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# Quality of life in patients with chronic slow-transit constipation according to the PAC-QOL scale one year after surgical treatment: comparison with preoperative data and reference values

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#### ABSTRACT

Aim: To assess the impact of surgical treatment on quality of life in patients with chronic slow transit constipation according to the PAC-QOL scale one year after surgery.

**Materials and Methods:** PAC-QOL scores were studied in 107 patients with chronic slow-transit constipation (main group) before and one year after total colectomy (57), subtotal colectomy (29) and colectomy with low rectal resection (21). 70 patients were included into the reference group. Open surgery was performed in 70 (65.4%) patients, while laparoscopic access - in 37 (34.6%) patients.

**Results:** Despite the long-term conservative treatment PAC-QOL scores for all subscales significantly exceeded the reference values in all patients before surgery (all p<0,05). After surgery PAC-QOL scores decreased to reference values and were statistically lower than preoperative values (all p<0.01): physical component - from 2.78 $\pm$ 0.52 to 1.01 $\pm$ 0.32; psychological component - from 1.90 $\pm$ 0.48 to 0.83 $\pm$ 0.41; warries and concerns - from 1.99 $\pm$ 0.31 to 0.72 $\pm$ 0.34; the satisfaction component - from 2.35 $\pm$ 0.60 to 0.84 $\pm$ 0.47; total PAC-QOL score - from 2.14 $\pm$ 0.23 to 0.82 $\pm$ 0.35.

**Conclusions: S**urgical treatment – total or subtotal colectomy in patients with chronic slow-transit constipation resistant to conservative treatment provides a significant reduction of all PAC-QOL scores to reference values and provides full social and functional adaptation.

KEY WORDS: chronic slow-transit constipation, PAC-QOL score, quality of life

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#### INTRODUCTION

Chronic constipation (CC) is a common condition characterized by the heterogeneity of etiological factors and pathophysiological mechanisms, which can occur across all age groups. Patients with CC typically have a long disease history, often starting in childhood, with a progressive course. Many patients had multiple courses of conservative therapy, the outcomes remain variable and unpredictable. According to studies, the prevalence of CC in general population ranges 3% - 27%. The overall prevalence of constipation was higher in women than in men, increased with age among men, and was inversely related to family income. Female gender, low socioeconomic status, stroke, nervous system disease, anal fissures, fistulae, hemorrhoids, previous anorectal surgery in anamnesis are significantly associated with constipation [1]. The average global prevalence is estimated to be approximately 16%, while among individuals aged 60 to 110 years, may reach 33.5%. With a global prevalence of 15%, chronic constipation is among the most common gastrointestinal conditions diagnosed in outpatient clinics and is a frequent reason for referrals to gastroenterologists and colorectal surgeons in the United States [2].

The annual use of laxatives results in significant financial costs up to millions of dollars. Prevalence rates of CC vary between countries. For instance, in Australia, the prevalence among adults, based on the Rome criteria, reached 24% [3], while in Brazil, previous studies showed a range from 14% to 26% [1, 4-11].

Chronic constipation significantly impacts patients' quality of life, often causing additional issues such as mental health disorders [11-14]. Despite the significance of the problem, contemporary literature lacks sufficient data on the impact of various treatment methods on the quality of life of patients with CC. While total or subtotal colectomy has been proven for slow-transit constipation (STC) treatment, its impact on defecation function and quality of life (QOL) remains insufficiently studied [14].

The SF-36 scale was commonly used to assess the quality of life in patients with CC, [13, 14], although

it is not disease-specific. Disease-specific PAC-QOL (Patient Assessment of Constipation Quality of Life Questionnaire) scale was increasingly advised by some authors [9], [11]. However, there are currently no studies investigating the impact of surgical treatment on the quality of life of patients with slow-transit chronic constipation (STCC) using this scale.

Standardized diagnostic approaches are necessary for effective treatment and evaluation of patients with CC. At present, information regarding the quality of life of such patients in Ukraine is limited. Comprehensive treatment should aim not only to alleviate individual symptoms but also to improve the overall quality of life.

#### AIM

The aim to assess the impact of surgical treatment on quality of life in patients with chronic slow transit constipation according to the PAC-QOL scale one year after surgery.

