



ORIGINAL ARTICLE

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The relationship between the treatment approach and the modified Hinchey classification and clinical parameters in acute diverticulitis

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Abstract

In this study, it was aimed to examine the relationship between the treatment approach and the modified Hinchey classification and clinical parameters in acute diverticulitis. In this study, the patients who consulted to the hospital between March 2010 and February 2015 and who were diagnosed clinically and radiologically with diverticulum disease of the colon were evaluated. The data were collected prospectively and analysed retrospectively. Patients were evaluated in terms of demographic data (age, sex), clinical and laboratory (Wbc, CRP) findings, diagnostic methods, staging (Hinchey staging), applied treatments (medical and surgical treatment), length of stay in hospital and complications. The obtained data were analysed through documentation. Sixty-five patients who were diagnosed with diverticulum disease of colon were included in the study. Of these patients, 30 (46.2%) were male and 35 (53.8%) were female. Examination of the localization of diverticulitis revealed that 47(72.3%) of the cases had sigmoid colon and 18 (27.7%) had localized descending colon. The Hinchey staging method gave the following patient distribution: 44 (67.7%) of the cases were stage Ia, 8 (12.3%) were stage Ib, 6 (9.2%) were stage II, 2 (3%) were stage III and 5 (7.8%) were stage 4. In total, 58 (89.2%) of the cases underwent medical treatment and 7 (10.8%) underwent surgical treatment. According to Hinchey staging, most of the cases is Stage I and II. The rate of postoperative complication was higher, and the duration of hospitalization was longer for stage III and IV cases compared to stage I and II cases.

Keywords: Colon, diverticul, hinchey, complication, treatment

Introduction

Intestinal diverticulum is the herniation of the inner surface of the large intestine, called the mucosa, out of the weak points in the form of a pouch and forming a pocket. Diverticulosis is the term which is used to define the numerous asymptomatic diverticula in the colon [1,2].

Colon diverticula has two types as real and pseudo. The real diverticulum includes all the layers of the intestine wall. The colonic diverticula are observed in the sigmoid colon mostly. Diverticulitis means the inflammation on diverticulum wall [1,2].

Diverticulosis is observed frequently among the Western societies. It is hard to determine its frequency precisely since most cases are asymptomatic. Its incidence has been reported as approximately 10%. Diverticulum is usually detected during colonoscopy or other evaluations. While the disease is seen rarely before 35, its frequency increases with the advancing age [3].

Although there is no certain information about the frequency, it is estimated that 10-25 % of the people with diverticulosis have acute diverticulitis [4]. 75% of the diverticulitis cases are non-complicated while 25% are complicated. 85% of the non-complicated cases are treated medically, 15% of them are treated with interventional methods. 95% of the complicated cases require surgery [5].

Even though diverticulosis bleeding is the most frequent cause of lower GIS bleedings, most of them stop spontaneous and don't necessitate intervention.

In this study, it was aimed to examine the relationship between the treatment approach and the modified Hinchey classification and

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clinical parameters in acute diverticulitis in the light of literature.

Materials and Methods

This study included 65 patients who admitted to T. C. Ministry of Health Recep Tayyip Erdogan Training and Research Hospital between March 2010 and February 2015 and who were diagnosed with diverticulitis clinically and radiologically. Approval for the study was obtained from the ethics committee of Recep Tayyip Erdogan University with the decision number 159 dated 14/11/2014 and no 2014/140.

Data on demographic data, clinical and laboratory findings, radiological findings and Hinchey Stages, treatment procedure, length of hospital stay and complications of the patients were obtained retrospectively from hospital records and the relationships between them were evaluated statistically.

