ORIGINAL CONTRIBUTION

Quality of Life and Persistent Symptoms After Uncomplicated Acute Diverticulitis

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BACKGROUND: Although acute diverticulitis and its recurrence are well studied, little is known about the period after these attacks have passed. Many patients appear to be affected by persistent symptoms that impair quality of life. The few published studies on this topic are mostly limited by the lack of CT confirmation of the acute diverticulitis diagnosis, low numbers of patients, or cross-sectional design.

OBJECTIVE: This study longitudinally evaluated quality of life and symptoms after antibiotic or observational treatment of uncomplicated acute diverticulitis.

DESIGN: This was an observational study of randomized clinical trial data.

SETTINGS: This study was conducted at a single tertiary care center.

PATIENTS: Patients with CT-proven, primary, left-sided, uncomplicated acute diverticulitis were randomly assigned to observational or antibiotic treatment.

MAIN OUTCOME MEASURES: Quality of life was assessed using questionnaires (EuroQol 5D, Short Form-36, and Gastrointestinal Quality of Life Index) at baseline and 3, 6, 12, and 24 months after random assignment. Patients were considered to have persistent symptoms when specific quality-of-life scores at the 12- and 24-month follow-ups were among the lowest 16% of scores measured in a healthy reference group.

RESULTS: A total of 528 patients were included. No difference was detected between the observational and antibiotic groups in any quality-of-life score during follow-up. Overall, 32.2% to 38.2% of patients had persistent symptoms after 1 or 2 years, depending on which questionnaire (sub)score was assessed. Risk factors for persistent symptoms based on to the Gastrointestinal Quality of Life index GI symptoms score included a mean pain score ≥3.75 (OR = 2.77 (95% CI, 1.60–4.80)) during the first 10 days of disease and prolonged (≥28 d) time to recovery (OR = 2.25 (95% CI, 1.31–3.88)). Flatulence, rumblings, bloating, fullness, and many stools were the top 5 complaints at the 12- and 24-month follow-ups.

LIMITATIONS: The study was limited by possible selection bias of patients included in a randomized controlled trial.

CONCLUSIONS: More than one third of patients experience persistent symptoms after an episode of acute uncomplicated diverticulitis. Long-term quality of life

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is comparable after initial antibiotic or observational treatment. See **Video Abstract** at http://links.lww.com/DCR/A916.

KEY WORDS: Antibiotic treatment; Observational treatment; Persistent symptoms; Quality of life; Uncomplicated acute diverticulitis.

Colonic diverticulosis is a common condition in Western countries, affecting 20% to 30% of individuals <50 years of age and <70% of individuals >80 years of age.[1] Approximately 4% of these individuals will eventually develop acute diverticulitis.[2] In recent years, 2 randomized clinical trials demonstrated the safety of omitting antibiotics in the treatment of uncomplicated acute diverticulitis.[3,4] Omitting antibiotics did not increase the time to recovery or the rates of complicated diverticulitis, recurrent diverticulitis, or sigmoid resection. However, there are currently no data on the quality of life after uncomplicated acute diverticulitis, with or without antibiotic treatment, although this is an important issue that could affect whether to omit antibiotics in cases of uncomplicated diverticulitis. Indeed, little in general is known about the quality of life of patients experiencing acute diverticulitis.

In contrast to the extensive data available on the management and outcomes of acute diverticulitis episodes, little is known about the period after these attacks have passed. Patients with overt flares are frequently seen in daily practice, but patients with persistent low-grade symptoms may go unrecognized. Nonetheless, these persistent symptoms can be particularly burdensome for patients and may impair their quality of life.[3,5,6] The pathophysiology of acute diverticulitis and the symptoms occurring after these episodes have passed remains unclear, hampering the development of effective treatment strategies. It is also unclear whether the chronic symptoms after acute diverticulitis are actually caused by the diverticulitis or whether these patients are at higher risk for other GI disorders that may also cause these symptoms, such as irritable bowel syndrome.[7]

