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Outpatient treatment in uncomplicated acute diverticulitis: 5-year experience

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Original Article

ABSTRACT

Background/Aims: Most cases of diverticular inflammation are mild and require only medical treatment with liquid diet and antibiotics. Until recently, this treatment required admission to hospitals, which consequently entailed costs. In most cases, treatment was conservative, and less than a quarter of patients admitted actually underwent surgery. In the last year, the outpatient treatment of these patients with uncomplicated diverticulitis has proven effective and safe. The aim of the present study was to describe our experience after 5 years of outpatient treatment with oral antibiotics.

Materials and Methods: We conducted a retrospective revision study between January 2010 and December 2014. We included all patients admitted to the Emergency Department of the University General Hospital of Elche with a diagnosis of uncomplicated acute diverticulitis based on medical history, physical examination and abdominopelvic computed tomography (CT) scanning. Outpatient treatment consisted of oral antibiotics for 10 days (metronidazole 500 mg/8 h and ciprofloxacin 500 mg/12 h), a liquid diet and oral analgesics (acetaminophen 1 g/6 h).

Results: During the period from January 2010 to December 2014, 224 patients were treated on an outpatient basis at a success rate of over 92%. Only 18 patients (8%) required admission after outpatient treatment.

Conclusion: Outpatient treatment of uncomplicated acute diverticulitis was demonstrated to be safe and effective.

Keywords: Outpatient treatment, diverticulitis, ambulatory

INTRODUCTION

Colonic diverticulosis is characterised by the presence of pockets that occur when colonic mucosa and submucosa herniate through defects in the muscle layer of the colonic wall (1), and it affects half of all individuals over 65 years of age in the western world (2), although the vast majority of patients have no symptoms or report only slight abdominal discomfort and do not consult a specialist. The disorder is classified as diverticulitis when the diverticula become inflamed. Diverticulitis is classified as either uncomplicated, where there is only colonic wall thickening and/or soft tissue stranding of the pericolic fat secondary to the inflammation, or complicated, where there is a perforation, fistula, obstruction and/or bleeding (3). It is estimated that as many as 20% of patients with diverticulosis will suffer an episode of acute diverticulitis (4). However, most cases of diverticular inflammation are mild and require only medical treatment with liquid diet and antibiotics. Until recently, this treatment required admission to a hospital, which consequently entailed costs. In most cases, treatment was conservative, and less than a quarter of patients admitted actually underwent surgery (5).

In the last year, outpatient treatment of these patients with uncomplicated acute diverticulitis has proven effective and safe (6-17).

The aim of this paper was to present the experience in our hospital in the management of acute diverticulitis with outpatient treatment and to study the characteristics of patients treated with this scheme.

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MATERIALS AND METHODS

We conducted a retrospective revision study between January 2010 and December 2014. We included all patients admitted to the Emergency Department of University General Hospital of Elche with a diagnosis of uncomplicated acute diverticulitis based on medical history, physical examination and abdominopelvic computed tomography (CT) scanning. We included all patients under 90 years of age, who were immunocompetent, tolerated oral intake, had no signs of severe sepsis [i.e. had: fever <39°C, leukocytes between <20,000 and >4,000/mm^3, cardiac frequency >100/min and systolic arterial pressure (90 mmHg)] and who had an adequate family and social support network (Table 1). The diagnostic criteria for acute diverticulitis in the abdominopelvic CT scan were, according to the classification by Ambrosetti/Doringer–Neff (18) (Table 2), the presence of diverticula, colonic wall thickening (<4 mm), soft tissue stranding of the pericolic fat and/or a pericolic abscess <3 cm. Those patients with abundant free fluid, an intra-abdominal abscess >3 cm or pneumoperitoneum were diagnosed with complicated acute diverticulitis and were excluded from the study.

All the patients who satisfied the inclusion criteria (Table 1) and who were diagnosed with uncomplicated acute diverticulitis during this period were treated as outpatients.

Outpatient treatment

Outpatient treatment consisted of oral antibiotics for 10 days (metronidazole 500 mg/8 h and ciprofloxacin 500 mg/12 h), a liquid diet and oral analgesics (acetaminophen 1 g/6 h). Clinical checks and tests were performed at 4 days, 7 days and 1 month. On day 4, physical examinations and blood tests were performed, and if progress was satisfactory, the patients were prescribed a low-fibre diet. At 7 days, the patient was examined again, new tests were performed and the patient was prescribed a fibre-rich diet. Colonoscopy was scheduled at 1 month in the outpatient department to confirm the diagnosis of diverticulitis and to rule out the presence of neoplasia. Another follow-up was performed at 6 months. All the examinations were performed by members of the surgery department of our hospital.

