

Comparison of long-term quality of life in patients with diverticular disease. Are there any benefits to surgery?

Research Article

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Abstract: Background: This study focused on the quality of life in patients who were treated in the past for complicated diverticulitis. We compared the effectiveness of conservative and surgical therapy. Methods: Between January 2000 and December 2005, 123 patients were treated for complicated diverticulitis in our ward. Five to ten years later these patients filled in the Gastrointestinal Quality of Life Index questionnaire. The results were evaluated with the Mann Whitney U test and Pearson chi square test. Result: We compared conservatively treated patients (49) with patients after sigma resection (27). On average, 7 years after the stay in hospital there were practically no differences in quality of life - 107 in the conservatively treated group versus 109 in the operated group. We counted the number of readmissions, which were higher in the conservatively treated group (34% vs 19%), but not statistically significant ($p = 0.7$). Notable adverse effects of resections were incisional hernias that were a reason for another surgery in 30% of cases. Conclusion: The kind of treatment does not appear to influence the long term quality of life in patients with diverticulitis. We can conclude that long term quality of life should not be a reason for surgery.

Keywords: Diverticulitis • Quality of life • Elective sigma resections

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1. Introduction

Diverticulosis of the colon is an acquired condition that results from herniation of the mucosa through sites of low resistance in areas of vascular passage defects of the colonic wall. Colonic diverticula are pseudodiverticula, because the mucosal herniation involves only the mucosal and submucosal layers.

Epidemiological studies have revealed that diverticular formation of the colon is primarily a disease that occurs in industrialized countries. Diverticula can occur anywhere, and the segment of the colon involved varies with geography [1]. In western countries, diverticula occur mainly in the left side of the colon, with up to 90% of patients having involvement of the sigmoid colon. The right-sided form is predominant in Asia. Approximately 60 percent of humans more than 60 years of age living

in developed countries will develop colonic diverticula. The condition became prevalent after the 1920s, possibly associated with a decrease in fiber intake. Postmortem studies reveal that it is rare prior to age 40 years, but increases with age so that one can estimate that by age 80 years approximately 65 percent of adults have diverticula of the colon. Most patients with diverticulosis remain asymptomatic throughout their lifetime, and only 25% to 30% develop symptoms at some stage [2].

Diverticular disease produces a wide range of clinical presentations, varying from minimal clinical discomfort to life-threatening complications. The complications of diverticular diseases could be categorized as either inflammatory conditions (diverticulitis with associated abscess, perforation, fistulization) or non-inflammatory conditions (lower gastrointestinal bleeding, benign stricture). The most frequently used classification is the Hinchey score, or in German-speaking countries, the Hansen-Stock

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classification. Hinchey stage I means acute phlegmonous diverticulitis without complications; Hinchey stage II, diverticulitis with paracolic abscess without perforation; Hinchey stage III, diffuse purulent peritonitis; and Hinchey stage IV, diffuse fecal peritonitis [3].

Uncomplicated diverticulitis is in the domain of conservative therapy, consisting of bowel rest and antibiotics [4]; 60% of patients treated for a first episode of acute diverticulitis will recover and have no further clinical problems. Hinchey I could be handled exclusively in a conservative manner. Bleeding usually ceases spontaneously. Hinchey II may be drained under computed tomography (CT) control, and then the patient does not need immediate surgery [5,6]. Complicated diverticulitis, mainly Hinchey III and IV, is the domain of surgical treatment [7]. The goal of elective surgical therapy is to achieve long-term cure, defined as normalized bowel habits and absence of abdominal symptoms. Elective colectomy should prevent recurrent diverticulitis, which may be associated with a high mortality rate. The timing of elective surgery is controversial, but it is usually recommended after the second episode [8]. However, we should proceed more rapidly with immunocompromised patients, patients with diabetes melitus, and those in whom cancer cannot be ruled out [9].

The aim of this study is to evaluate the impact of colonic resection on the long-term quality of life of patients with diverticular disease.

2. Patients and methods

2.1. Patients

This study enrolled all patients who were treated for complicated diverticulitis in the surgery ward at Hospital Vsetin from January 2000 to December 2005, younger than 90 years at the time of hospitalization. The diagnosis of diverticular disease was based on barium enema or colonoscopy. Complicated diverticulitis was estimated by computed tomography (CT) or ultrasound (US), laboratory results and perioperative findings.

