

- Benign prostatic hyperplasia, or BPH is a condition caused by increased 5α -reductase activity in the prostate which leads to increased dihydrotestosterone production, and prostate hyperplasia.
- Approach to BPH, as we all know (Hx, P/E, Invx)

Symptoms & Signs of Benign Prostatic Hyperplasia



Weak urine stream



Frequent urination



Dribbling after urination



Urge to urinate



Leakage of urine (overflow incontinence)



Frequent urination during night

P/E

DRE, Neurological exam

Labs

Urinalysis, Culture, KFT, PSA

Images

TRUS, Cystoscopy

BPH

"Noncancerous enlargement of the prostate gland that may restrict flow of urine from the bladder"

At histological level

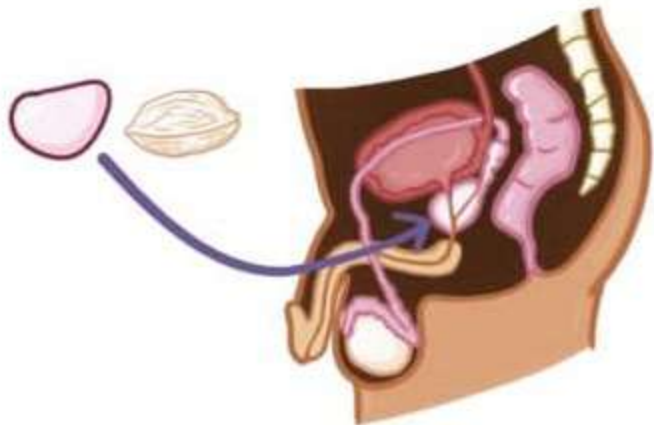
Refers to the proliferation of glandular epithelial tissue and stroma, within the prostatic transition zone

- Most common benign tumor in men
- This is a normal process of aging, and around 50% of men develop BPH by the age of 60, and over 90% have it by the age of 85.

The prostate is a small gland, about the size and shape of a walnut, that sits under the bladder and in front of the rectum.

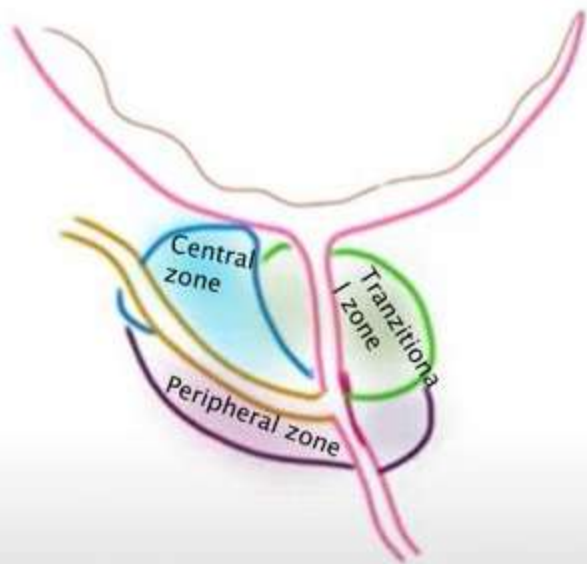
The main function of the prostate gland is to secrete an alkaline fluid.

