

## QUALITY OF LIFE IN PATIENTS AFTER RADICAL CYSTECTOMY WITH MODIFIED URETEROCUTANEOSTOMY AND BRICKER URINARY DIVERSION

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**Background:** Radical cystectomy (RC) has been used for over 100 years as an effective treatment of muscle invasive bladder cancer (MIBC). However, the main surgical challenge is not only to remove an affected organ but also to replace its functional component — urine diversion. The *aim* of our work is to study the efficacy of the modified ureterocutaneostomy technique by estimating the quality of life in post-RC patients with MIBC. **Materials and Methods:** A retrospective analysis of the cases of 40 patients was provided. Two groups were delineated depending on urinary diversion: 20 patients with urinary derivation by the modified ureterocutaneostomy method, and 20 patients — with Bricker conduit. All patients were matched by mean age, gender, American Society of Anesthesiologists status, disease stage and duration. 16 (80%) and 15 (75%) patients from the study and control groups, respectively, passed 3 courses of standard preoperative polychemotherapy with gemcitabine-cisplatin. Quality of life was assessed using the health survey SF-36 form (developed at the US Medical Research Institute), adapted at the National Cancer Institute (Ukraine). **Results:** Comparing patients after ureterocutaneostomy or Bricker surgery, no statistical discrepancy was noted before surgery and after 3 months. A statistical difference in perioperative parameters was noted only when comparing the surgery duration and length of stay in hospital. **Conclusions:** The modified ureterocutaneostomy technique contributes to performing surgery faster and more effectively since an intestinal stage is skipped in surgery. Our findings indicate that ureterocutaneostomy technique may be used as a standard of care for post-RC patients with MIBC.

**Key Words:** radical cystectomy, ureterocutaneostomy, Bricker urinary diversion, quality of life.

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Bladder cancer ranks as the ninth most common cancer worldwide. Morbidity and mortality levels increase dramatically with age, and about  $\frac{2}{3}$  of cases are registered at the age over 65. According to WHO, up to 430,000 new cases and 165,000 deaths are reported annually; men to women ratio being 3:1 [1]. Morbidity and mortality in Ukraine are increasing every year. According to the National Cancer Registry, in 2018 the total number of new cases was 4,429 and 1,645 deaths [2].

If bladder cancer is revealed in early stages, non-traumatic surgery — transurethral resection of the bladder with tumor followed by intra-bladder chemotherapy is considered to be feasible. However, radical treatment like the entire bladder removal is indicated to patients with advanced or muscle invasive bladder cancer (MIBC).

Radical cystectomy (RC) has been used for over 100 years as an effective treatment of MIBC. However, the main surgical challenge is not only to remove an affected organ but also to replace its functional component — urine diversion. Currently there are many different types of urinary diversion, such as neobladder reconstruction and incontinent diversion with urostomy on the anterior abdominal wall.

If ileal conduit reconstructive surgery is believed to be impossible for patients, the urinary diversion can be done with Bricker surgery or ureterocutaneostomy.

The quality of life in patients after the main urinary diversion types — Bricker's method and ileocystoneoplasty (replacement of the bladder with an ileal conduit) have been studied in some papers [3–5]. Considering traditional unpopularity of ureterocutaneostomy due to a drastic deterioration of the quality of life in patients, only limited data on ureterocutaneostomy modifications and its results regarding patients' social adaptation are available. Changed quality of life after surgery seems to be a rather urgent issue in recent years, when a 5-year survival rate increases dramatically in case of early detection and early treatment.

The main types of derivation involve significant surgery scope and as a result a large number of post-operative complications. Traditionally, ureterocutaneostomy was not a common method of derivation, due to formation of two urostomy bags resulted in great decline in patients' quality of life. At the National Cancer Institute's Plastic and Reconstructive Oncology Clinic, a modified ureterocutaneostomy technique was developed and patented, such as formation of a single-side urostomy, making it similar to Bricker surgery, except for a required intestinal surgery [6].

The aim of our paper is to study the efficacy of the modified ureterocutaneostomy technique by estimating quality of life in post-RC patients with MIBC. During the study, a comparative analysis of changes in quality of life of patients after modified ureterocutaneostomy versus Bricker urinary diversion was conducted.