Patients with other bowel diseases such as Crohn's disease, ulcerative colitis or colon cancer were excluded. Patients with Hinchey stage I were treated conservatively. For Hinchey II, we tended to drain the abscesses, but two of the patients underwent surgery. Some of the patients at this stage were later indicated to have elective surgery. The patients with diffuse purulent and stercoral peritonitis were operated on immediately. Patients with recurrent attacks of diverticulitis or with severe defecation problems, sigma stenosis, chronic abdominal pain or recurrent bleeding underwent elective sigma resection.

2.2. Conservative treatment

Medical therapy included fasting, parenteral nutrition, usually combined with antibiotics (combination of these antibiotics: amoxicillin+clavulanate, gentamicin, metronidazole, sometimes later changed to rifaximin). US-guided or CT-guided percutaneous drainage was attempted in the event of an isolated abdominal abscess. Endoscopic hemostasis was attempted when there was rectal bleeding. After the patients' discharge, a fiber-enriched diet was recommended.

2.3. Operative technique

The patients who were admitted for elective surgery were treated with primary anastomosis. In the acute state, we performed a one-stage procedure as well, but we also performed a few months later a Hartman operation or just diversion of the stoma and resection.

We performed the surgery through a midline incision, followed by mobilization of the colon, the abortion of the vascular pedicle. The extension of the resection was decided intraoperatively depending on the involved tract (sigmoidectomy or left hemicolectomy). A colon-rectal end-to-end anastomosis was then carried out.

Hartmann's operation, the resection of affected sigmoid colon, with closure of the rectal stump and formation of an end colostomy, was used in urgent cases.

Once the transversostomy was accomplished, the sigma resection followed 3 months later.

2.4. Quality of life evaluation

Quality of life was assessed by the Gastrointestinal Quality of Life Index (GLQI). We chose the GLQI questionnaire for its comprehensiveness and orientation to gastrointestinal symptoms, but at the same time, it seeks to evaluate all dimensions of human life quality. The GLQI was developed by a board of experts to measure quality of life in patients with gastrointestinal diseases, particularly those undergoing an operation. It quantifies 36 items within 5 main categories: gastrointestinal symptoms (19 questions), physical condition (7 questions), emotions (5 questions), social function (4 questions), and effect of medical treatment (1 question). Each question requires a response between 0 (least desirable option) and 4 (most desirable option); the total maximum score attainable by summation of all the responses is 144 points (the maximum score in each domain is: 76 - symptomatic, 28 - physical function, 20 - emotions, 16 - social function, 4 - medical treatment). It has previously been proposed that a change in score of 20% is clinically relevant [10,11]. In the original report, a healthy control population scored 125.8 points. The French version of the questionnaire similarly resulted in 126 points [12].

We used two versions of the GLQI, the English and German. We translated the English version to the Czech language, and thereafter, as a control, we translated it again to German.

2.5. Study design

Follow-up information was collected retrospectively. Patients were required to complete a structured questionnaire, which was mailed to the address given during the last hospitalization.

The responders were divided into two cohorts. One was created by patients treated without an operation. The second group constituted patients after acute or elective colon resection. All of the patients were provided with information about the study's methods and purpose.

We also counted the number of readmissions to the hospital for diverticular disease and determined how many of the operated patients underwent the plastic of consecutive incisional hernia. Each of these parameters was analyzed according to gender and age. We did not take comorbidities into account, because much time had passed since the hospitalization, so the information in our documentation was not relevant.

2.6. Statistical analysis

All results were documented with Microsoft Excel worksheets. Analysis was subsequently performed by Statistica 7 software. The Mann Whitney U test was used to examine for significance of any differences observed in continuous data. The Pearson chi square test was used to compare dichotomous variables. Statistical significance was ascribed at a level of $p < 0.05$.

3. Results

3.1. Demographics

We contacted 123 patients treated for diverticulitis at surgery ward Hospital Vsetin between January 2000 and December 2005 for follow-up. We sent 123 questionnaires and received 77 answers (62 percent of our

patients). Of the 77, 52 women (68 percent) and 25 men (32 percent) completed the questionnaire. The average age at the time of the survey was 62 years (range, 38-82 years). Patients were followed for a median of 7 years (range, 5-10 years).

