

Benign prostatic hyperplasia (BPH)

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The prostate gland is the male organ most commonly affected with either benign or malignant neoplasms.

3 distinct zones have been identified :

1-The peripheral zone : accounts for 70% of the volume of the young adult prostate.

2-the central zone: 25%

3-transition zone: 5%.

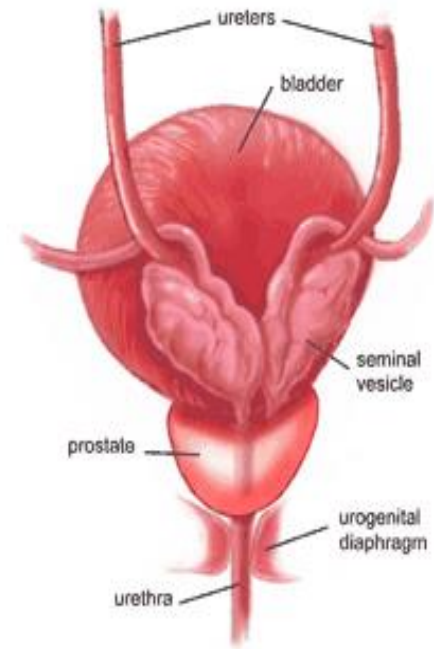
These anatomic zones have distinct ductal systems and differentially affected with neoplastic processes.

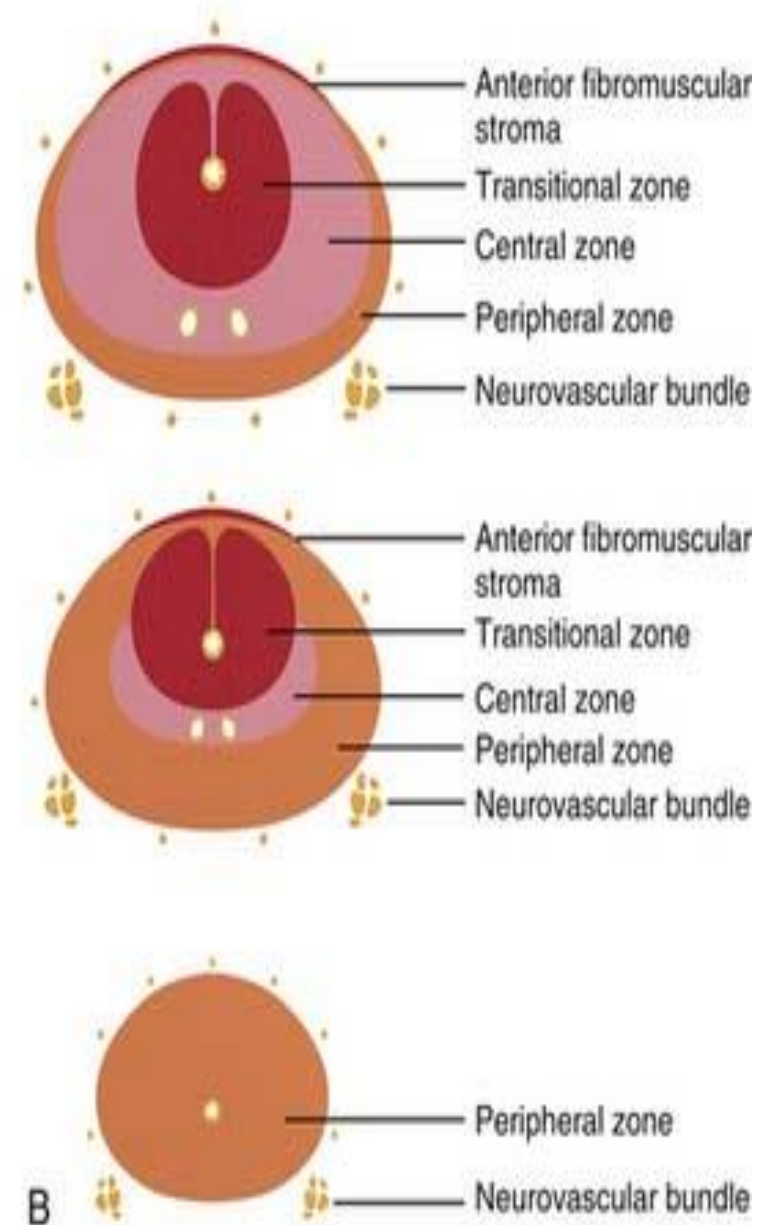
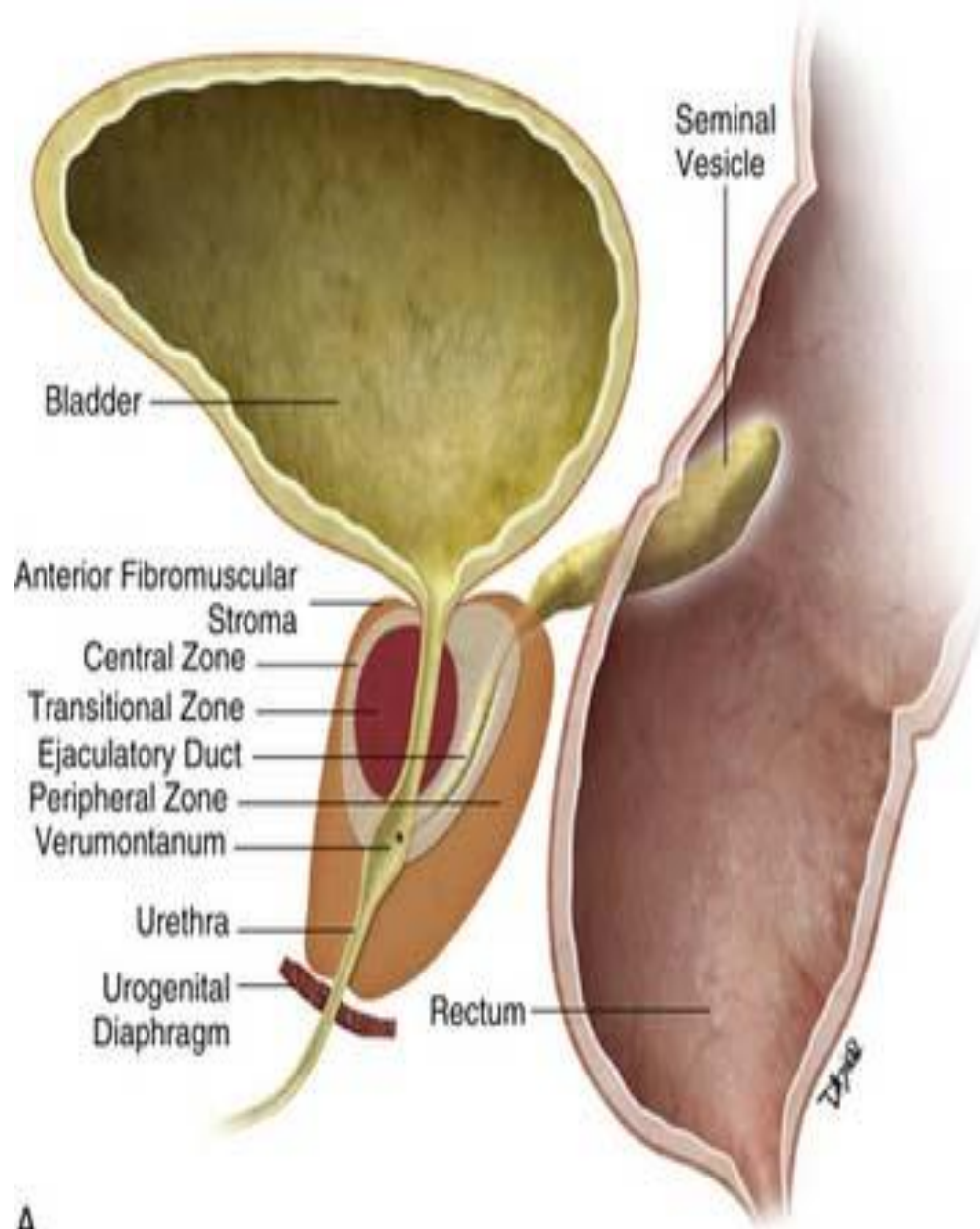
-**60-70% of CaP** :originate in **the peripheral zone**.

