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ANALYSIS OF THE QUALITY OF LIFE OF PATIENTS AFTER SURGICAL OPERATIONS IN TERMS OF THE RISK OF DEVELOPING ADHESIVE INTESTINAL OBSTRUCTION

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Abstract. Numerous experimental, clinical and laboratory studies have been devoted to the prevention of postoperative adhesions. Taking into account the etiological factors and mechanisms of formation of postoperative adhesions, a wide variety of methods have been proposed to prevent them. We analyzed the long-term results of surgical interventions on abdominal organs in 317 patients who were followed up to 18 months. The main group consisted of 101 patients in whom the drug Hemoben was used intraoperatively to prevent adhesions. The comparison group included 216 patients who underwent interventions without the use of any anti-adhesive agents. In the long-term period (from 3 to 18 months) after surgery, 116 patients of the comparison group and 64 patients of the main group had their quality of life assessed using the GIQLI questionnaire (Gastrointestinal Quality of Life Index) specially designed for such a cohort of patients. The study of the subjective factor of assessing anti-adhesive effectiveness based on a comparative analysis of the quality of life level according to the GIQLI questionnaire showed a higher value of this indicator in the main group for all major domains, with a total score of 103.8 ± 9.8 versus 92.6 ± 10.8 points ($t = 7.12$; $p < 0.05$) (the indicator in the group of healthy individuals was 123.6 ± 5.1 points).

Key words: *adhesive intestinal obstruction; anti-adhesive agents; quality of life; Hemoben drug.*

АНАЛИЗ КАЧЕСТВА ЖИЗНИ ПАЦИЕНТОВ ПОСЛЕ ХИРУРГИЧЕСКИХ ОПЕРАЦИЙ В АСПЕКТЕ РИСКА РАЗВИТИЯ СПАЕЧНОЙ КИШЕЧНОЙ НЕПРОХОДИМОСТИ

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Резюме. Предупреждению послеоперационных спаек посвящены многочисленные экспериментальные, клинические и лабораторные исследования. С учетом этиологических факторов и механизмов формирования послеоперационных спаек для их предупреждения предложены самые разнообразные методы. Нами проанализированы отдаленные результаты оперативных вмешательств на органах брюшной полости у 317 пациентов, которые были прослежены в сроки до 18 месяцев. Основную группу составил 101 пациент, у которых для профилактики спайкообразования интраоперационно применялся препарат Хемобен. В группу сравнения включено 216 больных, которым выполнены вмешательства без применения каких-либо антиадгезивных средств. В отдаленный период (от 3 до 18 месяцев) после операции у 116 пациентов группы сравнения и 64 больных основной группы была проведена оценка уровня качества жизни с помощью специально разработанного для такой когорты пациентов опросника GIQLI (Gastrointestinal Quality of Life Index). Изучение субъективного фактора оценки противоспаечной эффективности по сравнительному анализу уровня качества жизни по опроснику GIQLI показало более высокое значение этого показателя в основной группе по всем основным доменам, при этом общий балл составил $103,8 \pm 9,8$ против $92,6 \pm 10,8$ баллов ($t=7,12$; $p < 0,05$) (показатель в группе здоровых лиц составил $123,6 \pm 5,1$ баллов).

Ключевые слова: спаечная кишечная непроходимость; противоспаечные средства; качество жизни; препарат Хемобен.

INTRODUCTION

The adhesions lead to decreased quality of life, chronic abdominal pain, and infertility. In some cases, an intestinal obstruction may develop [1–3].

In fact, adhesions are a specific pathologic response of the peritoneum to inflammation in patients with cholecystitis, peptic ulcer, salpingitis, oophoritis, endometriosis, and uterine myoma. Previously occurring adhesions are often the cause of infertility in patients with tubal and peritoneal forms of infertility.

Numerous experimental, clinical, and laboratory studies have been devoted to the prevention of postoperative adhesions. Taking into account etiological factors and mechanisms of postoperative adhesions formation, a wide variety of methods have been proposed for their prevention [4–7].

