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QUALITY OF LIFE IN PATIENTS AFTER WIDESPREAD PERITONITIS OF VARIOUS ETIOLOGIES

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This study evaluated the impact of three different peritoneal lavage techniques on the quality of life in patients following surgical treatment for widespread peritonitis. A total of 98 patients were examined and allocated into three clinical groups. Quality-of-life outcomes were assessed using the SF-36, GIQLI, and EQ-5D questionnaires at 6 and 12 months post-treatment. The most favorable outcomes across all instruments were observed in the group that used probiotic antiseptics for peritoneal lavage. At one year, the scores for physical, emotional, and social functioning in this group significantly exceeded the corresponding indices in both the enterosorbent and control groups. Probiotic lavage facilitated faster recovery, reduced somatic symptoms, and improved both psycho-emotional status and general health. This positive therapeutic effect remained stable throughout the 12-month follow-up period. Although this method currently remains outside official clinical protocols due to limited evidence base, our findings demonstrate that integrating probiotic peritoneal lavage into comprehensive peritonitis management and long-term post-discharge surveillance is highly justified to improve long-term functional recovery.

Key words: peritonitis, postoperative period, quality of life, clinical monitoring.

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ЯКІСТЬ ЖИТТЯ ПАЦІЄНТІВ, ЯКІ ПЕРЕНЕСЛИ РОЗПОВСЮДЖЕНИЙ ПЕРИТОНІТ РІЗНОГО ГЕНЕЗУ

У дослідженні проаналізовано вплив трьох методів санації черевної порожнини на якість життя пацієнтів після хірургічного лікування розповсюдженого перитоніту. Усього було обстежено 98 хворих, яких розподілили на три клінічні групи. Найкращі результати за шкалами SF-36, GIQLI та EQ-5D виявлено в групі, де використовували пробіотичні антисептики. Через рік фізичне, емоційне та соціальне функціонування пацієнтів цієї групи достовірно перевищувало аналогічні показники у групі із сорбентом та контрольній групі. Пробіотична санація сприяла швидшому відновленню, зменшенню соматичних симптомів, покращенню психоемоційного стану та загального самопочуття. Її позитивний ефект зберігався протягом 12 місяців. Водночас метод залишається поза межами офіційних клінічних протоколів через недостатню доказову базу. Отримані результати свідчать про доцільність включення пробіотичної санації черевної порожнини до комплексної терапії перитоніту та подальшого катамнестичного спостереження за пацієнтами.

Ключові слова: перитоніт, післяопераційний період, якість життя, клінічний моніторинг.

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Evaluating the quality of life of patients treated for widespread peritonitis of various origins is important for a comprehensive assessment of the effectiveness of surgical intervention [14]. Peritonitis is one of the most severe forms of acute abdominal pathology, which is accompanied by a high risk of a fatal outcome, the development of multiple organ failure, and the formation of persistent postoperative disorders [12].

Overcoming the acute phase does not guarantee a full recovery of functional status, as a significant portion of patients face asthenic syndrome, pain, digestive disorders, psycho-emotional instability, and limitations in social activity for a long time after discharge from the hospital. In such a context, it is precisely the quality of life (QoL) indicators that assume special significance as integral indicators of the effectiveness of treatment and long-term rehabilitation.

The use of standardized tools for assessing QoL allows for the objective assessment of patients' subjective experiences and the comparison of results across treatment methods. Furthermore, QoL indicators are a fundamental tool in pharmacoeconomic analysis, as they enable the quantitative evaluation of not only the clinical effectiveness of medical interventions but also their impact on patients' functional, psycho-emotional, and social well-being [14].

Various approaches are utilized in current clinical practice for peritoneal lavage. Traditional serial irrigation with normal saline remains the baseline method, yet it fails to provide a sufficient anti-inflammatory or regenerative effect. Alternatively, sorbents can bind toxic metabolites, thereby improving local homeostasis. Recently, intraoperative irrigation with probiotic preparations has emerged as a promising strategy to modulate the immune response, restore the microbiota, and reduce systemic inflammation [1].

Evidence demonstrates that these specific methods yield the best outcomes regarding physical, psycho-emotional, and social recovery. Consequently, incorporating quality-of-life assessments into postoperative surveillance programs for patients with complicated peritonitis is a justified approach. This integration enables the timely and accurate evaluation of rehabilitation needs, optimizes

therapeutic strategies, and mitigates the risk of pathological changes becoming chronic.