To meaningfully address the origin of the persistent symptoms, robust evidence on their occurrence in patients with reliably proven diagnoses of acute diverticulitis is essential. Most studies on this topic include only patients with a clinical diagnosis of acute diverticulitis or patients with diverticular disease other than acute diverticulitis. With that approach, however, patients with other conditions may be included in the acute diverticulitis group. Only a few studies have used CT for diagnostic confirmation. This approach confirms the purity of the patient group and thus provides the most reliable data on persistent symptoms after an acute diverticulitis attack. However, even previous studies using CT confirmation have limitations. For instance, they reported only abdominal pain instead of the entire range of diverticular disease complaints, they selected a subgroup of patients with multiple recurrences, or they included a low number of patients.[3,5,6,8,9]

In this study, longitudinal data on quality of life and persistent symptoms in patients with a primary episode of CT-proven uncomplicated diverticulitis from the Diverticulitis: Antibiotics or Close Observation? (DIABOLO) trial[4] were used. The DIABOLO trial was a multicenter, randomized clinical trial of an observational or antibiotic treatment strategy in patients with uncomplicated acute diverticulitis. The aim of the present analysis was 2-fold. Our hypothesis was that omitting antibiotics does not impair quality of life as compared with routine antibiotic treatment. To test that idea, we compared the general and GI quality of life between patients receiving observational or antibiotic treatment for uncomplicated acute diverticulitis. In addition, we performed an explorative study of the quality of life after an episode of uncomplicated acute diverticulitis, assessing the rate of persistent symptoms and identifying patients at risk for persistent symptoms.

PATIENTS AND METHODS

Study Design and Patient Population

The DIABOLO trial was a multicenter, pragmatic, noninferiority, randomized clinical trial conducted at 22 clinical sites in the Netherlands from 2010 to 2012. The main clinical outcomes during <12 months of follow-up have been reported elsewhere.[4] In summary, a total of 528 patients with CT-proven, first episode, left-sided, and uncomplicated acute diverticulitis were randomly assigned to an observational (262 patients) or antibiotic (266 patients) treatment group. *Uncomplicated acute diverticulitis* was defined as modified Hinchey stages 1a and 1b and Ambrosetti's mild diverticulitis stage.[10,11] *Time to recovery* was defined as the time interval between random assignment and meeting the following criteria: discharge from the hospital, normal diet (tolerating solid food and >1 L of fluid orally), temperature <38°C, pain visual analog scale (VAS) score <4 (with no use of daily pain medication), and resumption of preillness working activities as assessed from a daily patient diary. The study protocol and some protocol amendments were published previously.[4,12] Because quality of life was a secondary outcome of the DIABOLO trial, the study was not powered on this outcome. The medical research ethics committee of the Academic Medical Center approved the protocol, and all of the patients provided written informed consent.[4,12] The Strengthening the Reporting of Observational Studies in Epidemiology checklist for reporting was followed,[13] and the trial registration number is NCT01111253 (www.clinicaltrials.gov).

Data Collection and Outcomes

Patients were followed up at outpatient clinics or by telephone at 12 and 24 months. In addition to baseline questionnaires,

quality-of-life questionnaires were sent to all of the patients 3, 6, 12, and 24 months after random assignment. The EuroQol 5D (EQ5D) survey is a general health-related quality-of-life questionnaire, from which only one question, containing the VAS, was used in the present study.[14] The SF-36 survey is a general health quality-of-life questionnaire containing 36 items covering 8 dimensions aggregated into a physical and mental composite score.[15] The Gastrointestinal Quality of Life Index (GIQLI) survey is a health-related quality-of-life questionnaire for GI diseases containing 36 items covering 4 domains (GI symptoms, physical function, social function, and emotional function).[16] For both SF-36 and GIQLI scores, a higher score indicates a better quality of life.

Statistical Analysis

Quality of life after an episode of uncomplicated diverticulitis was compared between observational and antibiotic treatments. In addition, quality of life and persistent complaints were assessed in all of the included patients and, if possible, compared with healthy individuals. Quality-of-life scores determined 3, 6, 12, and 24 months after observational or antibiotic treatment were compared using generalized linear mixed models, with adjustment for baseline quality-of-life scores. The final mixed model was selected based on the Akaike information criterion value and included a gamma regression distribution with a scaled identity covariance structure. Both the overall effect of a treatment strategy and the interaction between the treatment strategy and time were assessed.