Table 1. Inclusion criteria

Age under 90 years
CT: Grades Ia, Ib and Ic of Ambrosetti´s classification
Inmunocompetent patient
Patient tolerating oral feeding
No signs of serious sepsis
Social support network

Table 2. Ambrosetti/Doringer–Neff classification of acute diverticulitis

Grade	Ambrosetti/Doringer–Neff classification
Ia	Diverticula
Ib	Peridiverticulitis (>4 mm)
Ic	Pericolic abscess <3 cm
II	Pericolic abscess >3 cm
III	Purulent peritonitis
IV	Faecal peritonitis

Ethics

The study was presented to the Hospital Ethical Board and accepted as an interventional study. The research was conducted in accordance with the Helsinki Declaration and local legislation.

Statistical analysis

We performed a descriptive analysis of the quantitative variables expressed in terms of the mean±standard deviation and of the qualitative variables expressed as absolute numbers or in percentages of the total number of patients in the study. Comparison between the variables was performed using Student's t-test. For dichotomous outcomes, the variables were compared using the $\chi 2$ test. Mann–Whitney U and Kruskal–Wallis tests were used for continuous, non-normally distributed outcomes, whereas analysis of variance (ANOVA) was used for continuous, normally distributed data. Statistical significance was set at $p<0.05$. The statistical analyses were performed using the Statistical Package for the Social Sciences 22.0 (SPSS Inc.; Chicago, IL, USA).

RESULTS

Figure 1 shows the flowchart for the study. During the period from January 2010 to December 2014, a total of 262 patients were diagnosed with acute diverticulitis in the Emergency Department of our hospital. Diverticulitis was confirmed by CT scans in all of the patients. Of these 262 patients, 235 presented with uncomplicated acute diverticulitis. Overall, 224 satisfied

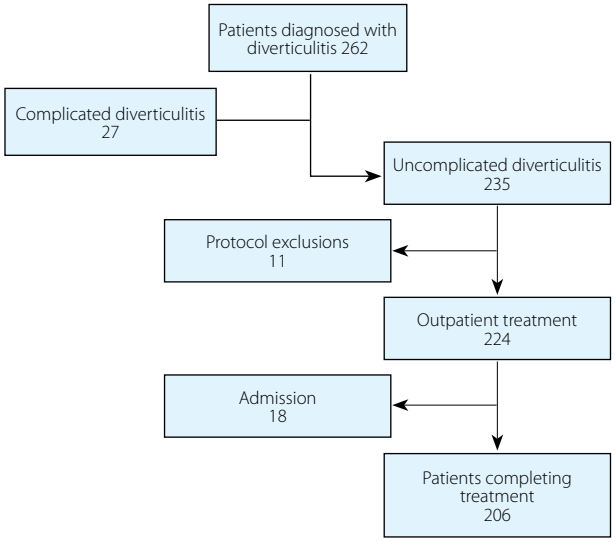

Figure 1. Flow diagram of the patients included in the study

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the inclusion criteria for outpatient treatment (Table 1). Eleven patients did not satisfy the criteria because of intolerance to oral intake in seven cases and because the family rejected the proposal for antibiotic treatment at home in the other four cases. The ages ranged between 19 and 89 years [mean (standard deviation)=57.72 (14.329) years]. In 212 patients (94.64%), the descending colon–sigmoid colon was affected; in three (1.34%), the transverse colon and in nine (4.02%), the ascending colon. Twelve patients (5.35%) were classified as grade Ia, 188 (83.93%) as grade Ib and 24 (10.72%) as grade Ic. In 168 patients (75%), this was the first episode, whereas in the remaining 56 (25%), it was a second or later episode. Hospital admission was required for 18 patients (8.04%). In 10 cases, hospitalisation was performed by oral intolerance or vomiting, in five cases by abdominal pain without objectifying the complication of acute diverticulitis and, finally, in three cases by rejection of the patient or the family to continuing home treatment. The flowchart in Figure 1 shows the application of the protocol. None of the patients required urgent surgery for this episode of diverticulitis. The clinical features of these patients are described in Table 3.

Follow-up

Follow-up (mean duration 15±5 months) was performed on 224 patients (100%). Colonoscopy was performed on 215 patients and confirmed the diagnosis of diverticular disease in all of them. The remaining nine patients refused to undergo colonoscopy. Overall, 83 patients (37.05%) presented with a new episode of acute diverticulitis during follow-up; 75 of which were uncomplicated, and the patients again underwent treatment according to the outpatient treatment protocol. Two patients underwent emergency surgery for perforation of the colon secondary to acute diverticulitis, and six patients were admitted for intravenous treatment. Twelve patients underwent scheduled surgery (Table 4).