The purpose of the study was to evaluate the quality of life in patients who had undergone widespread peritonitis of various etiologies.

Materials and methods. The study was conducted at the Brovary Multidisciplinary Clinical Hospital between 2023 and 2024. We analyzed the treatment outcomes of 98 patients with widespread peritonitis, who were divided into three groups based on the peritoneal lavage techniques used.

Group I (the intervention group) included 31 (31.6 %) patients whose surgical management consisted of intraoperative peritoneal lavage repeated 3 to 5 times with a 5 % solution of the probiotic antiseptic "SVITECO PHS" (Sirion LLC, Ukraine) in sterile 0.9 % NaCl. Following irrigation, the probiotic disinfectant spray "AREDERMA' (Sirion LLC, Ukraine) was applied to the surgical wound, and a thin layer of the probiotic gel "SVITECO PPG' (Sirion LLC, Ukraine) was applied to the wound site after closure. Group II (the comparison group) comprised 32 (32.7 %) patients. Peritoneal lavage in this cohort was performed using a solution of the sorbent "Enterosgel" (CREOMA-PHARM, Ukraine) in sterile 0.9 % NaCl. The abdominal cavity was irrigated 3 to 5 times, allowing the solution to dwell for 2 to 3 minutes before it was flushed out with 0.9 % NaCl. Group III (the placebo-control group) consisted of 35 patients (35.7 %) who underwent standard peritoneal lavage with 0.9 % NaCl, repeated 3 to 5 times.

The study population comprised 61 (62.2 %) men and 37 (37.8 %) women. Patient age ranged from 19 to 84 years, with a mean age of 54.8±13.6 years.

Inclusion criteria were as follows: age older than 18 years; clinically, laboratory, and intraoperatively confirmed widespread peritonitis of various etiologies; undergoing surgical intervention with peritoneal lavage; and written informed consent from the patient or their legal representative for participation in the study and subsequent follow-up observation.

Exclusion criteria included: local or localized peritonitis; primary bacterial peritonitis; terminal state with a predicted life expectancy of less than 30 days; decompensated cardiac, hepatic, or renal failure; severe psychiatric illnesses or cognitive impairments that precluded the adequate completion of questionnaires; pregnancy; and patient refusal to participate or withdrawal of informed consent.

Patients were allocated to groups postoperatively based on the peritoneal lavage technique utilized. The groups were comparable regarding age, sex, peritonitis extent, and the nature of the primary pathology ($p>0.05$). No crossover or reallocation between groups occurred after the study commenced. During the 12-month follow-up period, a subset of patients did not participate in the repeated questionnaire assessments due to loss to follow-up or withdrawal from further observation, and this was accounted for in the analysis of long-term outcomes. No modifications to the treatment strategy or group composition occurred throughout the study duration.

This study was conducted to evaluate the long-term postoperative quality of life in patients who had undergone widespread peritonitis. The investigation utilized the SF-36 (36-Item Short Form Health Survey), GIQLI (Gastrointestinal Quality of Life Index), and EQ-5D-5L (EuroQol 5-Dimensional 5-Level questionnaire) [4, 11]. Assessments were performed at 6- and 12-month post-treatment. The study was conducted in accordance with current bioethical standards [3]. All patients or their legally authorized representatives provided voluntary, written informed consent to participate in the study.

Statistical analysis was performed using descriptive statistics, including frequency, analysis of variance (ANOVA), and correlation analyses [2], utilizing Statistica software, version 14.1.25 (TIBCO Software Inc., USA; License No. AXA009K288111FAACD-7, 2024). Quantitative data were expressed as the arithmetic mean (M) and standard error of the mean (m). The normality of data distribution was assessed using the Shapiro–Wilk test. Intergroup comparisons were performed using a one-way analysis of variance (ANOVA), followed by Tukey's post hoc test. Categorical variables were analyzed using Pearson's chi-square (χ^2) test. Differences were considered statistically significant at $p<0.05$.

Results of the study. Analysis of patient outcomes across the three clinical groups revealed significant differences in the SF-36 scores at 6 months. The most favorable outcomes were observed in the group that received probiotic preparations during peritoneal lavage. In this group, the level of physical functioning (PF) was 42.2±0.9 points, which significantly exceeded the values in the comparison (36.3±0.8) and control (29.7±1.2) groups.

A similar advantage was observed in other subscales: role-based physical functioning (RF) – 30.5±1.1 points versus 23.9±1.3 and 22.8±1.0, respectively; bodily pain (BP) – 42.1±0.8 versus 36.0±1.0 and 24.9±1.2, respectively; general well-being (GH) – 49.1±1.0 versus 44.0±0.8 and 38.5±0.6, respectively (Table 1).

