

Complicated Diverticulitis Rates in Acute Abdominal Cases

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ABSTRACT

Background: The location of diverticulitis, the frequency of the concomitant findings, and the severity of diverticulitis were detected in the abdominal CTs of the patients who presented to the emergency service with complaint of acute abdomen due to complicated diverticulitis. The necessity of CT evaluation was emphasized using classification.

Aims: The aim of this study is to raise awareness about the fact that the abdominal CTs should be evaluated by classification in order to guide a physician encountering a patient with complicated diverticulitis who presented with acute abdomen for the first time to the correct treatment option.

Study Design: The present study protocol was reviewed and approved by the Recep Tayyip Erdoğan University Local Ethics Committee (approval No. 40465587-40). Informed consent was submitted by all subjects when they were enrolled. The approval of and the permission for study from the training and research hospital management was received. The data of the patients over the age of 35 who presented to the emergency service of our hospital from 2014-2016 with the complaint of acute abdomen was retrospectively evaluated. The medical information of the patients kept in the system records was reviewed.

Methods: The contrast abdominal CTs of 1000 patients were examined. 56 patients with diverticular disease were divided into two groups; non-complicated and complicated diverticulitis. The group with complicated diverticulitis was classified by two radiologists using modified Hinchey classification. The data obtained was statistically analyzed using the Pearson Chi-Square Test.

Results: Diverticular disease was detected in 5.6 of 1000 patients, 2.3% of which was non-complicated, while 3.3% was complicated. Of the patients with complicated diverticulitis, 2.1% were classified as having Hinchey Ia, 0.4% Hinchey Ib, 0.2% Hinchey II, 0.3% Hinchey III, and 0.3% Hinchey IV diverticulitis. Of the patients with diverticular disease, 58.8% developed complicated diverticulitis, 18.2% of whom developed Hinchey III-IV diverticulitis requiring inpatient conservative and surgical treatment. Descenden and sigmoid colon involvement was seen primarily (60.9%). Of the six patients with possibility

of surgical indication who were classified as having Hinchey III/IV diverticulitis, 100% had peritonitis with localized and pelvic abscess, 50% had perforation, and 75% had purulent fluid.

Conclusion: Complicated diverticulitis can be seen in the majority of diverticulitis patients who present to the emergency service with acute abdomen. As Hinchey III/IV stages may require emergency intervention and be fatal, we are of the opinion that classification systems should be routinely used for the proper management of the treatment of the disease.

Key words: Diverticulitis, classification, Hinchey, CT

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INTRODUCTION

Diverticulitis is the inflammation of the pouches formed in the mucosa due to various causes, which may be non-complicated or complicated [1]. Non-complicated diverticulitis is a benign disease without mortality. Complicated diverticulitis, on the other hand, is a fatal disease that may progress to sepsis and generalized peritonitis, requiring intensive care. Many studies have demonstrated that conservative treatment in non-complicated diverticulitis cases is a safer alternative than colectomy[1]. Although the diagnosis of complicated diverticulitis is somewhat standardized, surgical treatment is supported by a limited number of studies. 41% of colorectal diseases requiring emergency hospitalization are diverticular disease, 20% of which are operated on [2]. Despite the fact that the use of advanced technology, such as high speed CT, enable earlier and more accurate diagnosis [3], the number of publications mentioning a rise in the progression and rate of complicated diverticulitis have recently increased[4]. The prevalence of complicated diverticulitis is 10%, and while its mortality rate is 6% for Hinchey III, it is 35% for Hinchey IV [5,2,6]. We evaluated 1000 patients who presented to the emergency service with acute abdomen. 5.6% of them had diverticular disease. 58.8% of the patients with diverticular disease had developed complicated diverticulitis. 9.1% of them had Hinchey III complicated diverticulitis requiring inpatient conservative treatment, while 9.1% had Hinchey IV complicated diverticulitis requiring surgical treatment. It is considered that recurrent diverticula episodes increase the risk of developing complicated diverticulitis, resulting in morbidity and mortality[7]. One of our patients who was evaluated as having Hinchey III diverticulitis received inpatient conservative treatment, and one year later, he underwent surgery due to having an episode. While medical treatment, and in selected cases, percutaneous drainage could be sufficient in Hinchey I-II complicated diverticulitis patients, Hinchey III-IV may mostly require emergency surgical treatment or laparoscopic peritoneal lavage[8]. When we reviewed the literature, we saw that there is a plethora of studies on the treatment and classification of complicated diverticulitis, whereas the number of studies on the rate of cases who presented to the emergency service with acute abdomen is limited. The aim of this study is to raise awareness about the fact that the abdominal CTs should be evaluated by classification in order to guide a physician encountering a patient with complicated diverticulitis who presented with acute abdomen for the first time to the correct treatment option. We think that using classification in the CT evaluations of patients with diverticular disease who present to the emergency service will not only allow timely surgical treatment of patients with Hinchey III-IV, but also decrease the complication rate and hospitalization time, as well as contribute to the management of patients with Hinchey I-II.

