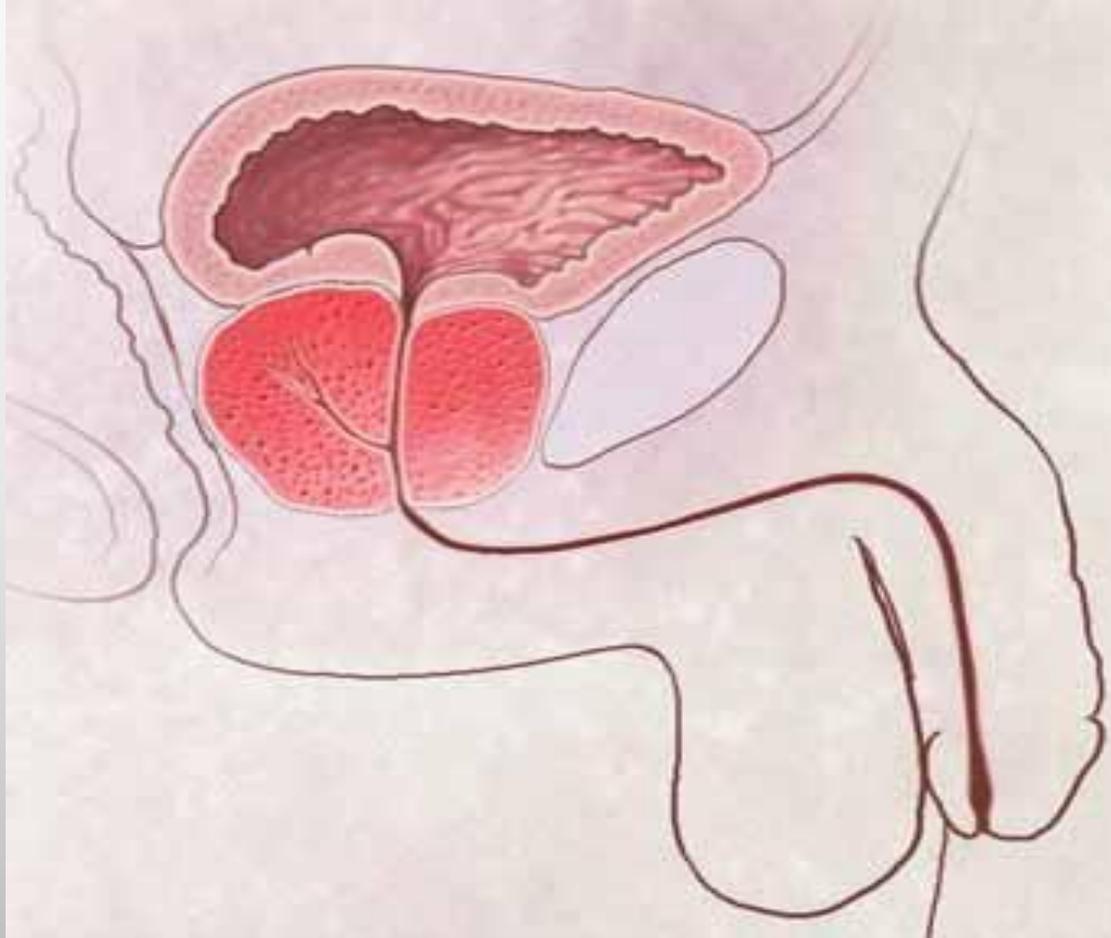


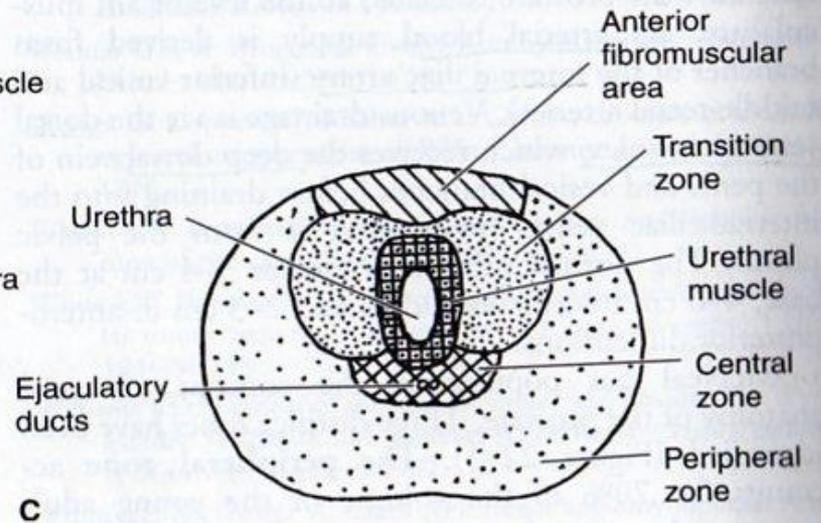
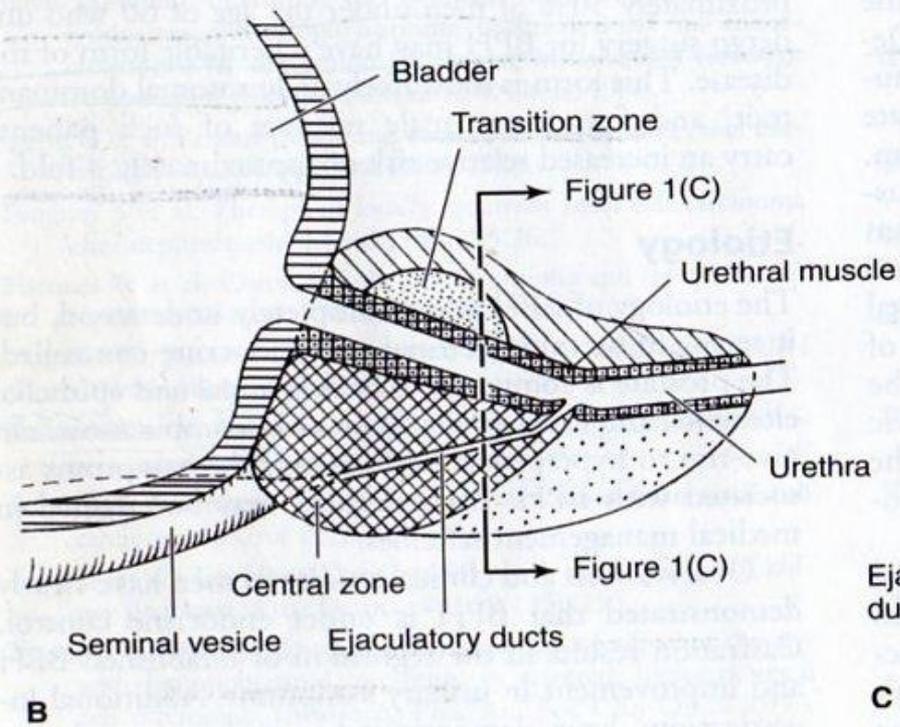
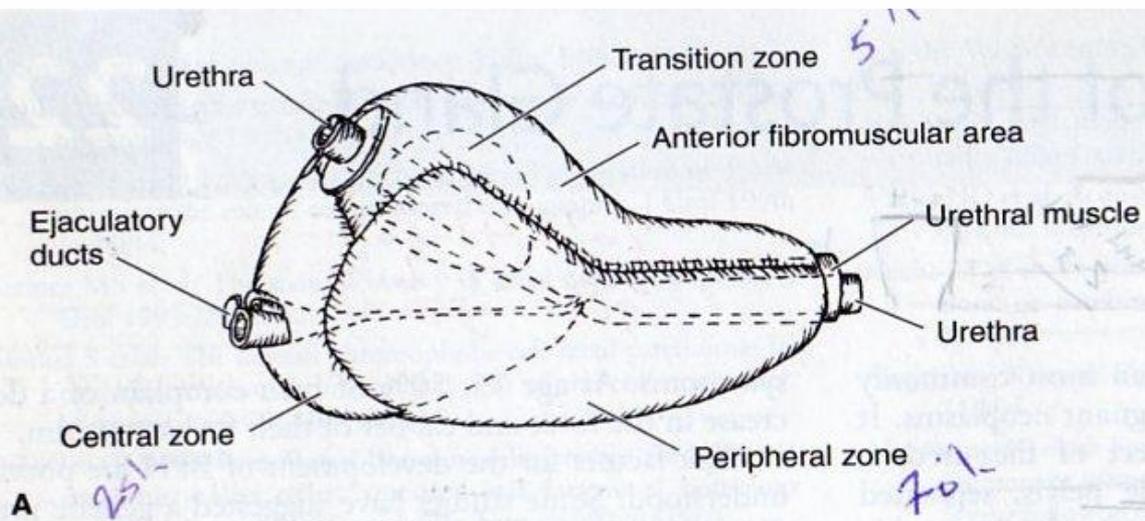
The Prostatic Diseases

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The Prostate

- It comprises the most proximal aspect of the male urethra.
- Anatomically
 - it resides in the true pelvis
 - anteriorly : the retropubic space (space of Retzius).
 - posterior : Denonvilliers' fascia.
 - The base of the prostate is continuous with the bladder neck
 - The apex of the prostate rests on the upper surface of the urogenital diaphragm.
 - Laterally : levator ani musculature.
- Arterial blood supply: inferior vesical and middle rectal arteries.
- Venous drainage is via the dorsal venous complex draining into the internal iliac veins.
- Innervation is from the pelvic plexus.
- The normal prostate measures 3–4 cm at the base, 4–6 cm in cephalocaudal, and 2–3 cm in anteroposterior dimensions.