The available "barriers" are not the panacea; the search for new methods continues. Also, some authors propose to continue the development of liquid substances for single intraperitoneal application, which will significantly reduce the incidence of postoperative adhesions. It will have a reasonable cost and there will not be any adverse effects on the coagulation system and wound healing processes [8–10].

MATERIALS AND METHODS

We analyzed the long-term results of surgical treatment of abdominal organs in 317 patients who were followed up to 18 months. The

main group consisted of 101 patients in whom Hemoben was intraoperatively used to prevent adhesions. The control group included 216 patients, who underwent treatment without any anti-adhesive agents (Table 1).

As the result of the follow-up in the long-term period (18 months) it was possible to establish the development of clinical picture of acute adhesive intestinal obstruction (AAIO) in 2 (2.0%) patients of the main group, and in the control group — in 19 (8.8%) patients (Table 2). It should be noted, that in patients who had operated on for liver and spleen injury with the use of Hemoben, in the long-term period the occurrence of clinical picture of AAIO was not noted in any case.

Only 1 (1.0%) patient of the main group and 8 (3.8%) patients of the comparison group underwent surgical intervention because of the AAIO (Table 3).

The data shows only clinically significant cases of postoperative adhesive intestinal obstruction.

Therefore, for a more objective analysis the study was supplemented with subjective assessment, which can also indirectly find the presence of adhesions affecting the patient's condition and their quality of life (QOL). For this purpose, in the period from 3 to 18 months after the surgical treatment, 116 patients of the comparison group and 64 patients of the main group were evaluated for their QOL using the Gastrointestinal Quality of Life Index (GIQLI) questionnaire, which

Table 1. The number of followed-up patients depending on the time of follow-up

Таблица 1. Количество прослеженных больных в зависимости от сроков наблюдения

Период наблюдения / Observation period	Группа сравнения / Comparison group		Основная группа / The main group	
	абс. / abs.	%	абс. / abs.	%
Оперированы по поводу ОСКН / They were operated on for AAIO				
1 месяц / 1 month	12	11,5	7	25,0
6 месяцев / 6 months	31	29,8	14	50,0
12 месяцев / 12 months	46	44,2	4	14,3
18 месяцев / 18 months	15	14,4	3	10,7
Всего / Total	104	100,0	28	100,0
Оперированы на желудке и/или кишечнике / Operated on the stomach and/or intestines				
1 месяц / 1 month	14	19,4	11	20,4
6 месяцев / 6 months	24	33,3	21	38,9
12 месяцев / 12 months	23	31,9	14	25,9
18 месяцев / 18 months	11	15,3	8	14,8
Всего / Total	72	100,0	54	100,0
Оперированы по поводу травм печени или селезенки / They were operated on for injuries to the liver or spleen				
1 месяц / 1 month	7	17,5	4	21,1
6 месяцев / 6 months	11	27,5	9	47,4
12 месяцев / 12 months	15	37,5	4	21,1
18 месяцев / 18 months	7	17,5	2	10,5
Всего / Total	40	100,0	19	100,0
Все больные / All patients				
1 месяц / 1 month	33	15,3	22	21,8
6 месяцев / 6 months	66	30,6	44	43,6
12 месяцев / 12 months	84	38,9	22	21,8
18 месяцев / 18 months	33	15,3	13	12,9
Всего / Total	216	100,0	101	100,0

Примечание: ОСКН — острая спаечная кишечная непроходимость.

Note: AAIO — acute adhesive intestinal obstruction.

