Benign prostatic hyperplasia and the urinary tract repercussions

Hiperplasia prostática benigna e as repercussões do trato urinário

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Laura Cajubá Vieira de Britto
Undergraduate Student in Medicine
Institution: Universidade Ceuma
Address: J. Montello St., 01, Renascença II, São Luís – MA
E-mail: lauracajuba@hotmail.com

Rômulo Diego Marinho Siqueira
Undergraduate Student in Medicine
Institution: Universidade Ceuma
Address: J. Montello St., 01, Renascença II, São Luís – MA
E-mail: romulodiegos@gmail.com

Maria Laura Nunes Machado de Barros
Undergraduate Student in Medicine
Institution: Universidade Ceuma
Address: J. Montello St., 01, Renascença II, São Luís – MA
E-mail: laurarabarross_@outlook.com

Kênia Carlos Santana Arrivabene
Undergraduate Student in Medicine
Institution: Universidade Ceuma
Address: J. Montello St., 01, Renascença II, São Luís – MA
E-mail: keniarrivabene@hotmail.com

ABSTRACT
Known as the most common urological disease, benign prostatic hyperplasia (BPH) is a condition that affects men from 40 years of age. Linked to metabolic, hormonal and inflammatory mechanisms, the disease causes growth of prostatic tissue, epithelial and stromal cells, compressing the urethra, resulting in resistance to the output of urine from the bladder and the main complaints of the disease, the symptoms of the lower urinary tract (LUTS). This study aims to inform about benign prostatic hyperplasia and its main symptoms of the lower urinary tract, since these LUTS negatively affect affected patients. This is a literature review with articles published on the subject in the last 7 years, through an electronic search in the main bibliographic indexes. The benign growth of the prostate gland and its obstructive and irritating urinary symptoms such as: urgency to urinate, hesitation, forced urination with slow flow, nocturia and irritation, negatively affect the quality of life of most patients. Diagnosed in a simple way, based on the patient's clinical history, physical examination and digital rectal examination, in addition to laboratory and imaging tests, such as transrectal ultrasound, BPH has an excellent prognosis. For the treatment, the degree of the patient's symptoms is evaluated through a questionnaire, the International Prostate Symptom Score (IPSS), the classification in mild, moderate and severe defines the conduct. Watchful waiting, a treatment for patients with...
mild symptoms, is the most common. The existing drug classes aim to reduce LUTS and slow down the progression of the disease. The growth of the prostate gland and the consequent compression of the urethra, causes several complaints and losses in the daily life of men who have BPH, therefore, knowing the signs and symptoms of the disease is essential for it to be effectively diagnosed and treated.

**Keywords:** BPH, LUTS, prostate, hyperplasia.

**RESUMO**

Conhecida como a doença urológica mais comum, a hiperplasia prostática benigna (HPB) é uma afecção que acomete homens a partir de 40 anos. Ligada a mecanismos metabólicos, hormonais e inflamatórios, a doença causa crescimento do tecido prostático, das células epiteliais e estromais, comprimindo a uretra, resultando na resistência da saída de urina da bexiga e as principais queixas da doença, os sintomas do trato urinário inferior (STUI). Este estudo tem como objetivo informar sobre a hiperplasia prostática benigna e seus principais sintomas do trato urinário inferior, uma vez que estes STUI afetam de maneira negativa os pacientes acometidos. Trata-se de uma revisão de literatura com artigos publicados sobre o tema nos últimos 7 anos, por meio de por meio de uma pesquisa eletrônica nos principais índices bibliográficos. O crescimento benigno da glândula prostática e seus sintomas urinários obstrutivos e irritativos como: urgência para urinar, hesitação, micção forçada com fluxo lento, noctúria e irritação, afetam negativamente a qualidade de vida da maioria dos pacientes. Diagnosticada de maneira simples, com base na história clínica do paciente, exame físico e toque retal, além de exames laboratoriais e de imagem, como a ultrassom transretal, a HPB tem excelentes prognósticos. Para o tratamento, é avaliado o grau dos sintomas do paciente por meio de um questionário, o International Prostate Symptom Score (IPSS), a classificação em leve, moderada e grave definem a conduta. A espera vigilante, tratamento para pacientes com sintomas leves, é o mais comum. As classes medicamentosas existentes, têm como objetivo reduzir os STUI e diminuir a progressão da doença. Assim sendo, o crescimento da glândula prostática e a consequente compressão da uretra, causa diversas queixas e prejuízos no dia a dia de homens que possuem a HPB, logo, conhecer os sinais e sintomas da doença é fundamental para que de maneira eficaz ela seja diagnosticada e tratada.

