BENIGN PROSTATE HYPERPLASIA: CLINICAL EFFECTIVENESS OF MODERN DIAGNOSIS AND TREATMENT METHODS

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ABSTRACT

An increase in prostate gland volume is accompanied by urinary dysfunction, deterioration in quality of life, and an increased risk of complications affecting the urinary tract. The aim of this study was to evaluate the effectiveness of modern diagnostic and treatment methods for benign prostatic hyperplasia based on the analysis of clinical, laboratory, and instrumental indicators. A total of 150 patients aged 50 to 82 years with benign prostatic hyperplasia (BPH) were examined and treated. The results demonstrated the high diagnostic value of a comprehensive assessment including the measurement of prostate-specific antigen (PSA) levels, ultrasonographic examination, and uroflowmetry. Modern pharmacological and minimally invasive treatment methods contributed to significant improvements in urodynamic parameters and patients' quality of life.

Introduction. Benign prostatic hyperplasia (BPH, or prostate adenoma) is a benign growth of prostate gland tissue that causes it to enlarge and compress the urethra. It is one of the most common urological diseases in men over 50. BPH is not cancerous and does not metastasize.

According to the World Health Organization, signs of prostatic hyperplasia (BPH) are found in more than 50% of men over 60 years of age and in 80–90% of men over 80 years of age. The development of BPH is accompanied by lower urinary tract symptoms, including increased urinary frequency, nocturia, a weakened urinary stream, a sensation of incomplete bladder emptying, and urinary retention. These symptoms significantly reduce patients' quality of life and can lead to chronic urinary retention, urinary tract infections, stone formation, and kidney failure.

Despite significant advances in modern urology, issues of timely diagnosis, selection of optimal treatment tactics and increasing the effectiveness of treatment for patients with BPH continue to remain relevant.

Purpose of the study. To evaluate the effectiveness of modern methods of diagnosis and treatment of benign prostatic hyperplasia based on the analysis of clinical, laboratory and instrumental parameters.

Materials and methods. The study was conducted in the urology department of a multidisciplinary clinic from 2021 to 2024. The study included 150 patients with clinically confirmed benign prostatic hyperplasia. The subjects' ages ranged from 50 to 82 years, with an average age of 66.8±1.4 years.

All patients underwent a comprehensive examination, including a history of their complaints and illness, a digital rectal examination, serum prostate-specific antigen measurement, prostate and bladder ultrasound, uroflowmetry, and residual urine volume measurement. The international IPSS scale was used to assess symptom severity, and quality of life was assessed using the QoL scale.

Depending on the chosen treatment tactics, patients were divided into two groups. The first group included 92 patients who received conservative therapy using α1-blockers, 5-α-reductase inhibitors, or a combination thereof. The second group consisted of 58 patients who underwent surgical interventions, including transurethral resection of the prostate gland, laser enucleation of the prostate and bipolar plasma vaporization.

Treatment effectiveness was assessed 6 and 12 months after the start of therapy. Statistical processing of the results was performed using SPSS Statistics 23.0. Mean values of the indicators (M±m) and Pearson correlation coefficients (r) were calculated; differences were considered statistically significant at $p<0.05$.

Results. At initial presentation, most patients complained of increased urination frequency during the day and night, weakened urinary stream, a feeling of incomplete bladder emptying, and decreased quality of life. The average IPSS score corresponded to the severity of disease symptoms. After treatment, positive dynamics were observed in almost all studied parameters. The maximum urine flow rate more than doubled and amounted to 18.7±0.8 ml/s compared to 8.1±0.5 ml/s before treatment ($p<0.001$). Concurrently, a significant decrease in residual urine volume was observed—from 92.4±6.1 ml to 28.6±3.4 ml ($p<0.001$), indicating elimination of infravesical obstruction and improved bladder function.

The average prostate volume decreased from 58.7±2.8 cm^3 to 42.1±2.2 cm^3 ($p<0.001$). The severity of symptoms according to the IPSS scale decreased from 23.4±1.2 to 8.6±0.7 points ($p<0.001$), and the quality of life indicator improved from 5.2±0.3 to 1.9±0.2 points ($p<0.001$). There was also a decrease in the average PSA level from 4.8±0.3 to 3.1±0.2 ng/ml ($p<0.01$).

The most significant positive changes were observed in patients who underwent surgical treatment. After transurethral resection and laser enucleation of the prostate, urinary parameters were restored more quickly and to a greater extent compared to patients who received medical therapy alone.

Before treatment, most patients complained of increased urination frequency, nocturia, difficulty urinating, and decreased quality of life. After treatment, significant improvements in urodynamic and clinical parameters were noted (Table 1).

Table 1

Main clinical and functional indicators of patients before and after treatment (M±m)

Indicator	Before treatment	After treatment	p
Maximum urine flow rate (Qmax), ml/s	8,1±0,5	18,7±0,8	<0,001
Residual urine volume, ml	92,4±6,1	28,6±3,4	<0,001
Prostate gland volume, cm^3	58,7±2,8	42,1±2,2	<0,001
IPSS, points	23,4±1,2	8,6±0,7	<0,001
QoL, points	5,2±0,3	1,9±0,2	<0,001
PSA level, ng/ml	4,8±0,3	3,1±0,2	<0,01

The results obtained indicate a significant improvement in urination and a reduction in the severity of disease symptoms.

A strong correlation was found between prostate volume, severity of disease symptoms and quality of life of patients (Table 2).

Table 2

Correlation analysis of clinical indicators

Indicator	r	p
Prostate volume and IPSS	0,71	<0,001
Residual urine and QoL	0,68	<0,001
Qmax and quality of life	-0,73	<0,001
Age and prostate volume	0,54	<0,01
PSA and prostate volume	0,65	<0,001
Surgical treatment and improvement of Qmax	0,77	<0,001

As can be seen from Table 2, the conducted correlation analysis revealed a strong positive relationship between the volume of the prostate gland and the severity of disease symptoms ($r=0.71$; $p<0.001$). A significant correlation was also established between the volume of residual urine and a decrease in the quality of life of patients ($r=0.68$; $p<0.001$). A negative correlation between the maximum urinary flow rate and quality of life indicators ($r=-0.73$; $p<0.001$) indicates that improved urodynamics is accompanied by a decrease in clinical manifestations of the disease.

The data obtained confirm the high effectiveness of a comprehensive approach to diagnosing benign prostatic hyperplasia. The use of laboratory and instrumental examination methods allows for early detection of the disease, determination of the degree of bladder outlet obstruction, and selection of the most appropriate treatment strategy.

Conclusions. The study results showed that drug therapy provides a good clinical effect in patients with moderate symptoms and relatively small prostate volumes. However, in patients with significantly enlarged prostates and severe urinary dysfunction, modern surgical treatments are more effective.

Minimally invasive technologies such as laser enucleation of the prostate and bipolar plasma vaporization deserve special attention. They are characterized by high efficacy, less trauma, and a shorter recovery period. The obtained results are consistent with data from domestic and international studies confirming the advantages of modern endoscopic interventions in the treatment of BPH.

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