

<https://doi.org/10.33878/2073-7556-2024-23-2-117-123>



The impact of anastomotic leakage on the quality of life of patients after surgery for rectal cancer

Evgeniy A. Khomyakov^{1,2}, Evgeniy G. Rybakov¹, Oleg I. Sushkov¹

¹Ryzhikh National Medical Research Center of Coloproctology (Salyama Adilya st., 2, Moscow, 123423, Russia)

²Russian Medical Academy of Continuous Professional Education (Barrikadnaya st., 2/1, Moscow, 125993, Russia)

ABSTRACT *AIM: to assess the impact of colorectal anastomotic leakage on the severity of low anterior rectal resection syndrome and the quality of life.*

PATIENTS AND METHODS: the results of 375 patients with rectal tumors were analyzed. In 26 patients, surgery was complicated by anastomosis failure. For a assessment of the quality of life of patients with anastomotic leakage, each patient was matched with a pair from the group of respondents with an uncomplicated postoperative period. The quality of life was assessed in all patients using the EORTC QLQ-C30 questionnaire with the Cr-29 module.

RESULTS: patients with anastomosis leakage have more severe low anterior rectal resection syndrome — 29 (17;34), versus 20 (9;28) points ($p = 0.03$) and a lower global score ($p = 0.01$), physical ($p = 0.01$) and social ($p = 0.04$) functioning. The symptom scales of the EORTC QLQ-C30 questionnaire, supplemented by the Cr-29 module, had significant differences between groups on the scales of body image ($p = 0.01$), fecal incontinence ($p = 0.04$) and embarrassment ($p = 0.01$).

CONCLUSION: colorectal anastomosis leakage negatively affects the quality of life of patients.

KEYWORDS: colorectal anastomotic leak, rectal cancer

CONFLICT OF INTEREST: the authors declare no conflict of interest

FOR CITATION: Khomyakov E.A., Rybakov E.G., Sushkov O.I. The impact of anastomotic leakage on the quality of life of patients after surgery for rectal cancer. *Koloproktologia*. 2024;23(2):117–123. (in Russ.). <https://doi.org/10.33878/2073-7556-2024-23-2-117-123>

ADDRESS FOR CORRESPONDENCE: Khomyakov E.A., Ryzhikh National Medical Research Center of Coloproctology, Salyama Adilya st., 2, Moscow, 123423, Russia; e-mail: evgeniy.khomyakov@gmail.com

Received — 25.12.2023

Revised — 15.03.2024

Accepted for publication — 24.04.2024

INTRODUCTION

Anastomosis leakage is a lesion in the integrity of the intestinal wall in the area of the anastomosis or pouch, leading to communication of the intestinal lumen with an extra-intestinal component (cavity or organ), while an abscess next to the anastomosis is also regarded as its leakage [1]. The leakage of colorectal anastomosis is a life-threatening complication in surgery for rectal cancer, the rate of which reaches 25% with low anterior resections [2].

The clinical consequences of anastomosis leakage and treatment options for this vary quite a lot: from minimal changes in treatment approach and transanal washout to the need for re-operation [3].

The anastomosis leakage has a negative effect on oncological results [4]. In addition, the consequences of this morbidity affect the quality of life and functional results.

An additional factor that worsens the quality of life of patients with colorectal anastomosis leakage is that in a significant number the preventive stoma will not be closed, and if necessary, separation of the anastomosis in a number of patients, with two stomas may be on the anterior abdominal wall [3].

In Russian clinical practice, the issue of the effect of anastomosis leakage on the quality of life of the corresponding category of patients has not been studied yet. Taking into account the relevance of the presented problems, a retrospective study was done in order to assess the impact of colorectal anastomosis leakage on the

severity of manifestations of low anterior rectal resection syndrome and the quality of life of patients.

PATIENTS AND METHODS

The results of a survey of 375 patients with rectal cancer, of whom 279 were hospitalized from June 2015 to August 2022, were analyzed. Another 96 patients underwent an anonymous questionnaire using an online platform, which was distributed via social networks to the target audience of special groups. Out of the total number of respondents, we were able to identify 26 patients whose surgery in the volume of low anterior resection for rectal cancer was complicated by the colorectal anastomosis leakage.

The fact of the anastomosis leakage was established by official medical documents and extracts from the medical history. Seventeen patients were operated on at the RNMRC of Coloproctology, 9 at other medical institutions.

In the study, we used the definition and classification AL as per the International Study Group of Rectal Cancer (2010), in which the anastomosis leakage was divided into 3 grades — radiological asymptomatic detected by proctography (Grade A), clinical symptomatic (Grade B) and clinical severe, requiring re-operation (Grade C).