Because a definition for persistent symptoms after an episode of acute diverticulitis was lacking, they were defined using 3 quality-of-life subscales to test the robustness of patient identification: the SF-36 bodily pain subscale, the GIQLI GI symptoms subscale, and the GIQLI abdominal pain score. Data from a previous Dutch SF-36 validation study were used as reference data.[17] Patients with acute diverticulitis with SF-36 scores >1 SD below the mean score in the reference population (representing individuals with the lowest 15.86% quality-of-life scores) were considered patients with persistent symptoms at baseline and 3, 6, 12, and 24 months after study entry. Because no such Dutch reference group is available for the GIQLI, pooled mean scores from cohorts of healthy individuals from 3 previously published studies were used as reference data.[18–20] A French study[18] reported a mean score of 66.0 ± 8.4 (N = 125), a study from Taiwan[20] reported a mean score of 66.3 ± 7.2 (N = 340), and a Swedish study[19] reported a mean score of 63.9 ± 9.6 (N = 390), resulting in a pooled mean score of 65.2 ± 8.5. As with the SF-36, patients with GIQLI GI symptoms scores >1 SD below this pooled mean score were considered patients with persistent symptoms at that time point.

For numerical variables, means and SDs or medians and interquartile ranges were calculated. Comparisons were made using an unpaired *t* test or Mann–Whitney *U* test, as appropriate. For categorical variables, numbers and percentages were calculated and compared using the χ^2 test or Fisher exact test, as appropriate. Multivariable logistic regression was used to identify independent risk factors. The dependent variable was persistent symptoms, which were defined based on fulfillment of the criteria for persistent symptoms at the 12- or 24-month follow-up. Risk factors for developing persistent symptoms were assessed using all 3 of the aforementioned tests to assess persistent symptoms. Variables that were significant or approached significance ($p \leq 0.10$) in the univariable analyses were included in the multivariable logistic analyses. Some numerical variables were converted into dichotomous categorical variables defined by clinically relevant thresholds, making them easier to interpret and use in daily practice. For both the mean pain score during the first 10 days of the initial episode and time to recovery, the upper quartiles of all patients (pain VAS ≥3.75 and time to recovery ≥28 d) were considered potentially predictive factors to be entered in the logistic regression analyses. All of the risk estimates are expressed as the OR. Any missing values were excluded from the analysis of that outcome or time point. A 2-sided $p < 0.05$ was considered statistically significant. All of the analyses were performed using SPSS, version 23.0 (IBM Corp, Armonk, NY).

RESULTS

Observational Versus Antibiotic Treatment Strategy

Most patients correctly filled out and returned the quality-of-life questionnaires. The response rates were 88% to 90% at baseline, 73% to 74% at 12 months, and 70% to 73% at 24 months after random assignment. Adjusting for baseline scores, comparison of the estimated mean EQ5D–VAS health state (observational 77 vs antibiotics 76); SF-36 composite physical and mental scores (observational 47 vs antibiotics 47); and GIQLI physical, GI symptoms (observational 63 vs antibiotics 63), social, emotional, and total score (antibiotics 117 vs observational 116) revealed no overall differences between an observational and antibiotic treatment strategy, nor did it reveal differences during follow-up (Appendix Tables 1 and 2, Supplemental Digital Content, http://links.lww.com/DCR/A954).

Quality of Life After a Primary Episode of Uncomplicated Acute Diverticulitis

The EQ5D health state, SF-36 physical, GIQLI total, and GIQLI GI symptoms scores revealed impaired physical quality of life at the time of the diagnosis of a first episode of uncomplicated acute diverticulitis (Fig. 1 and Appendix Table 3, Supplemental Digital Content, http://links.lww.com/DCR/A954). All of these scores normalized within 3 months and remained normal at the 24-month follow-up. The SF-36 mental subscale, as well as the GIQLI emotional scores, was fairly constant from baseline throughout the 24 months of follow-up.

