ORIGINAL CONTRIBUTION

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QUALITY OF LIFE ASSESSED BY QUESTIONNAIRE MOS SF-36 IN BLADDER CANCER PATIENTS DEPENDING ON THE METHOD OF SURGICAL TREATMENT

Using the Ukrainian version of the Medical Outcomes Study Short Form, MOS SF-36 questionnaire for assessment of quality of life (QoL), a prospective analysis of the QoL of patients with bladder cancer who underwent radical surgery in the scope of radical cystectomy (group 1, 15 patients) and organ-preserving surgeries (bladder resection or transurethral resection, group 2, 40 patients) was conducted in the period from 2020 to 2022 at the Center for Urology and Urologic Oncology of the Feofania Clinical Hospital. The survey was conducted 1 week before radical surgery and 6 months after surgery. None of the studied patients had signs of recurrence or progression of bladder cancer during the postoperative survey. With identical QoL indicators before surgery, patients who underwent organ-preserving surgeries demonstrated significantly higher QoL indicators, such as physical, role, social, emotional functioning, and psychological health.

Keywords: quality of life, questionnaire, bladder cancer, radical cystectomy, organ-sparring treatment.

The effectiveness of cancer treatment, in particular bladder cancer, includes achieving high survival rates: overall, relapse-free, progression-free survival, as well as full rehabilitation of the patient after special treatment. Assessment of the patient's quality of life (QoL) after cancer treatment is an important aspect of determining the effectiveness and quality of the treatment process and the obtained result. WHO defines QoL as a persons' perception of their life situation in the context of the culture and value systems in which they live, as well as in relation to their goals, expectations, standards, and problems [1].

The QoL assessment is a subjective criterion determined by the patient himself, but it is an objective parameter for assessing the quality of the performed medical intervention and post-treatment rehabilitation that includes the restoration of working capacity, the disappearance of pain, and the restoration of the ability to function in society, therefore it is an important criterion for scientific research. While the oncological outcome of treatment depends primarily on the biological characteristics of the tumor and the correctness of the surgery, the QoL depends on the functionality and unlimitedness in performing daily life and professional exercises and tasks. To assess the QoL af-

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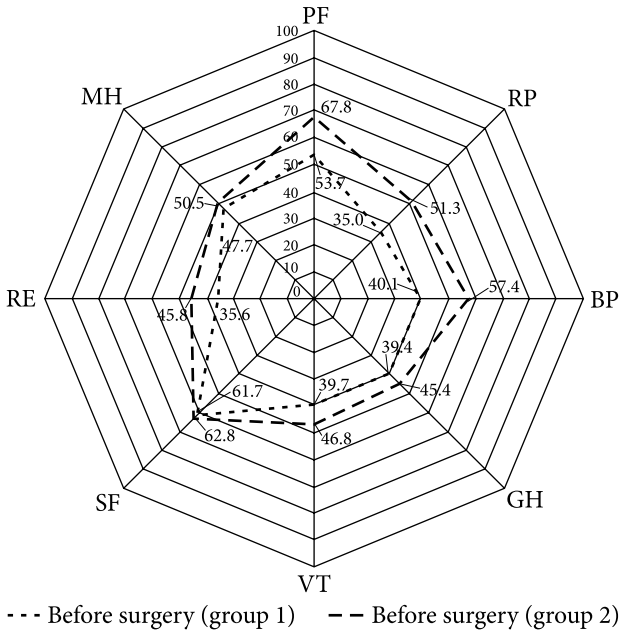