### MATERIALS AND METHODS

A retrospective analysis of the database of the Plastic and Reconstructive Oncology Department,

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**Abbreviations used:** MIBC — muscle invasive bladder cancer;  
RC — radical cystectomy.

National Cancer Institute, Ukraine was performed. The study was approved by the Institutional Ethics Committee.

All patients analyzed in this retrospective study underwent treatment and follow-up examinations from 2015 to 2017. In total, in 2015–2017, about 250 cystectomies were performed at the Department (modified ureterocutaneostomy in 136 patients, Bricker surgery in 89 cases, and ileoneocystoplasty in 25 cases). The data on the quality of life of 40 patients were analyzed. Two groups, each of 20 patients were delineated. In group 1 (20 patients), RC was followed by urine derivation under the modified ureterocutaneostomy method. In group 2 (20 patients), cystectomy was followed by Bricker surgery.

The patients of both groups were matched by the basic clinical characteristics (Table 1). The groups were also comparable by disease stages, its duration before treatment, and preoperative risks. 16 (80%) and 15 (75%) patients from groups 1 and 2, respectively, passed 3 courses of standard preoperative polychemotherapy with gemcitabine-cisplatin. Patient characteristics are specified in Table 1.

Quality of life was assessed using the health survey SF-36 form (developed at the US Medical Research Institute) adapted at the National Cancer Institute for use in the Ukrainian population and considered today to be a gold standard of health-related quality of life assessment. This questionnaire is presented as a short form of medical examination and includes 36 questions. The score on each scale ranges from 0 to 100 points, where 100 corresponds to the patient's full health. The survey was completed in both groups under the same conditions. Quality of life was investigated before and 3 months after surgery according to the below parameters (Table 2).

Additionally, perioperative complications and events occurred in the early postoperative period in patients were analyzed in the groups under comparison.

Student's *t*-test and Mann — Whitney *U* test were used for analyzing the differences between two groups of patients.

**Table 1.** Patients characteristics

| Parameter                 | Group 1<br>(n = 20) | Group 2<br>(n = 20) | <i>p</i> |
|---------------------------|---------------------|---------------------|----------|
| Age (years)               | 58.5 ± 9.3          | 60.5 ± 8.4          | 0.25     |
| ASA 2                     | 14                  | 13                  | 0.4      |
| ASA 3                     | 6                   | 7                   | 0.3      |
| Preoperative stage T      |                     |                     |          |
| T2                        | 11                  | 14                  | 0.34     |
| T3                        | 5                   | 4                   | 0.49     |
| T4                        | 4                   | 2                   | 0.79     |
| Disease duration (months) | 4.2                 | 4.6                 | 0.34     |
| PCT before surgery        | 16                  | 15                  | 0.74     |

**Table 2.** The major parameters to assess quality of life according to SF-36 questionnaire

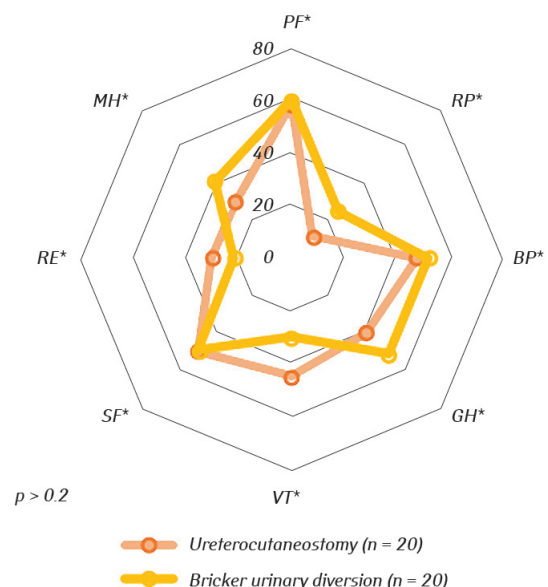
|                                               |                                                     |
|-----------------------------------------------|-----------------------------------------------------|
| PF – physical functioning                     | VT – life activity                                  |
| RP – physical function-based role functioning | SF – social functioning                             |
| BP – pain intensity                           | RE –role functioning conditioned by emotional state |
| GH – general health                           | MH – mental health                                  |

