THE STUDY OF BIPOLAR TRANSURETHRAL RESECTION EFFICIENCY OF MEDIUM- AND SMALL-SIZED BENIGN PROSTATIC HYPERPLASIA

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The aim of the investigation is to study the efficiency and prove the choice of bipolar transurethral resection if there are indications for medium-sized benign prostatic hyperplasia surgical treatment.

Materials and Methods. The research was based on the comparative analysis of surgical results of 244 patients by bipolar (n=122) and monopolar (n=122) transurethral resection, the size of prostatic hyperplasia being 40–80 cm^3.

Conclusion. The obtained results of surgical treatment of patients operated by the bipolar transurethral resection technique prove the efficiency of the endoscopic method and make the choice of the technique preferable in case of medium-sized benign prostatic hyperplasia.

Key words: benign prostatic hyperplasia; bipolar transurethral resection; medium-sized prostatic hyperplasia.

Benign prostatic hyperplasia (BPH) is an integral symptom complex of ageing male organism. Its prevalence has a direct relationship to age, and clinical presentations are reported in 11.3% of patients aged 40–49 years, and in 81.4% of patients over 80 [1]. Over 40% of men over 50 undergo an operation, and the proportion of these patients is increasing due to worldwide tendency for ageing of population. Currently, in Russian urology clinics the standard of BPH surgical treatment is open adenomectomy — 27.2% operations, and transurethral prostatic resection — 27.8% [2, 3].

According to the existing scheme of BPH operative treatment, if the prostatic volume is up to 80 cm^3, monopolar transurethral prostatic resection (MTUR) is recommended [4]. 5% glucose solution or other low-osmolar solutions are used as lavage fluid. 10–20% of operated patients have intraoperative or postoperative severe complications and life-threatening conditions that restrain the use of this surgical technique, especially in patients with somatic burdening [5, 6].

In this regard, the study of bipolar transurethral prostatic resection (BTUR) availability is worth noticing. The operation is performed by means of bipolar resectoscope, resection loop of which limits electric influence on a patient. It eliminates unintended tissue burn risk and broadens indications for this technique [7, 8]. Saline solution used as lavage fluid in bipolar technique also contributes to safety improving. The advantages of this method over MTUR are reduced risk of major intraoperative bleeding TUR-syndrome, hyponatremia; reduced risk of contamination and hardening of urinary tract in postoperative period due to the reduction of urethral catheterization time; high tolerability of patients with severe cardiovascular pathology and pacemaker patients [9, 10]. However, in Russia BTUR technique is not widespread, since many of the abovementioned advantages have not been clinically proven, and that is the objective of the present study.

The aim of the investigation was to study the efficiency and prove the choice of bipolar transurethral resection if there are indications for medium-sized benign prostatic hyperplasia surgical treatment.

Materials and Methods. The research was carried out on the basis of Urology centre of Nizhny Novgorod Railway Clinical Hospital, in 2009–2011. The inclusion criteria were the following: patients with BPH aged over 50, who gave written informed consent; symptoms of lower urinary tract according to international assessment system I-PSS ⩾8 points; prostate volume — from 40 to 80 cm^3; no previous history of BPH complications. Control follow-up periods were 1, 6 and 12 months after the surgery. The sampling was formed by two groups with 122 patients in each group (the main group — patients with BTUR, and the control group — with MTUR). And for reasons of sampling representativeness, the patients were collected by copy-

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Table 1

Mean values of patients' initial indices (M±m)

Indices	Main group	Control group	p
Mean age, years	66.8±1.1	65.5±1.2	0.437
Prostate V, cm^3	58.3±2.2	56.4±2.1	0.534
PSA, ng/mL	3.1±0.2	2.8±0.1	0.160
Qmax, mL/s	9.1±0.3	9.5±0.3	0.291
PVR, mL	112.4±0.9	110.8±0.9	0.223
IPSS, points	28.7±0.5	29.4±0.5	0.320
QoL, points	4.6±0.2	4.8±0.2	0.277
SF-36, points	49.7±0.6	51.0±0.6	0.141
LQ-100, points	3.8±0.2	3.7±0.2	0.678
Average time of hospital stay before the operation, bed-days	1.4±0.1	1.5±0.1	0.411

and-match method taking into account comparability of initial clinical characteristics of patients of the compared groups: age, prostate volume (V_{pr}), prostate specific antigen (PSA) level in blood serum, postvoid residual urine volume (PVR), maximal urinary flow rate (Qmax), assessment of symptoms and life quality of patients according to international standardized questionnaires IPSS, QoL, SF-36 and QOL-100 (Table 1).