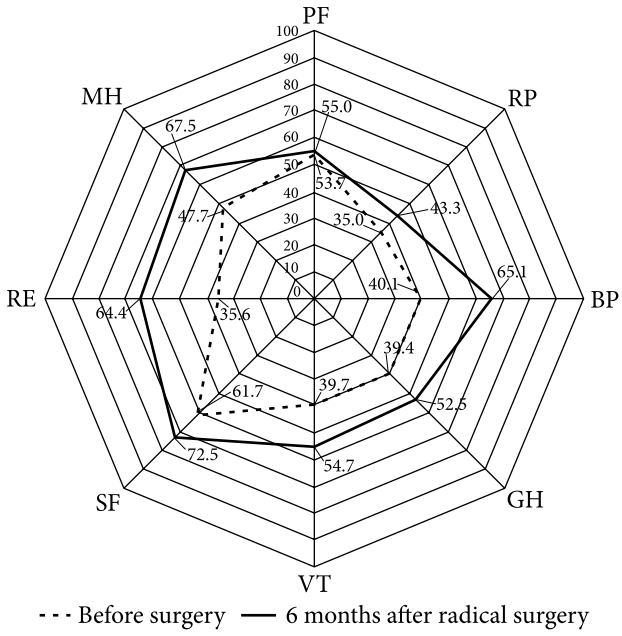


Fig. 1. Diagram of QoL indicators in groups 1 and 2 before surgery

Fig. 2. Diagram of QoL indicators in group 1 before surgery and 6 months after radical surgery in the volume of radical cystectomy

ter oncological treatment, there are a considerable number of questionnaires [2—7] that can be an effective tool in determining the fullness of the patient's recovery after surgical treatment of bladder cancer.

The aim of the study was to conduct a comparative analysis of QoL of patients with bladder cancer (BC) depending on the method of the surgical treatment (organ-preserving or organ-removing) using the Ukrainian version of the Medical Outcomes Study Short Form, the MOS SF-36 QoL assessment questionnaire.

Table 1. **Comparison of QoL indicators before surgery in groups 1 and 2**

Indicators	Group 1 (n = 15), scores (M ± SD)	Group 2 (n = 40), scores (M ± SD)
Physical component		
PF	53.7 ± 33.2	67.8 ± 24.9
RP	35.0 (+42.0; –35.0)	51.3 ± 42.3
BP	40.1 ± 18.2	57.4 ± 28.3*
GH	39.4 ± 24.3	45.4 ± 17.5
Psychological component		
VT	39.7 ± 24.6	46.8 ± 21.8
SF	61.7 ± 28.9	62.8 ± 25.9
RE	35.6 (+44.5; –35.6)	45.8 ± 40.4
MH	47.7 ± 27.1	50.5 ± 23.5

Note: * The difference in the indicator between the groups is significant, $p < 0.05$.

Materials and Methods

Using the MOS SF-36 questionnaire, a prospective assessment of the QoL was conducted in 55 patients (mean age 63.7 ± 9.0; 47 males — 85.5%) who underwent radical treatment for BC at the Center for Urology and Urological Oncology of the Feofania Clinical Hospital according to the recommendations of the multidisciplinary oncological board from February 2020 to May 2022. According to the method of treatment, all patients were divided into 2 groups: group 1 (control), 15 patients who underwent radical cystectomy (RCE), and group 2 (study group), 40 patients who underwent organ-preserving operations, such as open bladder resection (7 patients), or transurethral resection of the bladder (TURB) (33 patients). The hypothesis of our study was that the QoL in patients operated in the scope of organ-preserving operations (resection or TURB) for BC is not worse by the criteria for assessing the QoL than in patients who were operated in the scope of RCE. The questionnaire was filled out twice — a week before the radical operation, and 6 months after it. The answers received were entered into a spreadsheet for further mathematical calculation of indicators according to the algorithms for calculating the QoL parameters described in the methodology [8].

The QoL of patients was assessed using the Standardized Nonspecific Questionnaire SF-36 (Medical Outcomes Study 36-Item Short-Form Health

Status), which contains 36 questions determining physical and mental statuses.

The physical component of health includes the following indicators: 1) Physical functioning (PF), 2) Role (physical) functioning (RP), 3) Pain (BP), and 4) General health (GH). The criteria of the mental component are: 1) Vitality (VT), 2) Social functioning (SF), 3) Emotional functioning (RE), and 4) Psychological health (MH).

The data obtained using the MOS SF-36 questionnaire were statistically processed by the software StatPlus Pro v.7 (AnalystSoft Inc., USA). The in-group and intergroup comparison of the QoL parameters and the general parameters of the physical and psychical health was provided, and the index of the effect was calculated. In case of the normal distribution of the data, the parametric Student's test was used. When the variables were not normally distributed, the Mann — Whitney U-test was used to compare the differences. The Shapiro — Wilk test assessed the normality of the obtained data. The data were presented as M ± SD, where M is the arithmetic mean, and SD is the standard deviation. The difference was considered statistically significant at $p < 0.05$.