Results

65 patients who were diagnosed with diverticulitis were included in the study. Of these patients, 30 (46.2%) were male and 35 (53.8%) were female. The average age of the patients were 70 ± 11 (44 to 92 years old). When the patients were evaluated in terms of their body mass index (BMI), the number of the patients whose BMI was over 30 (BMI>30) was 48 (73.8%) and the number of the patients whose BMI was below 30 (BMI<30) was 17 (26.2%). The demographic data of the patients are summarized in Table 1. Clinically, 23 patients had rectal bleeding, 27 patients had left lower quadrant pain, 8 patients had right lower quadrant pain, 7 patients had acute abdomen findings and 10 patients had fever. Considering the laboratory findings, 32 patients had leucocytosis ($>10,000/\text{mm}^3$) and 23 patients had high CRP ($>1.0 \text{ mg/dL}$). Table 2 reveals the clinical symptoms and laboratory findings of the patients. When

the diverticulitis localization of the patients was examined, 47 (72.3%) of the cases had sigmoid colon whereas 18 (27.7%) of the cases had localized descending colon (Table 3). When the distribution of the patients was examined according to the modified Hinchey staging, 44 (67.7%) cases were identified as stage Ia; 8 (12.3%) were identified as stage Ib; 6 (9.2%) cases were identified as stage II, 2 (3%) cases were identified as stage III and 5 (7.8%) cases were identified as stage IV (Table 5).

Table 4 illustrates the accompanying diseases of the patients. 58 (89.2%) cases were treated medically and 7 (10.8%) cases were treated surgically. 14 cases had diverticulum abscess. 8 patients were treated only medical while 2 patients were treated with CT/USG guided aspiration and 2 patients were underwent Catheter drainage. As medical treatment, Hartman procedure was applied to 5 patients and resection + primary anastomosis was applied to 2 patients. There were 23 patients who had been diagnosed with colonic diverticulum bleeding and all of them were treated medically. The average hospital stay time was found as 7.3 ± 1 days (4-30 days).

At least one complication was observed on 3 (5%) patients (subileus 2, fistule 1) who had been followed with medical treatment (medical+drainage) and on all the patients (100%) who had been operated. When the operated patients were examined in terms of their complications, 2 (28%) patients were observed to have lung infection together with surgical side infection, 1 (14%) patient was observed to have ileus together with surgical side infection and 4 (57%) patients were observed to have only surgical side infection. A patient who was at Hinchey stage IV died of sepsis. Table 6 shows the patients' stages according to the modified Hinchey, the applied treatments, the complications and the average hospital stay.

Table 1. Demographic data of the patients

	Demographic Data	
	Number of Patients	Percentage(%)
Age		
<50	12	18.5%
50-70	45	69.2%
>70	8	12.3%
Gender		
Female	35	53.8%
Male	30	46.2%
*BMI		
<30 BMI	17	26.2%
>30 BMI	48	73.8%

*BMI: Body Mass Index

Table 2. Clinical examination and laboratory findings

	Clinical examination findings and laboratory	
	Number of Patients	Percentage (%)
Rectal bleeding	23	35%
Left lower quadrant pain	27	41%
Right lower quadrant pain	8	12%
Fever ($>36.5 \text{ }^\circ\text{C}$)	10	15%
Sensitivity/Defence	7	10%
CRP($>1.0 \text{ mg/dL}$)	23	35%
Leucocytosis ($>10.000/\text{mm}^3$)	32	49%

Table 3. The distribution of the diverticulitis according to their anatomic localizations

Localization	Number of Patients	Percentage
Descending colon	18	27.7%
Sigmoid colon	47	72.3%
Total	65	100

Table 4. The distribution of the accompanying diseases of the cases

	Number of Patients	Percentage
Cardiovascular system	8	5.4%
Respiratory system	5	3.2%
Diabetes mellitus	10	6.3%

Table 5. The distribution of the case stages according to the modified Hinchey staging

Stage	Number of Patients	Percentage
1A	44	67.7%
1B	8	12.3%
2	6	9.2%
3	2	3%
4	5	7.8%
Total	65	100

Table 6. The staging of the patients with diverticulitis, the applied treatments, the complications, the average hospital stay and the distribution of the mortality rates

