservative treatment fails, however, percutaneous drainage or surgery should be considered. Operative treatment is considered standard therapy for severe diverticulitis with perforation and generalized peritonitis (stages III–IV) [16].

In last decade, the gold standard for the treatment of perforated diverticulitis has changed. One of the treatments with primary anastomosis is becoming more and more frequent, even if most surgeons are worried about the anastomotic leakage or dehiscence especially when there is an evident peritoneal contamination. For this reason, sigmoid resection and colostomy procedure is the most diffused surgical approach [17].

Today trend is to treat the diverticular disease with colic and paracolic abscess by a medical therapy and percutaneous drainage under CT scan or ultrasound view. In case of III and IV degree of Hinchey diverticulitis the treatment of choice is resection with anastomosis or colostomy [18].

On the other hand, the developing on devices used in open abdomen technique with application of Negative pressure with or without irrigation show the utility of this approach in the management of severe peritonitis [19]. The aims of open Abdomen technique are to decontaminate the abdomen and prevent the stiffness of fascial lateralization. The typical clinical pictures include patient with local or generalized peritonitis like diverticulitis, anastomotic dehiscence, trauma ecc [20].

Other surgical option for Hinchey stages 3 and 4 is the laparoscopic peritoneal wash, however the results do not allow to draw certain conclusions [17,21-22].

Materials and Methods

From August 2016 to December 2019 thirty patients who underwent surgery for acute stage III and IV diverticulitis according to Hinchey Staging hospital were considered for this study in our department of Antonio Cardarelli Hospital in Neaples.

For a correct staging we have taken into consideration all their clinical history, blood test, and diagnostic exam-

Table I - *Hinchey classification and its modifications*

	Original Hinchey Classification	Sher, Kohler modification	Wasvari modification	Kaiser Modification
Stage I	Pericolic abscess confined by the mesentery of the colon	Pericolic Abscess	1a Phlegmon 1b Pericolic abscess	1a Confined pericolic inflammation-phlegmon 1b Confined pericolic abscess
Stage II	Pelvic abscess resulting from a local perforation of pericolic abscess	IIA distant abscess amenable to percutaneous drainage IIB Complex abscess associated with/without fistula	Pelvic abscess	Pelvic, distant intrabdominal or retroperitoneal abscess
Stage III	Generalized peritonitis resulting from rupture of pericolic/pelvic abscess into the general peritoneal cavity	Generalized purulent peritonitis	Purulent peritonitis	Generalized purulent peritonitis
Stage IV	Fecal peritonitis results from the free perforation of a divertuculum	Fecal Peritonitis	Fecal peritonitis	Fecal peritonitis

ination.18 patients were female, 12 male, was of average age was of 61.7.
In 24 patients (80%) we have one or more concomitant pathologies, while 6 patients (20%) did not show any comorbidity. Cardiovascular pathologies and hypertension are more common, followed by diabetes (4), pulmonary diseases (2) with chronic obstructive pulmonary disease and chronic Kidney disease (4) haematological diseases 1.
At the end of the operation all patients have been treated with Open Abdomen technique with Ab-thera device. During the surgical procedure we took an abdominal liquid sample for bacteriological examination, we washed the abdominal cavity with hot physiological solution, we resected sigmoid colon with pathological process, with a colic mobilization of the splenic flexure and mechanic anastomosis.
No patients have been undertaken to a colo-colic anastomosis; the abdomen was left open by device Ab-thera. All patients have had a second surgical look after 48-72 hours. In 23 patients we removed Ab-Thera, and a stapled Latero-terminal anastomosis was performed. All patients have received a double drainage in pelvic and left parietocolic side.
In seven patients we did not do any anastomosis, but a definitive colostomy in the left flank. This strategy was due to the general conditions of patients. In fact, four patients had BMI > 50 with diabetes in insulin therapy and chronic Kidney disease in dialytic treatment. Two patients were elderly (93-95 years old), one patient was affected by a hematologic illness in chemotherapy.