# **MATERIALS AND METHODS**

107 patients with CSTC were studied and operated at the surgical department of the Saint Michael Clinical Hospital – clinical base of O. O. Bogomolets National Medical University in the period 2011 — 2023 (group O). 70 patients without CSTC were included into the reference group (group R). The Rome IV criteria were used to diagnose CSTC [15].

**INCLUSION CRITERIA** 

- Age over 18 years.
- CSTC that does not respond or poorly respond to modern conservative treatment methods for at least 6 months.
- Low QoL.
- Consent for surgical treatment.
- Consent to complete a QoL questionnaire. EXCLUSION CRITERIA
- Age under 18 years.
- Severe comorbidities.
- Patients with mental disorders.
- Pregnancy.
- Oncological diseases.
- Harmful habits.
- Refusal to complete the QoL questionnaire.
- Proctogenic constipation.
- Irritable bowel syndrome and/or constipation of secondary specific etiology (associated with an underlying condition).
- Drug-induced constipation.

The patients in the study groups did not differ in gender, average age, and body mass index. In both

groups, women were predominant: 102 (95.3%) in group O and 65 (92.9%) in the group R, p=0.486. The average age was  $43.1\pm13.6$  years and 41.5, p=0.436; the body mass index was  $22.9\pm4.5$  kg/m<sup>2</sup> and  $22.2\pm2.0$  kg/m<sup>2</sup>, p=0.227 respectively.

### QUALITY OF LIFE ASSESSMENT

The quality of life was evaluated using the disease-specific PAC-QOL questionnaire, developed and validated by Marquis et al. [8] in 2005. The questionnaire includes 28 items grouped into 4 subscales:

- Worries and concerns (11 items),
- Physical discomfort (4 items),
- Psychosocial discomfort (8 items), and
- Satisfaction with treatment (5 items).

Each item is assessed using a 5-point Likert scale ranging from 0 (not at all/never) to 4 (very much/all the time) over the previous 2-week period. A higher score indicates a worse QoL due to constipation. Total PAC-QOL scores and subscale scores were calculated according to the original PAC-QOL documentation for every patient [8]. QoL was assessed before surgery and one year after the surgery.

CSTC was manifested at various ages, with an average onset in patients of 21.5±16.3 years (ranging from 1 year to 67 years) according to the anamnestic data. The duration of the disease before treatment in our clinic was on average 20.7±13.2 years, ranging 5 - 53 years. The delay in bowel movements before clinic consultation was on average 9.4±5.1 days (from 3 days to 30 days). The stool consistency according to the Bristol Stool Form Scale [16] was Type I in 67 (62.6%) patients, Type 2 in 28 (26.2%), Type 3 in 8 (7.5%), Type 4 in 3 (2.8%), and Type 5 in 1 (0.9%). More than a quarter of bowel movements required manual assistance in 60 (56.1%) patients. The sensation of incomplete evacuation was reported by 101 (94.4%) patients, and the sensation of a blockage in the rectum during more than a quarter of bowel movements was reported by 97 (90.7%). Abdominal bloating and pain were registered in 80 (74.8%) patients.

Before visiting the clinic, all patients were continuously undergoing courses of conservative therapy, which gradually became less effective over time. They used a high-fiber diet in 103 (96.3%) cases, pharmacological agents in 107 (100.0%), and cleansing enemas in 92 (85.9%).

In O group 29 (27.1%) patients underwent subtotal colectomy, 57 (53.3%) underwent total colectomy, and 21 (19.6%) underwent colectomy with low rectal resection. Open surgery was performed in 70 (65.4%) patients, while laparoscopic access - in 37 (34.6%) patients.



Fig. 1. The distribution of the average score for the Physical discomfort subscale in patients of group O (A) before surgery and in the respondents of group R (B).



Fig. 2. The distribution of the average score for the Psychosocial discomfort subscale in patients of group 0 (A) before surgery and in respondents of group R (B).

# STATISTICAL ANALYSIS

Statistical analysis was performed using IBM SPSS Statistics, version 22. Descriptive statistics were calculated. Data normality was assessed using the Shapiro– Wilk test. Mean values were presented as M±SD. Categorical data were expressed as counts (%). The Student's t-test was used to compare variables between groups when the data distribution wasn't differ from normal; in other cases, the Wilcoxon-Mann-Whitney test was used. Comparisons of relative frequencies were performed using Pearson's chi-square test. The null hypothesis of equality of variables was rejected at p<0.05.