We divided the patients into two study groups – one treated conservatively, the second surgically. Characteristics of the groups are shown in Table 1. The conservatively treated group was comprised of 50 patients, whose average age was 64 years; 32 of them were women, and 18 were men. The Hinchey score was I in the entire group. They completed the questionnaire, on average, 7 years after admission to the hospital.

The invasively treated group consisted of 9 patients operated on urgently and 18 operated on electively. The mean age was 59 years. We operated on 20 women and 7 men. There were no significant differences in age and gender distribution in these two groups. The patients who had urgent operations were Hinchey II (2) and Hinchey III (7). Treatment methods based on the Hinchey classification are illustrated in Figure 1.

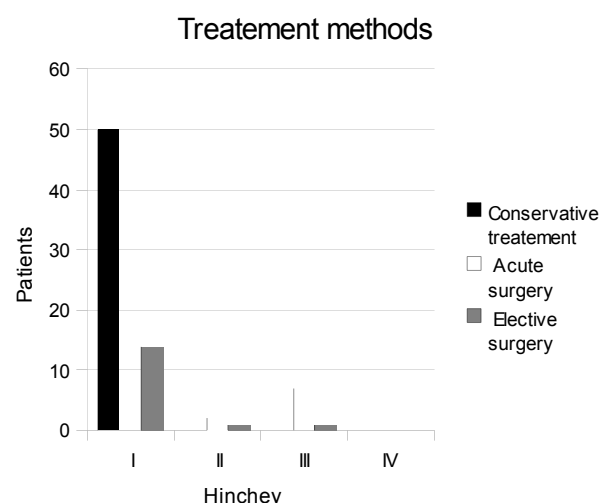


Figure 1. Treatment methods depending on Hinchey classification.

Patients who underwent elective surgery were at the time of operation without acute complications. Surgery was indicated after relapses of diverticulitis, Hinchey I (13);

Table 1. Characteristics of the operated and non-operated patients (percents of the total number of included patients).

	Conservative treated patients	Surgically treated patients	Acute surgery	Elective surgery
Number of patients	50 (65%)	27 (35%)	9	18
Women	34 (42%)	20 (26%)	7	13
Men	18 (23%)	7 (9%)	2	5
Mean age	64	59	67	55
Hinchey I	50 (65%)	14 (18%)	0	14
Hinchey II	0	3 (4%)	2	1
Hinchey III	0	8 (10%)	7	1
Hinchey IV	0	0	0	0
Mean year of admission	2003	2003	2003	2003

after conservatively treated diverticulitis, Hinchey II (1); or after recovery of diverticulitis with diffuse peritonitis, Hinchey III, which was first treated with laparoscopic lavage only (1) because of persistent abdominal problems (1) or because of recurrent bleeding (2). They completed the questionnaire, on average, 7 years after operation, as well. Once we constructed diverting stoma and the patient underwent a sigmoidectomy 2 months later. 2 patients with Hinchey III were indicated to have Hartman's resection. The other patients (24) underwent sigma resection with primary anastomosis. We also surgically treated patients with Hinchey IV, but they did not participate in our survey.

3.2. Readmission

We analyzed the number of readmissions because of diverticulosis. Eleven patients (22%) of the conservatively treated group were readmitted to the hospital at least once more, and the total number of readmissions was 17 (34%). Patients treated surgically needed 5 readmissions (19%), each of them just once. So, there is a difference in the total number of readmissions that favors surgery, but it is not statistically significant ($p = 0,7$). However, the adverse effect of the surgery was that 8 patients (30%) were later operated for incisional hernia. All the patients with incisional hernias were women. The wound was closed per primam intentionem in 5 of them; the healing was complicated in 3 by partial (2) or total (1) wound dehiscence. Incisional hernia followed the acute operation in 6 cases and after elective surgery in 2 cases. This means an incisional hernia followed 67% of acute operations and 11% of elective operations (Table 2).

Table 2. Total number of readmission and incisional hernia due to diverticulitis.