The distribution of patients according to the grade of anastomotic leakage is shown in Table 1. According to the analysis of primary medical documentation, 23 (88.5%) of 26 patients underwent rectal resection with the formation of a preventive stoma during the main radical surgery. In this group of patients, 7 (30.4%) patients required re-operation with anastomosis disjunction. In three of those 7 patients, the preventive stoma was subsequently closed. The remaining 4 patients had two stomas on the anterior abdominal wall at the time of the survey. Sixteen patients with confirmed anastomosis leakage were conservatively treated. In 10 (62.5%) patients of that group, the stoma was closed within the

Table 1. Distribution of patients according to the grade of anastomotic leakage

Grade of anastomotic leakage	N
A-B	16 (61.5%)
C	10 (38.5%)

prescribed time after the healing of the anastomosis zone according to radiological control. The remaining 6 patients had not had a preventive stoma closed at the time of the survey. In three another patients (11.5%), the stoma was not formed during the first operation, they had formed a preventive stoma during the second operation without disconnecting the colorectal anastomosis, and two of them subsequently had the stoma closed.

The flowchart of the distribution of patients according to the treatment status of anastomosis leakage is shown in Figure 1. Thus, at the time of the survey, 12 (46.1%) patients out of 26 had their stoma closed. In that group of patients, the severity of low anterior rectal resection syndrome was assessed.

The quality of life was assessed in all patients using the EORTC QLQ-C30 questionnaire with the Cr-29 module.

The survey data was presented in the form of Microsoft Office Excel 2019 spreadsheets. The statistical analysis was performed using the IBM SPSS Statistics v.26 program (IBM Corporation, USA). The normal distribution of quantitative values was determined using the Shapiro-Wilk criterion. All variables did not have a normal distribution, respectively, the variation series was described using medians and quartiles (Q1; Q3). The Fisher criterion was used to analyze dichotomous variables. Continuous data was evaluated using the Mann-Whitney test when comparing the two groups. The results were considered statistically significant at $p < 0.05$.

For a comparative assessment of the quality of life of patients with anastomosis leakage, each patient was matched with a pair from a group of respondents who underwent

Table 2. Patient characteristics

Indicator	With anastomotic leakage	Without anastomotic leakage	<i>p</i>
Number of patients	26	26	
Gender			1
Males, <i>n</i> (%)	17 (65.4%)	17 (65.4%)	
Females, <i>n</i> (%)	9 (34.6%)	9 (34.6%)	
Median age (Q1; Q3), years	61 (54;65)	58 (55;63)	0.9
Median height of the tumor from the anal verge, cm	6 (4;10)	7 (5;10)	0.9
Postoperative period (Q1; Q3), months	14 (12;21)	16 (13;28)	0.8
Neoadjuvant CRT, <i>n</i> (%)	17 (65.4%)	17 (65.4%)	1.0
Postoperative chemotherapy, <i>n</i> (%)	11 (42.3%)	12 (46.2%)	0.8
The disease stage, <i>n</i> (%)			0.9
I	5 (19.2%)	7 (26.9%)	
II	11 (42.3%)	9 (34.6%)	
III	10 (38.5%)	10 (38.5%)	
Access, <i>n</i> (%)			1.0
Open	14 (53.8%)	14 (53.8%)	
Laparoscopic	12 (46.2%)	12 (46.2%)	
Anaesthetic risk rate according to ASA, <i>n</i> (%)			0.9
I–II	18 (69.2%)	19 (73.1)	
III	8 (30.8%)	7 (26.9%)	

radical surgery at the National Center of Coloproctology of the Ministry of Health of Russia without complications in the postoperative period in accordance with age, gender, anesthesiologic risk, stage of rectal cancer and tumor site, the fact of chemoradiotherapy,

the volume of operation, surgical access and duration of follow-up.

After selecting a group of patients, we obtained two completely comparable groups according to the specified basic characteristics of the respondents (Table 2).