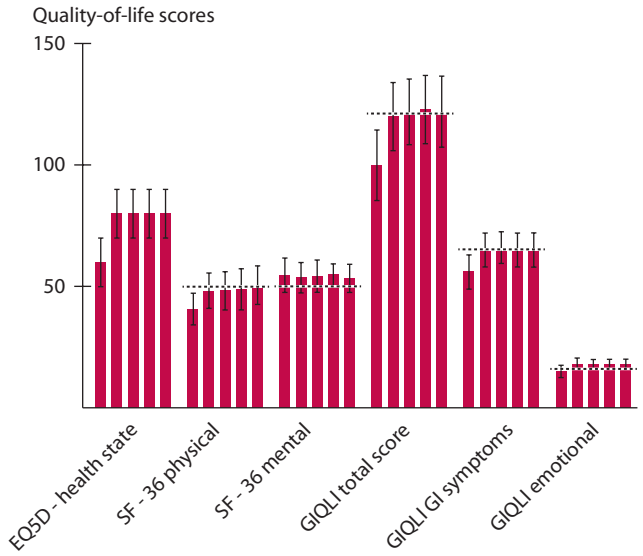

FIGURE 1. Median quality of life scores and interquartile ranges at baseline and 3, 6, 12, and 24 months after diagnosis according to EQ5D, Short Form (SF)-36, and Gastrointestinal Quality of Life Index (GIQLI) questionnaires. For each quality-of-life (sub)score, the bars represent, from left to right, baseline and 3, 6, 12, and 24 months of follow-up. The dotted lines represent mean scores in groups of healthy individuals, that is, pooled study-level results from 3 other studies[18–20] for GIQLI scores and results from a Dutch validation study[17] for SF-36 scores.

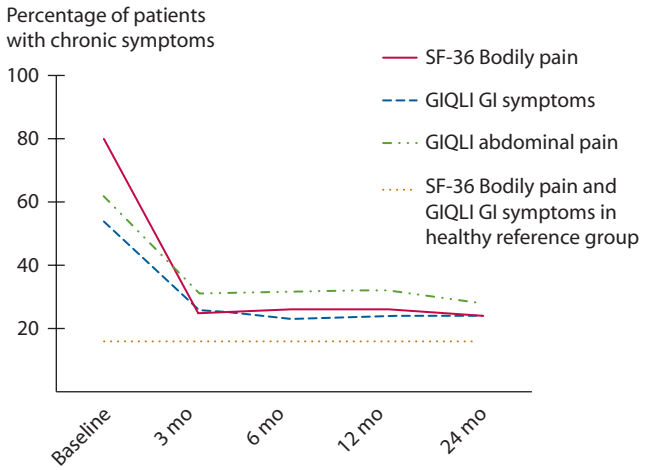

FIGURE 2. Percentages of patients with persistent symptoms at the indicated times points according to the Short Form (SF)-36 and Gastrointestinal Quality of Life Index (GIQLI) questionnaires, including a comparison with healthy reference groups.

Persistent Symptoms After a Primary Episode of Uncomplicated Acute Diverticulitis

Sixty percent of patients fulfilled the criteria for persistent symptoms according to the SF-36 "bodily pain" subscale (Fig. 2 and Appendix Table 4, Supplemental Digital Content, http://links.lww.com/DCR/A954). Throughout the 24 months of follow-up, the percentage of patients with persistent complaints ranged from 22% to 27%. According to the GIQLI GI symptoms subscale, 54% of the patients fulfilled the criteria for persistent symptoms at baseline, and persistent symptoms were seen in 23% to 26% of the patients during the follow-up period (Fig. 2 and Appendix Table 4, Supplemental Digital Content, http://links.lww.com/DCR/A954).

Because the threshold for persistent symptoms was defined as >1 SD below the mean of a healthy reference group, 15.68% of patients in the reference group automatically met the criteria for having persistent symptoms. In the acute diverticulitis group, by contrast, the rate of patients with persistent symptoms was 24% (according to the SF-36 bodily pain subscale) or 25% (according to the GIQLI GI symptoms subscale) at the 24-month follow-up, which was significantly higher than in the reference group (Fig. 2).

No reference data were available for the GIQLI abdominal pain question. Patients were considered to have persistent symptoms when they reported abdominal pain every now and then, almost continuously, or continuously. Consequently, 80% reported symptoms at baseline, followed by 24% to 26% during the follow-up period (Fig. 2 and Appendix Table 5, Supplemental Digital Content, http://links.lww.com/DCR/A954).

