

SELECTION OF THE URINE DERIVATION METHOD IN PATIENTS WITH ACUTE URINARY RETENTION BEFORE SURGICAL TREATMENT OF BENIGN PROSTATIC HYPERPLASIA**D.O. Gusev¹, A.D. Adilov², S.M. Pikalov³, A.A. Zimichev⁴**¹ Samara City Clinical Hospital No. 8, Samara, Russia;² Orenburg State Clinical Hospital No. 1, Orenburg, Russia;³ Samara Regional Clinical Hospital named after V.D. Seredavin, Samara, Russia;⁴ Samara State Medical University, Samara, Russia

For citation: Gusev DO, Adilov AD, Pikalov SM, Zimichev AA. Selection of the urine derivation method in patients with acute urinary retention before surgical treatment of benign prostatic hyperplasia. *Aspirantskiy Vestnik Povolzh'ya*. 2020;(1-2):122-125. <https://doi.org/10.17816/2072-2354.2020.20.1.122-125>

Received: 17.01.2020

Revised: 26.02.2020

Accepted: 16.03.2020

▪ **Actuality.** Nowadays it is necessary to recognize that the problem of acute urinary retention associated with benign prostatic hyperplasia is one of the most frequent causes of hospitalization into the urology hospital. A number of standard urine derivation techniques are used as a part of preoperative treatment. **The aim** of the study is to optimize the choice of the preoperative bladder drainage. **Material and methods.** The data of 280 patients hospitalized in the Urology Department of Samara City Clinical Hospital No. 8 over the period of 2012–2015 were studied to evaluate the results of acute urinary retention. **Results and conclusions.** Retrospective pseudo-factor analysis allows to evaluate the effect of the bladder drainage method on the results of treatment of acute urinary retention in benign prostatic hyperplasia. The results can be used as the basis for a mathematical model which allows to predict the outcome of the treatment of acute urinary retention during surgical treatment of benign prostatic hyperplasia. Obtained data were used to develop recommendations on the methods of bladder drainage as a part of preoperative treatment in patients with benign prostatic hyperplasia.

▪ **Keywords:** acute urinary retention; benign prostatic hyperplasia; bladder drainage.

ВЫБОР МЕТОДА ДЕРИВАЦИИ МОЧИ У ПАЦИЕНТОВ С ОСТРОЙ ЗАДЕРЖКОЙ МОЧЕИСПУСКАНИЯ ПЕРЕД ХИРУРГИЧЕСКИМ ЛЕЧЕНИЕМ ДОБРОКАЧЕСТВЕННОЙ ГИПЕРПЛАЗИИ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ**Д.О. Гусев¹, А.Д. Адилов², С.М. Пикалов³, А.А. Зимичев⁴**¹ Государственное бюджетное учреждение здравоохранения Самарской области «Городская клиническая больница № 8», Самара;² Государственное бюджетное учреждение здравоохранения «Городская клиническая больница № 1» города Оренбурга;³ Государственное бюджетное учреждение здравоохранения «Самарская областная клиническая больница им. В.Д. Середавина», Самара;⁴ Федеральное государственное бюджетное образовательное учреждение высшего образования «Самарский государственный медицинский университет» Министерства здравоохранения Российской Федерации, Самара

Для цитирования: Гусев Д.О., Адилов А.Д., Пикалов С.М., Зимичев А.А. Выбор метода деривации мочи у пациентов с острой задержкой мочеиспускания перед хирургическим лечением доброкачественной гиперплазии предстательной железы // Аспирантский вестник Поволжья. – 2020. – № 1–2. – С. 122–125. <https://doi.org/10.17816/2072-2354.2020.20.1.122-125>

Поступила: 17.01.2020

Одобрена: 26.02.2020

Принята: 16.03.2020

▪ **Актуальность.** На сегодняшний день необходимо признать, что проблема возникновения острой задержки мочеиспускания на фоне доброкачественной гиперплазии предстательной железы является одной из наиболее частых причин госпитализации больных в урологический стационар. В рамках предоперационного лечения применяется ряд стандартных методик деривации мочи. **Целью исследования** — оптимизация выбора подхода предоперационного дренирования мочевого пузыря. **Материал и методы.** Для оценки результатов купирования острой задержки мочеиспускания использована выборка из 280 пациентов, госпитализированных в урологическое отделение ГБУЗ СО СГКБ № 8 за 2012–2015 гг.: катетеризация мочевого пузыря выполнена 164 пациентам, наложение эпицистостомы — 59, наложение троакарной эпицистостомы — 57 больным. **Результаты и выводы.** Ретроспективный псевдомногофакторный анализ позволяет оценить влияние метода

дренирования мочевого пузыря на результаты лечения острой задержки мочеиспускания при доброкачественной гиперплазии предстательной железы. Результаты могут быть положены в основу математической модели, прогнозирующей исход купирования острой задержки мочеиспускания при доброкачественной гиперплазии предстательной железы. Исходя из полученных результатов, даны соответствующие рекомендации по поводу методов дренирования мочевого пузыря в рамках предоперационного лечения у пациентов с доброкачественной гиперплазией предстательной железы.