- The zonal anatomy of the prostate (by McNeal) . Three distinct zones have been identified :
 - The peripheral zone : 70% of the volume of prostate
 - The central zone : 25%
 - The transition zone: 5%
- These anatomic zones have distinct ductal systems.
- CA prostate originates:
 - 60-70% in the peripheral zone,
 - 10–20% in the transition zone,
 - 5– 10% in the central zone .
- BPH originates in the transition zone.

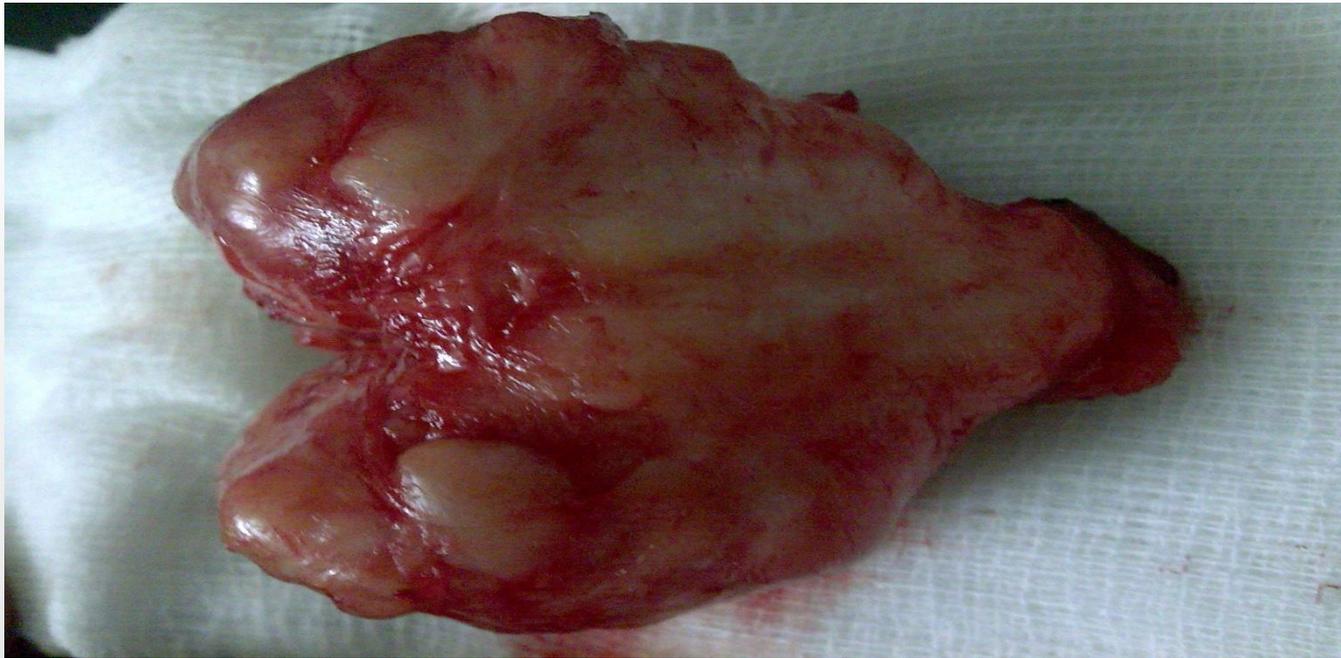
BENIGN PROSTATIC HYPERPLASIA (BPH)

- **Incidence & Epidemiology**
- BPH is the most common benign tumor in men
- its incidence is age related.
- The prevalence of histological BPH in autopsy studies rises
 - 20% in men aged 41–50,
 - 50% in men aged 51–60,
 - >90% in men older than 80.
- obstructive voiding symptoms
 - At age 55: 25%
 - At age 75: 50%
- Risk factors for the development of BPH are poorly understood.
- Some studies have suggested a genetic predisposition, and some have noted racial differences.

BENIGN PROSTATIC HYPERPLASIA (BPH)

- **Etiology**
- The etiology of BPH is not completely understood
 - it seems to be:
 - multifactorial
 - endocrine controlled.
- The prostate is composed of both:
 - stromal elements
 - epithelial elements
 - each, either alone or in combination, can give rise to hyperplastic nodules and the symptoms associated with BPH.