MATERIALS AND METHODS

Ethics

The present study protocol was reviewed and approved by the Recep Tayyip Erdoğan University Local Ethics Committee (approval No. 40465587-40). Informed consent was submitted by all subjects when they were enrolled. The approval of and the permission for study from the training and research hospital management was received.

Design and patient population

The data of the patients over the age of 35 who presented to the emergency service of our hospital from 2014-2016 with the complaint of acute abdomen was retrospectively evaluated. The medical information of the patients kept in the system records was reviewed. Patients with a clinical history of acute abdomen due to cancer, trauma, inflammatory bowel disease, or other causes were excluded from the study. All abdominal CTs (Toshiba Medical Systems Corporation, Nashu, Japan) of 1000 patients who presented with acute abdomen were evaluated. 56 patients with diverticular disease were evaluated. Diverticular

disease was divided into two groups; non-complicated and complicated diverticulitis. The group with complicated diverticulitis was classified by two radiologists using modified Hinchey classification.

Measures and data

Hinchey Ia diverticulitis is characterized by inflammation without pericolonic phlegmon and/or organized fluid accumulation, Hinchey Ib diverticulitis by a finding of pericolonic abscess under 4cm adjacent to the diverticulitis site, and Hinchey II diverticulitis by the presence of pelvic or inter-loop abscesses, or abscesses larger than 4cm [4]. Hinchey III is characterized by purulent peritonitis, and Hinchey IV by the presence of generalized peritonitis findings.

Statistical analysis

The data obtained was statistically analyzed using the Pearson Chi-Square Test.

RESULTS

While diverticular disease was detected in 56 of the 1000 cases examined (5.6%), no diverticula were observed in 944 patients (94.4%). 58.8% of the patients who presented to the emergency service with diverticular disease developed complicated diverticulitis, 18.2% of whom underwent inpatient conservative or surgical treatment. The age range of the cases is 38-93 (mean 68.6), with the mean age of the male patients with complicated diverticulitis being significantly lower than that of female patients ($t=2.02$; $p<0.05$). Of 56 cases with diverticular disease, 26 were female and 30 were male (Table 1). The diagnosis of complicated diverticulitis was defined on the basis of an observation of overfilling advanced beyond the integrity of the colon and/or air/fluid levels in the colon, and thickening of the colon wall. Complicated diverticulitis was defined by confirmation of the presence of intramural air, local or peritoneal abscess, purulent free fluid, obstruction, fistulous tracts, and perforation (Figure 1). 23 of the cases (2.3%) were non-complicated, and 33 (3.3%) were complicated. The abdominal CTs of the patients with complicated diverticulitis were reevaluated by two radiologists for the locations of the diverticula (ascendan, transverse, descenden, sigmoid) and modified Hinchey classification. The presence or absence of the criteria of phlegmon, local or peritoneal abscess, ascites, fistula, perforation and peritonitis was determined and the data was collected. Of 33 cases with complicated diverticulitis, 21 (2.1%) were classified as having Hinchey I, 4 (0.4%) Hinchey Ib, 2 (0.2%) Hinchey II, 3 (0.3%) Hinchey III, and 3 (0.3%) Hinchey IV diverticulitis (Table 2). Descenden and sigmoid colon involvement (60.9%) was seen primarily, followed by involvement of the entire colon (Table 3). 58.8% of the patients who presented to the emergency service with diverticular disease developed complicated diverticulitis, 18.2% of whom underwent inpatient conservative or surgical treatment. It should be noted that 18.2% of the patients with complicated diverticulitis develop Hinchey III-IV complicated diverticulitis. Of the 6 cases with possibility of surgical indication who were classified as having Hinchey Stage III-IV diverticulitis, 100% had peritonitis with localized and pelvic abscess (Figure 1a-b), 50% had perforation, and 75% had purulent fluid (Figure 2). Three patients with Hinchey IV underwent surgery, and three with Hinchey III received inpatient conservative treatment and were discharged with full recovery. After one year, a 53-year-old male patient classified as having Hinchey III presented to the emergency service again with acute abdomen, and perforation was observed in his abdominal CT. The patient was evaluated as having Hinchey IV and operated on. In conclusion, diverticular disease was observed in 5.6% of the patients who presented to the emergency service with acute abdomen, 58.8% of whom had complicated diverticulitis, and 18.2% of whom had Hinchey III-IV diverticulitis requiring inpatient conservative/surgical treatment.

