

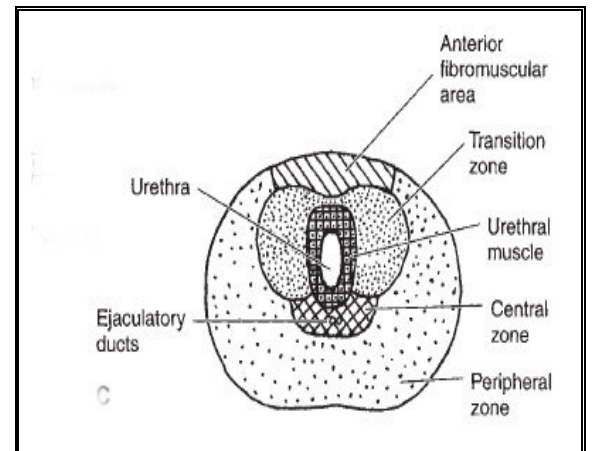
# **BENIGN PROSTATIC HYPERPLASIA (BPH)**

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## **Surgical anatomy**

The prostate is made up of epithelial (glandular) and stromal (collagen and smooth muscle) elements.

The prostate is divided into several zones: The anterior fibromuscular stroma (is a thick sheet of connective tissue that covers the entire anterior surface of the prostate), the peripheral zone is the largest zone of the prostate, the central zone is a small region traversed by the ejaculatory ducts and the transitional zone.



## **Etiology and Risk factors**

The development of BPH is poorly understood. Some studies have suggested a genetic predisposition, and some have noted racial differences. The etiology of BPH seems to be multifactorial and endocrine controlled that is related to some imbalance between estrogens and androgens. Additional investigations have demonstrated a positive correlation between levels of free testosterone and estrogen and the volume of BPH. The latter may suggest that the association between aging and BPH might result from the increased estrogen levels of aging causing induction of the androgen receptor, which thereby sensitizes the prostate to free testosterone.

## **Pathology**

BPH develops in the transition zone. It is truly a hyperplastic process resulting from an increase in cell number of varying amounts of stroma and epithelium and each, either alone or in combination, can give rise to hyperplastic nodules and the symptoms associated with BPH.

The stroma is composed of varying amounts of collagen and smooth muscle which is rich in adrenergic nerve supply.

As BPH nodules in the transition zone enlarge, they compress the outer zones of the prostate, resulting in the formation of a so-called surgical capsule.

One can relate the symptoms of BPH to either the obstructive component of the prostate or the secondary response of the bladder to the outlet resistance.

The obstructive component can be subdivided into the mechanical and the dynamic obstruction.

The mechanical obstruction may result from intrusion of enlarged prostate into the urethral lumen or bladder neck.

The dynamic component of prostatic obstruction resulting from increased tone of smooth muscle. Both; mechanical and dynamic obstruction leads to a higher bladder outlet resistance.

Bladder outlet obstruction leads to detrusor muscle hypertrophy and hyperplasia as well as collagen deposition that is most likely responsible for a decrease in bladder compliance and detrusor instability.

## **Clinical Findings**

### **A. Symptoms**

The symptoms of BPH can be divided into obstructive and irritative complaints.

<b>Obstructive symptoms</b>	<b>Irritative symptoms</b>
<ul style="list-style-type: none"><li>• Hesitancy</li><li>• straining</li><li>• Poor urine flow</li><li>• Intermittent stream</li><li>• Terminal dribbling</li><li>• Incomplete emptying</li></ul>	<ul style="list-style-type: none"><li>• Frequency</li><li>• Urgency</li><li>• Nocturia</li><li>• Incontinence</li></ul>

The AUA Symptom Score (American Urological Association) which is now more commonly called the International Prostate Symptom Score (IPSS) is used for identifying the need to treat patients with BPH and in monitoring their response to therapy.

### **B. Signs**

A physical examination, DRE, and focused neurologic examination are performed on all patients. The size and consistency of the prostate is noted, even though prostate size, as determined by DRE, does not correlate with severity of symptoms or degree of obstruction.

Induration, if detected, must alert the physician to the possibility of cancer and the need for further evaluation.

## **Diagnosis**

In addition to full **history** and **physical examination**, investigations are essential component to reach diagnosis.

A **urinalysis** to exclude infection or hematuria.

Upper-tract **imaging** (renal ultrasound or computed tomography [CT] urogram) is recommended only in the presence of concomitant urinary tract disease or complications from BPH (eg, hematuria, urinary tract infection, renal insufficiency, history of stone disease).