- **Benign prostatic hyperplasia (BPH):**

originates in **the transition zone** . It is truly a hyperplastic process resulting from an increase in cell number.

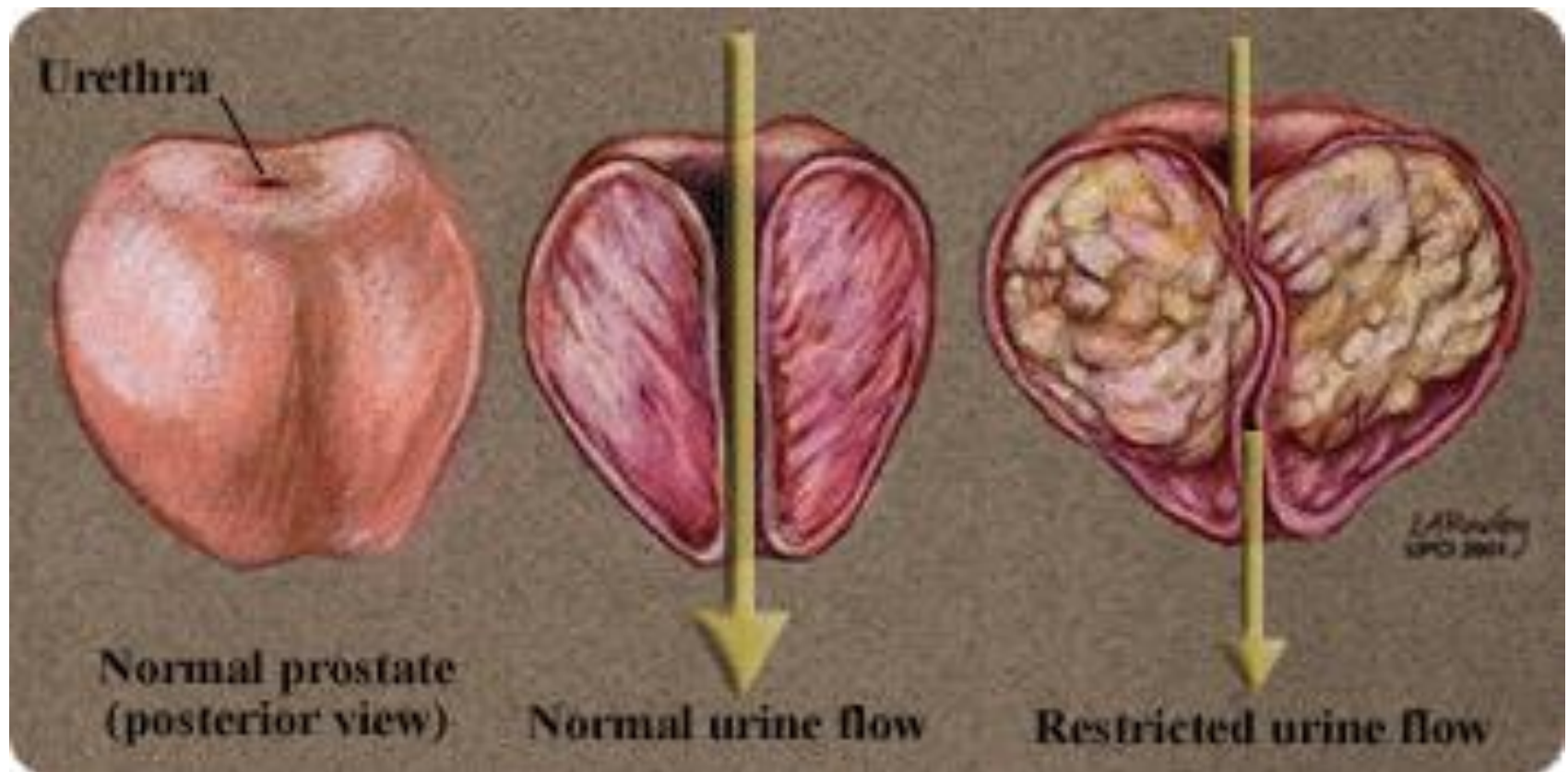
* Nodular hyperplasia is NOT a precursor to carcinoma.