- **Pathology**
- BPH develops in the transition zone.
- It is truly a hyperplasia= increase in cell number.
- Microscopically : a nodular growth pattern that is composed of varying amounts of stroma and epithelium.
 - Stroma is composed of varying amounts of:
 - collagen
 - smooth muscle.
- 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.
- This boundary separates the transition zone from the peripheral zone and serves as a cleavage plane



Pathophysiology

- The symptoms of BPH related to either
 - Obstruction
 - the secondary response of the bladder to the outlet resistance.
- The obstruction:
 - **mechanical obstruction.**
 - **dynamic obstruction.**
- **Mechanical obstruction** : intrusion of adenoma into the urethral lumen or bladder neck, leading to a BOO.
- **The dynamic obstruction:** the prostatic stroma (composed of smooth muscle and collagen, is rich in adrenergic nerve supply). The level of autonomic stimulation thus sets a tone to the prostatic urethra.
- The irritative voiding symptoms of BPH result from the secondary response of the bladder to the increased outlet resistance.
 - Bladder outlet obstruction leads to detrusor muscle hypertrophy and hyperplasia as well as collagen deposition.
 - These results in a decrease in bladder compliance and detrusor instability.

Clinical Findings

A. SYMPTOMS

- The symptoms of BPH can be divided into obstructive and irritative complaints.(LUTS)
 - The AUA Symptom Score questionnaire ..
 - 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.
 - 0–7 = mild
 - 8–19 = moderate,
 - 20–35 = severe.
- May present with hematuria.
- A detailed history focusing on the urinary tract excludes other possible causes of BOO .

URINARY SYMPTOMS (Symptoms Score criteria)	Not at all	< 1 time in 5	< half the time	About half the time	> half the time	Almost always
1. Incomplete emptying	0	1	2	3	4	5
2. Frequency	0	1	2	3	4	5
3. Intermittency	0	1	2	3	4	5
4. Urgency	0	1	2	3	4	5
5. Weak stream	0	1	2	3	4	5
6. Straining	0	1	2	3	4	5
	None	1time	2 times	3 times	4 times	5 times
7. Nocturia	0	1	2	3	4	5

Clinical Findings

B. SIGNS

- physical examination,
- DRE,
- focused neurologic examination
- The size and consistency of the prostate is noted.
- BPH usually results in a smooth, firm, elastic enlargement of the prostate.
- Induration??
 - the possibility of cancer and needs further evaluation
 - prostate-specific antigen (PSA)
 - TRUS
 - biopsy.

C. LABORATORY FINDINGS

- urinalysis
- serum creatinine
- PSA

D. IMAGING

- Ultrasound of the prostate and bladder for:
 - prostatic size
 - bladder wall
 - Bladder volume
 - Bladder stone.
- Upper-tract imaging (IVU or renal ultrasound) is recommended only in
 - the presence of concomitant urinary tract disease
 - complications from BPH (eg, hematuria, urinary tract infection, renal insufficiency, history of stone disease).

E. CYSTOSCOPY

- is not recommended to determine the need for treatment
- but may assist in choosing the surgical approach in patients opting for invasive therapy.

F. ADDITIONAL TESTS

- Cystometrograms and urodynamic profiles
 - are reserved for patients with suspected neurologic disease or those who have failed prostate surgery.
- Measurement of flow rate, determination of postvoid residual urine, and pressure flow studies are
 - considered optional.