Stage (Modified Hinchey)	Treatment	Applied the number and rate of the patients with complications (%)	Average hospital stay (Day)	Mortality (%)
58(1a-1b-II)	*Medical+drainage	**3 (5%)	8.6	0 (0%)
7 (III-IV) (Hartmann Procedure 5) (Resection+Anastomosis 2)	Surgical	*** 7 (100%)	17.4	1 (%14)

* Patients having bleeding diverticulosis are included in the medical treatment group

** 2 patients with subileus, 1 patient with fistule

***2 patients with subdermalinfection+lung infection, 1 patient with subdermal infection+subileus, 4 patients with subdermal infection

Discussion

Colonic diverticulosis is an asymptomatic disease of western countries. It first came to be recognized as a common problem in the 20th century. Diverticulosis increases with age and is estimated to occur in 2% under 30 years of age, 40% over 60 years of age, and 60% above 80 years of age [5-7]. The rate of development of diverticulitis in patients with diverticulosis has been reported to be 10-25% [8]. In Western countries, 70,000-100,000 patients are hospitalized annually due to diverticulitis [9-11]. However, it is estimated that 3-5 patients per 100,000 develop diverticulitis perforation [12].

Pain in the left lower quadrant, fever, moderate leukocytosis, and changes in bowel movements are the classic symptoms of diverticulitis. Sometimes cases may be accompanied by nausea and vomiting [6,13]. Depending on the stage of the disease, different symptoms can be seen. When we examined our patients, left lower quadrant pain was the most prominent clinical finding with 27 (41%) patients. The second most common finding was rectal bleeding with 23 (35%) patients. 8 (12%) patients had right lower quadrant pain related to the long sigmoid colon. Different clinical symptoms can be seen in Hinchey stage 3-4 patients. Due to abscess or diverticulitis perforation, diffuse tenderness, rebound and defense may occur in the abdomen. There are cases that develop ileus due to the involvement of small intestine segments. In some

cases, diarrhea may occur [6]. When our cases were evaluated, one patient in the medical treatment group had mechanical small bowel obstruction due to diffuse intra-abdominal microabscesses, and one patient developed ileus due to localized pericolic abscess.

Diverticular bleeding is another common complication. Although most of the diverticulum is located in the left colon, bleeding is most frequently seen in the right located diverticula [14,15]. The main complaint was rectal bleeding in 23 (35%) of 65 cases included in the study. Similar to the literature, diverticular hemorrhage constituted the majority of lower GIS hemorrhages in our cases.

27 (41%) patients with Hinchey I-II diverticulitis had tenderness and a feeling of fullness in the left lower quadrant as a physical examination finding. Although it is not possible to make a full differential diagnosis with physical examination findings, diverticulitis and malignancy are among the first diagnoses to be considered, especially in elderly patients. Differential diagnosis can be made easily with current imaging methods. Routine laboratory tests (hemogram, biochemistry, urinalysis, etc.) requested in the emergency department for diagnosis are necessary for the differential diagnosis of other causes of acute abdomen [5]. Although laboratory findings are not specific in diverticular disease, leukocyte count and high CRP support the diagnosis [5,13]. In our cases, leukocytosis was present in 32 (49%) patients. CRP value was high in 24 (35%) patients. These values were

found to be particularly high in 7 complicated cases. In our cases, the most valuable laboratory findings were leukocytes and CRP elevations.

Traditionally, the treatment of diverticulitis is bowel rest, parenteral fluids, and parenteral antibiotics [16,17]. Approximately 70% of patients with acute diverticulitis are non-complicated and can be treated conservatively [5,18,19]. Although the success rate is 85% in medically treated cases, the recurrence rate in the follow-up was reported to be quite low [5,14,20].