Table 2. The frequency of verification of the development of acute adhesive intestinal obstruction in the period from 1 to 18 months after surgery

Таблица 2. Частота верификации развития острой спаечной кишечной непроходимости в сроки от 1 до 18 месяцев после операции

Период наблюдения / Observation period	Группа сравнения / Comparison group		Основная группа / The main group	
	абс. / abs.	%	абс. / abs.	%
Оперированы по поводу ОСКН / They were operated on for AAIO				
1 месяц / 1 month	1	1,0	0	0,0
6 месяцев / 6 months	3	2,9	0	0,0
12 месяцев / 12 months	5	4,8	1	3,6
18 месяцев / 18 months	4	3,8	0	0,0
Всего / Total	13	12,5	1	3,6
Оперированы на желудке и/или кишечнике / Operated on the stomach and/or intestines				
1 месяц / 1 month	0	0,0	0	0,0
6 месяцев / 6 months	0	0,0	0	0,0
12 месяцев / 12 months	2	2,8	1	1,9
18 месяцев / 18 months	1	1,4	0	0,0
Всего / Total	3	4,2	1	1,9

Ending of the table 2/ Окончание табл. 2

Период наблюдения / Observation period	Группа сравнения / Comparison group		Основная группа / The main group	
	абс. / abs.	%	абс. / abs.	%
Оперированы по поводу травм печени или селезенки / They were operated on for injuries to the liver or spleen				
1 месяц / 1 month	0	0,0	0	0,0
6 месяцев / 6 months	0	0,0	0	0,0
12 месяцев / 12 months	2	5,0	0	0,0
18 месяцев / 18 months	1	2,5	0	0,0
Всего / Total	3	7,5	0	0,0
Все больные / All patients				
1 месяц / 1 month	1	0,5	0	0,0
6 месяцев / 6 months	3	1,4	0	0,0
12 месяцев / 12 months	9	4,2	2	2,0
18 месяцев / 18 months	6	2,8	0	0,0
Всего / Total	19	8,8	2	2,0
$\chi^2=5,169$; df=1; p=0,023				

Примечание: ОСКН — острая спаечная кишечная непроходимость.**Note:** AAIO — acute adhesive intestinal obstruction.

Table 3. The number of patients with acute adhesive intestinal obstruction requiring surgery of the intestinal wall

Таблица 3. Число больных с острой спаечной кишечной непроходимостью, потребовавшей оперативного лечения

Период наблюдения / Observation period	Группа сравнения / Comparison group		Основная группа / The main group	
	абс. / abs.	%	абс. / abs.	%
Оперированы по поводу ОСКН / They were operated on for AAIO				
1 месяц / 1 month	0	0,0	0	0,0
6 месяцев / 6 months	1	1,0	0	0,0
12 месяцев / 12 months	2	1,9	1	3,6
18 месяцев / 18 months	2	1,9	0	0,0
Всего / Total	5	4,8	1	3,6
Оперированы на желудке и/или кишечнике / Operated on the stomach and/or intestines				
1 месяц / 1 month	0	0,0	0	0,0
6 месяцев / 6 months	0	0,0	0	0,0
12 месяцев / 12 months	1	1,4	0	0,0
18 месяцев / 18 months	1	1,4	0	0,0
Всего / Total	2	2,8	0	0,0
Оперированы по поводу травм печени или селезенки / They were operated on for injuries to the liver or spleen				
1 месяц / 1 month	0	0,0	0	0,0
6 месяцев / 6 months	0	0,0	0	0,0
12 месяцев / 12 months	1	2,5	0	0,0
18 месяцев / 18 months	0	0,0	0	0,0
Всего / Total	1	2,5	0	0,0
Все больные / All patients				
1 месяц / 1 month	0	0,0	0	0,0
6 месяцев / 6 months	1	0,5	0	0,0
12 месяцев / 12 months	4	1,9	1	1,0
18 месяцев / 18 months	3	1,4	0	0,0
Всего / Total	8	3,7	1	1,0

Примечание: ОСКН — острая спаечная кишечная непроходимость.**Note:** AAIO — acute adhesive intestinal obstruction.