Differential Diagnosis Of BPH

Prostatic Hyperplasia



*BLADDER OUTLET
OBSTRUCTION*

Non-BPH causes of obstruction



*DETRUSOR
RESPONSE*

Neurogenic Disease

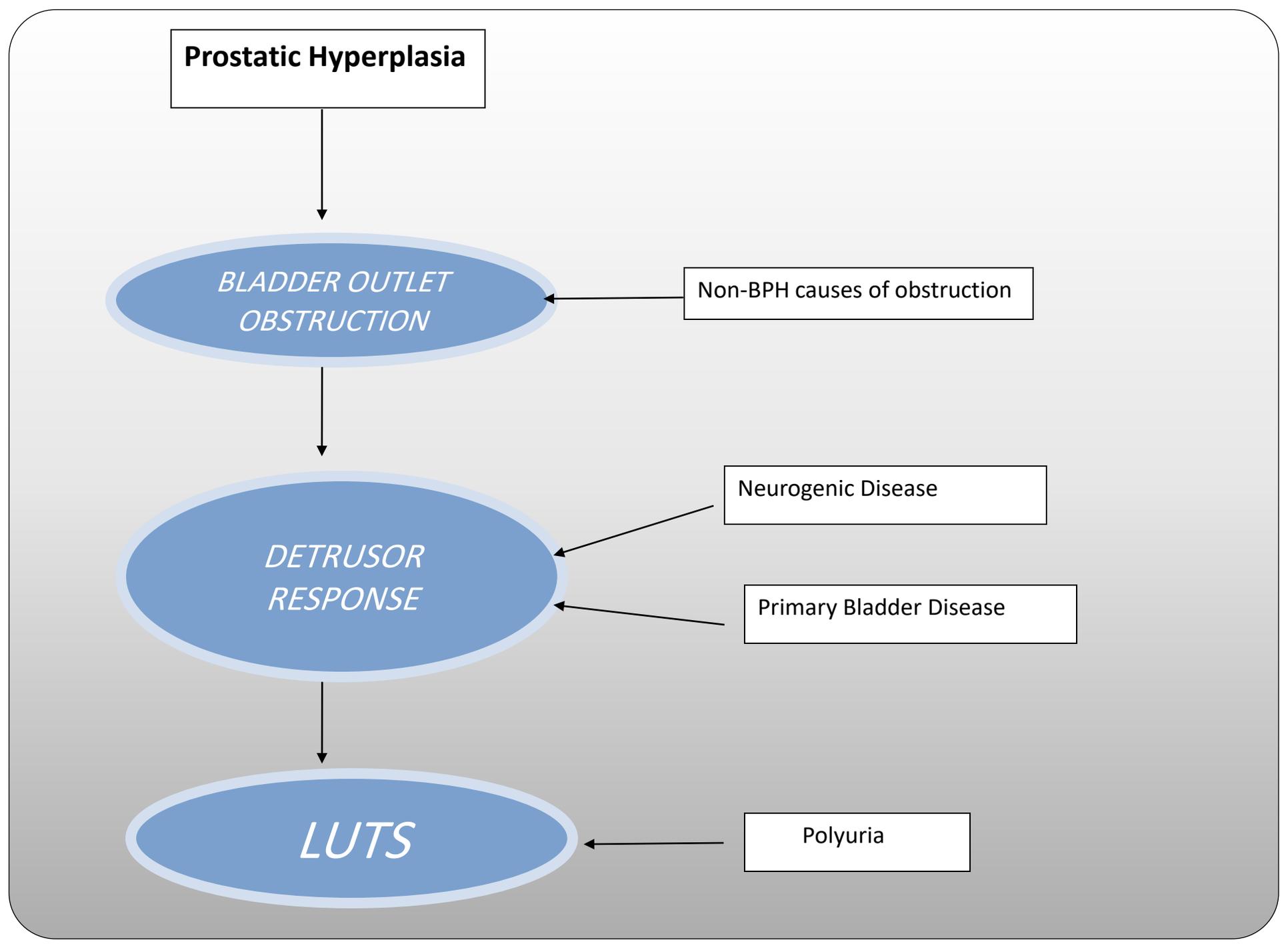


Primary Bladder Disease



LUTS

Polyuria



Treatment

- Specific treatment recommendations can be offered for certain groups of patients.
- Absolute surgical indications include:
 1. Refractory urinary retention (failing at least one attempt at catheter removal),
 2. Recurrent urinary tract infection from BPH,
 3. Recurrent gross hematuria from BPH,
 4. Renal insufficiency from BPH,
 5. Bladder stones from BPH,
 6. Large bladder diverticula.

Treatment

A. WATCHFUL WAITING

B. MEDICAL THERAPY

1. Alpha-blockers
2. 5-Alpha-reductase inhibitors
3. Combination therapy
4. Phytotherapy

C. SURGICAL THERAPY

- TURP
- TUIP
- SIMPLE PROSTATECTOMY

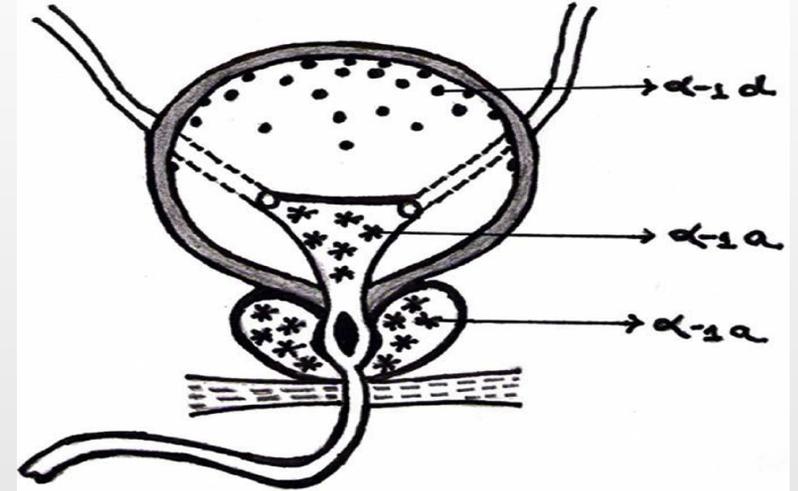
D. MINIMALLY INVASIVE THERAPY

1. **Laser therapy**
2. **TUVP**
3. **TUMT**
4. **TUNA**
5. **HIFU**
6. **Intraurethral stents**
7. **PAE**

A. WATCHFUL WAITING

- is the appropriate management for:
 - Men with mild symptom scores (0–7).
 - Men with moderate or severe symptoms can also be managed, if they so choose.