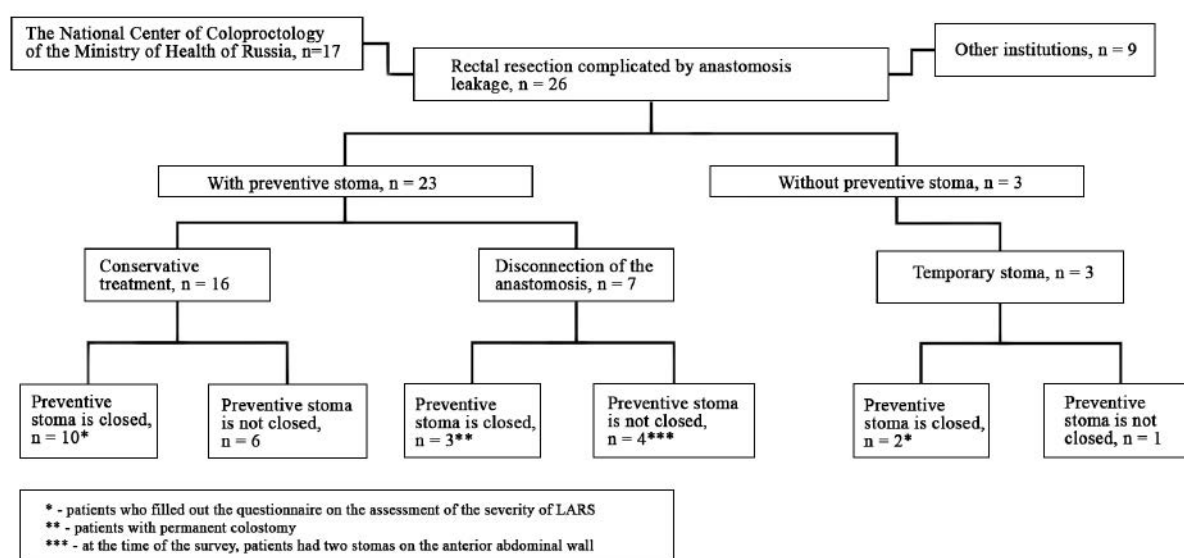
**Figure 1.** Flowchart of distribution of patients with anastomotic leakage

Table 3. Comparative analysis of the quality of life of patients with anastomotic leakage according to the EORTC QLQ-C30 questionnaire

Indicator	With anastomotic leakage, median score (Q1; Q3)	Without anastomotic leakage, median score (Q1; Q3)	<i>p</i>
LARS, points*	29 (17;34)	20 (9;28)	0.03
EORTC QLQ C-30			
Global	50 (41;66)	75 (66;83)	0.01
Physical	50 (41;58)	75 (66;91)	0.01
Role	66 (41;75)	66 (50;91)	0.1
Cognitive	100 (75;100)	100 (83;100)	1.0
Emotional	58 (50;75)	75 (50;91)	0.06
Social	58 (41;75)	75 (50;83)	0.04
Fatigue	44 (11;66)	22 (11;44)	0.07
Nausea and vomiting	0 (0;16)	16 (0;16)	0.7
Pain	33 (0;50)	16 (16;33)	0.4
Dyspnea	33 (0;66)	0 (0;33)	0.6
Insomnia	33 (0;66)	33 (0;33)	0.6
Anorexia	33 (0;66)	33 (0;66)	0.9
Constipation	33 (0;66)	33 (0;66)	0.4
Diarrhea	66 (33;66)	66 (33;66)	0.1
Financial difficulties	33 (33;66)	33 (0;33)	0.08

Note: * Only for patients who eventually had intestinal continuity restored, *n* = 12

RESULTS

Twenty-six patients of the main group and the corresponding number of patients of the control group filled out the EORTC QLQ-C30 questionnaire with the Cr-29 module. Twelve patients in the anastomotic leakage group who underwent stoma closure also filled out a questionnaire to assess the severity of low anterior rectal resection syndrome.

According to the results, significant differences were obtained on the scales of global (*p* = 0.01), physical (*p* = 0.01) and social (*p* = 0.04) functioning (Table 3).

When comparing the symptomatic scales of the EORTC QLQ-C30 questionnaire with the Cr-29 module, significant differences between the groups were obtained on the scales of body image

(*p* = 0.01), fecal incontinence (*p* = 0.04) and embarrassment (*p* = 0.01).