**Keywords:** HPB, STUI, próstata, hiperplasia.

**1 INTRODUCTION**

Benign prostatic hyperplasia (BPH) is one of the most common non-malignant pathologies in men, defined as the excessive growth of prostatic tissue around the urethra, which can cause prostate enlargement, benign prostatic obstruction and other symptoms of the lower urinary tract (LUTS), a very common complaint in more than 30% of patients over 65 years of age (CONCHADO-MARTINEZ, 2021).

It is a disease that has a high prevalence in males, especially from the fourth decade of life onwards, negatively affecting the quality of life of the vast majority of affected patients, due to its obstructive and irritating symptoms. The established risk factors are: age, androgens,
testosterone (T) and dihydrotestosterone (DHT), which may also be related to genetic predisposition, environmental factors and racial differences. (ROBLEDO, 2020)

In addition, the Metabolic Syndrome, which causes diseases such as dyslipidemia, arterial hypertension and atherosclerotic cardiovascular disease, has also been associated with the pathogenesis of BPH due to the inflammatory environment caused, which increases the activity of T lymphocytes in inflammatory infiltrates of the prostate, resulting in the stimulation of proliferation of stromal and epithelial tissues. (CONCHADO-MARTINEZ, 2021).

The diagnosis of the disease is histological, defined as an increase in the total number of epithelial and stromal cells within the transition zone of the prostate. Between the third and fourth decade of life, foci of hyperplasia begin to appear in the glandular and fibromuscular tissue, and after the fifth decade there is a second phase of growth. BPH symptoms may be related to this obstructive component of the prostate (mechanical obstruction), also known as emptying symptoms, a consequence of growth into the urethral lumen or bladder neck, which leads to greater resistance to the output of urine from the bladder, causing symptoms such as: initial difficulty, post-void dribbling, intermittency and straining. (GUTIÉRREZ, J.A.E.S. et.al., 2022)

In addition to the irritating symptoms, caused by changes in the muscle tone of the bladder neck and the smooth muscles of the gland, called filling symptoms, such as urgency, frequency with flow, weakness, nocturia, urge incontinence and stress incontinence, and post micturition symptoms, terminal dribble and incomplete emptying. All of them are symptoms related to the lower urinary tract (LUTS), their prevalence is 16.6% in men over 40 years old, while in people over 70, it is three times higher (HERNÁNDEZ, 2017).

The prevalence and continued progression of this disease has led to the application of instruments for its identification and evaluation, among the most used is the International Prostate Symptom Index (IPSS), a questionnaire that includes seven questions about difficulty urinating, which evaluates the severity and repercussion of symptoms, in mild, moderate and severe; as well as its relationship with the patient's quality of life (CONCHADO-MARTINEZ, 2021).

BPH symptoms may have their manifestations and progression attenuated by reducing water intake, less caffeine consumption and limiting salt and pepper consumption, in addition to physical activity and moderate alcohol intake. The reduction of these symptoms has a direct effect on the quality of life of patients (MACHADO, F.C. et.al., 2022).

The diagnosis of benign prostatic hyperplasia is relatively simple and needs to be associated with a detailed anamnesis with family history of BPH or prostate cancer, presence
of urinary symptoms, associated with physical examination and digital rectal examination, which provides information about the size, consistency, surface and edges of the prostate, in addition to microscopic examinations, which detect hyperplasia, laboratory tests, which include prostate specific antigen (PSA), which, even though it does not discriminate between BPH and prostate cancer, is a fundamental test, serum creatinine, useful for patients with LUTS, as it can ensure that renal failure has not occurred by obstructive uropathy and imaging tests such as transrectal ultrasound, which details prostate characteristics more accurately than digital rectal examination (KIM, E.H. et.al., 2016).