## RESULTS

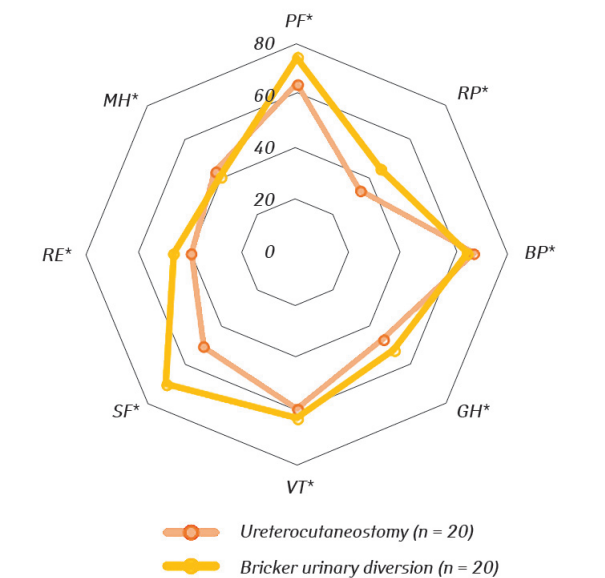
The results of the studies showed poor physical condition in both groups, poor overall health and vital exhaustion caused by pain of varying intensity. All these symptoms limited daily activity and decreased its quality. Serious worrying about the future life led to mental disorders. Patients were particularly concerned about life after urostomy. Indicators of social activity and emotional state influence were also low (Fig. 1). As can be seen from the chart (see Fig. 1), there were no statistical differences in preoperative quality of life in both groups ( $p > 0.2$ ), which may indicate that the groups were correctly selected.

At the follow-up examination 3 months after the surgery, in addition to routine examination (3 area contrast computed tomography scan and laboratory tests), the patients were offered a quality-of-life survey through the SF-36 questionnaire. An analysis of the patient questioning in 3 months revealed improvement in overall and mental health outcomes (GH and MH) in group 1 with modified ureterocutaneostomy. At the same time, in group 2 after cystectomy with Bricker's urinary derivation, the indicators of general and mental health (GH and MH) were slightly different from the outcomes of group 1. Quality of life indicators, namely physical health (PF), vitality (VT) and social functioning (SF), increased slightly in group 1. In group 2, the same indicators (PF, VT and SF) were slightly higher. Pain decreased comparing with the preoperative indicators, indicators of daily activity and emotional state increased in both groups. Comparing patients after ureterocutaneostomy and Bricker surgery, no statistically significant difference in quality of life was found in the analysis of treatment results after 3 months (Fig. 2).

An additional analysis of perioperative indicators was also conducted comparing complications in the groups under study. Surgery data were summarized and presented in Table 3.



**Fig. 1.** Comparison of quality of life scores in two groups of patients prior to surgery



**Fig. 2.** Comparison of quality of life scores in two groups of patients in 3 months after surgery

**Table 3.** Comparative characteristics of cystectomy and ureterocutaneostomy or Bricker urinary diversion, n = 40

| Indicator                          | Group 1<br>(n = 20) | Group 2<br>(n = 20) | Reliability                            |
|------------------------------------|---------------------|---------------------|----------------------------------------|
| Surgery duration, min              | 128 ± 24            | 160 ± 26            | <i>t</i> -test; <i>p</i> < 0.01        |
| Volume of blood loss, ml           | 370 [300, 500]      | 400 [300, 500]      | Mann – Whitney U test; <i>p</i> = 0.49 |
| Perioperative complications, n (%) | 2                   | 2                   | $\chi^2 = 0$ ; <i>p</i> = 1            |
| Bed-day                            | 5.7 ± 2.3           | 8.8 ± 3.2           | <i>t</i> -test; <i>p</i> < 0.01        |
| <i>M</i> ± <i>SD</i>               |                     |                     |                                        |

Table 3 shows that the intervention lasted much quicker in the group of modified ureterocutaneostomy, which is easily explained by the absence of a whole stage for resection of the ileum, an intestine segment, and imposition of intestinal anastomosis. There were no significant differences in comparative groups in the volume of intraoperative blood loss. The total number of perioperative complications was low and not statistically different. The length of stay in hospital was shorter in the ureterocutaneostomy group and made 5.7 ± 2.3 days vs 8.8 ± 3.2 days in groups 1 and 2, respectively. A statistical difference in perioperative parameters was noted only when comparing the surgery duration and length of stay in hospital.