DISCUSSION

According to our data, patients whose postoperative period was complicated by the colorectal anastomotic leakage had more severe manifestations of low anterior resection syndrome — 29 (17; 34), versus 20 (9; 28) points (*p* = 0.03) and a lower global (*p* = 0.01), physical (*p* = 0.01) and social (*p* = 0.04) functioning. However, the result does not seem to fully reflect the impact of this morbidity on the quality of life of patients. In addition, the anastomotic leakage obviously has a negative effect on the patient’s emotional state, fatigue and financial difficulties, although we did not receive significant

Table 4. Comparative analysis of the quality of life of patients with anastomotic leakage according to the Cr-29 module

Indicator	With anastomotic leakage, median score (Q1; Q3)	Without anastomotic leakage, median score (Q1; Q3)	p
Body image	50 (33;66)	16 (0;33)	0.01
Anxiety	41 (16;50)	33 (16;50)	0.1
Weight Loss	16 (0;33)	16 (0;33)	0.7
Urinary frequency	33 (0;50)	16 (0;33)	0.1
Blood and mucus in the stool	16 (0;33)	0 (0;16)	0.09
Stool frequency	50 (33;50)	33 (16;50)	0.1
Urinary incontinence	16 (0;33)	16 (0;33)	0.4
Dyspnea	0 (0;33)	0 (0;33)	0.7
Abdominal pain	16 (0;33)	0 (0;33)	0.1
Pain in the buttocks	16 (0;33)	0 (0;33)	0.1
Abdominal distention	0 (0;33)	0 (0;33)	0.9
Dry mouth	0 (0;33)	0 (0;33)	0.9
Hair loss	0 (0;0)	0 (0;0)	0.9
Taste	0 (0;33)	0 (0;33)	0.9
Flatulence	0 (0;33)	0 (0;33)	1.0
Fecal incontinence	66 (33;66)	33 (0;66)	0.04
Skin inflammation	66 (33;66)	33 (0;33)	0.08
Embarrassment	33 (0;66)	0 (0;33)	0.01
Impotence	33 (0;66)	0 (0;66)	0.3
Dyspareunia	33 (0;33)	0 (0;33)	0.4

differences according to these scales ($p > 0.05$), which can be explained by a small sample of patients. The results of our study fit into the concept reflected in the systematic review by Plastiras A. et al. This work included 13 publications focused on the study of the functional consequences of colorectal anastomotic leakage [5]. Most of the authors included in the analysis of works are unanimous regarding the negative impact of this morbidity on the quality of life of patients.

Despite the very unambiguous results, they should be interpreted quite carefully. So, the study by Mongin C. et al., combining the results of the treatment of 170 patients operated on in the volume of total mesorectumectomy (67%

after CRT), which in 21 patients was complicated by anastomotic leakage, showed a significant decrease in physical activity, self-esteem and a high incidence of depression in patients with this morbidity. But, at the same time, the authors point to a trend towards improving these indicators with over time, based on the results of follow-up with a median of 30 months [6]. This conclusion makes it extremely interesting to assess the quality of life of patients with anastomotic leakage over time.

When assessing changes in the quality of life of patients with anastomotic leakage during two years of follow-up, Arron M.N. et al. found an increased risk of a clinically significant decrease in quality of life in 6 months after surgery

(OR = 3.65, 95% CI 1.62–8.21), compared with the group of patients without morbidity complication. However, these differences lost their significance after two years of follow-up (OR = 1.91, 95% CI 0.62–5.93). Nevertheless, the results of this study are difficult to extrapolate to the general sample, since it included patients after both rectal and colon resection, which means that the late effect of colorectal anastomotic leakage on quality of life has yet to be established [7].

A general important problem of study on the effect of anastomosis leakage on the quality of life of patients is the heterogeneity of the patients involved and the variety of manifestations, severity and tactics of treatment of morbidities. It is obvious that the physiological and functional consequences will differ in patients who simply needed to leave drainage for a longer period or delayed closure of the ileostomy, and those who underwent emergency surgery [8]. An additional limitation of this study is the lack of data on the quality of life of patients at the preoperative stage. This fact can play an important role in terms of the initially compromised quality of life of patients diagnosed with rectal cancer and the difficulty of selecting a homogeneous group of patients, especially since the quality of life depends not only on the disease itself and its treatment methods, but also on other social, emotional, economic, value and other factors. In addition to these factors, the bias of the results may be influenced by the presence of undiagnosed asymptomatic anastomosis leakage in the group of patients classified in the group without postoperative complications. According to the data obtained by Hain E. and co-authors, the severity of low anterior resection syndrome differs for clinical and radiological leakage [9]. Based on the analysis of the treatment results of 46 patients with anastomosis leakage after low anterior rectal resection and a selected group of 89 patients without morbidities in postoperative period, the authors obtained significant differences in the rate of severe low anterior rectal resection syndrome between the group of patients

with symptomatic anastomosis leakage (44%) and the control group (44% vs. 17%, $p = 0.004$).