The treatment of BPH has two main objectives: first, to relieve the patient's clinical manifestations and second, to correct complications related to prostatic growth. In situations where the patient has mild symptoms or moderate to severe symptoms, with minimal impairment in quality of life, expectant management and changes in lifestyle factors (weight loss, increased physical activity and reduced food intake) are recommended. Of caffeine and alcohol. In men with recurrent urinary tract infection, renal failure due to obstructive uropathy, watchful waiting is not advised. (SANTOS, M.A. et.al., 2023)

Drug treatment is carried out through medications such as alpha blockers, the best known being tamsulosin, which relieve LUTS, reducing the smooth muscle tone of the prostate and bladder neck, 5-alpha-reductase inhibitors, such as finasteride, which block the conversion of T into DHT, preventing the increase in prostatic volume and preventing the progression of the disease. Surgical intervention such as transurethral resection of the prostate or simple prostatectomy are indicated for patients who have failed medical treatment or who have complications arising from bladder outlet obstruction due to BPH. (KIM, E.H. et.al., 2016).

This study aims to inform about benign prostatic hyperplasia and the main symptoms of the lower urinary tract, since these LUTS develop with great repercussions in affected patients.

2 METHODS

This is a bibliographic review of scientific and documental production on benign prostatic hyperplasia and its urinary repercussions. The inclusion criteria used were articles published between 2016 and 2023, in Portuguese, English and Spanish, with the following keywords: benign prostatic hyperplasia, prostate and lower urinary tract.

The exclusion criteria were: theses, dissertations and studies that deviate from the topic addressed. The systematic literature review was carried out through an electronic search in the bibliographic indexes Google academic, SCIELO and Medical Journals. In addition,
complementary information was obtained from guideline of the Brazilian Society of Urology (BSU) and American Urological Association (AUA).

3 RESULTS AND DISCUSSION

Benign prostatic hyperplasia (BPH) is a benign medical condition that occurs due to the proliferation of stromal cells and the prostate epithelium and manifests itself with an increase in the volume of the gland. This growth is associated with an increase in resistance to the outflow of urine, with side effects on bladder and kidney function, manifesting clinically in the form of lower urinary tract symptoms (LUTS), which has a significant adverse effect on the quality of life of patients' lives (SANTOS, M.A. et.al., 2023).

It usually affects older men, with a prevalence of nearly 50% among men age 50 and older and nearly all men age 90. Therefore, age is the main risk factor for the disease, since during aging there is interference in the pathways of growth factors, generating a process of tissue remodeling that leads to prostate growth. BPH is the result of hyperplasia of epithelial and stromal tissues that predominantly affects the transition zone of the prostate. The urethra is compressed by hyperplastic nodules, causing mechanical obstruction of urinary outflow and irritability of the bladder detrusor muscle due to increased resistance (KIM, E.H. et.al., 2016).

The exact cause responsible for the development of BPH is unknown, however, metabolic, hormonal and inflammatory mechanisms have been identified. The metabolic mechanisms are based on some risk factors such as: atherosclerotic vascular damage, metabolic syndrome and cardiovascular risk. Tissue ischemia caused by atherosclerosis causes prostatic stromal cells to produce high levels of growth factors, which lead to epithelial hyperplasia of the gland, components of the metabolic syndrome such as dyslipidemia, glucose intolerance and high blood pressure can cause activation of the system autonomic nervous system, which contributes to LUTS, due to alpha-adrenoceptor-mediated smooth muscle contraction of the bladder neck and prostate. Androgens, testosterone (T) and dihydrotestosterone (DHT), are also related to BPH. (ROBLEDO, García-Perdomo. et.al., 2020).

Even without serious and frequent complications, BPH significantly affects the quality of life of patients, causing changes in sleep, in day-to-day activities, in the personal and professional aspects, so it is important that the diagnosis of the disease be made in a timely manner. early, since it is relatively simple to be diagnosed (SANTOS, M.A. et.al., 2023).