Patients in the intervention group showed improvement in most indicators, in particular in the vital energy (VT) and social functioning (SF) scales: 48.8±0.6 and 60.1±0.9 ($p<0.05$), respectively. This indicates a faster recovery of energy and social interaction.

Regarding the psychoemotional component, the results of the role emotional (RE) subscale were the highest in patients receiving probiotic lavage – 52.5±0.8, while in the comparison and control groups – 47.5±0.7 and 45.5±0.6, respectively ($p<0.05$). Mental health (MH) in the main group was 46.3±1.3 points – slightly lower than in the comparison group, but higher than in the control group.

Table 1

Dynamics of QOL indicators according to the SF-36 scale

Subscales	In 3 months			In 6 months		
	Group I	Group II	Group III	Group I	Group II	Group III
PF	42.2±0.9*	36.3±0.8*	29.7±1.2	60.9±0.9*	60.3±0.8*	54.8±1.2
RF	30.5±1.1*	23.9±1.3	22.8±1.0	60.2±1.3*	61.6±1.6*	55.2±0.8
BP	42.1±0.8*	36.0±1.0*	24.9±1.2	66.3±1.0*	62.1±0.9	61.1±1.6
GH	49.1±1.0*	44.0±0.8*	38.5±0.6	67.6±1.3*	62.9±2.0	60.4±1.4
VT	48.8±0.6*	45.3±0.6*	42.5±0.7	64.2±0.9	67.5±0.8	61.0±1.7
SF	60.1±0.9*	56.2±0.9*	53.3±0.9	66.8±0.9*	65.0±1.0	62.6±2.2
RE	52.5±0.8*	47.5±0.7*	45.5±0.6	70.5±0.4*	70.8±0.5	55.9±1.8
MH	46.3±1.3*	50.5±0.6*	43.7±0.7	63.8±0.5*	64.4±0.9	56.1±0.5

Note: * – differences compared to the control group are statistically significant ($p<0.05$).

The application of probiotic antiseptics during peritoneal lavage demonstrated clear clinical advantages, including reduced pain, improved physical and emotional functioning, and a faster return to daily activities. Even one year post-intervention, these positive changes remained stable despite a reduction in the number of respondents. All three clinical groups showed improvements in quality of life at 12 months; however, the most favorable trends were observed in the active lavage groups (probiotic or sorbent). Specifically, the highest values in the probiotic group were achieved on the BP, RE, and GH scales. The control group demonstrated the least positive trend.

The trajectory of the SF-36 scores, as illustrated in the figure, shows steady growth across all groups, confirming the efficacy of an integrated therapeutic approach that combines surgical intervention with targeted local therapies and postoperative rehabilitation.

Concurrently, the comparison group presented with residual complaints, including moderate fatigue, impaired social interactions, emotional instability, and decreased physical activity levels. Nevertheless, at 12 months, all GIQLI subscales showed marked improvement, with the most pronounced gains in the intervention group (Table 2).

Table 2

Quality of Life Trends (GIQLI Scale)

Subscales	Group I		Group II		Group III	
	In 6 months	In 12 months	In 6 months	In 12 months	In 6 months	In 12 months
Gastrointestinal symptoms	38.3±1.3	55.5±1.9	32.2±1.6	41.1±2.1	23.3±1.5	37.6±2.4
Physical functioning	12.4±0.4	22.2±0.7	10.5±0.5	19.1±0.9	8.4±0.5	18.2±1.2
Emotional functioning	11.3±0.4	18.2±0.6	9.4±0.4	15.6±0.7	6.2±0.4	13.4±0.4
Social functioning	10.5±0.4	16.4±0.6	7.2±0.5	14.4±0.3	5.0±0.3	12.2±0.8
Effect of medical treatment	2.0±0.1	3.1±0.1	2.2±0.1	3.0±0.1	2.1±0.1	2.0±0.1
Total GIQLI score	73.4±2.6	114.4±4.0	60.0±2.9	92.2±4.4	44.4±2.9	82.4±5.4

The GIQLI score in this group increased from 73.4±2.6 to 114.4±4.0 points, corresponding to approximately 75–80 % of the values observed in the healthy population. In the comparison group, the final result was 92.2±4.4 points, and in the control group – 82.4±5.4 points, which indicates a partial, but less complete adaptation to the consequences of surgical intervention. Notably, all changes exceeded the minimal clinically important difference (MCID) threshold, meaning they were significant not only statistically but also in patients' everyday lives. Thus, the GIQLI scale confirmed its utility for monitoring quality of life following peritonitis. It enables tracking improvements in physical, emotional, and social functioning, as well as the impact of therapeutic interventions on daily life.