#### RESULTS

Despite the long history of conservative treatment, patients of group O had unsatisfactory quality of life scores in all PAC-QOL subscales, which significantly exceeded the reference values.

Thus, for the physical discomfort subscale, the average score in group O was  $2.78\pm0.52$ , ranging 1.5-3.78 points (Fig. 1A), while in the reference group, it was  $1.19\pm0.29$ , ranging from 0.25 to 1.75 points (p<0.001), (Fig. 1B).

The average score for the psychosocial discomfort subscale in group O was  $1.90\pm0.52$ , ranging 0.88 - 2.88 (Fig. 2A), while in the R group, it was  $0.85\pm0.18$ , ranging (0.5 - 1.38) (p<0.001), (Fig. 2B).



Fig. 3. The distribution of the average score for Worries and concerns subscale in patients of group O (A) before surgery and in group R (B).

PAC-QOL scales	Mean	SD	Min	Max
Physical discomfort	63,1	11,2	30,0	81,8
Psychosocial discomfort	56,7	16,0	5,5	78,6
Worries and concerns	64,0	15,8	7,8	82,4
Satisfaction	81,2	7,9	33,3	88,2
PAC-QOL	61,5	14,9	6,2	77,2

Table 1	I. Posto	perative	reduction	in PAC-	QOL :	scale and	subscale	scores	(in %	) after	surgical	treatment
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According to the worries and concerns subscale, the average score in group O was  $1.99\pm0.31$ , ranging from 0.73 to 2.36 points (Fig. 3A), while in the R group, it was 0.77 $\pm$ 0.24, ranging from 0.36 to 1.45 points (p<0.001), (Fig. 3B).

For the satisfaction with treatment subscale, the average score in group O was  $2.36\pm0.58$ , ranging 0.8 - 3.4 (Fig. 4A), while in the reference group -  $0.86\pm0.28$ , ranging 0.20 - 1.60 (p<0.001), (Fig. 4B).

According to the total PAC-QOL score, the average value in group O was  $2.13\pm0.23$ , ranged 1.57-2.71, fig. 5 A, while in group R it was  $0.87\pm0.12$ , ranging 0.61-1.18 (p<0.001), fig. 5 B.

PAC-QOL scale scores were decreased by 56.7% to 81.2% in all patients after surgical treatment, Table 1.

The average scores in all PAC-QOL subscales were significantly lower compared to preoperative values one year after surgery. Specifically, the physical discomfort scores decreased from  $2.78\pm0.52$  to  $1.01\pm0.32$  (p<0.01); the psychological discomfort scores - from  $1.90\pm0.48$  to  $0.83\pm0.41$  (p<0.01); the warries and concerns scores - from  $1.99\pm0.31$  to  $0.72\pm0.34$  (p<0.01); the satisfaction with treatment score decreased from

2.35±0.60 to 0.84±0.47; and the total PAC-QOL score - from 2.14±0.23 to 0.82±0.35.

At the same time, the mean scores of all PAC-QOL subscales in postoperative patients did not statistically differ from those in the reference group (all p>0.05), (Fig.6).

# DISCUSSION

Surgical treatment of chronic slow-transit constipation (CSTC) remains one of the most important aspects of gastroenterology, requiring a proffessional approach. Patient selection, the choice of optimal intervention methods, and the assessment of long-term outcomes are still subjects of active scientific discussions despite advancements in surgical techniques. The impact of surgery on patients' quality of life is one of the main aspects, it allows to evaluate treatment success by patients themselves.

The obtained results demonstrate a significant impact of CSTC on patients' quality of life, as evidenced by high scores across all subscales of the PAC-QOL scale compared to the reference group. High scores for



Fig. 4. Distribution of the average score for the Satisfaction subscale in patients of group O (A) before surgery and in the respondents of group R (B).

physical discomfort ( $2.78\pm0.52$ ), psychosocial discomfort ( $1.90\pm0.52$ ), warries and concerns ( $1.99\pm0.31$ ), and satisfaction ( $2.36\pm0.58$ ) indicate that CSTC significantly restricts both the physical functioning and social and emotional well-being in patients. Our results align with previous studies showing significantly worse quality-of-life indicators in patients with CSTC than the general population [5, 17-20].