Results

Between patients with colorectal anastomosis did not register any death. The average of hospital stay was 15,7 days. We registered only one case of leakage at the 8th day corpuscolar serum in a perianastomotic drainage without clinical and laboratorial evidence of sepsis. CT scan did not show any abscess, for this reason the patient was treated with antibiotic therapy and fasting. One case of micro pulmonary embolism was treated with heparin therapy.
Peristalsis was observed at the 4th day and the patient began to eat again at the 7th day. The drainages were removed between the 9th and 12th day.
In patients with leaks the oral alimentation was reintroduced at the 15th day. In patients with colostomy only one died because of diabetes, Kidney disease in dialysis treatment.
The two elderly patients were discharged between the 15TH /18th day. The patient with lymphoma was sent to haematology department for further treatment.
Two obese patients were discharged the 13th and 15th day respectively, and one patient with chronic Kidney disease was discharged the 27th day because during the hospital stay he was affected by pulmonary embolism.

Conclusions

Open Abdomen treatment is an important option to treat patients with acute diverticulitis disease in III and IV Hinchey stage. This treatment gives the possibility to have a second surgical look at the 2nd and 3rd day and permits a better drainage of intrabdominal abscess and improve the intestinal oedema. Furthermore, it allows to postpone the procedure of colostomy. This therapeutic approach gives important advantages in patients with postponed colostomy, in fact, thanks to Open Abdomen, we can wash the abdomen, aspire every organic fluid and can avoid the presence of extremely dangerous abdominal compartmental syndrome. For this reason, the treatment of diverticulitis at the 3rd and 4th Hinchey stage by Open Abdomen technique gives great advantages both with postponed anastomosis and postponed colostomy, representing a technique every surgeon should know.
In conclusion, we think this method can be considered a valid therapeutic alternative in the treatment of patients affected by Hinchey diverticulitis at the 3rd and 4th stage. We can observe a reduced a mortality in patients with purulent peritonitis and a reduced probability of dehiscence of anastomosis when we practice it in the second look.

Riassunto

Scopo dello Studio: Lo scopo di questo studio è di mettere in luce la nostra esperienza sull'uso della tecnica dell'addome aperto come strategia per la gestione della diverticolite complicata del colon con anastomosi o confezionamento di colostomia differita.
Materiali e Metodi: Trenta pazienti, al III o IV stadio della scala di Hinchey, sono stati sottoposti a una procedura chirurgica con tecnica di addome aperto e applicazione del dispositivo Ab-thera. Un second look chirurgico è stato effettuato dopo 48-72 ore al fine di valutare la possibilità di eseguire un'anastomosi o una colostomia.
Risultati: Non sono stati riportati decessi in pazienti con anastomosi, ma sono stati registrati un caso di fistola anastomotica comparsa in ottava giornata postoperatoria e un caso di micro-embolia polmonare. I due pazienti più anziani sono stati dimessi in quindicesima e diciottesima giornata postoperatoria. Un paziente affetto da linfoma è stato trasferito in ematologia per ulteriori terapie.
Discussione: L'attuale tendenza è quello di trattare la malattia diverticolare con ascessi colici e paracolici mediante una terapia medica e drenaggio percutanei TC o eco- guidati. I pazienti in stadio III o IV della scala di Hinchey vengono trattati chirurgicamente mediante resezione del tratto interessato e confezionamento di anastomosi colo-colica o colostomia. La tecnica dell'ad-

dome aperto consente ai chirurghi di differire la decisione colostomia/anastomosi nel second look chirurgico a 48-72 ore trattamento con irrigazione e aspirazione mediante AB-Thera.
CONCLUSIONE: La tecnica dell'addome aperto è un valido approccio terapeutico alternativo per i pazienti con malattia diverticolite acuta in III e IV grado Hinchey. Questo approccio terapeutico offre importanti vantaggi in quanto aumenta la possibilità di confezionamento di anastomosi e riduce la percentuale di confezionamento di colostomie.

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