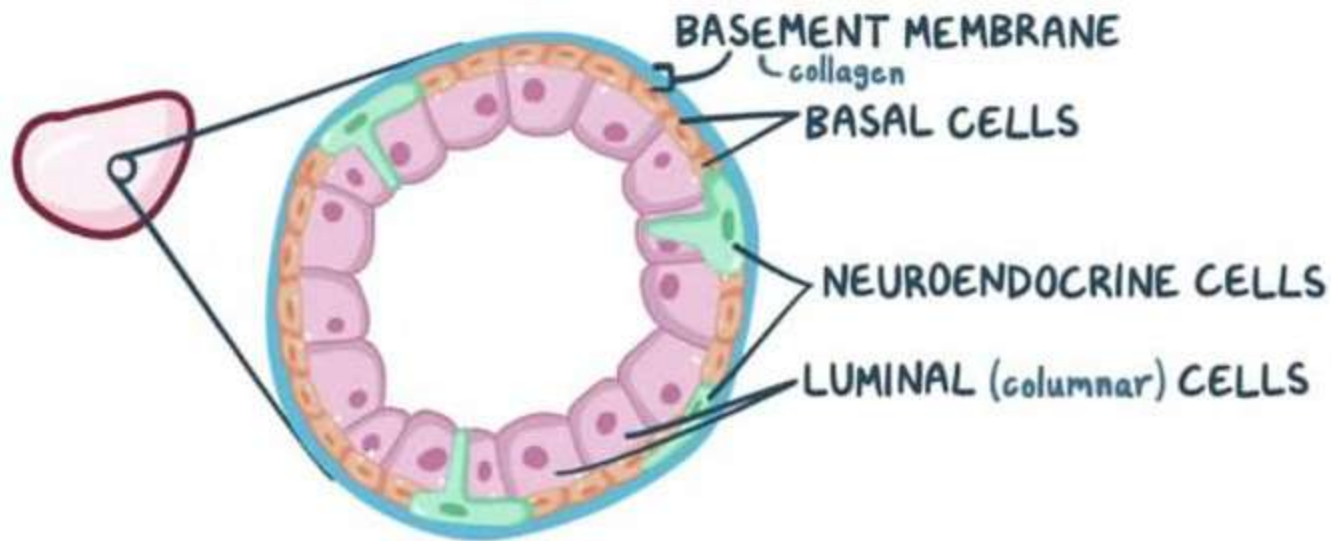
The secretions produce lubrication and nutrition for the sperm and helps to neutralize the acidic vaginal environment.



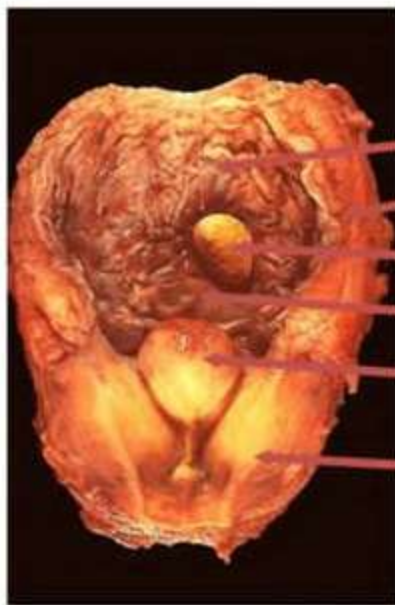
Aetiology

- Not completely understood
 - Multifactorial
 - Endocrine control
- Castration results in the regression of established BPH and improvement in urinary symptoms
- Positive correlation with free testosterone levels and estrogen levels and the volume of BPH
- Genetic predisposition-AD:
4x increased risk in 1st degree relatives





Morphology

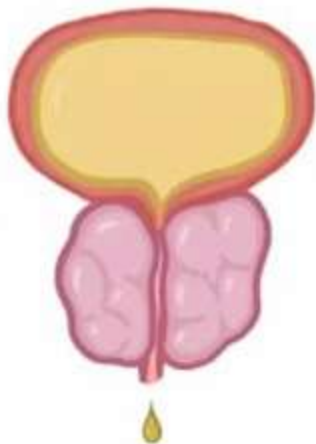


- Trabeculations
- Hypertrophy of wall
- Stone - urolithiasis
- Inflammation
- Median lobe- ball valve.
- Enlarged prostate.

Pathophysiology

- Microscopic nodular growth pattern composed of:
 - Stroma (collagen and smooth muscle)
 - Epithelium
- The histologic components of BPH may explain the potential responsiveness to medical therapy.
- α -blocker therapy may result in excellent responses in patients with BPH that has a significant component of smooth muscle.
- Those with BPH predominantly composed of epithelium might respond better to 5 α -reductase inhibitors.
- Patients with significant components of collagen in the stroma may not respond to either form of medical therapy.