DISCUSSION

Effectiveness

This study and those previously published (6-17) show that the majority of patients diagnosed with uncomplicated acute diverticulitis can be treated safely and effectively by oral outpatient treatment (Table 5). The economic benefits of this type of treatment have also been clearly demonstrated (6,8,17). Although in most cases, the results were based on a single institution series, with a small number of selected patients, they show results comparable to intravenous treatment with a low admission rate. Mizuki et al. (9), in a sample of 70 patients with uncomplicated diverticulitis of the right colon, reported the success of outpatient treatment in 68 of the patients, while only two required admission. They therefore concluded that with this type of treatment, it is possible to have cost savings of 80% in each episode, while maintaining efficacy and safety levels similar to those of inpatient treatment. However, the main drawback of the study was that the treatment was only

Table 3. Clinical features and radiological findings in patients diagnosed with uncomplicated acute diverticulitis

Clinical features		All patients, N=224 (%)	Treatment failures (%)	p
Sex				
	Male	107 (47.77)	8 (3.57)	0.874
	Female	117 (52.23)	10 (4.46)	
Fever				
	<38º	198 (88.39)	15 (6.69)	0.443
	>38º	26 (11.61)	3 (1.34)	
Abdominal pain				
	No	5 (2.23)	0 (0)	0.600
	Yes	219 (97.77)	18 (8.04)	
Diarrhoea				
	No	193 (86.16)	18 (8.04)	0.659
	Yes	31 (13.84)	0 (0)	
Leucocytosis				
	<10,000 l/mm^3	68 (30.36)	8 (3.57)	0.417
	>10,000 l/mm^3	156 (69.64)	10 (4.46)	
Ambrosetti grade classification:				
	Ia	12 (5.35)	0 (0)	0.702
	Ib	188 (83.93)	17 (7.59)	
	Ic	24 (10.72)	1 (0.45)	
Episode				
	First	168 (75)	13 (5.80)	0.832
	Second or later	56 (25)	5 (2.23)	

Table 4. Clinical results in patients diagnosed with uncomplicated acute diverticulitis

Clinical results		All patients, N=134 (%)	Treatment failures (%)	p
Recurrence (%)				0.472
	Yes	83 (37.05)	5 (2.23)	
	No	141 (62.95)	13 (5.80)	
Surgical treatment for current episode (%)				0.654
	Yes	0 (0)	0 (0)	
	No	224 (100)	0 (0)	
Surgical treatment for further episodes (%)				0.754
	Yes	2 (0.89)	0 (0)	
	No	222 (99.11)	18 (8.04)	
Elective surgical treatment (%)				0.869
	Yes	12 (5.36)	3 (1.34)	
	No	212 (94.64)	15 (6.69)	

Table 5. Published studies

Author (reference)	Year of publication	Study design	Diagnosis	Severity staging	Antibiotics	Readmission rate
Mizuki et al. (9)	2005	Prospective cohort	US	Abscess <2 cm	Cefpodoxime	2.86%
Pelaez el al. (16)	2006	Prospective cohort	CT	No abscess	Ciprofloxacin and metronidazole	5%
Martin-Gil et al. (15)	2009	Prospective cohort	CT	Abscess <3 cm	Ciprofloxacin and metronidazole	5.41%
Alonso et al. (7)	2010	Prospective cohort	CT	No abscess	Ciprofloxacin and metronidazole	2.86%
Rodriguez-Cerrillo et al. (14)	2010	Prospective cohort	CT	No abscess	Ertapenem or piperacillin/tazobactan iv initially and fluoroquinolone and metronidazole oral.	0%
Park et al. (13)	2011	Prospective cohort	CT	Abscess <3 cm	Ciprofloxacin and metronidazole	0%
Moya et al. (6)	2012	Prospective cohort	CT	No abscess	Ciprofloxacin and metronidazole	6.25
Lorente et al. (8)	2013	Retrospective cohort	CT	No abscess	Amoxicillin-clavulanic acid	5.56%
Ünlü et al. (11)	2013	Retrospective cohort	CT	No abscess	Amoxicillin-clavulanic acid	8.47%
Biondo et al. (12)	2014	Randomised controlled trial	CT	No abscess	Amoxicillin-clavulanic acid	4.62%