■ **Ключевые слова:** острая задержка мочеиспускания; доброкачественная гиперплазия предстательной железы; дренирование мочевого пузыря.

Introduction

High-frequency acute urinary retention (AUR) requires urgent hospitalization of a patient in a urological hospital. In a 5-year-follow-up past study, every tenth man of age 60–70 years had at least 1 episode of AUR, while the AUR occurrence rate was 30% in men during another 10-year-follow-up study [2, 5, 7]. Generally, AUR in men is caused by benign prostatic hyperplasia (BPH), which occurs in 50%–70% of the patients [3–5]. It is the fear of urinary retention, and not the symptoms of urination disorder, that often propels a patient to visit a urologist. It is already known that, on an average, AUR occurs in 10% of men aged >70 years [1, 6]. The epidemiological data indicate that, with an increase in the volume of prostate of >40 cm³ and that of the prostate-specific antigen (PSA) level in blood at >1.4 mg/mL, the risk of AUR increases by 4 times [3, 5]. The probability of AUR in the male gender is 8-times greater in those aged >70 years than in those of age 40 years [3].

In most cases of emergency hospitalization, the doctors do not have all the necessary information to perform a one-stage prostatectomy or transurethral resection (TUR) of the prostate. The lack of data on the PSA level is of particular importance, as it does not eliminate the chances of prostate cancer. In such situations, as well as in the absence of a tendency to restore spontaneous urination after catheter removal, an open or trocar cystostomy is generally practiced.

The present study aimed to optimize the choices of approaches to preoperative drainage of the bladder.

Materials and methods

The study was conducted using the case-control methodology.

A retrospective analysis of the results of treatment of patients admitted to the urology department of the State Clinical Hospital No. 8 during 2015–2018 was performed. The patients enrolled in the study met the criteria of the presence of AUR caused by BPH, which was confirmed by the results of ultrasound examination and the

drainage of the bladder as an approach of preparation for surgery in order to eliminate the chances of BPH. Depending on the approach used to perform drainage, all patients were distributed into 3 groups: group 1 (catheterization of the bladder with a urethral catheter), group 2 (epicystostomy), and group 3 (trocar epicystostomy).

As per the literature, the number of patients with bladder catheterization was 164, with epicystostomy was 59 people, and with trocar epicystostomy was 57 people. A total of 280 people were included in the study.

The estimates of the effect of the treatment method on the disease outcome were determined via one-way analysis of variance (ANOVA). We assumed X as a certain general population that can be influenced by some qualitative factor F , which has p levels F_1, F_2, \dots, F_p . One-way ANOVA was used to determine whether the factor F has a significant effect on the value of X . For this, the factor variance s_{fact}^2 (2), generated by the effect of the factor, and the residual variance s_{res}^2 , due to random causes, were compared. If the difference between these variances was significant, then the factor F was considered to have a significant effect on the population X . In this case, in order to identify which of the factor levels had the greatest influence on the population X , a pairwise comparison of the means corresponding to different values of $F_p, i = \overline{1, n}$, was performed. We considered the number of tests at different levels to be different, with q_1 tests performed at the F_1 level, q_2 tests performed at the F_2 level, ..., and q_p tests performed at the F_p level. To simplify the calculations, instead of individual cases x_{ij} , i was the number of the test, j was the number of the factor level, $y_{ij} = x_{ij} - C$ was used, where C is the average of all observations x_{ij} . To determine whether the variances s_{fact}^2 and s_{res}^2 differed significantly, the null hypothesis $H_0: s_{\text{fact}}^2 = s_{\text{res}}^2$ was tested using Fisher's test at a significance level of $\alpha = 0.95$.

