

THE USE OF BIPOLAR TRANSURETHRAL ENUCLEATION FOR THE TREATMENT OF LARGE-SIZED BENIGN PROSTATIC HYPERPLASIA

UDC 616.65–006.03–08:539.232
Received 28.03.2012



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The aim of the investigation is to study the clinical efficiency of the transurethral enucleation of large-sized prostate adenoma based on a comparative analysis with the results of open adenectomy.

Materials and methods. The research is based on the treatment results of 122 patients treated using the transurethral enucleation method, and 122 patients with open adenectomy.

Conclusion. The advantage of an operative method of bipolar transurethral enucleation of prostate over adenectomy in the treatment of large-sized benign prostatic hyperplasia is the significant decrease of intraoperative blood loss, the reduction of postoperative urinary catheterization period, and the period of urine composition normalization, the duration of dysuric disorders, and the incidence rate of infectious and inflammatory complications, and the sclerosis of the neck of urinary bladder in late postoperative period, and in the long run — the reduction of postoperative period in inpatient department and the time of complete recovery.

Key words: benign prostatic hyperplasia, prostatic adenoma, bipolar transurethral enucleation method.

If there are indications for the operative treatment of benign prostatic hyperplasia (BPH, prostatic adenoma) — one of the most common diseases among middle aged and old men — transurethral resection (TUR) remains the "gold standard" if prostate volume is under 80 cm³ [1–3]. However, in greater prostate volume, the treatment choice is limited and a patient undergoes an open traumatic operation entailing high risk of intra- and postoperative complications [4].

The major drawback of adenectomy is excessive intraoperative hemorrhage; long urinary catheterization increasing the risk of urinary infection; and long-term healing of postoperative wound (several weeks); frequent late postoperative complications — scars, urinary bladder stones, and long persisting urinary fistulas. And as a result, there is the increase of postoperative period of a patient's stay in the inpatient department, rehabilitation period, and vocational rehabilitation. Moreover, an open surgery can be restricted by the presence of intercurrent diseases (pulmonary, cardiac and vascular diseases, etc) [5, 6].

Trans Urethral Enucleation with Bipolar — TUEB is the method of choice in the range of innovative bipolar endoscopic technologies for the operative treatment of large-sized prostatic adenomas.

TUEB technique using electroconducting saline solutions

as irrigation liquid enables to avoid TUR syndrome and hyponatremia [7], and avoid the risk of electric current exposure, thus, extending the application of the method in patients with somatic pathology, and those with artificial pacemaker [8, 9].

Other advantages of the technique over an open operation is minimum intraoperative blood loss, and a short period of urinary catheterization (24–72 h) reducing the risk of urinary infection. No traumatic incision of anterior abdominal wall and urinary bladder enables to avoid late postoperative complications, contributes to rapid urine composition normalization, and reduces rehabilitation period [10, 11].

The abovementioned advantages of TUEB method make it possible to use it extensively in clinical practice. Though evidence based medicine requires prior thorough analysis of strengths and weaknesses of the surgical technique before practical application.

The aim of the investigation is to study the clinical efficiency of the transurethral enucleation in large-sized benign prostatic hyperplasia based on a comparative analysis with the results of open adenectomy.

Materials and Methods. The research has been carried out on the basis of Urological Centre of Railway Clinical Hospital, Nizhny Novgorod, where TUEB technique has

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been used since 2008, and over 220 of such operations have been performed for 4 years. Two groups of patients with large-sized prostatic adenomas were included into study by sampling. The main group consisted of 122 patients with TUEB. In order to maintain the representativeness, the control group was composed by “copy-pair” method, i.e. for each patient from the first group there was matched retrospectively a patient with adenomectomy having the same initial indexes (age, prostate volume (V), prostatic specific antigen (PSA) level in blood serum, postvoid residual urine volume (PVR), maximum speed of urine flow (Qmax)).

Inclusion criteria: patients with BPH aged 50 yrs and older who gave a written informed consent; prostate volume from 80 to 250 cm³; result index according to international prostate symptom score (IPSS) ≥8 scores; no BPH complications in past history.

Exclusion criteria: hepatic and serious renal failure, unstable angina, life-threatening conditions; operative interventions on prostate 6 months before the inclusion; planned biopsy, prostatic surgeries within the follow up period; urinary tract infections, prostatitis, neurogenic dysfunction of urinary bladder, diagnosed prostate cancer; the patients taking 5- α -reductase inhibitors 6 months before the inclusion.

Control periods were assigned 1, 3, 6 and 12 months after the operation. Table 1 demonstrates no statistically reliable differences in basic characteristics of patients included into the study.

To study TUEB clinical efficiency there were considered the most informative criteria reflecting the care quality, its short- and long-term results. Mann-Whitney U-test was used to compare quantitative data; and for qualitative data — χ^2 Pearson criterion (Yates correction was used in fourfold contingency tables) or sensitive Fischer test. The differences were considered statistically significant in $p \leq 0.05$.

Results and Discussion. The analysis of intraoperative indexes, the rate and structure of early postoperative complications (Table 2) showed the time of open operation to be 1.8 times as less on the average than TUEB time (<0.001). At the same time, in the patients of the main group, moderate (from 100 to 500 ml) and serious (over 500 ml) intraoperative blood loss was less frequently — 11.4±2.9 vs 27.9±4.1% — in the control group ($p < 0.001$). The necessity for a long postoperative urine bladder catheterization among TUEB patients was 3.8 times less frequently ($p < 0.001$). Catheterization period in most patients of the main group (91.8%) was no more than 3 days, while urethral catheterization period in 77.0% of control patients was more than 10 days increasing the risk of urinary tract infection.