Complications	Conservative treated patients	Surgically treated patients	p
Readmissions	17	5	0,7
Incisional hernia	0	8	0,0005

3.3. Quality of life assessment

The median of total GQLI in the conservatively treated group was 107 (range, 58 to 138) and in the surgically treated group 109 (range, 74 to 138). Thus, there was no significant difference. We compared the conservatively treated group and the surgically treated group for symptoms (60 compared to 61), for emotions (14 compared to 15), for physical functions (18 compared to 17), for social functions (11 compared to 12), and for treatment (3 compared to 3). So, the quality of life of both groups was the same (Table 3, Figure 2), showing that the kind of treatment apparently does not influence the

Table 3. Gastrointestinal Quality of Life Index by conservatively and surgically treated patients.

GLQI	Conservative treated patients	Surgically treated patients	p	Maximal account
Total value	107	109	non significant	144
Symptoms	60	61	non significant	76
Emotions	14	15	non significant	28
Physical function	18	17	non significant	20
Social function	11	12	non significant	16
Treatment	3	3	non significant	4

Table 4. Gastrointestinal Quality of Life Index by operated patients.

GLQI	Acute operated	Electively operated	p
Total value	109	110	non significant
Symptoms	59	63	non significant
Emotions	19	15	non significant
Physical function	17	17	non significant
Social function	12	12	non significant
Treatment	3	4	non significant

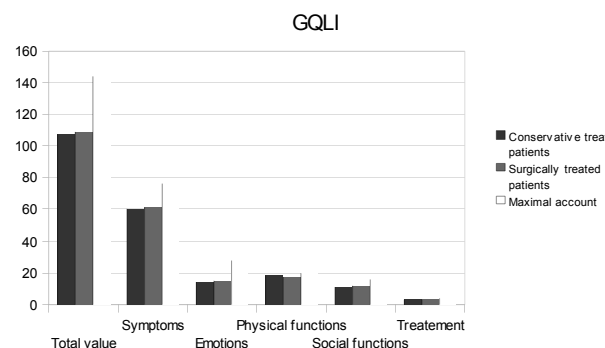


Figure 2. Gastrointestinal Quality of Life Index by conservatively and surgically treated patients.

long term quality of life for patients with diverticulosis. We also compared the quality of life in the surgical subgroups – acute and elective – and even between them there was no difference (Table 4).

4. Discussion

Indications for surgery is the subject of many polemics. Who should undergo surgery? Patients with Hinchey I are usually treated conservatively. But, how many attacks at this stage of diverticulitis should occasion elective surgery? Should we operate on patients with Hinchey II? If we drain the abscess under CT control, should the patient undergo surgery later on? It appears that there is no dispute about the necessity of an operation for patients Hinchey III and IV, but there are reports of success of drainage and lavage, without colon resection. If we have already decided in favor of an elective operation, when should it follow the attack of diverticulitis? A few days, weeks or months? What about

the patients with chronic abdominal pain, problems with defecation, or recurrent bleeding? Are these patients candidates for elective surgery?

Most authorities have agreed on these indications for elective surgery: 1. patients with two or more previous attacks that were treated conservatively; 2. patients with complicated diverticulitis with obstruction, fistula formation; 3. patients in whom colonic cancer cannot be excluded; 4. immunocompromised patients who should be operated after first attack of diverticulitis.

Previously, two attacks were enough to proceed to surgery because of the increased awareness of more serious evolution and necessity of acute surgery [2]. However, these concerns were not confirmed, for example by Guzzo et al. (study with 196 patients, follow-up 5,2 years) [13], Chautems et al. (study with 118 patients, follow-up 9,5 years) [14], Broderick-Vila et al. (study with 3165 patients, follow-up 8,9 years) [15] or by a review from New Zealand [16]. The effectiveness of conservative therapy is increasing compared to the past. Chapman et al. split 150 patients with antecedent episodes of diverticulitis into two groups: Group A included patients with 1 or 2 prior episodes of diverticulitis and Group B included patients who had more than 2 prior episodes. No significant differences in operative complications, morbidity, or mortality rates were identified between the groups [17]. According to Richard et al. surgery after the third attack yields more years of life and quality-adjusted life years at a lower cost than surgery after one or two attacks [18]. A similar, but more radical, statement was made by Salem et al. with a preference for colectomy after the fourth rather than the second episode. Those authors postulated that a more expectant approach results in fewer deaths and fewer colostomies and is cost-saving for both younger and older patients [19]. Scarpa et al. found the same quality of life, symptom frequency, and operation and hospital admission rate in operated and nonoperated patients (study with 71 patients, follow-up 3,9 years) [20].