Table 4. The level of quality of life (GIQLI) in a group of healthy individuals

Таблица 4. Уровень качества жизни (GIQLI) в группе здоровых лиц

Компонент оценки качества жизни / The quality of life assessment	Здоровые лица (n=12) / Healthy faces (n=12)			
	M	δ	Min	Max
Значимость симптомов / The significance of the symptoms	66,5	4,1	59	72
Физическая активность / Physical activity	23,3	1,7	21	26
Эмоциональная активность / Emotional activity	16,4	1,6	14	19
Социальная активность / Social activity	13,7	0,8	12	15
Реакция на оперативное лечение / Reaction to surgical treatment	3,8	0,5	3	4
Общий балл / Total score	123,6	5,1	116	132

Table 5. Assessment of the level of quality of life (GIQLI) after operations for acute adhesive intestinal obstruction

Таблица 5. Оценка уровня качества жизни (GIQLI) после операций по поводу острой спаечной кишечной непроходимости

Компонент оценки качества жизни / The quality of life assessment	Группа сравнения (n=52) / Comparison group (n=52)				Основная группа (n=21) / The main group (n=21)				t	
	M	δ	Min	Max	M	δ	Min	Max	значение / meaning	p
Значимость симптомов / The significance of the symptoms	47,3	9,5	29	67	54,8	8,1	41	70	3,37	<0,05
Физическая активность / Physical activity	16,1	2,6	11	21	17,8	2,2	13	22	2,78	<0,05
Эмоциональная активность / Emo- tional activity	12,1	2,7	7	17	12,7	2,2	9	16	0,96	>0,05
Социальная активность / Social activity	10,0	1,8	6	13	10,8	1,4	8	13	1,83	>0,05
Реакция на оперативное лечение / Reaction to surgical treatment	2,1	0,6	1	3	2,4	0,6	1	3	2,43	<0,05
Общий балл / Total score	87,6	10,2	64	111	98,4	8,8	82	115	4,50	<0,05

was specially developed for this cohort of patients.

Among the 5 components of the GIQLI questionnaire assessment, special importance was in parameters such as "Significance of symptoms" and "Reaction to surgical treatment", although other components were important ("Physical activity", "Emotional activity", and "Social activity"). Overall, all components provided a summative score for the QOL. For a more qualitative comparative analysis, a group of healthy persons (12 people) was also studied, whose indicators were considered as a reference for our two groups (Table 4). For convenience and more complete information, the given numerical data will reflect the mean (M), its standard deviation (δ), the sample minimum (Min) and the sample maximum (Max) in each group.

As control data, we took the results of the survey in 12 healthy individuals, whose quality of life indicators are presented in Table 4.

РЕЗУЛЬТАТЫ

CA comparative analysis of both group's quality of life after undergoing surgical treatment for AAIO showed reliable differences in four parameters: significance of symptoms, physical activity, and response to surgical treatment. These parameters were higher in the main group ($p < 0.05$) (Table 5).

However, in patients who underwent gastric or intestinal surgical treatment, physical activity was the same as in the control group. But other parameters did not differ in the reliability level from those in patients operated on for AAIO (Table 6).

Similar results are in patients who underwent surgical treatment of liver and spleen injuries, where also the quality of physical activity in both groups does not differ (Table 7).

However, the analysis of the cumulative assessment of the QOL after all the surgeries shows that indexes are higher in the patients of the main group ($p < 0.05$), and only for one index

("Emotional activity") there was no significant difference between two groups (Table 8).

Comparing, in the patients of the main group, where the anti-adhesive preparation Hemoben was applied, after various surgeries on the abdominal organs, indices of QOL are close to those in healthy people, and significantly higher ($t=7,12$; $p<0,05$) than in the patients of the comparison group (Fig. 1, 2).

CONCLUSIONS

Thus, clinical evaluation of prevention of postoperative AAIO in the abdominal cavity has shown that application of Hemoben bio-

coating both over parenchymatous organs at traumatic injuries and locally to the injury area of parietal and visceral peritoneum, in terms of 18 months following-up allowed to reduce the frequency of clinically significant cases of post-operative AAIO from 8.8% (in 19 out of 216 patients in the comparison group) to 2.0% (2 out of 101 patients in the main group). The largest proportion of patients (13 out of 19 and 1 out of 2, respectively) were after earlier surgical treatment of this complication. In turn, resolution of AAIO was observed in 11 out of 19 patients in the comparison group and in 1 out of 2 in the main group, whereas in 3.7% (8 patients) and 1.0%