Risk Factors for Persistent Symptoms

From the SF-36 bodily pain score, 38.2% of the patients reported persistent symptoms; from the GIQLI GI symptoms score, 32.2% reported persistent symptoms; and from the GIQLI abdominal pain score, 35.9% reported persistent symptoms. No independent risk factors could be identified from the SF-36 bodily pain score (Appendix Table 5, Supplemental Digital Content, http://links.lww.com/DCR/A954). From the GIQLI GI symptoms score, 2 factors describing the course of the initial episode were independent risk factors: a mean pain VAS score of ≥3.75 during the first 10 days after presentation (OR = 2.77 (95% CI, 1.60–4.80)) and a time to recovery of ≥28 days (OR = 2.25 (95% CI, 1.31–3.88); Table 1). The same 2 factors also were independent risk factors for persistent symptoms using the GIQLI abdominal pain question, with respective ORs of 2.18 (95% CI, 1.27–3.74) and 2.24 (95% CI, 1.31–3.81; Appendix Table 6, Supplemental Digital Content, http://links.lww.com/DCR/A954).

Types of Persistent Symptoms

In contrast to the aggregate scores reported previously, we assessed individual lower GI complaints at all 5 time points using questions from the GIQLI questionnaire (Fig. 3). Symptoms were considered truly persistent if they occurred every now and then, almost continuously, or continuously. At presentation of the initial episode of acute diverticulitis (baseline), abdominal pain was the most reported symptom, followed by bloating, rumblings, and flatulence. Most symptoms were reported at similar rates at all 4 time points evaluated (3, 6, 12, and 24 months after the start of treatment of the first episode). At 24 months, predominantly occurring symptoms were flatulence (39%), rumblings

TABLE 1. Univariable and multivariable analyses of risk factors associated with persistent GI symptoms (according to the Gastrointestinal Quality of Life Index questionnaire) at the 12- or 24-month follow-ups

Risk factors	*No. of patients at risk for persistent symptoms*	*Persistent symptoms, n (%)*	*Univariable OR (95% CI)*	*Multivariable OR (95% CI)[a]*
Sex				
Men	207	68 (32.9)	1.06 (0.71–1.59)	
Women	222	70 (31.5)		
BMI, kg/m^2				
<30	339	110 (32.4)		
>30	85	27 (31.8)	0.97 (0.58–1.61)	
Age, y				
<50	117	43 (36.8)	1.33 (0.85–2.07)	
≥50	312	95 (30.4)		
Smoking				
Yes	95	31 (32.6)	1.01 (0.62–1.65)	
No	312	101 (32.4)		
Alcohol ≥2 units per day				
Yes	80	20 (25.0)	0.65 (0.37–1.16)	
No	227	77 (33.9)		
Pain score at presentation				
VAS <8	277	79 (28.5)		
VAS ≥8	92	42 (45.7)	2.11 (1.30–3.42)	1.38 (0.79–2.42)
Mean pain score during first 10 days of initial episode				
VAS <3.75	263	62 (23.6)		
VAS ≥3.75	89	48 (53.9)	3.80 (2.29–6.29)	2.77 (1.60–4.80)
Hinchey				
1a	401	127 (31.7)		
1b	28	11 (39.3)	1.40 (0.64–3.07)	
Treatment type				
Observational	210	66 (31.4)	0.94 (0.62–1.40)	
Antibiotic	219	72 (32.9)		
Time to recovery, d				
<28	318	84 (26.4)		
≥28	111	54 (48.6)	2.64 (1.69–4.13)	2.25 (1.31–3.88)

VAS = visual analog score.
[a]Model C-statistic = 0.68.

(31%), many stools (30%), bloating (28%), fullness (28%), and severe urgency for defecation (27%). However, these symptoms also occur in healthy individuals. The absolute quality-of-life scores for several symptoms were actually comparable to those for healthy individuals in other studies (a higher score indicates fewer symptoms): flatulence (2.62 in the present study vs 2.57[19] and 3.10[20] in healthy individuals), bloating (2.96 vs 2.74[19] and 3.10[20]), and fullness (3.06 vs 3.29[19] and 3.10[20]). For other symptoms, scores in patients with diverticulitis from the present study were lower than in healthy individuals: abdominal pain (3.05 vs 3.42[19] and 3.40[20]), rumblings (2.89 vs 3.12[19] and 3.40[20]), and many stools (3.01 vs 3.18[19] and 3.50[20]).