Table 2. **Results of the QoL assessment before the surgery and 6 months after surgery in group 1 (n = 15)**

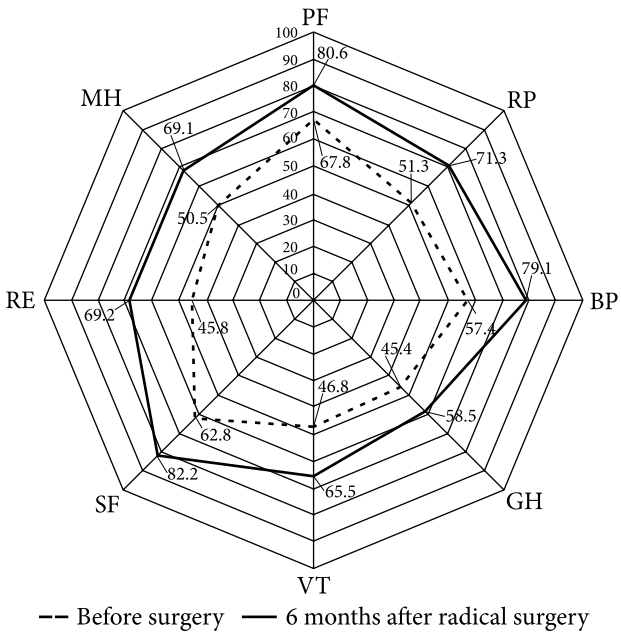
Indicators	Before surgery, scores			6 months after surgery, scores		
	M ± SD	Min score	Max score	M ± SD	Min score	Max score
Physical component						
PF	53.7 ± 33.2	0	100	55.0 ± 33.8	10	95
RP	35.0 (+42.0; –35.0)	0	100	43.3 (+44.8; –43.3)	0	100
BP	40.1 ± 18.2	12	74	65.1 ± 31.3*	12	100
GH	39.4 ± 24.3	10	85	52.5 ± 20.8	10	92
Psychological component						
VT	39.7 ± 24.6	0	85	54.7 ± 24.8	5	95
SF	61.7 ± 28.9	25	100	72.5 ± 28.4	12.5	100
RE	35.6 (+44.5; –35.6)	0	100	64.4 ± 47.9	0	100
MH	47.7 ± 27.1	0	92	67.5 ± 22.4*	16	100

Note: * The difference between the indicators before and after the operation is significant, $p < 0.05$.

Table 3. **QoL assessment in group 2 (n = 40) before surgery and 6 months after surgery**

Indicators	Before surgery, scores			6 months after surgery, scores		
	M ± SD	Min score	Max score	M ± SD	Min score	Max score
Physical component						
PF	67.8 ± 24.9	15	100	80.6 ± 19.7*	40	100
RP	51.3 ± 42.3	0	100	71.3 ± 39.9*	0	100
BP	57.4 ± 28.3	12	100	79.1 ± 20.7*	41	100
GH	45.4 ± 17.5	0	77	58.8 ± 16.6*	25	97
Psychological component						
VT	46.8 ± 21.8	0	80	65.5 ± 15.6*	25	90
SF	62.8 ± 25.9	0	100	82.2 ± 17.9*	50	100
RE	45.8 ± 40.4	0	100	69.2 ± 40.2**	0	100
MH	50.5 ± 23.5	0	88	69.1 ± 18.0*	16	92

Note: *, ** The difference between the indicators before and after the operation is significant, $p < 0.0001$ and $p < 0.001$, correspondingly.