Table 6. Quality of Life Assessment (GIQLI) after gastric and/or intestinal surgery

Таблица 6. Оценка уровня качества жизни (GIQLI) после операций на желудке и/или кишечнике

Компонент оценки качества жизни / The quality of life assessment	Группа сравнения (n=36) / Comparison Group (n=36)				Основная группа (n=29) / The main group (n=29)				t	
	M	δ	Min	Max	M	δ	Min	Max	значение / meaning	p
Значимость симптомов / The significance of the symptoms	51,7	9,6	34	70	59,4	8,8	46	75	3,40	<0,05
Физическая активность / Physical activity	18,6	2,6	14	23	19,6	2,0	15	24	1,72	>0,05
Эмоциональная активность / Emo- tional activity	13,6	2,8	9	18	13,9	2,1	11	18	0,52	>0,05
Социальная активность / Social activity	11,3	1,8	8	14	12,0	1,2	9	14	1,88	>0,05
Реакция на оперативное лечение / Reaction to surgical treatment	2,2	0,6	1	3	2,6	0,6	1	4	2,31	<0,05
Общий балл / Total score	97,3	10,3	78	121	107,7	8,5	93	124	4,10	<0,05

Table 7. Quality of Life Assessment (GIQLI) after surgery for liver and/or spleen injuries

Таблица 7. Оценка уровня качества жизни (GIQLI) после операций по поводу травм печени и/или селезенки

Компонент оценки качества жизни / The quality of life assessment	Группа сравнения (n=28) / Comparison group (n=28)				Основная группа (n=14) / The main group (n=14)				t	
	M	δ	Min	Max	M	δ	Min	Max	значение / meaning	p
Значимость симптомов / The significance of the symptoms	49,1	8,1	35	66	55,4	8,2	39	72	2,32	<0,05
Физическая активность / Physical activity	20,3	2,6	16	25	21,3	2,6	17	26	1,15	>0,05
Эмоциональная активность / Emo- tional activity	13,3	2,2	9	17	13,6	1,8	11	17	0,44	>0,05
Социальная активность / Social activity	11,0	1,3	9	13	11,8	1,3	9	13	1,85	>0,05
Реакция на оперативное лечение / Reaction to surgical treatment	2,1	0,6	1	3	2,5	0,5	2	3	2,39	<0,05
Общий балл / Total score	95,8	8,5	80	111	104,5	9,2	88	119	2,96	<0,05

Table 8. Summary assessment of the quality of life (GIQLI) after all operations

Таблица 8. Сводная оценка уровня качества жизни (GIQLI) после всех операций

Компонент оценки качества жизни / The quality of life assessment	Группа сравнения (n=116) / Comparison group (n=116)				Основная группа (n=64) / The main group (n=64)				t	
	M	δ	Min	Max	M	δ	Min	Max	значение / meaning	p
Значимость симптомов / The significance of the symptoms	49,1	9,3	29	70	57,0	8,6	39	75	5,71	<0,05
Физическая активность / Physical activity	17,9	3,1	11	25	19,3	2,5	13	26	3,43	<0,05
Эмоциональная активность / Emotional activity	12,8	2,7	7	18	13,4	2,1	9	18	1,61	>0,05
Социальная активность / Social activity	10,7	1,8	6	14	11,5	1,4	8	14	3,71	<0,05
Реакция на оперативное лечение / Reaction to surgical treatment	2,1	0,6	1	3	2,5	0,6	1	4	4,36	<0,05
Общий балл / Total score	92,6	10,8	64	121	103,8	9,8	82	124	7,12	<0,05