DISCUSSION

While in many trials, quality of life in patients with an artificial bladder and incontinent urine diversion was compared, no comparison of such urinary diversions as modified ureterocutaneostomy and Bricker urinary diversion in terms of quality of life has not been found in the available literature. The choice of ureterocutaneostomy is often limited by the potential complications associated with two urostomy bags, but in case of the proposed modified ureterocutaneostomy, only one stoma is to be formed and cosmetic effect is comparable to Bricker urinary diversion with preference for quick surgery and ab-

sence of the intestinal stage. Traditionally, Bricker urinary diversion is believed to worsen quality of life due to urostomy, compared to the ileocystoneoplasty method. However, one of the first prospective analyzes and a systematic review of the literature published by Somani *et al.* [7] did not show significant differences in quality of life of patients with the main types of urinary diversion. As a result, Bricker method is preferred worldwide accounting for almost 70% of all urine diversions after the bladder removal. Only expert centers, which pioneered bladder ileocystoplasty, have the ability to perform this type of diversion more often than the cutaneous urostomy [8]. The issues of quality of life after various types of urinary diversion become more relevant with the increased patients' life expectancy. Recent publications have shown a marginal benefit of quality of life in young patients after ileocystoneoplasty [9].

Oncological and functional outcomes after RC are determined by the treatment quality on the one hand, and the patient's general condition — on the other. Age, general health, concomitant chronic diseases, underlying disease stage, ancillary procedures, post-operative complications, postoperative rehabilitation, preoperative cognitive function of the patient, among others, are believed to be crucial for the right choice of the urinary diversion method. All these factors affect quality of life after treatment. The social and cultural background of the patients should be taken into account when comparing different groups. Mansson *et al.* [10] have concluded that the patient's social and cultural characteristics significantly influence the results of quality of life after surgery. However, this study involved patients after cystectomy with formation of an ileal conduit.

When outcomes of surgery are evaluated in terms of patients' quality of life, many important factors that may significantly affect the outcome should be considered. The most common mistake is that health and physical ability are confused with quality of life. Much evidence shows that patients with serious disabilities and close to death can maintain a good quality of life. To assume that physically disabled or elderly people have lower quality of life than younger or able-bodied people is confirmation of stereotypes that underlie discriminatory practices. For example, questionnaires that include questions about physical and sexual activity may be less relevant to older than to younger patients. Not all aspects of patients' lives are related to surgery because life continues around regardless of their health. However, other aspects may interact unexpectedly with other factors. Besides, people tend to adapt to circumstances, which can also affect results. Especially after surgery, the patient's indicators and actions may be changed when he or she overestimates quality of life. Thus, the question is which results may be applied in treatment and which not worth serious consideration. In addition, illness-related accompaniment and social support can have a decisive influence on patients' quality

of life, which is currently poor in Ukraine compared to other countries.

Moreover, research articles are generally restrained with another factor — conditions for filling out questionnaires by patients. Standardization is important when comparing groups. The questionnaire should be processed as similar as possible between groups and at different points in time. For example, if one treatment group completes a questionnaire in hospital and another completes it at home, the results cannot be compared. It should also be noted that a low response rate may also indicate that the patient thinks the questionnaire is inappropriate. For this reason, it is necessary to talk to the patient before completing the questionnaire in order to explain to him the importance of answering all the questions of the questionnaire.

Based on the above, quality of life in patients after RC because of invasive bladder cancer did not differ significantly in the groups with urinary derivation conducted by two different methods: modified ureterocutaneostomy and Bricker urinary derivation. It should be noted that previous studies show a decrease in the number of postoperative complications in the ureterocutaneostomy group, which is associated with skipping an intestinal stage during such derivation and avoiding potential complications that may result from an anastomosis of the small intestine. Moreover, further studies are required to determine the location of modified ureterocutaneostomy in treatment of patients with bladder cancer. The modified ureterocutaneostomy technique is believed to be a possible recommendation as a standard treatment for patients with invasive bladder tumors, especially for patients

with advanced forms of the disease when cystectomy is cytoreductive and palliative.

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