It has been reported that approximately 15% of patients presenting with diverticulitis have abscesses on CT [21-23]. In a study, the incidence of pericolic abscess in complicated disease was reported to be approximately 30% [24]. Abscesses smaller than 5 cm can be successfully treated medically [21]. Larger abscesses can be drained percutaneously under CT guidance in many cases [21,22,25]. The success rate in abscess drainage varies according to the localization and the characteristics of the abscess content. The general opinion is that aspiration will be sufficient in small abscesses, and catheter drainage will be appropriate in large abscesses [5,23,26]. The aim of the percutaneous approach to diverticulitis abscesses is to delay emergency surgery and to save the patient from unnecessary interventions. The rate of mortality and stoma requirement is high in patients undergoing direct surgical intervention [22,27]. In our study, diverticular abscess was detected in 14 of the cases. Of these patients, 8 received medical treatment, 4 received CT or ultrasound guided aspiration, and 2 received a drainage catheter. Re-drainage was required due to recurrent abscess in 2 patients who underwent aspiration. There is no consensus on the withdrawal time of the drainage catheter. It is the general opinion that the incoming fluid should be serous and its amount should be expected to decrease [21,28]. Our approach is to wait for the amount coming after washing with 0.9% isotonic fluid daily to fall below 10cc in cases where we apply percutaneous drainage. Enterocutaneous fistula developed in one of the patients who underwent a catheter, and spontaneous closure was observed in the follow-up.

Indications for emergency surgical treatment in cases with diverticulitis include diffuse peritonitis, uncontrollable perforation, and non-response to nonoperative treatment [29,30]. Various treatment approaches are available in Hinchey III-IV cases [31,32]. It has been reported that resection and primary anastomosis can be performed instead of Hartmann's operation in cases without sepsis and diffuse peritonitis [26]. Approaches such as laparoscopic lavage and drain placement have been reported in the literature for Hinchey III-IV patients. It has been reported that in this way, patients can be successfully treated without opening the stoma [33,34]. In our cases, 7 patients were evaluated as Hinchey III-IV. Since these patients had diffuse peritonitis and SIRS findings, the Hartmann procedure was performed in 5 patients, resection and primary anastomosis were performed in 2 patients. It has been reported that wound infection is common and the mortality rate is high in the Hartmann procedure. In our cases, complications developed in 100% of 5 patients, which was found to be consistent with the literature. The length of stay in diverticulitis cases varies. Especially in Hinchey III-IV cases, the length of hospital stay has been reported to be long. This period varies depending on both the septic complication and the surgery performed [35,36]. In our cases, the mean hospital stay was 17 days. This period was found

to be significantly longer especially in Hinchey IV cases.

In some studies, it has been reported that diet and antibiotic therapy are effective in the treatment of symptomatic uncomplicated diverticulitis [37]. In our series, mostly (89%) consisted of such cases. The cases treated with medical treatment were called for control by giving a high fiber diet and antibiotics. No case of complicated diverticulitis was detected in these patients during follow-up.

Diverticular hemorrhages constitute the majority of lower GI bleedings [38,39]. Most of these bleedings stop spontaneously. In our series, we had 23 cases of diverticular disease presenting with lower GI bleeding. All of these patients were treated with medical therapy. Emergency colonoscopy was not performed in 15 cases whose bleeding stopped spontaneously. Endoscopic intervention was performed to stop the bleeding in 8 cases with ongoing bleeding. There was no case requiring surgery. These results are compatible with the literature.

Conclusion

The Hinchey classification is generally used in the staging of diverticulitis to determine treatment approaches. According to this classification, most of the cases consist of stages I-II. While uncomplicated cases (Stage I-II) can be successfully treated with medical and percutaneous drainage, surgical intervention is frequently required in complicated cases (Stage III-IV). In cases with fecal peritonitis, a stoma may be required for diversion in addition to resection. The postoperative complication rates of stage III-IV cases are higher than those of stage I-II, and the length of hospital stay is longer.

Since diverticulitis cases are usually seen in elderly patients, we believe that post-acute colonoscopic examination would be appropriate in order to detect pathologies such as tumors in the differential diagnosis.

Conflict of interests

The authors declare that they have no competing interests.

Financial Disclosure

All authors declare no financial support.

Ethical approval

Approval Form of The University of Recep Tayyip Erdogan Ethics Committee for Clinical Research Date:14/11/2014 Study protocol:159 Decision No:2014/140.

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