To estimate the reliability of differences of the compared samplings we used Mann-Whitney U-test, and in dynamics — Wilcoxon T-criterion. The data were processed using specialized software package SPSS 17.0 and Statistica 6.0. The differences were considered statistically significant if $p \leqslant 0.05$.

Results and Discussion. Table 2 shows mean values and percentage ratio of indices characterizing the results of surgeries in groups of patients with BTUR and MTUR. Operation time for both techniques did not exceed 56 min, and had no statistically significant difference in the compared groups (p=0.270). In addition, the patients of the main group had significantly less extent of intraoperative blood loss (p<0.001). In early postoperative period patients after BTUR had bleeding 1.2 times less frequently, and infectious and inflammatory complications — twice less frequently, but there were no statistically significant differences (p=1.000 and p=0.684, respectively).

The periods of postoperative urinary catheterization in the main group were 1.7 times less (p<0.001) that clearly contributes to reduction of dysuric disorders duration. More than half of the patients (58.5%) after MTUR had dysuric manifestations over 2 weeks, after BTUR such patients amounted to only the ninth part (9.2%, p<0.001). Equifrequent urinary incontinence including partial urinary retention after urethral catheter withdrawal was observed in one in seven patient in both groups (p=0.437), therefore, the development of this complication is independent of the chosen operation technique.

The improvement of perioperational indices in patients after BTUR enables to attain prompt normalization of urea composition, reduce treatment period. According to the study, urea composition in patients of the main group normalized on day 20 after the operation on average, in control group — only on day 25 (p<0.001). Postoperative period in the main group was shorter by 21.1% (p<0.001), since the prevailing number of patients (72.3±3.9%) stayed in hospital from 2 to 5 days, and the majority of MTUR operated patients (53.8±4.4%) — from 6 to 8 days. Finally, total time of stay in urology clinic for patients after BTUR was 5.9±0.2 days, after MTUR — 7.2±0.2 days (p<0.001). Average duration of vocational rehabilitation was less in the main group as well — 21.9±0.6 versus 26.6±0.7 days (p<0.001).

The study of postponed results of surgeries demonstrated that in 6 and 12 months the frequency of complications

Table 2

The comparison of indices characterizing the results of surgeries in groups of patients after bipolar and monopolar transurethral resection (M±m)

Indices	Main group	Control group	p
Operation mean time, min	55.7±2.4	52.1±2.2	0.270
Mean blood loss volume, ml	115.6±3.0	131.8±3.0	**<0.001**
Mean periods of postoperative catheterization, days	2.8±0.2	4.7±0.2	**<0.001**
Dysuria after catheter withdrawal, %	85.3±3.1	90.5±2.6	0.149
Average time of dysuria, days	13.4±0.4	15.3±0.4	**<0.001**
Urinary incontinence, complete, partial after catheter withdrawal, %	13.9±3.1	14.8±3.2	0.437
Hemorrhage in early postoperative period, %	3.8±1.7	4.6±1.8	1.000
Inflammatory complications in early postoperative period, %	1.5±1.1	3.1±1.5	0.684
Mean periods of urea composition normalization, days	20.2±0.6	25.3±0.7	**<0.001**
Complications 6 months after the operation, %	7.4±2.2	11.5±2.8	0.170
Complications 12 months after the operation, %	4.1±1.7	6.2±2.1	0.788
Average time of hospital stay after the operation, bed-days	4.5±0.2	5.3±0.2	**<0.01**
Average time of complete vocational rehabilitation, days	21.9±0.6	26.6±0.7	**<0.001**

Table 3

The comparison of overall assessment dynamics in groups according to IPSS and QoL questionnaires before and after the operation in main and control groups

Time schedule	Assessment according to IPSS, points			Assessment according to QoL, points		
	main group	control group	p	main group	control group	p
Before operation	28.7±0.5	29.4±0.5	0.320	4.6±0.2	4.8±0.2	0.277
1 month after operation	3.1±0.2	4.3±0.2	**<0.001**	0.8±0.1	1.2±0.1	**<0.001**
6 months after operation	1.9±0.1	2.2±0.1	0.092	0.6±0.1	0.8±0.1	0.055
12 months after operation	1.2±0.1	1.4±0.1	0.158	0.3±0.1	0.4±0.1	0.174