Table 1. Demographics parametres of in patients with diverticulitis

	N	Minimum	Maximum	Mean	Std. Deviation	
Age	56	38,0	93,0	68,607	13,7374	
	N	Mean	Std. Deviation	Std. Error Mean	t	p
Women	30	71,967	13,2026	2,4105	2,02012	0,048*
Man	26	64,731	13,5575	2,6588		

* $p<0,05$

Table 2. Complicated diverticulitis rates according to Hincheys classification

	Frequency	Percent
Noncomplicated Diverticula	23	2,3
Hincheys Ia	21	2,1
Hincheys Ib	4	,4
Hincheys II	2	,2
Hincheys III	3	,3
Hincheys IV	3	,3
Non Diverticula	944	94,4
Totally	1000	100,0

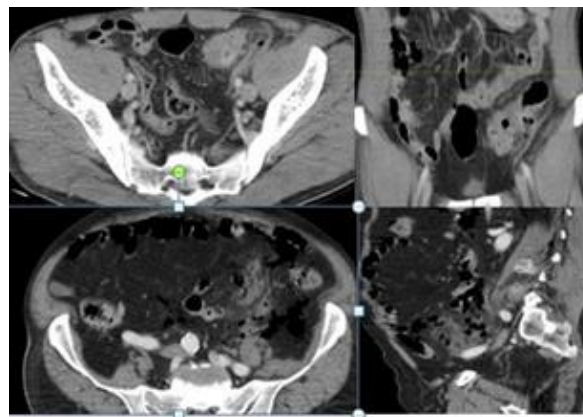


Figure 1. Abdominal CT. 53-year-old male patient with Hincheys III. (a) Axial and reformatted images. Phlegmon, intramural focal abscess, and peritonitis are observed in the sigmoid colon. In the abdominal CT axial images taken due to the patient having a new episode one year after being discharged from a six-day stay at the hospital receiving conservative treatment, phlegmon and perforation is observed in a longer segment. The disease progressed to Hincheys IV. (b) Abdominal CT. 80-year-old male patient with Hincheys IV. Axial and sagittal reformatted images. Phlegmon, pelvic abscess, peritonitis, generalized free air, and perforation are observed in the sigmoid colon. Segmental resection was performed, and the patient was discharged after 21 days.

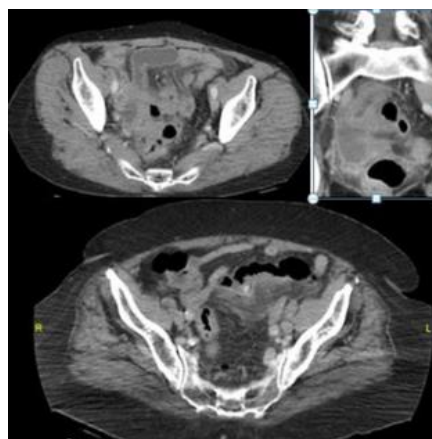


Figure 2. Abdominal CT. 66-year-old- female patient with Hincheys IV. Axial and coronal reformatted images. Phlegmon, purulane mai, pelvic abscess, peritonitis, perforation are observed in the sigmoid colon. Segmental resection was performed and the patient.

Table 3. Distribution of diverticula localizations (s: sigmoid, d: descenden, a: ascendant, t: transverse) and rates of association with Hinchey classification.