DISCUSSION

Long-term quality of life was comparable for patients receiving initial antibiotic treatment or observational treatment. More than one third of patients experienced persistent symptoms 1 to 2 years after an episode of uncomplicated diverticulitis. No patient characteristic appeared to be a risk factor for the development of persistent symptoms. Instead, 2 factors describing the course of the initial episode, prolonged time to recovery and high pain scores during the first 10 days after diagnosis, were risk factors for persistent symptoms.

The only other study that has compared quality of life after antibiotic or observational treatment of uncomplicated diverticulitis is a Scandinavian randomized clinical trial.[3] That study only reported abdominal pain and bowel habits at 12 months after diagnosis. Their findings were in line with the results of the present study in that no difference was detected between patients treated with or without antibiotics. However, ≈50% of patients experienced persistent abdominal pain, as opposed to 25% in the present study. This difference may be explained in part by the fact that, in the earlier trial, only 2 questions were asked, whereas the questionnaires used in the present study asked about a wide variety of symptoms. This may have caused patients with bloating, for instance, to report their symptom as abdominal pain in the earlier trial.

Although some symptoms reported in the present study may have been caused by episodes of recurrent diver-

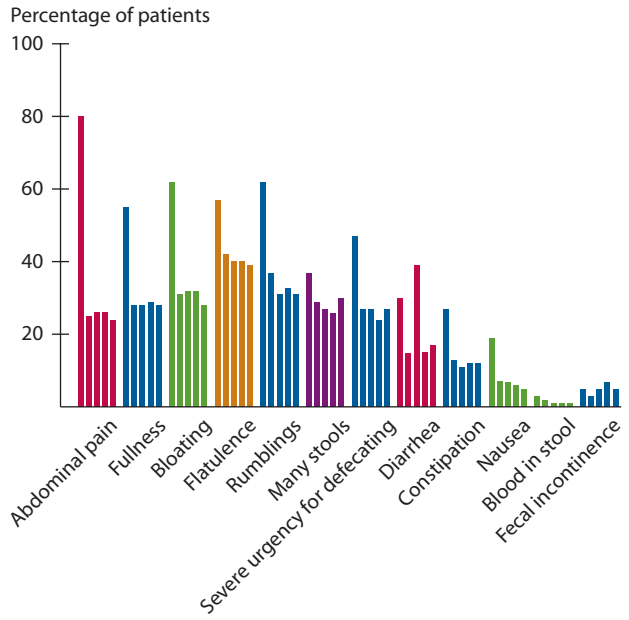

FIGURE 3. Percentages of patients with the indicated GI symptoms according to the Gastrointestinal Quality of Life Index (GIQLI) questionnaire every now and then or more often at baseline and after 3, 6, 12, and 24 months of follow-up displayed as colored bars.

ticulitis, the large majority were not associated with diagnosed recurrent episodes. Thirty one of 138 patients with ongoing abdominal complaints (according to the GIQLI questionnaire) experienced a recurrent episode of diverticulitis within the 24-month follow-up period. However, the quality-of-life questionnaires used in the present study assessed symptoms during the week (GIQLI) or 4 weeks (SF-36) before completing the respective questionnaire. As a result, only recurrent episodes occurring in the week or month before the questionnaire could be attributed to the symptoms. Because in the DIABOLO trial only 3 episodes of recurrent diverticulitis were diagnosed in month 12 of follow-up and 2 episodes in month 24, the effect of recurrent episodes on the rate of persistent symptoms is limited. This emphasizes the fact that patients with acute diverticulitis experience persistent symptoms that differ from the recurrent diverticulitis mainly reported in literature.