Symptoms



Symptoms of BPH can relate to either :

- 1-the obstructive component of the prostate .
 - 2-2ry response of the bladder to the outlet resistance.
-

Obstructive symptoms :

Hesitancy, decreased force and caliber of stream, sensation of incomplete bladder emptying, double voiding, straining to urinate, and postvoid dribbling

It's either :

Mechanical obstruction

Dynamic obstruction

Irritative symptoms :

Urgency, frequency, and nocturia

The irritative voiding complaints of BPH result from:

- Increased outlet resistance
- Increase pressure inside UB
- Detrusor muscle hypertrophy and hyperplasia and collagen deposition
- Trabeculation, Sacculation
- Increase residual urine and chronic retention



DRE

- Performed to estimate prostate size.
- A normal prostate is approximately the size of a walnut (7- 16 grams, with an average of 11 g) and firm and non tender.
- Although DRE is not a precise tool for measuring prostate volume , serial exams are useful to follow prostate size, and the examination can identify other abnormalities:
 - A tender prostate gland may reflect the presence of prostatitis
 - The presence of asymmetry or nodules raises suspicion for malignancy (further evaluation is required like PSA, TRUS and biopsy)
- In BPH: smooth, firm, elastic enlargement of the prostate

International Prostate Symptom Score (IPSS)

- The self-administered questionnaire originally developed by the American Urological Association (AUA) is both valid and reliable in:
 - 1- Identifying the need to treat patients
 - 2- Monitoring their response to therapy
- This assessment focuses on 7 items that ask patients to quantify the severity of their obstructive or irritative complaints on a scale of 0–5. Thus, the score can range from 0 to 35.
- An IPSS of:
 - 0–7 is considered mild
 - 8–19 is considered moderate
 - 20–35 is considered severe.

Table 1

The American Urological Association Symptom Index (AUASI) for BPH and the Disease Specific Quality of Life Question

AUA BPH Symptom Index:

	Not at all	Less than 1 time in 5	Less than half the time	About half the time	More than half the time	Almost always
1. Over the past month, how often have you had a sensation of not emptying your bladder completely after you finished urinating?	0	1	2	3	4	5
2. Over the past month, how often have you had to urinate again less than 2 hours after you finished urinating?	0	1	2	3	4	5
3. Over the past month, how often have you found you stopped and started again several times when you urinated?	0	1	2	3	4	5
4. Over the past month, how often have you found it difficult to postpone urination?	0	1	2	3	4	5
5. Over the past month, how often have you had a weak urinary stream?	0	1	2	3	4	5
6. Over the past month, how often have you had to push or strain to begin urination?	0	1	2	3	4	5
	None	1 time	2 times	3 times	4 times	5 or more times
7. Over the past month, how many times did you most typically get up to urinate from the time you went to bed at night until the time you got up	0	1	2	3	4	5

BPH Complications

Urethral compression

Epididymitis

Bladder hypertrophy

Trabeculation

Diverticula formation

Hydroureter - bilateral

Hydronephrosis

UTI

Stones formation

Labs



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



Culture .



KFT to assess renal function.



Serum PSA is considered optional, but most physicians will include it in the initial evaluation

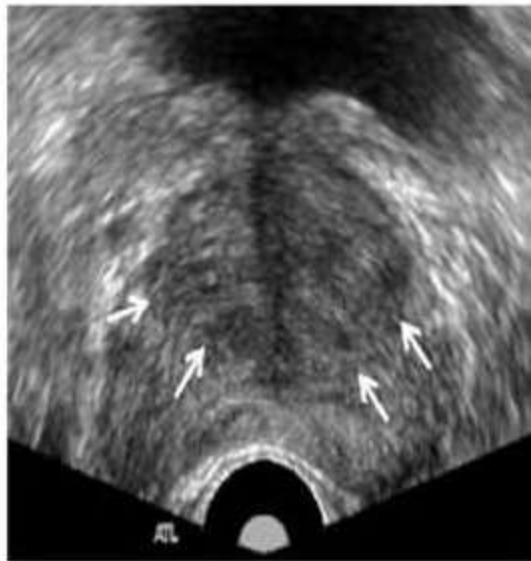
Additional tests

Measurement of **flow-rate**, determination of **postvoid residual urine**, and **pressure-flow studies** are considered optional.