			localization*						Totally
			no	s	s-d	s-d-t	s-d-t-a	d-t	
hinchey	Noncomplicated	Count	0	2	14	2	3	2	23
		Expected Count	21,7	,1	,8	,2	,1	,0	23,0
		% within	0,0%	8,7%	60,9%	8,7%	13,0%	8,7%	100,0%
	Flegmon (Hinchey Ia)	hinchey_							
		Count	0	2	12	7	0	0	21
		Expected Count	19,8	,1	,7	,2	,1	,0	21,0
		% within	0,0%	9,5%	57,1%	33,3%	0,0%	0,0%	100,0%
	Localize abscesses (Hinchey Ib)	hinchey							
		Count	0	0	3	0	1	0	4
		Expected Count	3,8	,0	,1	,0	,0	,0	4,0
		% within	0,0%	0,0%	75,0%	0,0%	25,0%	0,0%	100,0%
	Localize abscesses (Hinchey II)	hinchey							
		Count	0	0	2	0	0	0	2
		Expected Count	1,9	,0	,1	,0	,0	,0	2,0
		% within	0,0%	0,0%	100,0%	0,0%	0,0%	0,0%	100,0%
	Purulent free fluid (Hinchey III)	hinchey							
		Count	0	0	2	0	1	0	3
		Expected Count	2,8	,0	,1	,0	,0	,0	3,0
		% within	0,0%	0,0%	66,7%	0,0%	33,3%	0,0%	100,0%
	Peritonitis with perforation (Hinchey IV)	Hinchey							
		Count	0	1	2	0	0	0	3
		Expected Count	2,8	,0	,1	,0	,0	,0	3,0
		% within	0,0%	33,3%	66,7%	0,0%	0,0%	0,0%	100,0%
Nondiverticule	Hinchey								
	Count	944	0	0	0	0	0	944	
	Expected Count	891,1	4,7	33,0	8,5	4,7	1,9	944,0	
	% within hinchey	100,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%	
Totally	Count	944	5	35	9	5	2	1000	
	Expected Count	944,0	5,0	35,0	9,0	5,0	2,0	1000,0	
	% within	94,4%	0,5%	3,5%	0,9%	0,5%	0,2%	100,0%	

Table 3.

* s-d-t-a: sigmoid-descenden-transverse-ascendant

DISCUSSION

Diverticular disease is a common disease affecting 20-60% of the population. While it may remain asymptomatic for many years, about a quarter of patients may develop complicated diverticulitis(9). 58.8% of our patients with diverticular disease had developed complicated diverticulitis and 18.2% of them were classified as having Hinchey III-IV diverticulitis. Particularly advanced age, left colon involvement, findings such as chronic abdominal pain, constipation, or vomiting, and steroid use are risk factors for complicated diverticulitis. Cases of complicated diverticulitis have an increased morbidity, particularly if they remain untreated and not aggressively treated in the early stage (10). While non-complicated diverticulitis can be treated, even without the need for antibiotics, complicated diverticulitis is a condition that may progress to generalized peritonitis and sepsis, and that may be fatal(11). Indications for emergency surgery in complicated diverticulitis are Hinchey stage III-IV diverticulitis, perforation, peritoneal abscess, severe intestinal obstruction, and patients with suppressed immune system/poor general condition (12, 13). Some classifications have been developed for defining this complex disease spectrum. Hinchey classification is the oldest and most widely-used classification system. Hinchey classification was developed based on intraoperative macroscopic anatomic findings, and has been modified many times to provide a classification compatible with CT(14). The use of advanced technology such as high-speed CT allows us to make earlier and more accurate diagnoses. There is a need for more information on the relationship between CT factors (abscess, free air, free intraperitoneal fluid, location and length of the affected colon) and the severity and prognosis of the disease(15). The above-mentioned risk factors have very low value of estimation for estimating the risk of complicated diverticulitis(9). It is essential that abdominal CTs be evaluated within the framework of a standard and that the diverticulitis be classified to assist the physician in foreseeing complicated diverticulitis and determining the correct treatment upon the first encounter. Although the diagnosis of complicated diverticulitis is somewhat standardized, the treatment has been based on the recommendation of surgical resection in patients who have had two or more diverticulitis episodes over a period of several years. However, there are publications suggesting the contrary(16). The methods of diagnosis, medical treatment, and surgical techniques developed in the last two decades have changed the treatment and outcomes of diverticulitis (7). As a consequence, complicated diverticulitis is a disease that should be considered in the evaluation of patients who present to the emergency service with acute abdomen, especially elderly patients. 18.2% of our patients had Hinchey III-IV diverticulitis requiring surgical treatment. Using classification in the evaluation of abdominal CTs contributes to the employment of the correct treatment approach in diverticular disease, thereby decreasing its complication rate and mortality.

Limitations: The retrospective nature of the study is its major limitation. Although the number of patients evaluated is high, the low number of patients who developed complicated diverticulitis is another limitation.

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