Of course, we can easily find studies that advocate a more invasive approach. The reason is the comparison between postoperative course after elective and acute surgery. Higher morbidity, longer hospitalization, increased hospital charges, and an elevation in mortality could be good reasons for prophylactic resection [21,22]. Good functional outcome and a low rate of recurrence after elective surgery has been acknowledged, as by Thörn [23].

Another dispute is about the approach to younger patients, that is, those less than 50 years of age. Medical treatment was noted to be less effective therapy by Greenberg et al. in a retrospective analysis conducted between 1991 and 2002 on 149 patients aged 40 years or younger [24].

On the other hand, Mäkelä et al. found that the course of the diverticular disease is not more aggressive in younger patients than in older ones [25], and an analysis of the literature performed in 2009 found a lack of evidence to support the hypothesis that elective surgery should follow a single attack [26].

So the latest recommendation for the proceeding after recovery from acute diverticulitis is to make a case-by-case decision based on age, physical condition, number of attacks and their severity, and persistent symptoms.

Only some studies focused on functional postoperative results. Stevenson et al. and similar Ambrosetti et al. in their studies regarding laparoscopic resection for diverticular disease advocate this surgery to achieve patient satisfaction with cosmetic and functional results [27,28]. However, Egger et al. have noted that 25 percent of operated patients suffer persistent symptoms like painful constipation, abdominal distension, cramps and painful diarrhea [29]. Munson et al. arrived at a similar percentage (27%) [30]. Thörn et al. arrived at 22% [23] and Breen et al. at 27% [31]. These authors attribute persistent abdominal discomfort to irritable bowel syndrome, inappropriate indications for surgery, or insufficient length of resected colon. Surgery can have a negative impact on defecation patterns (for example, shortened residual bowel, impaired neurogenic function or anastomotic stenosis). According to Sigma trial, the clinical outcomes did not differ between laparoscopic and open sigmoid resection after a 6-month follow-up period [32]. Similar results (after 12-month follow-up) were achieved with a study performed in Berlin [33].

A study focused on 30-day mortality, use of narcotics and length of stay performed in Singapor, found better results in the group undergoing laparoscopic surgery [34].

The aim of our work was to compare the benefits of surgery and conservative treatment after 5 to 10 years after a diverticulitis attack, examining the long-term results. We searched for any differences in quality of life between the patients treated conservatively and surgically. We tracked how many readmissions followed, and we counted the number of incisional hernias after a surgery.

There was no difference in quality of life for surgically or conservatively treated patients. From the long-term point of view, there is no superiority to surgery in regard to gastrointestinal symptoms, emotions, or physical and social functions. We questioned older patients, so there could be a presumption that many of them had at the time of inquiry other health problems, which could have influenced their satisfaction with life quality. We chose to do a retrospective analysis, because we were interested in the long-term results; a prospective study should follow. We are also well aware of the fact that just 62% of our patients took part in our study. We as-

sume that many of the remainder were not able to participate because of their age and deterioration of mental functions. The influence of aging could not be erased, because diverticular disease is an illness especially of seniors. The other problem is that our groups were not homogeneous; we did not distinguish between patients undergoing urgent or elective surgery.

There was no statistically significant difference in the number of readmissions because of a new attack of diverticulitis. But 30% of the patients who were treated surgically had incisional hernias that had to be surgically repaired. The incisional hernias evolved especially after acute surgery. In the years 2000-2005 we tended to treat diverticulitis with open surgery, not laparoscopically. The positive effects of surgery have been reported especially after laparoscopy [28,29]. So, it appears that open surgery has an adverse effect and simultaneously has no positive effect in terms of quality of life.

5. Conclusion

The quality of life for conservatively or surgically treated patients was the same. The kind of treatment does not appear to influence the long term quality of life in patients with diverticular disease. We can conclude that the long term quality of life should not be a reason for surgery and that a conservative approach should be seriously considered. But we also appreciate that elective surgery, especially laparoscopic, has fewer complications and results in fewer incisional hernias. We conclude that we should be more circumspect in recommending surgery because of persistent abdominal problems and we should consider thoroughly after how many attacks of diverticulitis we should recommend sigma resection to patients with Hinchey stage I.

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