Cystometrograms and urodynamic profiles are reserved for patients with suspected neurologic disease or those who have failed prostate surgery.

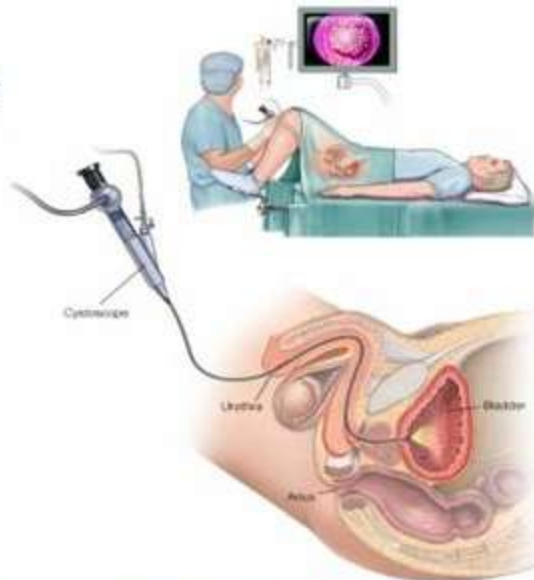
Imaging

- TRUS is useful to determine prostate size for men planning to undergo prostate surgery who are suspected to have severe prostate enlargement based on DRE.
- 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, (e.g., hematuria, urinary tract infection, renal insufficiency, history of stone disease).



Cystoscopy

- Not routinely recommended to determine the need for treatment but may assist in choosing the surgical approach in patients opting for invasive therapy.
- When marked obstructive symptoms exist in the setting of relative minimal prostate enlargement, cystoscopy may be useful to identify a high bladder neck, urethral stricture, or other pathology.
- If BPH is associated with hematuria, then cystoscopy is mandatory to rule out other bladder pathology



Management

A. Watchful Waiting

B. Medical Therapy

1. α -Blockers
2. 5-Reductase inhibitors—Finasteride
 - Combination therapy - α -blocker and 5 α -reductase inhibitor.
 - Phytotherapy.

C. Surgical Therapy

1. Transurethral resection of the prostate
2. Transurethral incision of the prostate
3. Transurethral vaporization of the prostate (TUVP)
4. Holmium laser enucleation of the prostate (HoLEP)
5. Simple (subtotal) prostatectomy
6. Transurethral microwave thermotherapy

Medical therapy

α -blockers

- The human prostate and bladder neck contain alpha 1 adrenergic receptors
- 2 types of α receptors: $\alpha 1$ and $\alpha 2$ and 2 subtypes of $\alpha 1$ receptors:
- $\alpha 1a$: predominant in human prostate stroma so mediates prostate smooth muscle contraction
- $\alpha 1b$: predominant in human prostate epithelium
- Can be classified according to their receptor selectivity or duration of action

$\alpha 1$ short acting (non-selective):

- Prazosin
- Phenoxybenzamine

$\alpha 1$ long acting:

- Terazosin
- Doxazosin

$\alpha 1a$ subtype (selective):

- Tamsulosin
- Alfuzosin
- Localized in the prostate and bladder neck. Results in fewer systemic (particularly cardiovascular) side effects

Side Effects

- Asthenia (tiredness)
- Dizziness
- Headache
- Postural hypotension
- Retrograde ejaculation
- Rhinitis

Medical therapy

5- α -reductase Inhibitors

- They are used to prevent BPH progression rather than acute symptom treatment
- 6 months therapy is required to see the maximum effects on prostate size (20 % reduction) and symptomatic improvement
- There are 2 forms (**isoenzymes**) of 5- α -reductase:
 - **Type I:** extraprostatic: in liver and skin
 - **Type II:** prostatic