However, no significant differences between the group with asymptomatic anastomosis leakage and the group without morbidity in the postoperative period in assessing the severity of low anterior resection syndrome ($p = 0.70$) were revealed by the authors [9]. Unfortunately, the small sample of patients included in our study does not allow for a reliable analysis of subgroups with asymptomatic and symptomatic leakage, which indicates the importance of accumulating experience and a set of materials for formulating unambiguous conclusions.

CONCLUSION

Patients whose postoperative period was complicated by the colorectal anastomotic leakage have more severe manifestations of low anterior resection syndrome — 29 (17/34), versus 20 (9/28) points ($p = 0.03$) and a lower global ($p = 0.01$), physical ($p = 0.01$) and social ($p = 0.04$) functioning. When comparing the symptomatic scales of the EORTC QLQ-C30 questionnaire supplemented with the Cr-29 module, significant differences between the groups were also obtained on the scales of body image ($p = 0.01$), fecal incontinence ($p = 0.04$) and embarrassment ($p = 0.01$).

AUTHORS CONTRIBUTION

Concept and design of the study: *Evgeniy A. Khomyakov, Evgeny G. Rybakov*

Collection and processing of material: *Evgeniy A. Khomyakov*

Text writing: *Evgeniy A. Khomyakov, Oleg I. Sushkov*

Editing: *Evgeny G. Rybakov*

INFORMATION ABOUT THE AUTHORS (ORCID)

Evgeniy A. Khomyakov — 0000-0002-3399-0608

Evgeniy G. Rybakov — 0000-0002-3919-9067

Oleg I. Sushkov — 0000-0001-9780-7916

REFERENCES

1. Rahbari NN, Weitz J, Hohenberger W, et al. Definition and grading of anastomotic leakage following anterior resection of the rectum: a proposal by the International Study Group of Rectal Cancer. *Surgery*. 2010;147:339–51. doi: [10.1016/j.surg.2009.10.012](https://doi.org/10.1016/j.surg.2009.10.012)
2. Alekseev M.V., Rybakov E.G., Achkasov S.I. Fluorescence angiography in colorectal surgery. *Pirogov Russian Journal of Surgery = Khirurgiya. Zhurnalim. N.I. Pirogova*. 2023; (9-2):58–62. (In Russ.). doi: [10.17116/hirurgia202309258](https://doi.org/10.17116/hirurgia202309258)
3. Ellis CT, Maykel JA. Defining Anastomotic Leak and the Clinical Relevance of Leaks. *Clin Colon Rectal Surg*. 2021;34(6):359–365. doi: [10.1055/s-0041-1735265](https://doi.org/10.1055/s-0041-1735265)
4. Ramphal W, Boeding JRE, Gobardhan PD, et al. Oncologic outcome and recurrence rate following anastomotic leakage after curative resection for colorectal cancer. *Surg Oncol*. 2018;27(4):730–6. doi: [10.1016/j.suronc.2018.10.003](https://doi.org/10.1016/j.suronc.2018.10.003)
5. Plastiras A, Korkolis D, Frountzas M, et al. The effect of anastomotic leak on postoperative pelvic function and quality of life in rectal cancer patients. *Discov Oncol*. 2022;13(1):52. doi: [10.1007/s12672-022-00518-w](https://doi.org/10.1007/s12672-022-00518-w)
6. Mongin C, Maggiori L, Agostini J, et al. Does anastomotic leakage impair functional results and quality of life after laparoscopic sphincter-saving total mesorectal excision for rectal cancer? A case-matched study. *Int J Colorectal Dis*. 2014;29(4):459–67. doi: [10.1007/s00384-014-1833-y](https://doi.org/10.1007/s00384-014-1833-y)
7. Arron MNN, Custers JAE, van Goor H, et al. The association between anastomotic leakage and health-related quality of life after colorectal cancer surgery. *Colorectal Dis*. 2023;25(7):1381–1391. doi: [10.1111/codi.16543](https://doi.org/10.1111/codi.16543)
8. Theodoropoulos GE, Papanikolaou IG, Karantanos T, et al. Post-colectomy assessment of gastrointestinal function: a prospective study on colorectal cancer patients. *Tech Coloproctol*. 2013;17(5):525–36. doi: [10.1007/s10151-013-1008-9](https://doi.org/10.1007/s10151-013-1008-9)
9. Hain E, Manceau G, Maggiori L, et al. Bowel dysfunction after anastomotic leakage in laparoscopic sphincter-saving operative intervention for rectal cancer: a casematched study in 46 patients using the low anterior resection score. *Surgery*. 2017;161(04):1028–1039. doi: [10.1016/j.surg.2016.09.037](https://doi.org/10.1016/j.surg.2016.09.037)