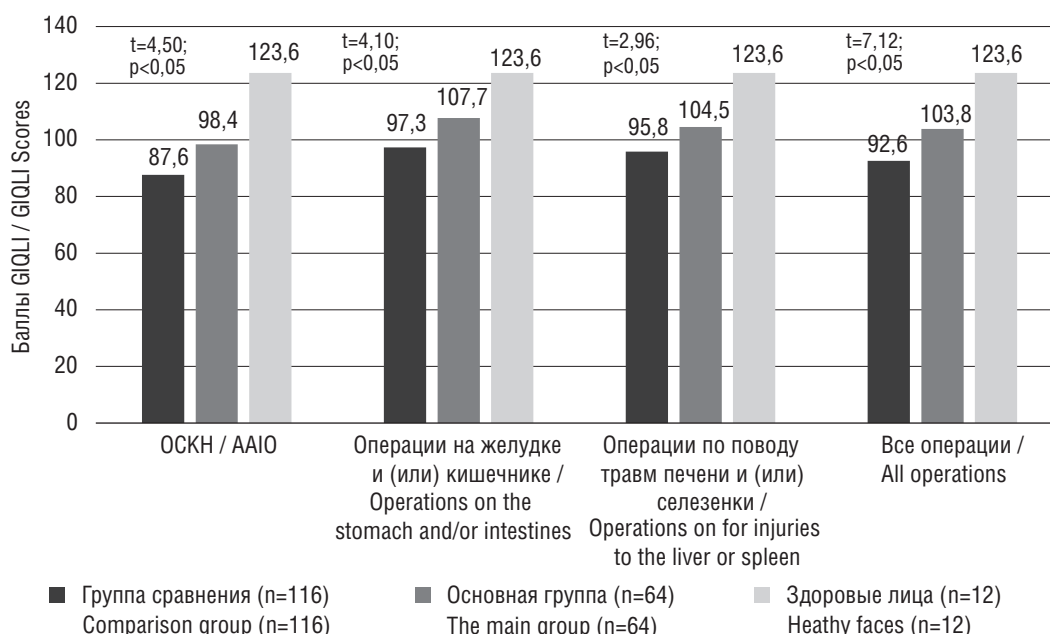


Fig. 1. Comparative indicators of the quality of life index (total GIQLI scores) depending on the operation. AAIO – acute adhesive intestinal obstruction. "P" values are reported between study groups

Рис. 1. Сравнительные показатели индекса качества жизни (общие баллы по GIQLI) в зависимости от перенесенной операции. ОСКН – острая спаечная кишечная непроходимость. Значение «р» приведено между группами исследования

(1 patient) of cases, respectively, this complication required surgical treatment. The comparative analysis of the level of QOL according to the GIQLI questionnaire showed a higher value of this indicator in the main group, which was indicated in the study of the subjective factor of anti-adhesive effectiveness. Thus, 4 out of 5 domains showed a higher value of QOL, in particular, according to the criterion "Significance of symptoms" the index in the comparison group amounted to $49,1 \pm 9,3$ points, and in the main

group — $57,0 \pm 8,6$ points ($t=5,71$; $p<0,05$); "Reaction to surgical treatment" — $2,1 \pm 0,6$ vs. $2,5 \pm 0,6$ points ($t=4,36$; $p<0,05$); "Physical activity" — $17,9 \pm 3,1$ vs. $19,3 \pm 2,5$ points ($t=3,43$; $p<0,05$) and "Social activity" — $10,7 \pm 1,8$ vs. $11,5 \pm 1,4$ points ($t=3,71$; $p<0,05$), and only for the "Emotional activity" domain the difference was not significant — $12,8 \pm 2,7$ vs. $13,4 \pm 2,1$ points ($t=1,61$; $p>0,05$). Overall, the total score was higher in the main group — $103,8 \pm 9,8$ vs. $92,6 \pm 10,8$ points ($t=7,12$; $p<0,05$), which gene-