Longitudinal trends in the EQ-5D scores further confirm the superior efficacy of probiotic peritoneal lavage. In Group I patients, subscale values at 6 months already exceeded those in the comparison groups, and at 1 year, this superiority became statistically significant across nearly all domains: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression (Fig. 1).

The overall EQ-5D index in group I increased from 0.75±0.08 to 0.84±0.08 points, approaching the healthy population reference values (0.85–1.0). In group II, the improvement was less pronounced, rising from 0.71±0.07 to 0.77±0.08 points, and in group III (control) it increased from 0.61±0.07 to only 0.68±0.08 points. This underscores the lower efficacy of standard peritoneal lavage with normal saline when used without adjunctive therapeutic agents.

Consequently, the data from the EQ-5D scale align with the SF-36 and GIQLI findings, confirming the superiority of probiotic lavage over sorbent-based and standard techniques. They also indicate the necessity of a multidisciplinary approach to treatment and long-term surveillance.

At 1 year, the overall EQ-5D index was 0.84±0.08 in Group I patients, approaching the level observed in the healthy population. In Group II, the value was 0.77±0.08, whereas in the control group, it was only 0.68±0.08. This demonstrates that treatment efficacy was heavily dependent on the peritoneal lavage technique utilized. Graphical analysis confirms that the fastest rate of functional recovery was observed in Group I, in which probiotic antiseptics were applied. The enterosorbent group (Group II) exhibited a moderate improvement trend, whereas the control group (Group III) showed the lowest improvement. For several indicators, Group III failed to achieve values indicative of complete recovery even at the one-year mark.

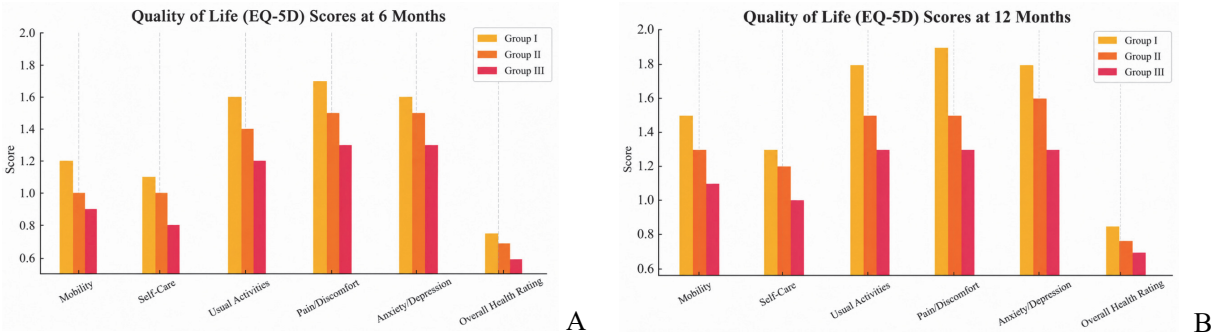

Fig. 1. Longitudinal trends in EQ-5D quality-of-life scores (a – at 6 months, b – at 12 months).

Discussion. Against this background, the question arises regarding the optimal duration of post-discharge surveillance. Arguments in favor of extending follow-up to 18–24 months include the potential for symptom chronicity, late-onset adhesive capsulitis or peritoneal adhesion development, residual pain syndrome, impaired exercise tolerance, and psycho-emotional disorders [9, 10, 14].

Following peritonitis, particularly generalized forms or those complicated by abdominal sepsis, patients' quality of life significantly deteriorates due to a constellation of physical, psycho-emotional, and social factors. The most prevalent issues include chronic fatigue, decreased exercise tolerance, abdominal pain associated with adhesions, and impaired gastrointestinal motility. Psychologically, a substantial proportion of patients experience anxiety disorders, depression, or even post-traumatic stress disorder (PTSD), which are further exacerbated by the trauma of intensive care unit (ICU) stays or repeat surgical interventions. Socially, these patients frequently suffer long-term disability, require external caregiver support, and face social isolation [6, 14]. Peritoneal lavage techniques play a pivotal role in subsequent functional recovery and long-term quality of life [1, 13].