**TRUS** (trans-rectal ultrasound) is useful to determine prostate size for men planning to undergo prostate surgery.

**Cystoscopy** is not routinely recommended, it may assist in choosing the surgical approach in patients opting for invasive therapy and it may be useful to identify a high bladder neck, urethral stricture, or other pathology that cause

bladder outflow obstruction. If BPH is associated with hematuria, then cystoscopy is mandatory to rule out other bladder pathology. Measurement of flow rate, determination of post voiding residual urine volume, and pressure-flow studies are considered **optional**.

### **Differential Diagnosis**

- 1- Urethral stricture.
- 2- Bladder neck contracture.
- 3- bladder stone.
- 4- Ca. Prostate.
- 5- A urinary tract infection, which can mimic the irritative symptoms of BPH.
- 6- Carcinoma of the bladder, especially carcinoma in situ.
- 7- Neurogenic bladder disorders.

### **Treatment**

#### **A. Watchful Waiting**

Not all patients with bladder outflow obstruction secondary to benign prostate hyperplasia need intervention. Watchful waiting is the appropriate management of men with mild symptom scores. Men with moderate or severe symptoms can also be managed in this fashion if they choose it. Observation is reasonable for those patients with interval follow-up.

#### **B. Medical Therapy**

**1.  $\alpha$ 1-Blockers**—The human prostate and bladder base contains  $\alpha$ 1 adrenoceptors, and the prostate shows a decrease in contractile response to  $\alpha$ 1 antagonists.  $\alpha$ -1Blockade has been shown to result in both objective and subjective degrees of improvement in the symptoms and signs of BPH in some patients.

$\alpha$ -Blockers can be classified according to their receptor selectivity as well as their half-life in this table.

#### **Classification of $\alpha$ -1Blockers**

##### **Nonselective:**

*Phenoxybenzamine*

##### **Selective :**

- **$\alpha$ 1, short acting:**

*Prazosin*

- **$\alpha$ 1, long acting:**

*Terazosin*

*Doxazosin*

- **$\alpha$ 1a-Selective:**

*Tamsulosin*

*Alfuzosin*

Long-acting  $\alpha$ 1-blockers make once-a-day dosing possible, but dose titration is still necessary.

Possible side effects include orthostatic hypotension, dizziness, tiredness, retrograde ejaculation, rhinitis, and headache.

**2. 5 $\alpha$ -Reductase inhibitors**—Finasteride is a 5 $\alpha$ -reductase inhibitor that blocks the conversion of testosterone to dihydrotestosterone (DHT). This drug affects the epithelial component of the prostate, resulting in a reduction in the size of the gland and improvement in symptoms.

**3. Combination therapy**—The combination of  $\alpha$ -blocker and 5 $\alpha$ -reductase inhibitor therapy is most likely to benefit those patients in whom baseline risk of progression of BPH is very high, i.e. generally patients with larger glands.

**4. Phytotherapy**—Phytotherapy refers to the use of plants or plant extracts for medicinal purposes, e.g. the saw palmetto berry.

### **C. Surgical intervention**

Surgery is used for men who have failed medical pharmacological treatment or have had complications such as urinary retention refractory to medical management and attempts at catheter removal, recurrent urinary tract infection, recurrent gross hematuria, bladder stones, renal insufficiency, or large bladder diverticula.

#### ***Surgical interventions for BPH include:***

- ***Transurethral resection of prostate (TURP):***

Is to remove the inner zone adenoma with a cystoscopy passed along the urethra .

- ***Transurethral incision of prostate (TUIP):***

Through one or two incisions of the prostate with a cystoscopy .

- ***Laser therapy:***

The two main laser therapies use neodymium:yttrium-aluminum-garnet (Nd:YAG) and Holmium:yttrium-aluminum-garnet (Ho:YAG) lasers. Both cause coagulative necrosis of the prostate tissue under direct vision with a cystoscopy.

- ***Transurethral microwave therapy:***

Microwave hyperthermia can be delivered to the prostate through transurethral catheters under local anesthesia.

- ***High intensity focused ultrasound:***

High intensity focused ultrasound is delivered through an ultrasound probe in the rectum. This heats the prostate and results in coagulative necrosis.

- ***Transurethral needle ablation of the prostate:***

This technique uses interstitial radiofrequency to heat prostate tissue, which results in coagulative necrosis.

- ***Prostate stents:***

Intraurethral prostate stents that are placed with a flexible cystoscopy under local anaesthetic are an excellent option for men who are elderly and need intervention but are high risk candidates for anesthesia.

- ***Open prostatectomy:***

This technique now is used only when the prostate is too large to be enucleated with endoscopic techniques.