Benign prostatic hyperplasia (BPH):

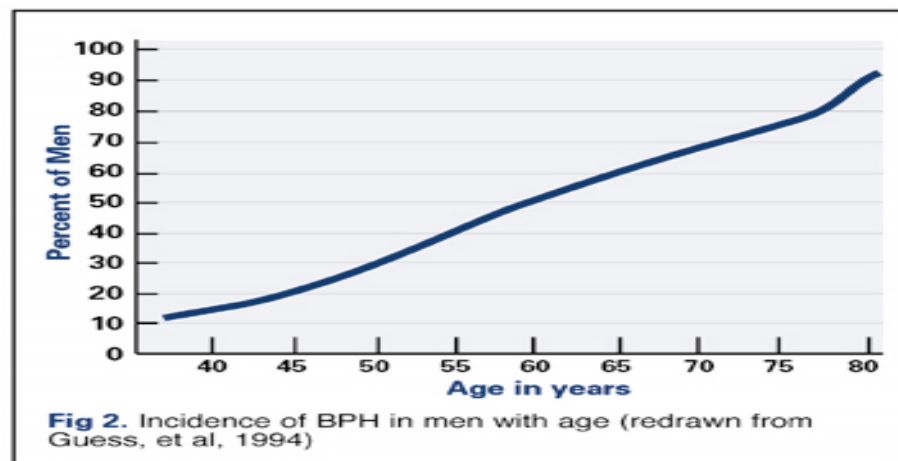
is a **noncancerous** enlargement of the prostate gland that may restrict flow of urine from the bladder.



Incidence of BPH

- BPH is the most common benign tumor in men, and its incidence is **age related**.
- **The prevalence of histologic BPH in autopsy studies:**

- **Rare** before age of **30**
- 20% in men aged 41–50
- 50% in men aged 51–60
- >90%** in men older than **80 yr**.



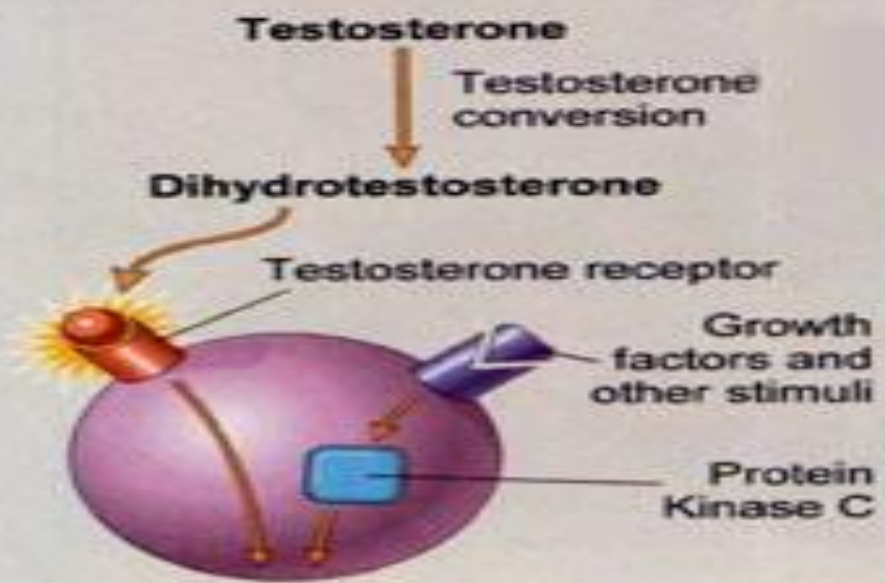
Etiology-1

- The etiology of BPH is not completely understood, but it seems to be **multifactorial** and **endocrine controlled** in general.
- Observations and clinical studies in men have clearly demonstrated that BPH is under endocrine control. **Castration** results in the regression of established BPH and improvement in urinary symptoms.

Etiology-2

- 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.
- some studies have suggested a genetic predisposition (AD) and first-degree male relatives of such patients carry an increased relative risk of approximately fourfold.

The Development of Benign Prostatic Hyperplasia...