First, every man aged 40 or over, or who has any urinary symptoms, needs to be evaluated through a detailed anamnesis, highlighting the type and severity of the symptoms. With the intention of standardizing the assessment of patients with or without symptoms related
to BPH, forms were developed, including the International Index of Prostatic Symptoms (IPSS), which determines the severity and repercussion of symptoms in mild, moderate and severe, as well as its relationship with the patients’ quality of life, as shown in Figure 1. The IPSS is based on the answer to seven questions about LUTS, such as: symptoms of incomplete urination, frequency, intermittency, urgency, nocturia, weakness of the jet voiding and the need to force urination, the total score can range from 0-35, where from 0 to 7, patients are slightly symptomatic and from 20 to 35, severely symptomatic (CONCHADO-MARTINEZ, J. et.al.,2021).

Figure 1: International Prostate Symptom Score (IPSS)

<table>
<thead>
<tr>
<th>Escore internacional de sintomas prostáticos (IPSS)</th>
<th>Nenhuma vez</th>
<th>Menos que 1 vez em cada 5</th>
<th>Menos que a metade das vezes</th>
<th>Cerca de metade das vezes</th>
<th>Mais que a metade das vezes</th>
<th>Quase sempre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 No último mês, quantas vezes você teve a sensação de não esvaziar completamente a bexiga após terminar de urinar?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2 No último mês, quantas vezes você teve de urinar novamente menos de 2 horas após ter urinado?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3 No último mês, quantas vezes você observou que, ao urinar, pareou e recomeçou várias vezes?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4 No último mês, quantas vezes você observou que foi difícil conter a urina?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5 No último mês, quantas vezes você observou que o jato urinário estava fraco?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6 No último mês, quantas vezes você teve de fazer força para começar a urinar?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7 No último mês, quantas vezes em média você teve de se levantar à noite para urinar?</td>
<td>Nenhuma</td>
<td>1 vez</td>
<td>2 vezes</td>
<td>3 vezes</td>
<td>4 vezes</td>
<td>5 vezes</td>
</tr>
<tr>
<td>8 Qualidade de vida</td>
<td>1 (excelente)</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6 (pessimo)</td>
</tr>
</tbody>
</table>


In addition to the anamnesis, a detailed physical examination is fundamental for the diagnosis of the disease, the evaluation of the abdomen, looking for a palpable bladder and rectal examination, must be performed. Although touch underestimates prostate volume, additional information such as size (normal, medium or large), consistency (fibroelastic, elastic or stony), temperature, surface, borders (regular or irregular), limits and whether there is pain on touch are fundamental for the diagnosis of the disease (HERNÁNDEZ, 2017).
Laboratory tests, such as urinalysis, which assesses in men with LUTS for glycosuria, pyuria, and hematuria, serum creatinine, which investigates the possibility of renal failure due to obstructive uropathy, a potentially serious complication of BPH, prostate-specific antigen (PSA), which even though it is not a specific test for prostatic hyperplasia, allows for the monitoring of interventions and provides data on the effectiveness of the treatment. The most commonly used imaging test is transrectal ultrasound, which provides a precise measure of prostate volume, unlike digital rectal examination. Having knowledge of the precise size of the gland is important for managing and choosing the treatment to be performed. Other tests such as cystourethroscopy and urodynamic studies also contribute to the diagnosis of the disease. (CONCHADO-MARTINEZ, J. et.al., 2021).

The treatment of BPH is based on complaints related to the lower urinary tract and aims to improve the symptoms and quality of life of men, in addition to preventing the clinical progression of the disease and reducing the risk of complications and/or the need for surgery. In patients with mild symptoms (IPSS <8) or moderate to severe symptoms, with minimal impairment in quality of life, watchful waiting is the treatment of choice, which should include education, changing lifestyle factors (weight loss, increased physical activity and reduced caffeine and alcohol intake) and annual reassessment. In patients with BPH-related complications of bladder outlet obstruction, such as recurrent urinary tract infection, bladder stones, and refractory urinary retention, watchful waiting is not advised. In cases of need for drug therapy, there are three classes of drugs to treat the symptoms of BPH (GUTIÉRREZ, J.A.E.S. et.al., 2022).