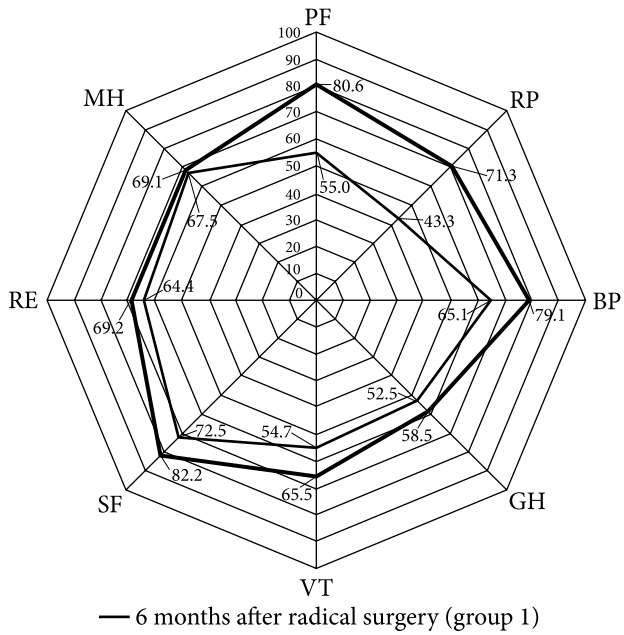


Fig. 3. Diagram of the QoL indicators in group 2 before surgery and 6 months after radical surgery in the scope of organ-preserving treatment (bladder resection or TURB)

Fig. 4. Diagram of the QoL indicators 6 months after radical surgical treatment in groups 1 and 2

Results

As a first step, we analyzed the QoL indicators in both groups before the surgery (Table 1). In general, the values of the QoL indicators before surgery in the groups were close and did not differ significantly, except for the indicator "Pain (BP)", which in group 1 was significantly lower, i.e., the pain was worse than in group 2: 40.1 ± 18.2 vs. 57.4 ± 28.3 ($p < 0.05$).

After 6 months, a slight increase in the average level of all QoL indicators was observed in group 1, and the improvements in BP and "Psychological Health (MH)" indicators were statistically significant ($p < 0.05$) (Table 2, Fig. 2).

In contrast, in group 2, 6 months after surgery, a more significant increase in all QoL indicators was observed (Table 3, Fig. 3).

When comparing the levels of the QoL indicators in the groups 6 months after surgery, the following was found. As seen from Table 4 and Fig. 4, after 6 months, all indicators in group 2 were higher than in patients in group 1, and the indicators PF, RP, SF, RE, and MH differed significantly.

Fig. 5 presents a diagram showing the cumulative QoL indicators of patients with BC before and 6 months after radical treatment for visual demonstration and comparison of QoL between the groups of patients, which demonstrates improvement in the parameters of physical and psychological components in group 2 compared to the parameters of patients in group 1.

Comparison of general indicators of physical and mental health components is shown in Table 5.

As seen from Table 5, after surgery, the overall indicator "Physical component of health (PH)"

Table 4. **Comparison of the QoL indicators 6 months after surgery in groups 1 and 2**

Indicators	Group 1 (n = 15), scores (M ± SD)	Group 2 (n = 40), scores (M ± SD)
Physical component		
PF	55.0 ± 33.8	80.6 ± 19.7*
RP	43.3 (+44.8; –43.3)	71.3 ± 39.9**
BP	65.1 ± 31.3	79.1 ± 20.7
GH	52.5 ± 20.8	58.8 ± 25.0
Psychological component		
VT	54.7 ± 24.8	65.5 ± 15.6
SF	72.5 ± 28.4	82.2 ± 17.9***
RE	64.4 ± 47.9	69.2 ± 40.2***
MH	67.5 ± 22.4	69.1 ± 18.0***

Note: *, **, *** — the difference between the indicators in the groups is statistically significant, $p < 0.05$, $p < 0.01$, and $p < 0.001$, correspondingly.

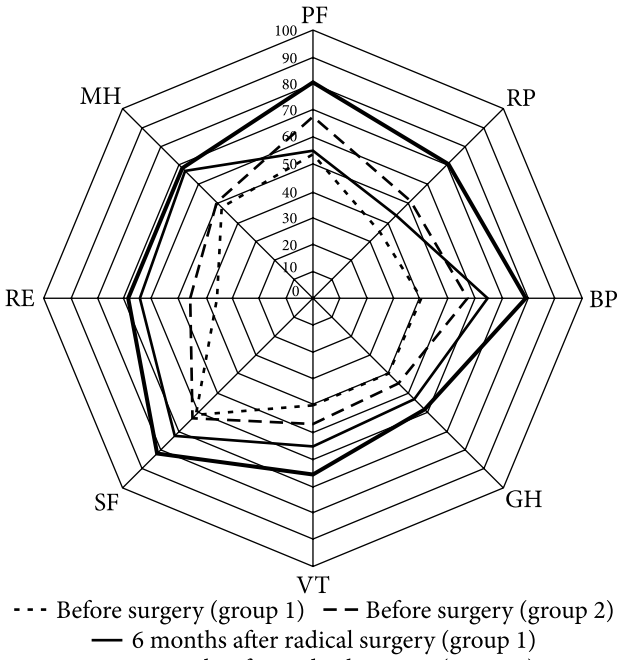


Fig. 5. Summary chart comparing the QoL parameters of patients in groups 1 and 2 before surgery and 6 months after surgery

showed a slight decrease in group 1, and a slight increase in group 2, while the overall indicator "Psychological component of health (MH)" in both groups increased approximately equally. However, the level of significance was different due to the small size of group 1.