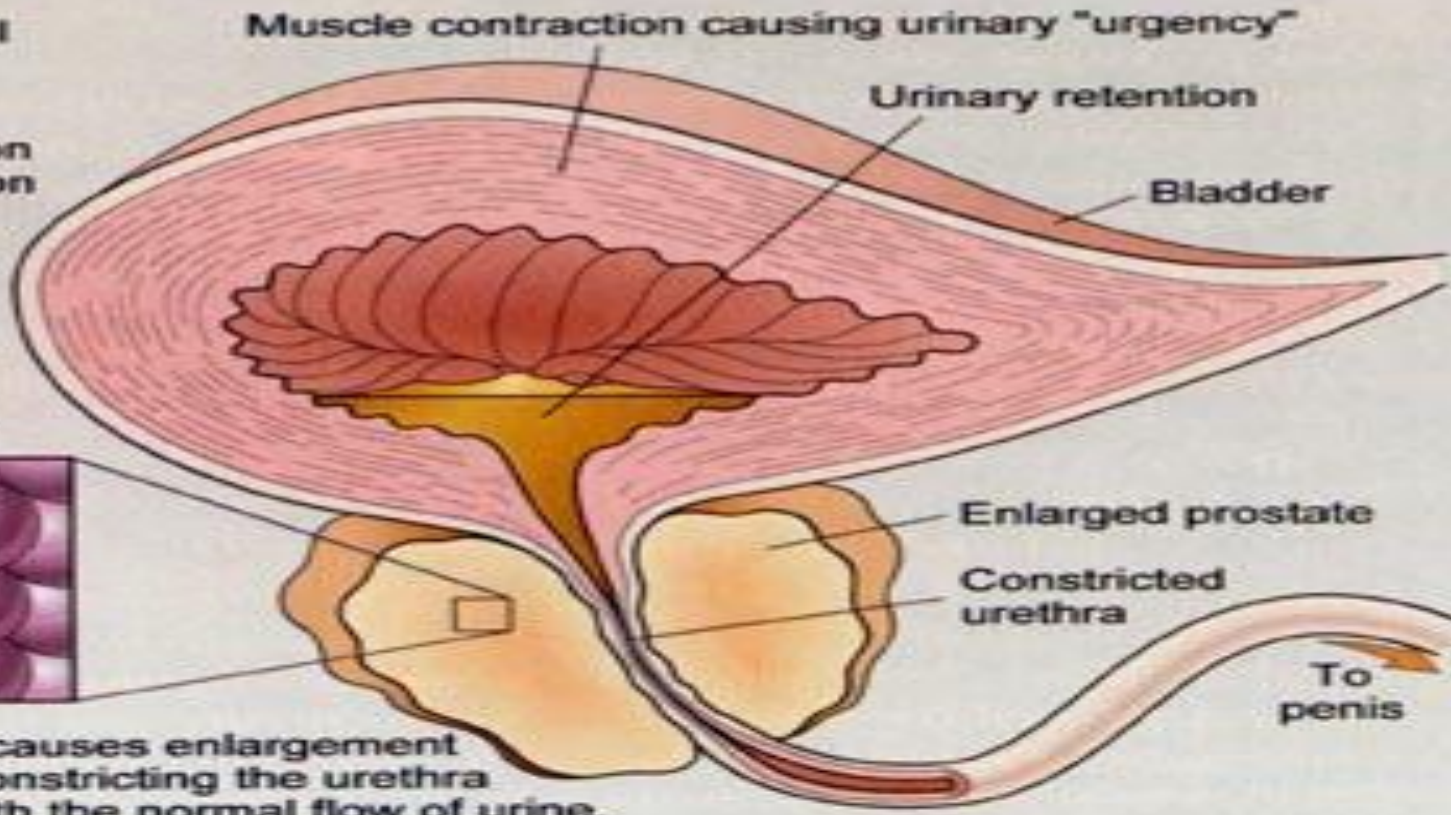


DNA replication and cell division

Rapid cell proliferation



Cell proliferation causes enlargement of the prostate, constricting the urethra and interfering with the normal flow of urine.



Pathology-1

Microscopic evaluation reveals a nodular growth pattern that is composed of varying amounts of **stroma** and **epithelium**.

Stroma is composed of varying amounts of collagen and smooth muscle.

Pathology-2

The differential representation of the histologic components of BPH explains, in part, the potential responsiveness to medical therapy. Thus, **α -blocker therapy** may result in excellent responses in patients with BPH that has a significant component of smooth muscle, while 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.

Pathology-3

- 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 for open enucleation of the prostate during **open simple prostatectomies** performed for BPH.

Pathophysiology

- symptoms of BPH can relate to either :

1-the obstructive component of the prostate .

2-or the 2ry response of the bladder to the outlet resistance.

- The obstructive component can be subdivided into :

- mechanical obstruction

- dynamic obstruction.

- **mechanical obstruction may result from:**

prostatic enlargement occurs = intrusion into the urethral lumen or bladder neck, leading to a higher bladder outlet resistance.

- **The dynamic component of prostatic obstruction**

explains the variable nature of the symptoms experienced by patients.

The prostatic stroma (smooth muscle and collagen) is rich in adrenergic nerve supply.

The level of autonomic stimulation thus sets a tone to the prostatic urethra. Use of α -blocker therapy decreases this tone, resulting in a decrease in outlet resistance.

Symptoms

The symptoms of BPH can be divided into:

- **Obstructive symptoms :**

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

- **Irritative symptoms :**

urgency, frequency, and nocturia.

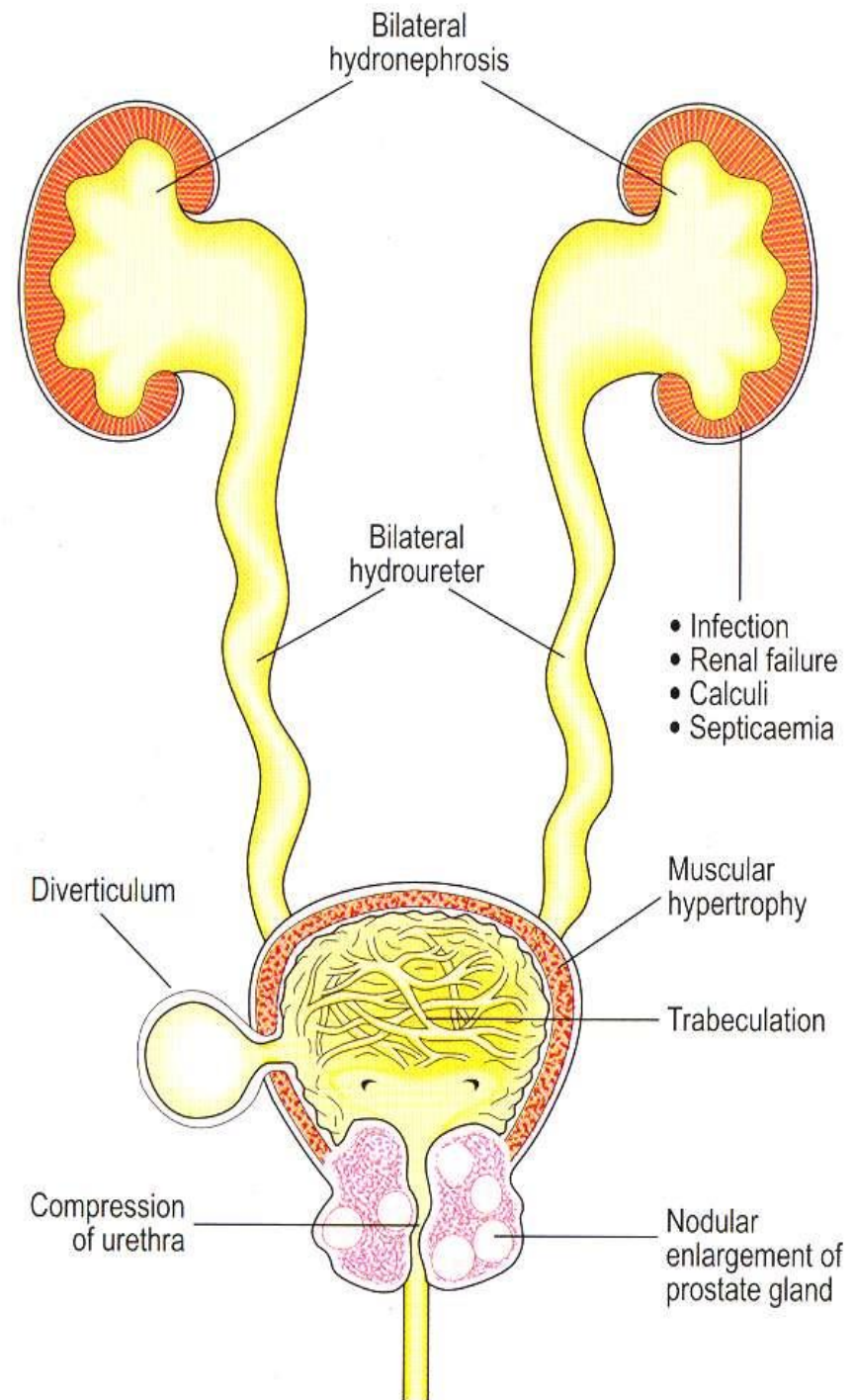
The irritative voiding complaints of BPH result