B. MEDICAL THERAPY



- **1. Alpha-blockers—**
- Alpha blockers can be classified according to their receptor selectivity as well as their half-life:
 - Nonselective (Phenoxybenzamine)
 - Alpha-1, short-acting (Prazosin)
 - Alpha-1, long-acting (Terazosin and Doxazosin)
 - Alpha-1a selective (Tamsulosin and Alfuzosin)

B. MEDICAL THERAPY

2. 5-Alpha-reductase inhibitors—

- **Finasteride**

- blocks the conversion of testosterone to DHT
- affects the epithelial component of the prostate,
- resulting in a reduction in the size of the gland and improvement in symptoms.
- Six months of therapy are required .
- >40 cm³.
- Side effects include decreased libido, decreased ejaculate volume, and impotence.
- PSA is reduced by 50% .

- **Dutasteride**

- differs from finasteride as it inhibits both isoenzymes of 5-alpha-reductase.
- Similar to finasteride, it reduces serum prostatic specific antigen and total prostate volume.
- The main side effects are erectile dysfunction, decreased libido, gynecomastia, and ejaculation disorders.

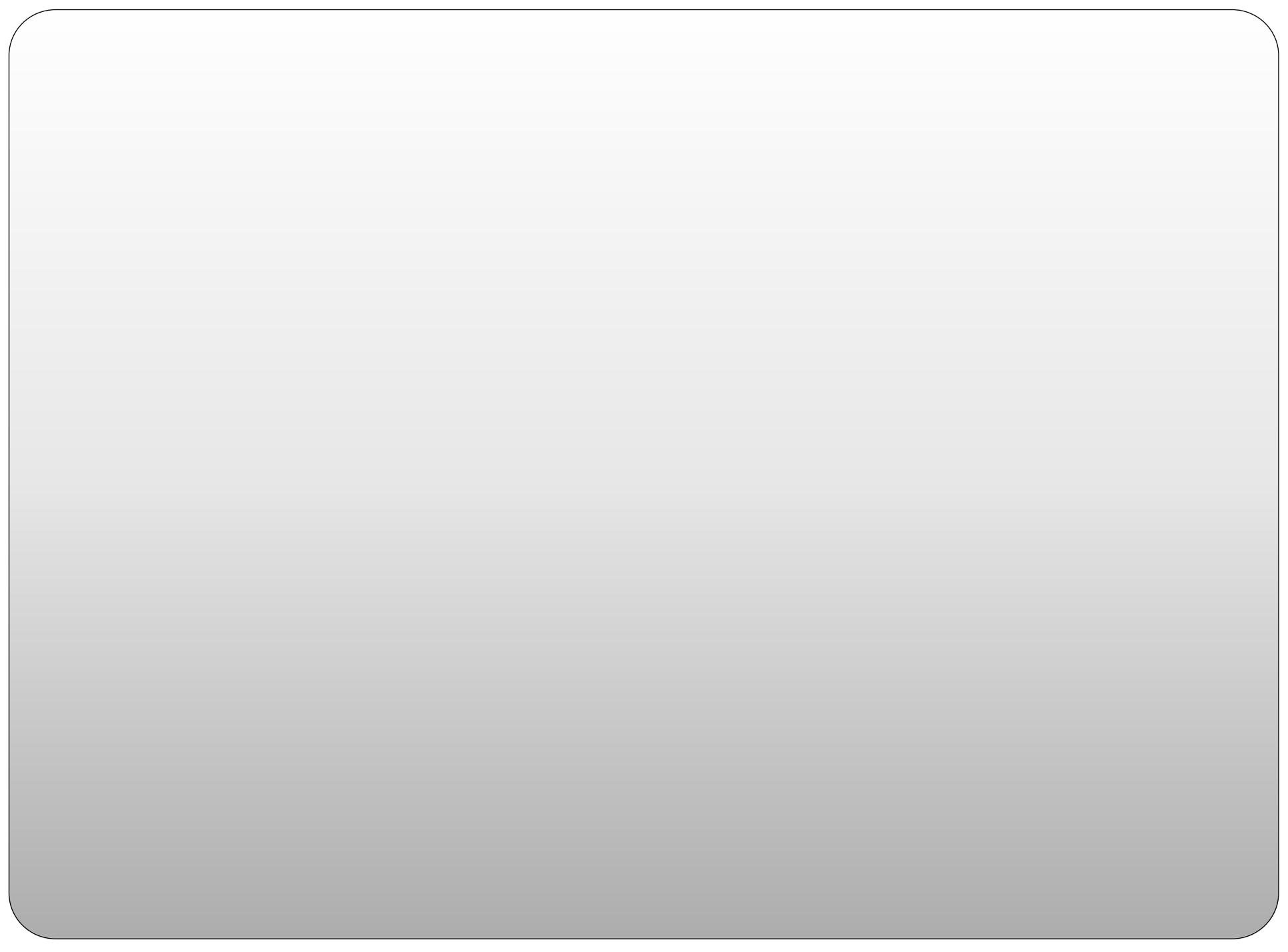
B. MEDICAL THERAPY

- **3. Combination therapy**— combination alpha-blocker and 5-alpha-reductase inhibitor therapy
- **4. Phytotherapy**—Phytotherapy refers to the use of plants or plant extracts for medicinal purposes.
 - Several plant extracts have been popularized, including the saw palmetto berry, (*Serenoa repens*) the bark of *Pygeum africanum*.