Table 4

The comparison of indices of overall estimate dynamics according to SF-36 and QOL-100 questionnaires before and after the operation in the main and control groups

Time schedule	Assessment according to SF-36, points			Assessment according to QOL-100, points		
	main group	control group	p	main group	control group	p
Before operation	49.7±0.6	51.0±0.6	0.141	3.8±0.2	3.7±0.2	0.678
1 month after operation	61.7±0.7	59.3±0.7	**0.013**	4.1±0.2	4.0±0.2	0.689
6 months after operation	70.4±0.7	68.9±0.7	0.167	4.2±0.2	4.1±0.2	0.812
12 months after operation	72.6±0.7	71.4±0.7	0.241	4.2±0.2	4.2±0.2	0.875

in the main group was 1.5–1.6 times less than in the control group, but there was no significant difference of indices (p=0.170; p=0.788). Among late postoperative complications more frequently diagnosed in patients after MTUR there were infectious and inflammatory processes (2.3±1.4 and 0.8±0.8%; p=0.078), hematuria (1.5±1.1 and 0.0%; p=0.094), urethral strictures and Marion disease (5.4±1.9 and 1.5±1.1%; p<0.05).

Comparative analysis of dynamics of BPH symptoms and life quality of patients after surgery demonstrated improvements in both groups. The most significant intergroup differences were observed in the first postoperative month. In the group of patients after BTUR 1 month after the operation overall assessment according to I-PSS decreased by 9.3 times, in MTUR group — by 6.8 times (p<0.001), according to QoL — by 5.8 and by 4 times respectively (p<0.001), in the main group improvements being statistically more significant (p<0.001) (Table 3).

Urinary flow rate 1 h after the operation in both groups increased equally, in the main group — from 9.1±0.3 to 21.6±0.4 mL/s (p<0.001), in control — from 9.5±0.3 to 22.4±0.4 mL/s (p<0.001). In accordance with uroflowmetry, postvoid residual urine volume (PVR) reduced from 110.8–112.4 ml up to 0 in both groups (p<0.001; p<0.001).

In later follow-up periods — 6 and 12 months after the operation — within groups there were observed improvements of indices on IPSS и QoL, but the observable changes being less prominent, and intergroup difference gradually leveling.

The same tendencies were established when estimating the quality of life of patients after surgery based on SF-36 questionnaire that showed significant changes of indices comparing initial data and those of 1 month after the operation (Table 4). In the main group there was evident improvement on scales: “physical functioning” — 14.7% increase, “role functioning” — 16.8% increase, “pain” 21.4%, “general health” — 2.9%, “viability” — 12.0%, “social functioning” — 1.4%, “emotional functioning” — 9.0%, and “psychological health” — 10.1% increase. Totally, overall assessment on physical component of life quality increased by 15.0%, psychological component — by 7.7%, and overall assessment — by 24.1%. In the control group of patients 1 month after the operation there was observed the increase of the most indices, though their dynamics was less intensive that provided statistically significant intergroup difference by all criteria of physical (p=0.005) and psychological component (p=0.027), as well as by overall estimate (p=0.013).

The assessment of life quality of patients using QOL-100 questionnaire did not reveal such significant differences between the groups. Within the groups the dynamics is appreciable and most significant on the first month after the operation. In BTUR group, monthly increase of physical indices was 28.1% (annual increase — 31.3%, p<0.001), psychological indices — 13.9% (16.7%; p=0.004), overall comprehension of health and wealth — 13.9% (19.4%; p=0.044).

Conclusion. The analysis of treatment success of medium-sized benign prostatic hyperplasia by bipolar transurethral resection using saline solution was performed by comparing the obtained results with the findings of monopolar resection, and indicated statistically significant reduction of intraoperative blood loss volume, catheterization and dysuria duration after catheter withdrawal that enables to reduce the duration of patients’ stay in hospital and their vocational rehabilitation. Moreover, after monopolar resection monthly dynamics of indices of symptoms intensity and quality of life is statistically significantly higher that indicates high medical and social efficiency of this operative technique in the nearest postoperative period,

and insignificant effect of the choice of surgical procedure in late postoperative period.

There was revealed no statistically significant difference between the groups in the number of postoperative complications; though full spectrum of other proved advantages of bipolar transurethral resection including safety and capability to perform the operation in patients with concomitant age-related pathology proves conclusively that this endoscopic technique is the procedure of choice if there are surgical indications in patients with prostatic hyperplasia of 40–80 cm^3.

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