From:

the 2ry response of the bladder to the increased outlet resistance → increase pressure inside UB
detrusor → muscle hypertrophy and hyperplasia and → collagen deposition
→ Trabeculation → Sculation → Diverticulation
→ increase residual urine and chronic retention.

BPH-Complications:

- 1.Urethral compression
- 2.Ball valve mechanism
- 3.Bladder hypertrophy
- 4.Trabeculation
- 5.Diverticula formation
- 6.Hydroureter – bilateral
- 7.Hydronephrosis
- 8.UTI
- 9.Stones formation
- 10.Epididymitis

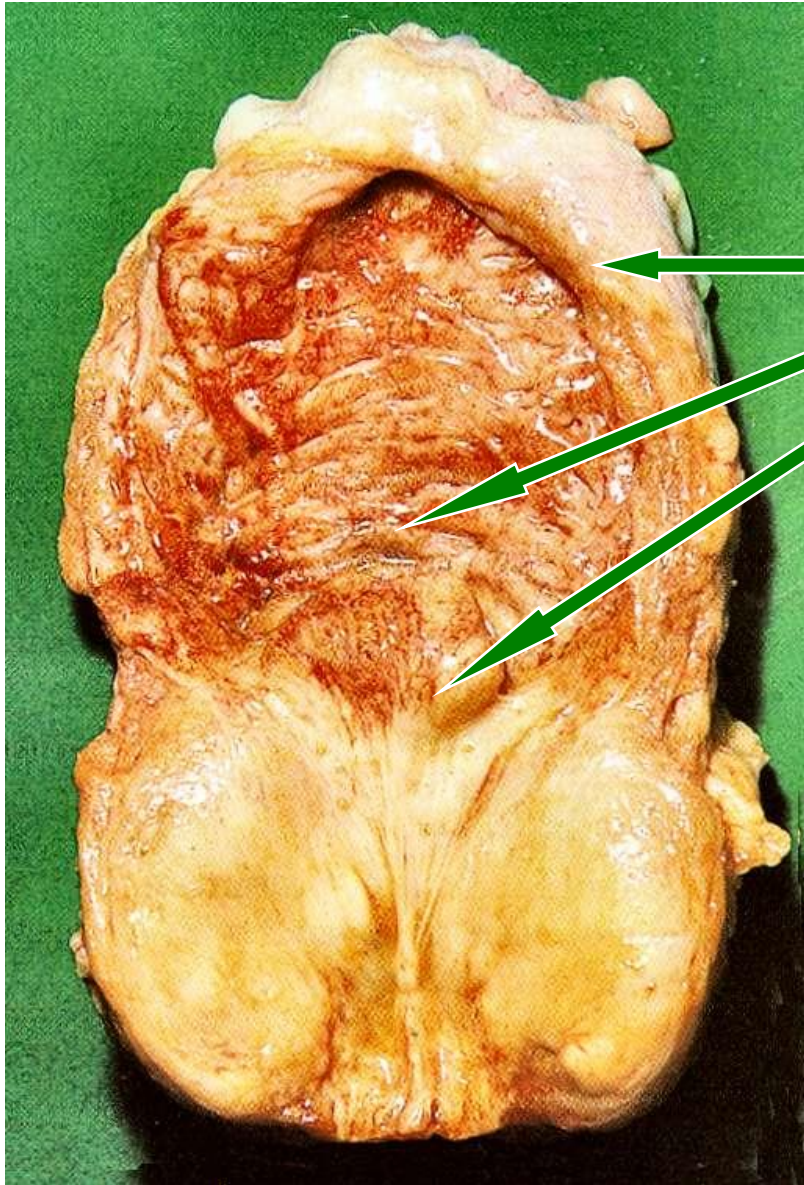


BPH-Bladder Gross



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

BPH-Bladder morphology:



- Hypertrophy
- Trabeculation
- Median lobe protrusion.

The AUA Symptom Score Questionnaire

- The self-administered questionnaire originally developed by the American Urological Association (AUA) is both valid and reliable in:
**identifying the need to treat patients and
In monitoring their response to therapy.**
- it is now more commonly called
the International Prostate Symptom Score (IPSS).