 - The mechanisms of action are unknown.

C. SURGICAL THERAPY

1. Transurethral resection of the prostate—(TURP)

- Risks of TURP include
 - retrograde ejaculation (75%),
 - impotence (5– 10%),
 - and incontinence (<1%).
- Complications include
 - bleeding,
 - urethral stricture or bladder neck contracture,
 - perforation of the prostate capsule with extravasation,
 - and if severe, TUR syndrome resulting from a hypervolemic, hyponatremic state due to absorption of the hypotonic irrigating solution.
- Clinical manifestations of the TUR syndrome include nausea, vomiting, confusion, hypertension, bradycardia, and visual disturbances.
- The risk of the TUR syndrome increases with resection times >90 minutes. Treatment includes diuresis and, in severe cases, hypertonic saline administration.



C. SURGICAL THERAPY

2. Transurethral incision of the prostate— (TUIP)

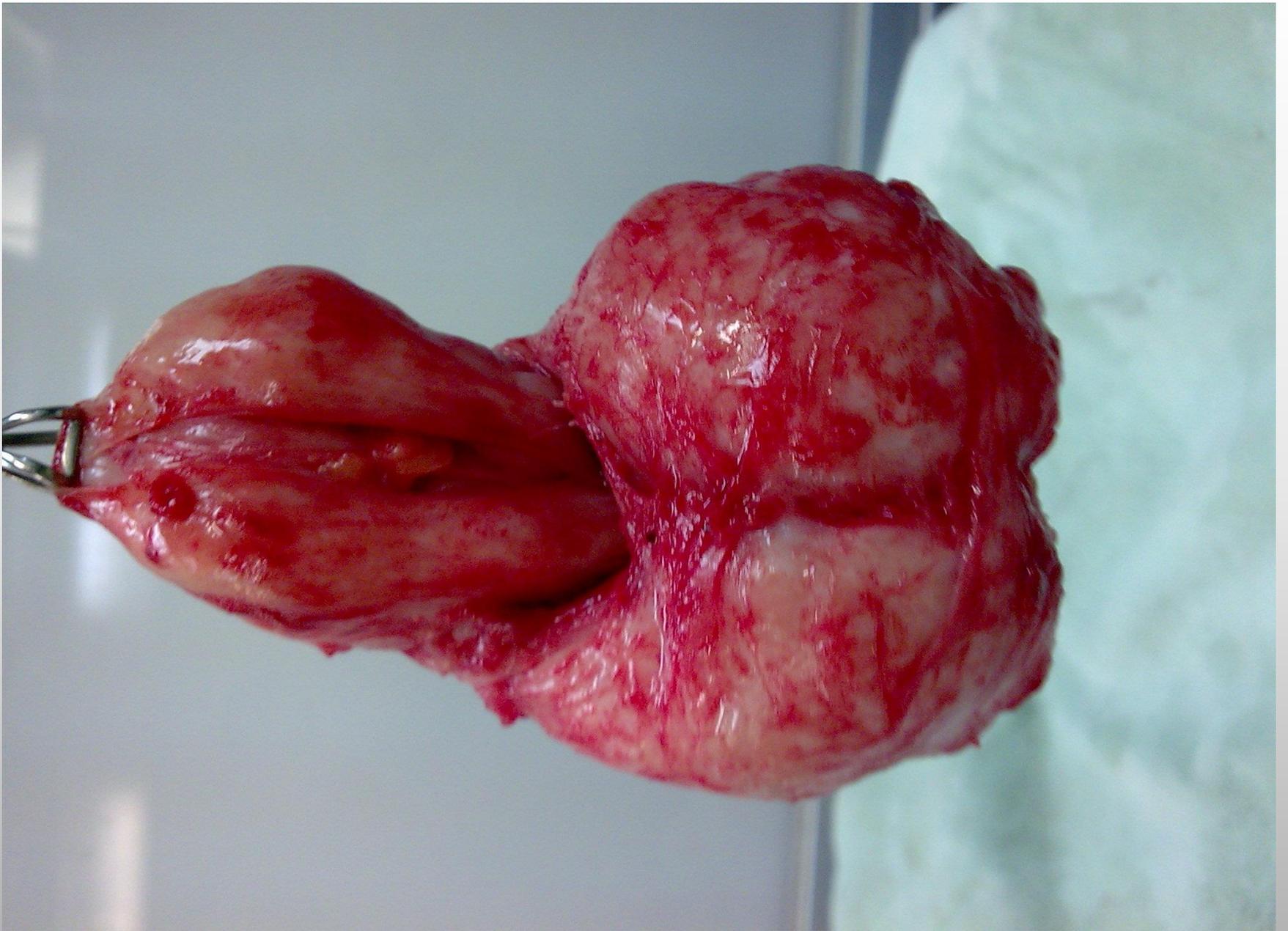
- Men with moderate to severe symptoms and a small prostate often have posterior commissure hyperplasia (elevated bladder neck).
- These patients will often benefit from an incision of the prostate.
- This procedure is more rapid and less morbid than TURP.
- The technique involves two incisions using the Collins knife at the 5- and 7-o'clock positions.
- The incisions are started just distal to the ureteral orifices and are extended outward to the verumontanum.