The outcome of treatment of a BPH patient was assigned a certain discrete numerical value of the natural series in accordance with the degree of manifestation, wherein 1 indicated surgical treatment performed for BPH without complications,

Comparative characteristics of bladder drainage methods in case of acute urinary retention

Сравнительная характеристика методов дренирования мочевого пузыря по поводу острой задержки мочеиспускания

Characteristics of the indicator	Group 1	Group 2	Group 3
Anesthesia			
Not used	158 (96.3%)	0	0
Local	0	0	57 (100%)
Intravenous anesthesia	6 (3.7%)	27 (45.8%)	0
Spinal anesthesia	0	32 (54.2%)	0
Technical difficulties during the procedure			
Yes	57 (34.8%)	8 (13.6%)	7 (12.3%)
No	107 (63.2%)	51 (86.4%)	50 (87.7%)
Successful procedure			
Yes	121 (73.8%)	59 (100%)	2 (4%)
No	43 (26.2%)	0	55 (96%)
Need for repeated drainage			
Yes	45 (27.4%)	0	0
No	119 (72.6%)	59 (100%)	57 (100%)
Infectious and inflammatory diseases of the lower urinary tract			
Urethritis	143 (87.2%)	2 (3.4%)	0
Prostatitis	56 (34.1%)	7 (11.9%)	4 (7%)
Infectious and inflammatory diseases of the scrotum organs	24 (14.6%)	2 (3.4%)	1 (1.8%)

2 implied surgical treatment for BPH that had immediate and long-term complications, and 3 indicated surgical treatment performed for BPH, which was fatal.

Research outcomes

The comparative characteristics of the methods of urinary bladder drainage for AUR are presented in Table. The vast majority of bladder catheterizations were performed without using anesthesia ($n = 158$, 96.3%) and the catheterizations under intravenous anesthesia were performed in 6 patients (3.7%). In the epicystostomy group, catheterizations under intravenous anesthesia were performed in 27 patients (45.8%) and catheterizations under spinal anesthesia in 32 patients (54.2%). In the trocar epicystostomy group, 57 (100%) surgeries were performed under local anesthesia.

Interventions were successfully performed in 121 (73.8%) patients in the catheterization group, in 59 (100%) patients in the epicystostomy group, and in 55 (96%) patients in the trocar epicystostomy group. Subjective difficulties in performing the manipulation were noted in 57 (34.8%) cases while draining the bladder with a urethral

catheter, in 8 (13.6%) cases when performing an epicystostomy, and in 7 (12.3%) cases when performing a trocar epicystostomy. The need for repeated drainage arose in 45 (27.4%) patients in the bladder catheterization group.

After the manipulation during hospitalization, 143 (87.2%) patients from the group 1 had urethritis, 56 (34.1%) patients had prostatitis, and 24 (14.6%) patients had infectious and inflammatory diseases of the scrotal organs. In group 2, these indicators were 2 (3.4%) for urethritis, 7 (11.9%) for prostatitis, and 2 (3.4%) for infectious and inflammatory diseases of the scrotal organs, respectively. In group 3, the smallest numbers of cases of prostatitis ($n = 4$, 7%) and infectious and inflammatory diseases of the organ scrotum ($n = 1$, 1.8%) were recorded.

TUR was performed in all patients with BPH ($n = 280$).

At the same time, patients with BPH and AUR ($n = 164$) underwent catheterization as a preoperative intervention for urine derivation, with subsequent TUR. In this group, cases of an infectious and inflammatory process were recorded in 143 (87.2%) patients. For 59 patients, an open epicystostomy was selected as the preoperative urine derivation method. In this group, cases of

an infectious and inflammatory process were recorded in 9 (15.2%) patients. Trocar cystostomy was applied in 57 patients as a preoperative urine derivation method. In this group, cases of an infectious and inflammatory process after PG TUR were recorded in 4 (7.0%) patients.

ANOVA results revealed that the outcomes of treatment of patients with BPH and AUR differed significantly. However, the hypothesis that $M(X_1) = M(X_2) = \dots = M(X_n)$ was rejected, since when testing it, $F_{\text{obs}} = 4.4$ exceeded $F_{\text{cr}} = 4.2$, at a value level of 0.05. This equation indicated that it was quite acceptable to compare the treatment results among the groups, and lower the value of M , better were the long-term results.

The most optimal method of urine derivation before TUR in patients with BPH was a combination of TUR of the prostate gland with trocar cystostomy (mean $M = 1.07$). When TUR was combined with open epicycstostomy, the average M was 1.15. Disappointing data were obtained after performing TUR in BPH when using a urethral catheter before the surgery as a method of urine derivation.

Conclusion

Based on the data obtained as a result of the analysis, it can be concluded that drainage of the urinary bladder in case of AUR by using a trocar epicycstostomy bears subjective difficulties no more often than by other methods discussed herein, with a consistently high percentage of successful procedures that eliminated the need for repeated drainage. Trocar epicycstostomy was accompanied

by the least number of infectious and inflammatory diseases of the lower urinary tract that could be performed exclusively under local anesthesia; therefore, it can be recommended as a method of choice for preoperative drainage of the bladder.

The authors declare no conflict of interests.

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