5- α -reductase Inhibitors

- **Finasteride:**
 - Block the conversion of testosterone to DHT
 - Affects the epithelial component of the prostate
- **Dutasteride**
 - Differs from finasteride as it inhibits both isoenzymes of 5 α reductase.
 - Like finasteride, it reduces serum PSA and total prostate volume
 - Affects the epithelial component of the prostate, resulting in a reduction in the size of the gland and improvement in symptoms
- **Side effects**
 - Decreased libido
 - Decreased ejaculate volume
 - Impotence
 - Serum PSA is reduced by 50%

Combination Therapy

α -blocker + 5 α -reductase inhibitor

- Indicated for patients with prostate enlargement and moderate to severe symptoms of BPH - (IPSS >12)
- Combination therapy was associated with a greater reduction in symptomatic clinical progression, episodes of acute urinary retention, incidence of renal insufficiency, recurrent urinary tract infections, and urinary incontinence compared with monotherapy

Differential diagnosis

- Other obstructive conditions of the lower urinary tract, such as:
 - Urethral stricture and bladder neck contracture (history of previous urethral instrumentation ,urethritis , trauma)
 - Bladder stone (Hematuria and pain)
 - Neurogenic bladder disorders (history of neurologic disease, stroke, diabetes mellitus, or back injury. Examination may show diminished perineal or lower extremity sensation or alterations in rectal sphincter tone)

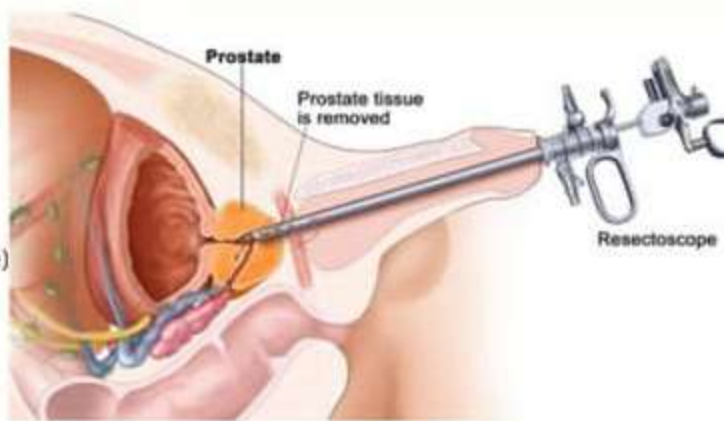
Surgical Therapy

- Indications:

- Failure of medical treatment
 - Hematuria
 - Recurrent UTI
 - Recurrent stones
 - Renal failure/ impairment
 - Recurrent/persistent urinary retention
- These should not be related to any cause other than BPH

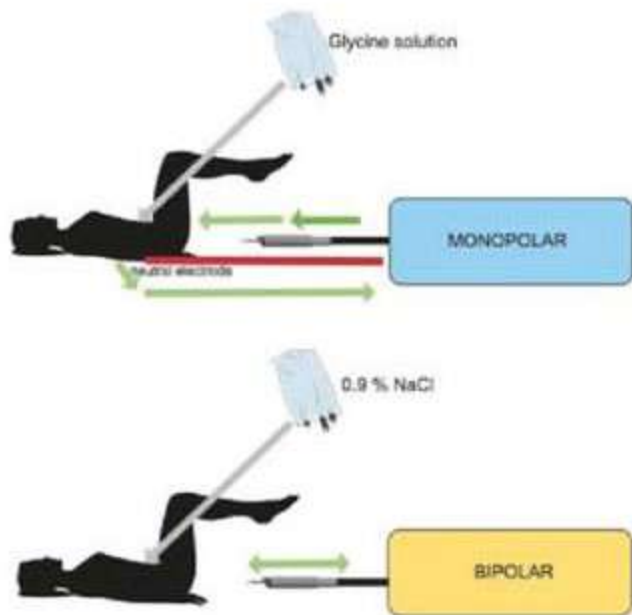
Transurethral Resection of Prostate (TURP)