Standard single-stage peritoneal lavage with drainage is the least invasive approach and is typically associated with lower complication rates. However, in cases of severe peritonitis, staged laparotomies are employed; while they allow for effective control of the infectious process, they simultaneously elevate the risk of incisional hernias and chronic pain syndrome.

Consequently, the appropriate selection of the lavage technique directly impacts the patient's physical autonomy, rehabilitation duration, and psycho-emotional status. Successful resolution of the infectious process prevents the development of multiple organ dysfunction syndrome, which is the primary driver of mortality and long-term disability. Conversely, aggressive or poorly timed interventions lead to high rates of surgical complications, particularly hernias, enterocutaneous fistulas, and peritoneal adhesions, significantly compromising long-term quality of life. Therefore, an effective combination of early diagnosis, optimal choice of lavage strategy, and a multidisciplinary approach to rehabilitation serves as the determining factor in achieving satisfactory functional outcomes following peritonitis treatment.

The application of probiotic antiseptics for peritoneal lavage in peritonitis is a promising, albeit currently experimental, approach aimed not only at eliminating pathogenic microorganisms but also at modulating the local immune response, mitigating inflammation, and restoring microbiological homeostasis. Following aggressive antibiotic therapy and generalized peritonitis, patients frequently develop profound dysbiosis, translocation of Gram-negative flora, impaired gastrointestinal motility, adhesion formation, and systemic inflammation. Direct intraperitoneal administration of probiotics – specifically strains of Lactobacillus plantarum, Bifidobacterium bifidum, and Saccharomyces boulardii – exerts an antagonistic effect against opportunistic pathogens, reduces levels of pro-inflammatory cytokines (such as IL-6, TNF-α), inhibits fibrin formation, stimulates peritoneal reparative processes, and promotes the restoration of local immune balance [13].

Clinical studies demonstrate a positive impact of this technique on post-peritonitis quality of life [5, 8]. Specifically, observed benefits include reduced postoperative pain, accelerated recovery of intestinal motility, a shorter duration of paralytic ileus, earlier resumption of oral feeding, a decreased incidence of peritoneal adhesion formation, and a reduced need for repeat surgical interventions. Collectively, these factors directly enhance physical autonomy, reduce

anxiety levels, and accelerate social reintegration. Furthermore, postoperative immune resilience has improved, with a lower incidence of infectious complications.

Current treatment guidelines for widespread peritonitis lack data on integrating probiotic antiseptics into peritoneal lavage as part of comprehensive therapeutic protocols [6, 7, 14]. Thus, it should be emphasized that large-scale, multicenter, randomized controlled trials evaluating the use of probiotic antiseptics in the management of widespread peritonitis are currently lacking. Our findings demonstrate the potential of these solutions to lower complication rates, reduce rehabilitation duration, and overall improve post-surgical quality of life in patients treated for peritonitis.

Long-term surveillance facilitates adaptive rehabilitation planning and the prevention of late-stage complications [9]. Incorporating probiotic antiseptics into the peritoneal lavage treatment protocol for widespread peritonitis not only improves short-term outcomes but also positively impacts long-term quality of life, fostering comprehensive physical, social, and emotional recovery.

Limitations. During the study, we encountered challenges regarding patient contact, particularly at the 12-month post-treatment follow-up. Additionally, a subset of patients declined to complete the follow-up questionnaires.

Conclusion

The application of probiotic antiseptics for peritoneal lavage in peritonitis demonstrated a statistically significant advantage over sorbent-based and standard lavage techniques across most subscales of the SF-36, GIQLI, and EQ-5D questionnaires. Notable improvements were observed in pain reduction, physical and emotional functioning, and the restoration of social activity and mental health. Patients in the intervention group exhibited a steady increase in quality-of-life indices during the 6- to 12-month postoperative period, reaching values close to the reference range for a healthy population. The total EQ-5D index after a year was 0.84±0.08 in patients in group I, which approached the level of the healthy population. In group II, the value was 0.77±0.08, and in the control group, only 0.68±0.08. This demonstrates that treatment efficacy was heavily dependent on the peritoneal lavage technique utilized. Specifically, the GIQLI score in this group increased by over 40 points, and the EQ-5D index rose by 0.09 points, both exceeding the minimal clinically important difference threshold.

Prospects for further research. To develop a comprehensive rehabilitation protocol and methodology for patients who have undergone surgical treatment for peritonitis, with the ultimate goal of optimizing long-term quality of life.

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