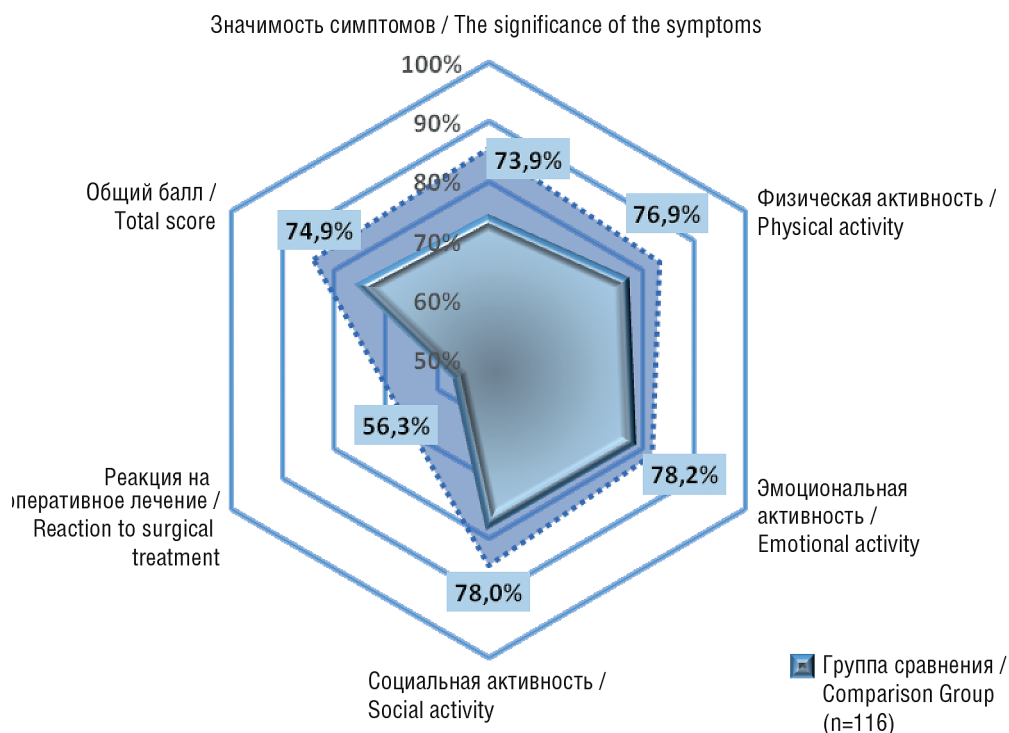


Fig. 2. The ratio of the quality of life indicator in the study groups in relation to healthy individuals

Рис. 2. Соотношение показателя качества жизни в группах исследования по отношению к здоровым лицам

rally provided a higher compliance with the group of healthy individuals (123.6 ± 5.1 points), amounting to 74.9% in the comparison group and 84.0% in the main group.

SUMMARY

The clinical evaluation of the prevention of the development of postoperative AAO in the abdominal cavity showed that the application of Hemoben bio-coating both over the parenchymatous organs at traumatic injuries and locally to the injury area of the parietal and visceral peritoneum, in 18 months follow-up allowed to reduce the frequency of development of clinically significant cases of postoperative AAO from 8.8 to 2.0%, while in 3.7 and 1.0% of cases, respectively, the mentioned complication required surgical treatment.

The study of subjective factor of anti-adhesive efficacy assessment by the comparative analysis of the level of QOL according to the GIQLI questionnaire showed a higher value of this index in the main group in all main domains, except for the level of the component "Social activity", and the total score amounted to 103.8 ± 9.8 vs 92.6 ± 10.8 points ($t=7.12$; $p<0.05$), which in general provided a higher correspondence to the group of healthy individuals (123.6 ± 5.1 points),

amounting 74.9% in the comparison group and 84.0% in the main group.

ADDITIONAL INFORMATION

Author contribution. Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

Competing interests. The authors declare that they have no competing interests.

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Consent for publication. Written consent was obtained from the patient for publication of relevant medical information within the manuscript.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ

Вклад авторов. Все авторы внесли существенный вклад в разработку концепции, проведение исследования и подготовку статьи, прочли и одобрили финальную версию перед публикацией.

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов

интересов, связанных с публикацией настоящей статьи.

Источник финансирования. Авторы заявляют об отсутствии внешнего финансирования при проведении исследования.

Информированное согласие на публикацию. Авторы получили письменное согласие пациентов на публикацию медицинских данных.

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