Although many patients develop persistent symptoms after a primary episode of acute diverticulitis, only a small fraction of diverticulitis research focuses on this phase of diverticular disease. In addition, the few studies on this topic did not use CT to confirm the diverticulitis diagnosis. For the label *persistent complaints after acute diverticulitis*, it is very important to make a clear distinction between patients who truly had an episode of acute diverticulitis and those that had symptoms from diseases such as inflammatory bowel disease or irritable bowel syndrome. One other study with CT confirmation of the diverticulitis diagnosis reported rates of individual persistent symptoms separately at a minimum of 12 months after diagnosis.[5] In that study, of the 40 conservatively treated patients, 25% experienced persistent complaints, which is slightly less than the 32% to 41% in the present study. Constipation (25%) and painful flatulence (25%) were reported most frequently, followed by painful defecation (23%) and abdominal cramps (23%). An Irish study,[8] which used only the SF-36 questionnaire, found lower physical and mental composite scores than the present study, but the small number of patients (N = 33) and the lack of longitudinal data in that study make it difficult to draw conclusions. Another Irish study[6] assesses a longitudinal global symptom score for 10 symptoms over a period of 12 months. Consistent with the results in the present study, the global symptom scores declined quickly after diagnosis for <3 months, after which remnant symptoms remained stable. At 12 months after diagnosis, 33% to 71% of patients reported ≥1 persistent symptom, that is, a global symptom score >1 on a scale from 0 (no symptoms) to 6 (severe symptoms). Despite the wide range in these percentages, one can conclude that a substantial fraction experienced persistent symptoms, which is consistent with the present study. Overall, however, differences in the types of persistent symptoms and in the quality-of-life measures evaluated make a direct comparison with data from the present study difficult. Nonetheless, the natural course in which complaints decreased during the first 3 months after diagnosis, followed by a stable number of patients with persistent symptoms, appears to be confirmed.

The present study has several strengths that other studies on this topic lack. The importance of CT confirmation, which all patients in the present study underwent, was discussed above. In addition, the use of multiple quality-of-life questionnaires provides several ways to identify patients with persistent symptoms, which increases the likelihood of correct patient identification. Repeated quality-of-life measures from diagnosis throughout 24 months of follow-up provides insight into the natural course of diverticulitis symptoms, in contrast to the cross-sectional methods used in most published studies. Lastly, the number of patients in the present study is considerably larger than most studies on this topic. Nevertheless, several limitations of the present study should be taken into account. First, data originating from randomized clinical trials could be subject to limited generalizability because of strict inclusion and exclusion criteria. As described previously,[4] however, the characteristics of the included patients and those of patients who were eligible but not included were largely comparable. Second, not all patients completed the full 24 months of follow-up; the percentage of missing quality-of-life questionnaires increased from 9% at baseline to 26% by the end of follow-up. This could have led to attrition bias. Third, the reference groups used to define the thresholds for persistent symptoms may have differed from the present study population. The SF-36 scores were compared with a Dutch reference group in which patients

were slightly younger than the study group. There was no Dutch reference group available for the GIQLI questionnaire, so an international reference group from 3 different countries was created. Consequently, cultural differences may have played a role as well. For both reference groups it is unclear to what extent this may have affected the results. Fourth, because the GIQLI questionnaire asks patients about symptoms experienced during the previous week, it may not be perfectly suited to assess acute complaints at presentation of acute diverticulitis (baseline in the present study). Therefore, the baseline rates of symptoms should probably not be interpreted as true rates but only as reference data for time points during follow-up. Fifth, 42 patients with a pericolic or mesocolic abscess of <5 cm were included in the DIABOLO trial, which reported predefined secondary outcomes, and were therefore included in the present study. Because the quality of life in Hinchey 1b patients has not been specifically studied before, there may have been some effect of including these patients on the overall outcomes. However, because only 8% (42/528) of patients were Hinchey stage 1b patients, the effect on the overall quality of life of the 528 patients is considered modest. Last, the DIABOLO trial was not powered on quality of life, and therefore the results from the comparison between observational and antibiotic treatment should be interpreted accordingly. Although post hoc power analysis of all 8 quality-of-life (sub)domains shows that the present study has sufficient power to detect clinically relevant differences, the effect sizes that could have been detected with a power of 80% varied between 0.28 and 0.29 (eg, representing a GIQLI total score difference of 2.63 in the present study), which is considered to be a small-to-medium effect.

Our results could be used by clinicians to inform their patients about the risk of developing persistent symptoms in addition to the much better known risk of recurrent diverticulitis. Moreover, the fact that a substantial fraction of patients with diverticulitis experience persistent symptoms creates awareness among clinicians and increases recognition in patients.

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