- IPSS is perhaps the single most important tool used in the evaluation of patients with BPH and is recommended for all patients before the initiation of 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 in the morning?	0	1	2	3	4	5

The Disease Specific Quality of Life Question:

The International Prostate Symptom Score (IPSS) uses the same 7 questions as the AUA Symptom Index (presented above), with the addition of the following Disease Specific Quality of Life Question (bother score) scored on a scale from 0 to 6 points (delighted to terrible):

■ If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?

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.
- **BPH** usually results in a smooth, firm, elastic enlargement of the prostate.
- **Induration**, if detected, must alert the physician to the possibility of cancer and the need for further evaluation (ie, prostate-specific antigen [**PSA**], transrectal ultrasound [**TRUS**], and **biopsy**).

Laboratory Findings

- **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

Imaging

- 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** is useful to determine prostate size for men planning to undergo prostate surgery who are suspected to have severe prostate enlargement based on DRE.

Cystoscopy

- **Cystoscopy** is 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

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.

Differential Diagnosis

- Other obstructive conditions of the lower urinary tract, such as:

- **urethral stricture and bladder neck contracture.**

(A history of previous urethral instrumentation , urethritis , or trauma)

- **bladder stone.**(Hematuria and pain)

- **CaP** (may be detected by abnormalities on the DRE or an elevated PSA)

- **neurogenic bladder disorders**

(may have many of the signs and symptoms of BPH, but a 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)

Treatment

- **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

Watchful waiting

- *Watchful waiting is the appropriate management of **men** with mild symptom IPSS scores (0-7).**
- *Some men undergo spontaneous improvement or resolution of their symptoms.**
- *Men with moderate or severe symptoms can also be managed in this fashion if they so choose.**

Medical Therapy

1. α blockers

The human prostate and bladder neck contains **alpha-1- adrenoreceptors**.

Alpha blockers can be classified according to their receptor selectivity.

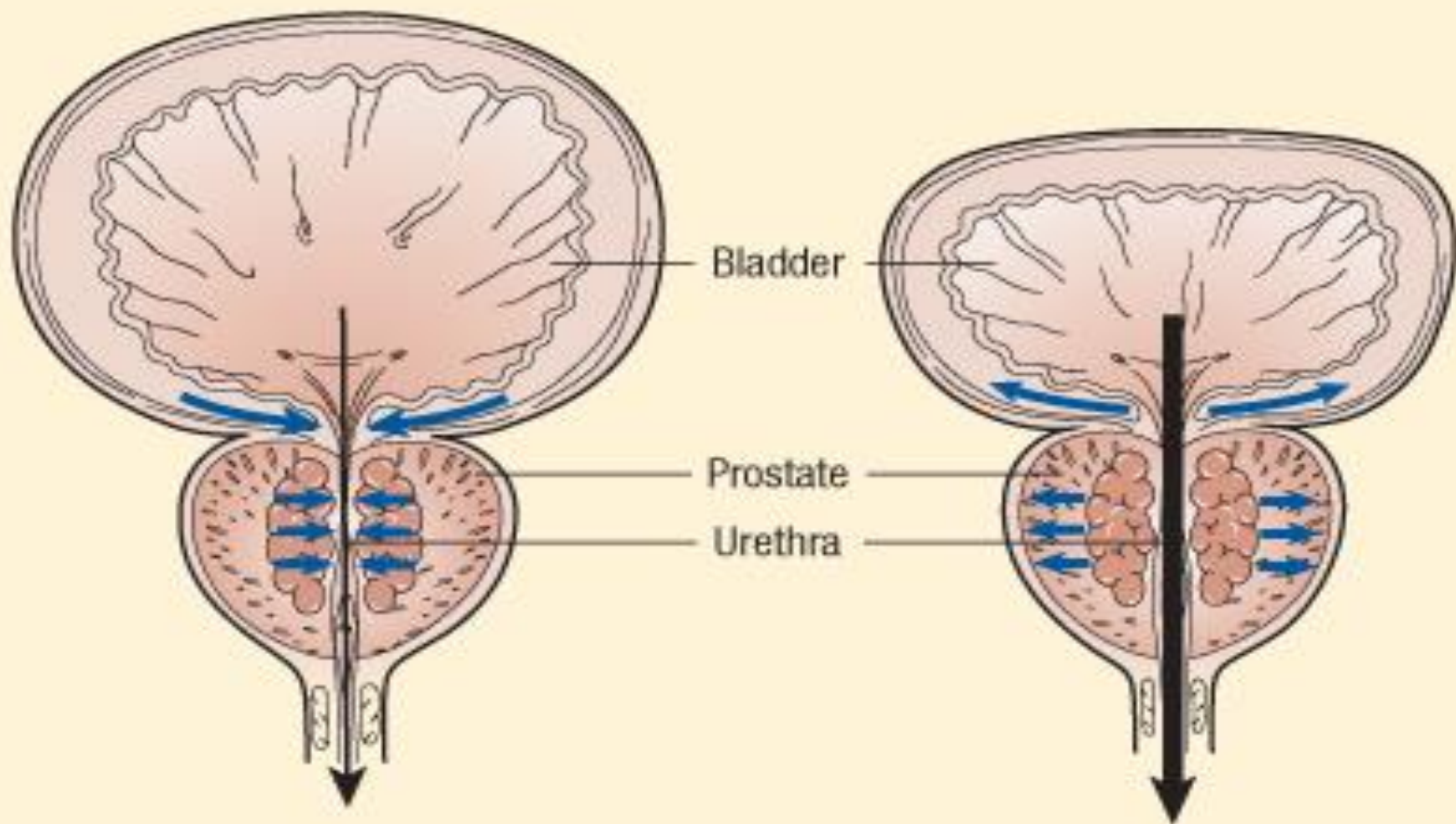
- **α - 1 short acting:**

Prazosin – 2 mg twice a day

- **α - 1 long acting:**

Hytrin[®] (terazosin)- 5 or 10 mg daily

Cardura[®] (doxazosin)- 4 or 8 mg daily



In untreated BPH, pressure at the bladder neck and on the urethra as it passes through the prostate causes urinary symptoms

With α_1 -blockers, the pressure is reduced and urine can flow more easily

α 1a-selective

Omnic[®] (tamsulosin)

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

***Typical side effects:**

Orthostatic hypotension, dizziness, tiredness, retrograde ejaculation, rhinitis, headache.