Discussion

QoL is now a subject of clinical interest, research, and a criterion by which the quality and effectiveness of treatment are assessed [8].

The first validated questionnaire for assessing the QoL in patients with organ-localized bladder cancer, the Bladder Cancer Index (BCI), was developed in 2010 by Gilbert et al. [9]. It identifies the aspects of health-related QoL associated with BC treatment that are not captured by more general indicators. The BCI contains 36 items, consists of urinary, bowel, and sexual health domains, and has demonstrated acceptably high rates of internal consistency, test-retest reliability, convergent validity, concurrent, and criterion validity [9].

When assessing the QoL of a patient after surgical treatment of BC, in particular its most aggressive form, high-grade muscle-invasive BC, we should take into account that the main treatment option for this type of BC is a removal of the bladder, and the organ-preserving surgery as a treatment option could be applied to a limited, carefully selected cohort of patients [10]. That is why we set the goal to investigate the QoL of patients with BC who were operated in the scope of both organ-preserving operations and cystectomy, i.e., when the bladder is removed, as another argument for the wider use of organ-preserving surgical treatment in the treatment of BC patients.

Various available questionnaires that examine different aspects of the patient's functioning after surgery can be used to assess the QoL, few of them are related to BC. Li et al. [2] evaluated the QoL in 142 patients with superficial BC after open bladder resection and TURB dividing them into two equal groups. They assessed the clinical effectiveness of treatment by such groups of criteria as surgical (intraoperative blood loss, operation time, bladder irrigation time after surgery, duration of bladder catheterization, duration of hospitalization), the frequency of postoperative complications, and the rate of relapses 1 year after surgery, using scales to assess the psychological and emotional state (Self-Rating Anxiety Scale, SAS; Self-Rating Depression Scale, SDS) and living conditions (Pittsburgh Sleep Quality Index, PSQI) before and after surgery. According to the results of the study [2], minimally invasive surgery for superficial BC (TURB) com-

Table 5. **Comparison of general indicators of physical and mental health components in groups 1 and 2**

Indicators	Group 1 (n = 15), M ± SD, scores		Group 2 (n = 40), M ± SD, scores	
	Before surgery	6 months after surgery	Before surgery	6 months after surgery
General indicator "Physical component of health (PH)"	44.5 ± 7.0	43.5 ± 9.8	49.6 ± 7.6	51.9 ± 5.7*
General indicator "Psychological component of health (MH)"	38.1 ± 12.6	48.7 ± 11.3	38.4 ± 12.7	47.9 ± 9.1**

Note: *, ** — the difference in indicators before surgery and 6 months after surgery in the group is significant, $p < 0.05$ and $p < 0.0001$, correspondingly.

pared to open bladder resection had better results in all surgical parameters evaluated, demonstrated fewer postoperative complications, lower levels of fear and depression, and better sleep parameters after surgery. That is, minimally invasive surgery for superficial BC provides advantages to the patient in terms of the postoperative QoL and clinical effectiveness of treatment. In our clinical experience, for superficial BC, i.e., for BC of stage pTa-pT1, we have never used open resection as an operation with excessive intraoperative trauma, while the optimal clinical result can be achieved precisely with the use of the endoscopic surgical technique of TURB.