Studies about SF-36 questionnaire reported a significant deterioration in the physical and mental components among patients with chronic constipation [20].

For instance, studies using the PAC-QOL and SF-36 scales showed similar trends in quality-of-life deterioration across various components. A 2015 study analyzed data using PAC-QOL and SF-36 questionnaires in patients with chronic functional constipation and irritable bowel syndrome with constipation (IBS-C) according to the Rome III criteria. The PAC-QOL survey included 43 patients (14% with IBS-C, 37% with functional constipation, and 49% with unclassified constipation), while the SF-36 survey included 93 patients (23% with IBS-C, 27% with functional constipation, and 51% with unclassified constipation).

The SF-36 questionnaire results indicated that patients with irritable bowel syndrome had a lower quality of life compared to those with functional and unclassified constipation. Statistically significant differences were observed between IBS-C patients and those with functional constipation in the fatigue/ energy scale in favor of the latter (41.67 ± 3.386 vs. 55.20 ± 4.383, p = 0.0221), as well as in the pain scale between IBS-C patients and those with unclassified constipation (p = 0.0362, 49.64 ± 5.290 vs. 63.62 ± 3.673).

The PAC-QOL questionnaire also showed worse

results in patients with IBS-C compared to those with functional constipation for physical component (p = 0.0029;  $10.00 \pm 1.125$  vs.  $4.938 \pm 0.8086$ ), psychological component (p = 0.0278;  $14.33 \pm 2.704$  vs.  $7.438 \pm 1.469$ ), warries score (p = 0.0379;  $17.33 \pm 4.410$  vs.  $9.375 \pm$ 1.494), satisfaction (p = 0.0180;  $16.50 \pm 0.4282$  vs. 10.31 $\pm 1.440$ ), and overall PAC-QOL score (p = 0.0034; 2.077 $\pm 0.2704$  vs.  $1.146 \pm 0.1391$ ) [11].

In our study, significant improvements in quality of life were observed across all components using the disease-specific PAC-QOL scale in patients with CSTC. Unlike the findings described by M.C. Ruiz-López, other authors evaluated the quality of life in 30 patients with slow-transit constipation after colectomy using the Gastrointestinal Quality of Life Index (GIQLI) and SF-36. It was found that GIQLI scores statistically improved (P < 0.05) after surgery during the study period (3 months, 6 months, 1 year, 2 years) as follows:  $77.8 \pm 17.5$  before surgery, 109.7 ± 21.2 in 3 months, 115.0 ± 20.7 in 6 months, 121.3 ± 20.3 in 1 year, and 123.6 ± 17.5 in 2 years. Additionally, SF-36 questionnaire results showed significant improvements in six health domains after colectomy in 3, 6, 12, and 24 months, respectively: Physical role (32.5 ± 46.0 vs. 66.7 ± 44.7, 78.3 ± 38.7, 74.4 ± 37.7, 76.7 ± 38.9). Emotional role (30.0 ± 46.6 vs. 67.8 ± 44.2, 87.8 ± 28.4, 87.8 ± 30.9, 81.6 ± 36.3). Physical pain (59.2 ± 31.8 vs. 72.2 ± 24.7, 77.4 ± 28.7, 83.9 ± 25.6, 88.9 ± 23.5). Vitality (49.0 ± 28.9 vs. 71.7 ± 27.4, 73.5 ± 25.6, 78.0 ± 26.1, 80.9 ± 23.0). Mental health (49.5 ± 26.5 vs. 74.0 ± 25.9, 76.3 ± 26.6, 83.7 ± 25.1, 86.2 ± 21.3). General health (29.4 ± 26.6 vs. 55.6 ± 27.5, 56.6 ± 28.3, 66.6 ± 33.0, 71.1 ± 30.0).

Thus, this study demonstrated that total or subtotal colectomy for slow-transit constipation is not only an effective method for eliminating constipation-associat-



Fig. 5. Total PAC-QOL score distribution in patients of group O (A) before surgery and in the respondents of group R (B).



Fig. 6. Average quality of life scores in patients of group O before and after surgery, and in respondents of the reference group.

ed symptoms but also significantly improves patients' quality of life [14].