- THE GOLD STANDARD for the management of bladder outlet obstruction due to BPH
- Removal of the obstructing tissue of BPH from within the prostatic urethra, leaving the compressed outer zone intact (surgical capsule)



TURP types

- **Monopolar TURP:**
 - Monopolar resectoscope
 - Nonionic, hypo-osmolar irrigation solution (glycine)
 - Higher risk of TUR syndrome
- **Bipolar TURP:**
 - Bipolar resectoscope
 - Iso-osmolar solutions (normal saline)
 - Reduce the risk of TUR syndrome



Complications of TURP

Early:

- Bleeding
- Urethral/ prostatic capsule perforation
- Clot or tissue retention
- **TUR syndrome**

Late:

- Bladder neck stricture
- Urinary incontinence (<1%)
- Retrograde ejaculation (up to 90%)
- Impotence (5-10 %)

TUR syndrome

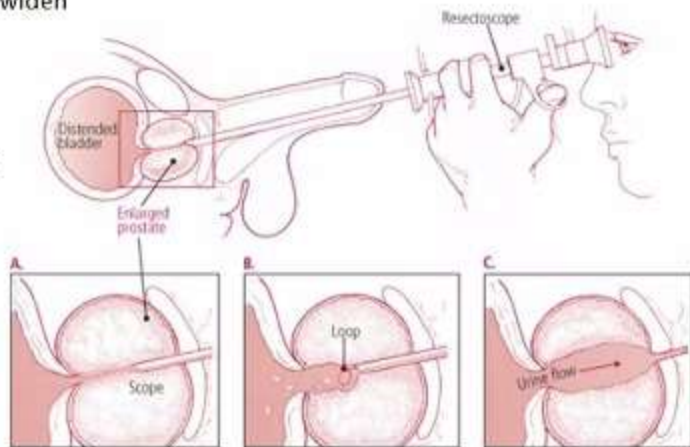
- Resulting from a **hypervolemic, hyponatremic state** due to absorption of the hypotonic irrigating solution.
- Large volumes of irrigation fluid being absorbed through venous sinuses
- Risk increases with resection time > 90 minutes, Usually seen in older men.
- **Clinical Manifestations:**
Mainly cardiovascular and neurological:
 - Nausea and vomiting
 - Confusion, Visual disturbances
 - Hypertension
 - Bradycardia
- **Treatment:**
 - Diuresis
 - In severe cases, hypertonic saline administration

Phytotherapy

- Use of plants or plants extracts
- *Pygeum africanum*, roots of *Echinacea purpurea*
- *Hypoxis rooperi*
- Saw palmetto
- African plum
- Rye pollen
- Pumpkin seeds

Transurethral Incision of the Prostate (TUIP)

- Small cuts made in bladder neck and prostate to widen urethra
- No prostate tissue removed
- Less risk of side effects when compared to TURP
- More rapid and less morbid than TURP
- Not suitable for large glands



Photoselective vaporization of the prostate (PVP, laser TURP)

Utilizes laser energy to vaporize prostatic tissue

Best suited for:

- Older men with more complex medical comorbidities
- those on long-term anticoagulation or antiplatelet therapy

Minimally Invasive Procedures

- **Holmium Laser Enucleation of Prostate (HoLEP)**
- HoLEP denotes an anatomic dissection in the plane between the central and peripheral zones of the prostate
- This approach is felt to provide the largest defect and perhaps the longest durability



Simple (subtotal) Prostatectomy

- **Indications:**
 - Concomitant bladder diverticulum or a large bladder stone
 - If dorsal lithotomy positioning is not possible
 - Used for very enlarged prostates (over 100 gm)
 - TURP not technically possible (limited hip abduction)
- **A simple suprapubic (transvesical) prostatectomy**
 - operation of choice with **bladder pathology**
- **A simple retropubic prostatectomy**
 - The bladder is not entered