The assessment of the QoL and quality of functioning of the preserved bladder in 53 patients with muscle-invasive BC (stages pT2-4) after chemoradiotherapy in patients who could be candidates for radical surgical treatment within the framework of a phase II clinical trial studied by Lagrange et al. [4] using the EORTC QLQ-C30 QoL questionnaire and the LENT-SOMA bladder symptom scale before treatment and regularly for 36 months after treatment with a study duration of 8 years. If after radiotherapy at a dose of 45 Gy according to the results of TURB, local recurrence was detected, the patient was offered a salvage cystectomy. The results in terms of treatment, preservation of a functioning bladder and QoL were interesting and encouraging. The bladder was preserved in 67% of patients, the overall survival after 8 years was 36% for all patients. Satisfactory bladder function according to the LENT-SOMA questionnaire was found in all 100% of patients who managed to preserve the bladder and provided that there was no relapse at the 36-month follow-up. Satisfactory bladder function before treatment was declared by 35% of patients before treatment, while 43%, 57%, and 29% of patients noted satisfactory bladder function after 6, 18, and 36 months after treatment. Thus, in patients with muscle-invasive BC, combined chemoradiotherapy of the bladder allowed preserving a functioning bladder and provided a relapse-free survival of 67% at 8 years of follow-up.

QoL after removal of the bladder affected by cancer with different types of urinary diversion has been given special attention by Wright et al. [7] because this operation has a large and significant impact on both urinary and sexual function of patients. It was noted that there was a large number of instruments for the QoL assessment but none have demonstrated the superiority of any particular method of urinary diversion after radical cystectomy for BC.

The SF-36 and EORTC QLQ-C30 questionnaires were used by Siracusano et al. [10] to prospectively determine (before surgery and 3 and 6 months after surgery) which option of urinary diversion (orthotopic intestinal bladder or heterotopic intestinal conduit) in 37 women with BC who underwent removal of the bladder affected by cancer was more acceptable and optimal in terms of mental, physical health, and emotional and role functioning. The authors acknowledged that radical cystectomy was a traumatic and invasive treatment with dramatic consequences for the daily social, professional, and sexual life of patients. However, the result of their work was the recognition that the above indicators, which make up the QoL, are somewhat better after 6 months in those patients who underwent orthotopic replacement of the removed bladder with a reservoir created from the small intestine after radical cystectomy.

Yang et al. [12] assessed the QoL using the SF-36 questionnaire in 82 patients who underwent either orthotopic or heterotopic bladder reconstruction after RCE. The authors obtained results indicating that patients after orthotopic reconstruction of the removed bladder feel better and demonstrate higher QoL indicators than patients who underwent the heterotopic reconstruction of the bladder after cystectomy.

In our work, we prospectively investigated the QoL of 55 patients using the MOS SF-36 questionnaire before and 6 months after radical surgical treatment. None of the patients had signs of relapse or progression of the disease at the time of filling out the questionnaire 6 months after surgery. According to the results, all indicators after 6 months in group 2 (organ-preserving treatment) were higher than in the patients in group 1 (radical cystectomy), and the indicators of physical, role, social, emotional functioning and psychological health differed significantly. Thus, we obtained confirmation that organ-sparing surgery for BC patients provides higher QoL after 6 months than radical cystectomy.

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ДОСЛІДЖЕННЯ ЯКОСТІ ЖИТТЯ ХВОРИХ НА РАК СЕЧОВОГО МІХУРА
В ЗАЛЕЖНОСТІ ВІД МЕТОДУ ХІРУРГІЧНОГО ЛІКУВАННЯ
ЗА ДОПОМОГОЮ ОПИТУВАЛЬНИКА MOS SF-36

За допомогою української версії опитувальника оцінки якості життя Medical Outcomes Study Short Form MOS SF-36 проведено проспективний аналіз якості життя хворих на рак сечового міхура, радикально оперованих в обсязі цистектомії (група 1, 15 хворих) і органо-зберігаючих резекцій (резекція сечового міхура або трансуретральна резекція, група 2, 40 хворих) з 2020 по 2022 роки в Центрі урології та онкоурології КЛ «Феофанія». Опитування проводили за тиждень до операції та через 6 місяців після неї. Жоден хворий не мав ознак рецидиву або прогресії раку сечового міхура на момент післяопераційного опитування. Маючи ідентичні показники якості життя до операції, хворі, оперовані в обсязі органо-зберігаючих операцій, продемонстрували достовірно вищі показники якості життя, такі як фізичного, рольового, соціального та емоційного функціонування та психологічного здоров'я.

Ключові слова: якість життя, опитувальник, рак сечового міхура, радикальна цистектомія, органо-зберігаючі операції.