One of the most debated issues is the criteria for selecting patients for surgical intrusion. Surgery is typically considered as a last-resort treatment when conservative therapy has failed and the patient's quality of life has significantly deteriorated [28]. However, even under these conditions, it is not always clear whether surgery is the best decision for every individual patient. For instance, manometric studies and colon transit time assessments are valuable tools, but they do not guarantee an accurate prediction of surgical success [2, 21, 22]. The choice of surgical procedure is also complex. The most common surgery techniques are total colectomy with ileorectal anastomosis and subtotal colectomy [19]. Total colectomy is effective for most patients with severe CSTC but carries risks of complications such as chronic diarrhea or pelvic organ dysfunction [2, 24]. Subtotal colectomy with ileorectal anastomosis is considered the standard surgical procedure for CSTC. When strict patient selection criteria are applied, the overall success rate exceeds 80% [2, 25]. Although subtotal colectomy is less invasive, it can still be associated with complications. According to some authors, a high incidence of small bowel obstruction was observed, leading to impaired peristalsis in some cases. Eight patients required conversion to an ileostomy. In long-term follow-up, 15 patients experienced worsening fecal incontinence (p < 0.01), stool consistency became softer (p < 0.01), and stool frequency decreased (p < 0.01) [26]. These factors highlight the necessity of an individualized approach when selecting a surgical method. For example, studies using the Wexner scale and GIQLI scores showed similar trends of poorer quality-of-life scores before treatment. The clinical effectiveness of laparoscopic total colectomy with ileorectal anastomosis and laparoscopic subtotal colectomy with an antiperistaltic cecorectal anastomosis in adults with slow-transit constipation has been demonstrated. These methods were found to significantly improve patients' quality of life in the long-term postoperative period [24].

The issue of long-term surgical effectiveness remains a topic of debate. While many studies show significant improvements in the physical and psychosocial components of quality of life following surgery, some patients develop new problems, such as fecal incontinence or social isolation due to side effects [27, 28]. These findings highlight the necessity for a comprehensive approach to evaluate treatment outcomes, considering both objective clinical indicators and the patient's subjective experience. Alternative methods, such as biofeedback or intestinal electrostimulation, are also gaining interest as potential ways to avoid radical surgery. However, current data on their effectiveness in patients with severe CSTC remain limited, necessitating further research to define their role in managing these patients [29].

The postoperative reduction in PAC-QOL scale scores by 56.7–81.2% confirms the high effectiveness of surgical treatment in improving the quality of life for patients with CSTC. The most significant changes were observed in the physical component (decreasing from 2.78±0.52 to 1.01±0.32; p<0.01) and the warries and concerns component (decreasing from 1.99±0.31 to 0.72±0.34; p<0.01). These findings align with those of other authors [14], where substantial improvements in physical and emotional parameters after total or subtotal colectomy were also registered.

Interestingly, one year after surgery, the average scores across all PAC-QOL subscales did not differ from those in the reference group (p>0.05). This suggests that surgery not only significantly reduces symptoms but also restores quality of life to a level comparable to healthy individuals. However, even when these improvements are achieved, some patients may remain dissatisfied due to minor but impactful postoperative issues, such as changes in bowel habits. Despite the clear benefits of surgical treatment, it is not without disadvantages. Some patients experience postoperative complications such as diarrhea, fecal incontinence, or electrolyte imbalances. Additionally, CSTC patients tend to have high levels of anxiety, which may affect their adaptation in postoperative period. Patient selection for surgical treatment remains debatable, particularly regarding the necessity to standardize approaches for determining the severity of CSTC and the optimal timing for intrusion. In our study, patients with a long CSTC history had significantly worse initial qualityof-life scores, which may have influenced treatment outcomes. Overall, surgical treatment of CSTC is an important tool for managing patients with refractory constipation, but it presents with significant challenges that require careful analysis. The impact of surgery on patients' quality of life should be a key factor in determining treatment strategies. Future research should focus on establishing optimal selection criteria, improving surgical techniques, and evaluating longterm outcomes.

# CONCLUSIONS

**S**urgical treatment – total or subtotal colectomy in patients with chronic slow-transit constipation resistant to conservative treatment provides a significant reduction of all PAC-QOL scores to reference values and provides full social and functional adaptation.

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#### **CONFLICT OF INTEREST**

The Authors declare no conflict of interest

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