US: ultrasound; CT: computed tomography; iv: intravenous

available to patients with diverticulitis in the ascending colon, a process that in most cases tends to be less aggressive and presents fewer complications. Ridgway et al. (10) compared the efficacy of oral treatment to intravenous treatment with the same antibiotics (ciprofloxacin and metronidazole). Their results indicated a similar efficacy for oral treatment, and there was no switching from oral to intravenous treatment. Moya et al. (6) reported a success rate of 95% for 40 patients treated as outpatients, which is a similar result to that reported by Martin Gil et al. (15). Alonso et al. (7) conducted a similar study on patients with diverticulitis of the sigmoid colon. In a sample of 70 patients treated as outpatients, they recorded an admission rate of 3%, whereas 68 patients completed treatment with oral antibiotics and reported no complication. In 2012, our group published an earlier study that indicated that outpatient treatment was applicable to approximately 2/3rds of patients presenting to our hospital with acute diverticulitis and that the inflammation was resolved in the majority of patients with uncomplicated diverticulitis (94%). Furthermore, the results showed that complication and recurrence rates were similar to those of patients admitted to hospital and treated with intravenous antibiotics (6). Ünlü et al. (11) published, from a study of a total of 118 patients treated as outpatients, a readmission rate of 8.5% and a single case that needed emergency surgery. Biondo et al. (12), in the only published multicentre study on 132 patients divided into two groups, reported the same results. In our study, of 224 patients included, we reported a failure rate of 8% in outpatient treatment.

Diagnosis

The CT scan was our first choice test in the diagnosis of diverticulitis because it can discriminate with accuracy and sensitivity (>90%) between the mild and complicated forms of the disease, and is, currently, considered to be the first choice diagnostic technique (19) and an important tool in patient triage (20). In most of the published studies, this is the diagnostic technique used to discriminate those patients who may benefit from outpatient treatment (6-8,11-16). Mizuki et al. (9) in their study classified their cases by means of ultrasonography, which provides a similar specificity and sensitivity to CT scanning. They believe that this test might be useful for the early diagnosis of diverticulitis. However, it is essential to bear in mind that the test is operator-dependent and non-reproducible, and it may give diagnostic errors in obese patients and in cases where there is excess gas in the colon. In such cases, they used the CT scan. Ridgway et al. (10) employed only physical examination for diagnosis; however, they only compared an oral treatment with an intravenous one always performed in the hospital. It seems clear that when performing outpatient treatment, we need a test image, and that CT currently gives a higher sensitivity than any other test; therefore, it should be the test of choice for select candidates for this treatment modality.

Staging

Those patients with abundant free fluid, an intra-abdominal abscess >3 cm or pneumoperitoneum were excluded from all the studies (6-17). Most studies include only those patients without abscesses. Our group, in an earlier article published in 2012 (6), also excluded those patients in whom the presence of abscesses was demonstrated by CT. In the literature, only three studies do not exclude these patients (9,13,15). In these studies, the success of treatment and the readmission index were similar to other publications (Table 5). Currently, our criteria for the selection of patients included the presence of diverticula, colonic wall thickening (<4 mm), soft tissue stranding of the pericolic fat and/or a pericolic abscess <3 cm, and, as reflected in our results, there was no difference between the presence or absence of <3 cm abscess (21). The presence of free fluid without perforation is a risk factor of treatment failure, and we

continued to exclude patients who presented with this condition (22). In this sense, we think the classification proposed by Ambrosetti et al. (18) is the simplest and allows more accurate selection of patients who will benefit most from outpatient treatment.

Antibiotic regimen

The most commonly used antibiotic regimens are metronidazole-ciprofloxacin and amoxicillin-clavulanic, between 7 and 10 days. The question that arises now is whether it is always necessary to use antibiotics (23,24). The use of antibiotics in uncomplicated diverticulitis is not based on evidence. Recent studies have shown that there is no superiority in the use of antibiotics over simple support therapy, in terms of clinical and recurrence resolution (23-25). The use of antibiotics seems to neither accelerate recovery nor reduce complications (26). Chabok et al. (23) reported that antibiotic treatment for acute uncomplicated diverticulitis neither accelerates recovery nor prevents complications or recurrence, concluding that antibiotic treatment should be reserved for the treatment of complicated diverticulitis only.

Limitations, drawbacks and shortcomings

The number of cases was insufficient to make robust conclusions.

CONCLUSION

Currently, there is evidence that outpatient treatment in patients with uncomplicated acute diverticulitis is safe and effective. The question that we face now is whether all patients require antibiotic treatment or whether the use of a liquid diet may be sufficient. Further studies are needed to clarify this issue.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of University General Hospital of Elche.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - P.M., A.A.; Design - P.M., M.B.; Supervision - R.C., J.L.; Data Collection and/or Processing - I.G., F.C.; Analysis and/or Interpretation - P.M.; Literature Review - P.M., M.B.; Writer - P.M.; Critical Review - A.A., R.C.

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