C. SURGICAL THERAPY

3. Open simple prostatectomy—

- When the prostate is too large to be removed endoscopically, an open enucleation is necessary.
- Glands >70 g are usually considered for open enucleation.
- Open prostatectomy may also be initiated when concomitant bladder diverticulum or a bladder stone is present
- if dorsal lithotomy positioning is not possible.
- Open prostatectomies can be done with either a suprapubic or retropubic approach.
- **A simple suprapubic prostatectomy I**
 - performed transvesically and is the operation of choice in dealing with concomitant bladder pathology.
- **In a simple retropubic prostatectomy,**
 - the bladder is not entered. Rather, a transverse incision is made in the surgical capsule of the prostate, and the adenoma is enucleated as described above. Only a urethral catheter is needed at the end of the procedure.





D. MINIMALLY INVASIVE THERAPY

1. Laser therapy—

- Many different techniques of laser surgery for the prostate have been described.
- Two main energy sources of lasers have been utilized—Nd:YAG and holmium:YAG.
- Several different coagulation necrosis techniques have been described.
 - Transurethral laser-induced prostatectomy (TULIP) is done with TRUS guidance.
 - Visual contact ablative techniques are more time-consuming procedures because the fiber is placed in direct contact with the prostate tissue, which is vaporized. An immediate defect is obtained in the prostatic urethra, similar to that seen during TURP.
 - Interstitial laser therapy places fibers directly into the prostate, usually under cystoscopic control. At each puncture
- Advantages of laser surgery include:
 - (1) minimal blood loss,
 - (2) rare instances of TUR syndrome,
 - (3) ability to treat patients receiving anticoagulation therapy,
 - (4) ability to be done as an outpatient procedure.
- Disadvantages
 - (1) lack of availability of tissue for pathologic examination,
 - (2) longer postoperative catheterization time,
 - (3) more irritative voiding complaints,
 - (4) high cost of laser fibers and generators.

D. MINIMALLY INVASIVE THERAPY

2. Transurethral electrovaporization of the prostate—(TUVP)

- TUVP uses the standard resectoscope but replaces a conventional loop with a variation of a grooved rollerball. High current densities cause heat vaporization of tissue, resulting in a cavity in the prostatic urethra.

3. Hyperthermia—(TUMT)

- Microwave hyperthermia is most commonly delivered with a transurethral catheter.
- Some devices cool the urethral mucosa to decrease the risk of injury.

D. MINIMALLY INVASIVE THERAPY

4. Transurethral needle ablation of the prostate—(TUNA)

- TUNA uses a specially designed urethral catheter that is passed into the urethra.
- Interstitial radio frequency needles are then deployed from the tip of the catheter, piercing the mucosa of the prostatic urethra.

5. High-intensity focused ultrasound—(HIFU)

- High-intensity focused ultrasound is another means of performing thermal tissue ablation.
- A specially designed dual-function ultrasound probe is placed in the rectum.
- high-intensity focused ultrasound energy, which heats the prostate tissue and results in coagulative necrosis.

D. MINIMALLY INVASIVE THERAPY

6. Intraurethral stents—

- endoscopically placed in the prostatic fossa and are designed to keep the prostatic urethra patent.
- They are usually covered by urothelium within 4–6 months after insertion.
- These devices are typically used for patients unfit for surgery or anesthesia.