Alpha-adrenergic antagonists, or alpha blockers, such as tamsulosin and silodosin, are the first choice in the treatment of symptoms of bladder outlet obstruction, and relieve LUTS by decreasing smooth muscle tone in the prostate and bladder neck. This drug class has been shown to significantly improve irritative and obstructive symptom scores, quality of life and urinary flow rates, however, it does not reduce the risk of needing surgical treatment. (NUNES, R. V. et.al., 2017).

Known as finasteride and dutasteride, the 5-alpha reductase inhibitors, block the conversion of testosterone to DHT by inhibiting type I and type II 5-alpha reductase, leading to a reduction in DHT concentrations in the prostate, decreasing the size up to 25% of the gland and of the serum PSA in half after one year of treatment. For patients with LUTS and an enlarged prostate, the use of these medications has been shown to significantly improve symptoms, urinary flow rate, and reduced risk of needing surgery. (GUTIÉRREZ, J.A.E.S. et.al., 2022).
The third class of drugs, the phosphodiesterase type 5 (PDE5-I) inhibitors, known as sildenafil and tadalafil, are recommended for patients with erectile dysfunction and mild or moderate lower urinary tract symptoms. The treatment of BPH can also be done by combination therapy, the association of the aforementioned medications is common, mainly to treat cases of patients with IPSS > 20 or who do not respond to monotherapy (NUNES, R. V. et.al., 2017).

Surgical intervention should be considered for men with clinically significant lower urinary tract symptoms associated with BPH, such as renal failure due to obstructive uropathy, macroscopic hematuria, bladder lithiasis and recurrent UTI, who have failed drug treatment, for those who have refractory retention at least one attempt at indwelling urinary catheter removal, or for patients with moderate to severe LUTS, where surgery may be considered the first choice. The gold standard for surgical treatment is transurethral resection of the prostate, indicated for patients with a prostate between 30 and 80mL. Simple prostatectomy, on the other hand, is an extirpative surgery reserved for patients with a prostate size greater than 100 grams. (KIM, E.H. et.al., 2016).

Currently, in an attempt to reduce treatment-related morbidity, new less invasive techniques have been adopted, such as transurethral microwave thermotherapy, performed in the office with a transurethral probe, transurethral needle ablation, which demonstrated efficacy for LUTS related to BPH, and high-intensity transrectal focused ultrasound, also effective in symptomatic improvement (GUTIÉRREZ, J.A.E.S. et.al., 2022).

4 CONCLUSION

BPH is a public health problem because of its high prevalence in the male population and the problems related to the quality of life of affected patients. Since the end of the last century, the World Health Organization recommends special attention to urological care needs, especially from the age of forty. In addition to being a disease whose main symptoms are those related to the lower urinary tract, early investigation of BPH through detailed anamnesis and physical examination, rectal examination, IPSS and laboratory and imaging tests, allow the treatment of the disease to be individualized and directed according to the symptomatological degree of each patient.

Although the American Urological Association does not recommend measuring serum creatinine or PSA in the evaluation of men with LUTS, they are useful in clinical practice, since the PSA, even though it is very sensitive but not very specific, helps in the therapeutic decision and in the differential diagnosis of prostate cancer. The main objective of treatment is to
improve the symptoms of the lower urinary tract and the quality of life of patients, as well as to prevent complications related to BPH.

The conduct in most cases is to wait and observe the symptoms, which are often mild or moderate and do not interfere with the patient’s daily life, always recommending annual reassessment. In more severe cases, with IPSS greater than 8 or with a high degree of impairment in quality of life, drug treatments are indicated, whether monotherapy or combined therapy. Surgical intervention is the criterion of choice in the minority of cases, when other attempts at treatment have already been discarded. In a few cases, when patients have complications due to obstruction of the bladder outlet, surgery is the first choice.

In view of the above, there is a need to always provide updated information regarding benign prostatic hyperplasia and its associated repercussions symptoms, since these symptoms, often neglected by patients, lead to the diagnosis and treatment of the disease.
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