Though there were found no statistically significant differences in the rate and structure of early postoperative

Table 1

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

Indexes	Main group	Control group	p
Average age, yrs	69.1±1.0	70.2±1.4	0.453
Prostate V, cm ³	118.7±4.3	114.3±6.0	0.511
PSA, ng/ml	2.9±0.2	3.1±0.2	0.480
Qmax, ml/s	9.7±1.7	8.9±1.6	0.530
PVR, ml	127.3±4.8	131.8±5.0	0.290
IPSS, scores	25.9±0.5	26.7±0.5	0.263
Quality of life index, scores	5.1±0.2	5.5±0.2	0.188
Questionnaire SF-36, scores	47.5±0.6	46.6±0.6	0.292
Questionnaire Quality of life-100, scores	3.7±0.2	3.6±0.2	0.738
Average duration of stay in hospital before the operation, bed-days	1.4±0.1	1.6±0.1	0.392

complications in the studied groups. Every 17th patient of the main group and every 10th control patient had complications ($p=0.170$), postoperative hemorrhage ($p=0.569$) and inflammatory complications ($p=1.000$) developing by 1.6 times more frequently in the control group.

The comparison of urination function indexes after urethral catheter withdrawal (Table 3) demonstrates the studied operative methods to have the same effect on the

Table 2

The indexes of operation time, urinary bladder catheterization period, intraoperative blood loss volume, frequency and structure of early postoperative complications (M±m)

Indexes	Main group	Control group	p
Average operation time, min	129.6±4.8	72.9±3.3	<0.001
Average blood loss volume, ml	110.2±3.0	165.9±9.5	<0.001
Average time of postoperative catheterization, days	2.8±0.2	10.7±1.8	<0.001
Early postoperative complications, % including:	5.7±2.1	9.9±2.7	0.170
Hemorrhages	4.1±1.8	6.6±2.2	0.569
Inflammatory complications	1.6±1.1	2.5±1.4	1.000
Others	0	0.8±0.8	1.000

Table 3

Indexes of urination function and the time of urinalysis normalization after urethral catheter withdrawal (M±m)

Indexes	Main group	Control group	p
Dysuria, %	90.2±2.7	85.2±3.2	0.242
Dysurian average time, days	3.5±0.2	5.8±0.4	0.854
Average time of urine composition normalization, days	21.8±2.7	26.5±3.0	0.859
Partial urinary incontinence, %	13.1±1.9	9.8±1.7	0.804
Urinary incontinence, %	3.3±1.5	1.6±1.1	0.679

Table 4

Average length of hospital stay and the rate of late postoperative complications (M±m)

Показатели	Main group	Control group	p
Average length of hospital stay after surgery, bed-days	4.2±0.2	12.1±0.3	<0.001
Average time of complete recovery, days	13.9±0.4	22.7±1.8	<0.001
Postoperative complications 3 months after the operation, %	7.4±2.4	14.8±3.2	0.103
Postoperative complications 6 months after the operation, %	8.2±2.5	13.9±3.1	0.221
Postoperative complications 12 months after the operation, %	4.9±2.0	7.4±2.4	0.594

rate of dysuric disorders, detrusor function, and the time of urine composition normalization. In particular, dysuria manifestation after catheter withdrawal in both groups had the same frequency (p=0.242), but in the main group dysuria was of less duration, in 68.4% of cases — up to 5 days (in control group — in 44.3%, p<0.001). Average dysuria duration in the main group was 1.7 times as less, though the difference did not reach statistical significance (p=0.854).

After catheter withdrawal that can be considered as one of the early postoperative complications, 16.4% of TUEB patients and 11.5% of patients with adenomectomy (p=0.355) had urinary incontinence (complete and partial). It indicates the same frequency of the complication regardless the operation technique.

The analysis of urine test normalization time showed mean values to differ insignificantly (p=0.859), but at the same time 13.9% of patients of the main group and only 3.3% of control patients (p=0.002) had the period less than 10 days.

The resulting index of clinical efficiency of TUEB technique is the length of a patient's hospital stay after the operation, it being almost 3 times as less compared to an open surgery (p<0.001). Furthermore, the period of complete recovery and vocational rehabilitation in the main group is one week less than that in the control group (p<0.001).

The comparison of the results of late operations showed postoperative complication rate 3 months after the operation in the main group to be 2 times as less (p=0.103). However, 6 months and a year after the surgery, the differences in the operated patients state have leveled, since there is no statistically significant difference in the rate of late postoperative complications in both groups.

Among the late complications frequently diagnosed in patients after adenomectomy in comparison with TUEB patients were the following: prostatitis and other infectious and inflammatory processes (0.0 and 2.5±1.4; p=0.245),

as well as sclerotic changes of the neck of urinary bladder (4.1±1.8 and 0.8±0.8; p=0.215).

Conclusion. The advantage of operative technique of bipolar transurethral enucleation of prostate over adenomectomy in the treatment of large-sized benign prostatic hyperplasia is the significant decrease of intraoperative blood loss, the reduction of postoperative urinary catheterization period, and the period of urine composition normalization, the duration of dysuric disorders, and the incidence rate of infectious and inflammatory complications, and the sclerosis of the neck of urinary bladder in late postoperative period, and in the long run — the reduction of postoperative period in inpatient department and the time of complete recovery. The compared methods have the same effect on the rate of early postoperative complications and urination dysfunction after catheter withdrawal. The exceeding operation time in transurethral enucleation compared to an open operation is not to be supposed as an essential fault since the parameter depends on a number of avoidable factors (equipment, surgeon's experience, etc).

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