5 -alpha -reductase inhibitors

Proscar[®] (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. Similar to finasteride, it reduces serum PSA and total prostate volume.

This drug affects the epithelial component of the prostate, resulting in a reduction in the size of the gland and improvement in symptoms. 6month therapy is required to see the maximum effects on prostate size (20% reduction) and symptomatic improvement.

***Typical side effects:**

Decreased libido, decreased ejaculate volume, impotence.
--Serum PSA is reduced by 50%.

3. Combination therapy

4. Phytotherapy

Use of plants or plants extracts

Pygeum africanum, roots of *Echinacea*

purpurea, *Hypoxis rooperi*.

- Saw palmetto
- African plum
- Rye pollen
- Pumpkin seeds

Medical therapy

Advantages:

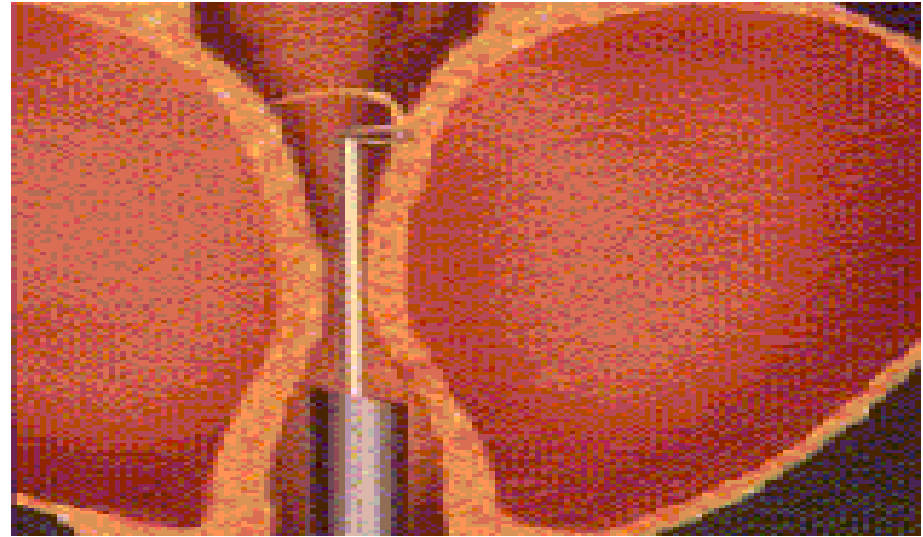
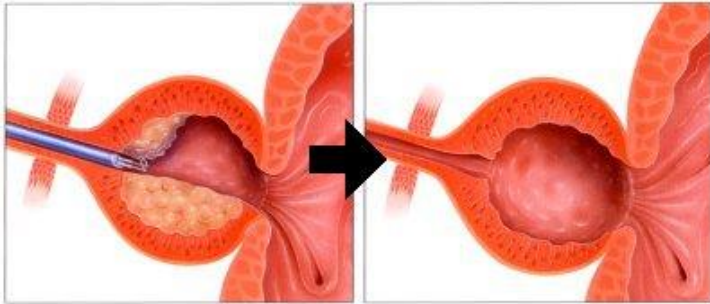
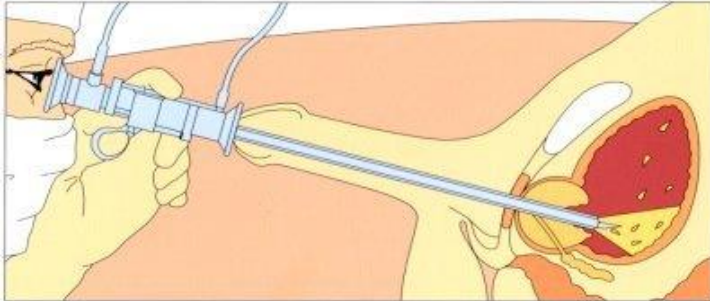
- No surgery.
- Effective for mild to moderate symptoms.

Disadvantages:

- Lifelong commitment to therapy.
- Effectiveness may decrease over time.

Surgical therapy

Transurethral Resection of Prostate (TURP)

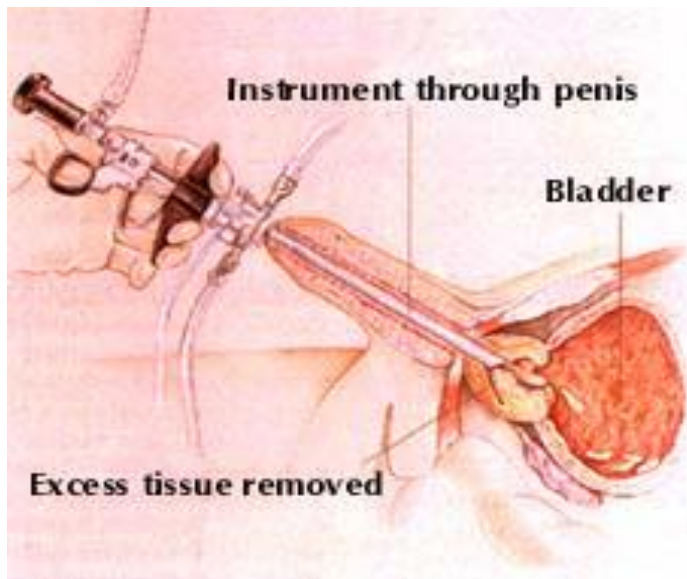


Potential side effects:

- Retrograde ejaculation (75%)
- Impotence (5-10%)
- Incontinence (<1%)

Complications:

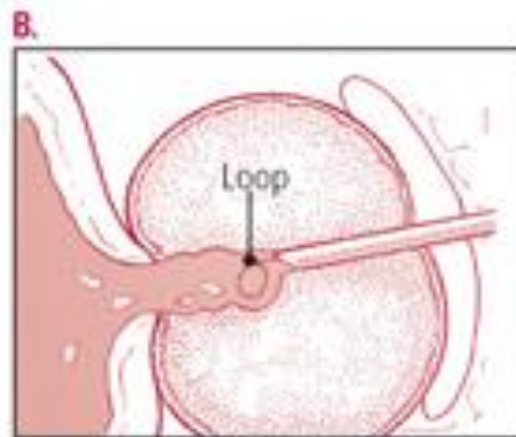
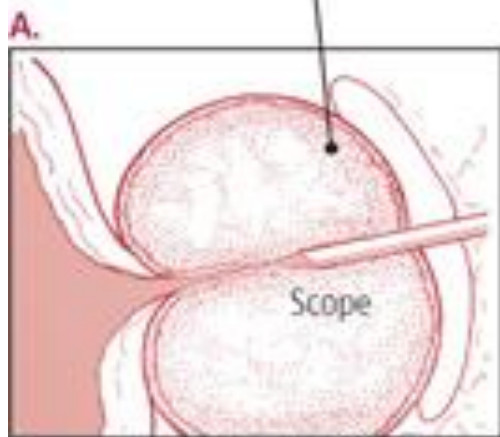
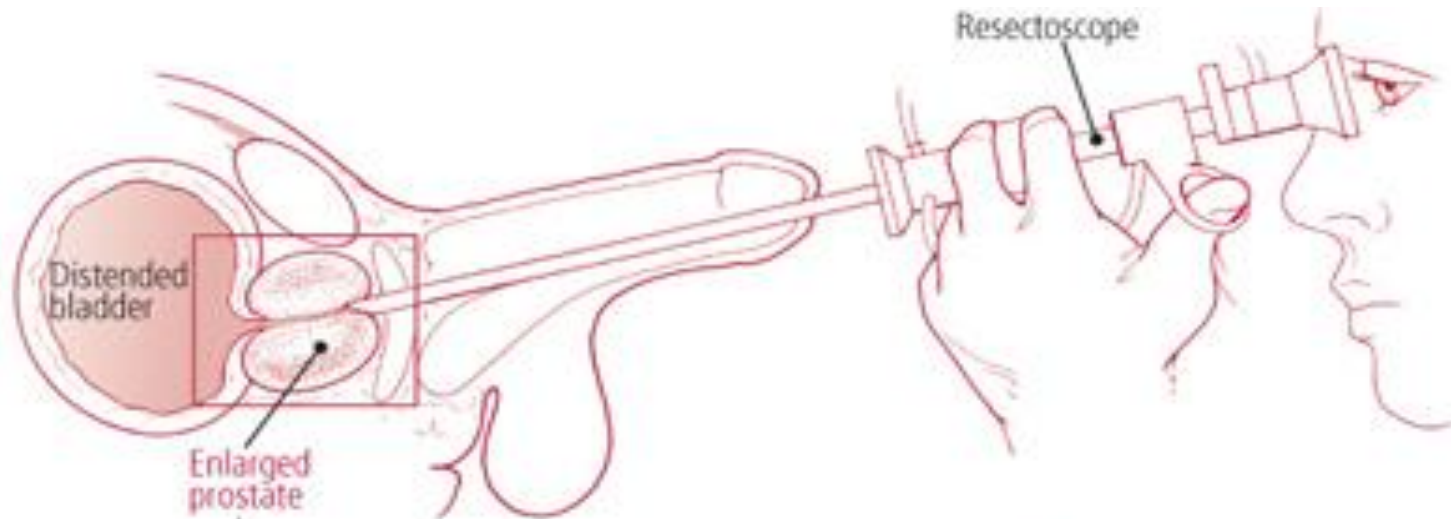
Bleeding, urethral stricture or bladder neck contracture, perforation of the prostate capsule, **TUR syndrome.**



transurethral resection (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 and is usually seen in older men.
- **Treatment** includes diuresis and, in severe cases, hypertonic saline administration

Transurethral incision of the prostate (TUIP)

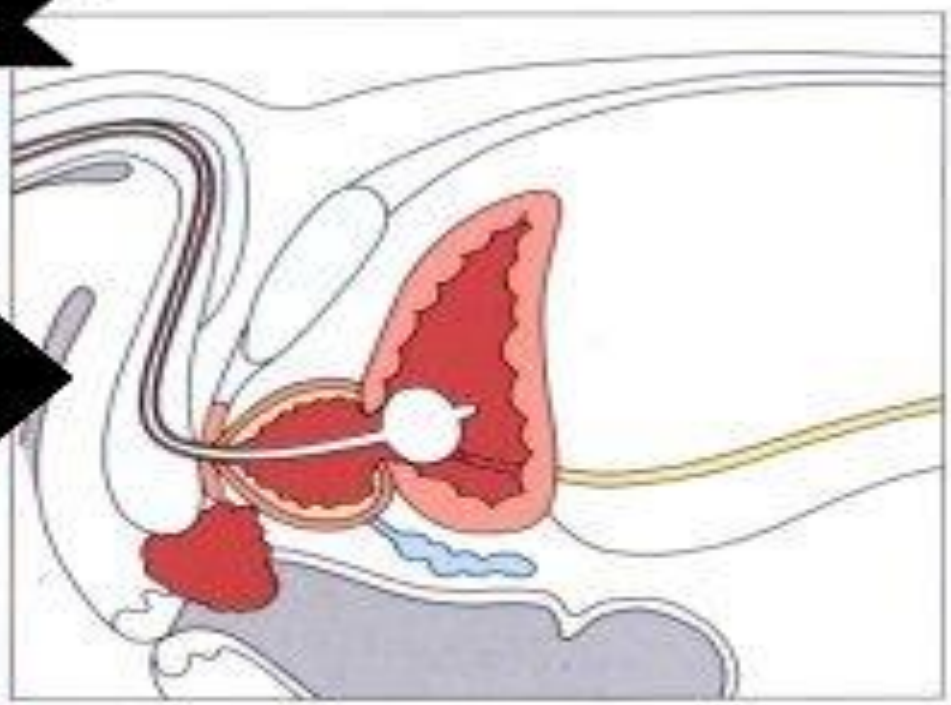
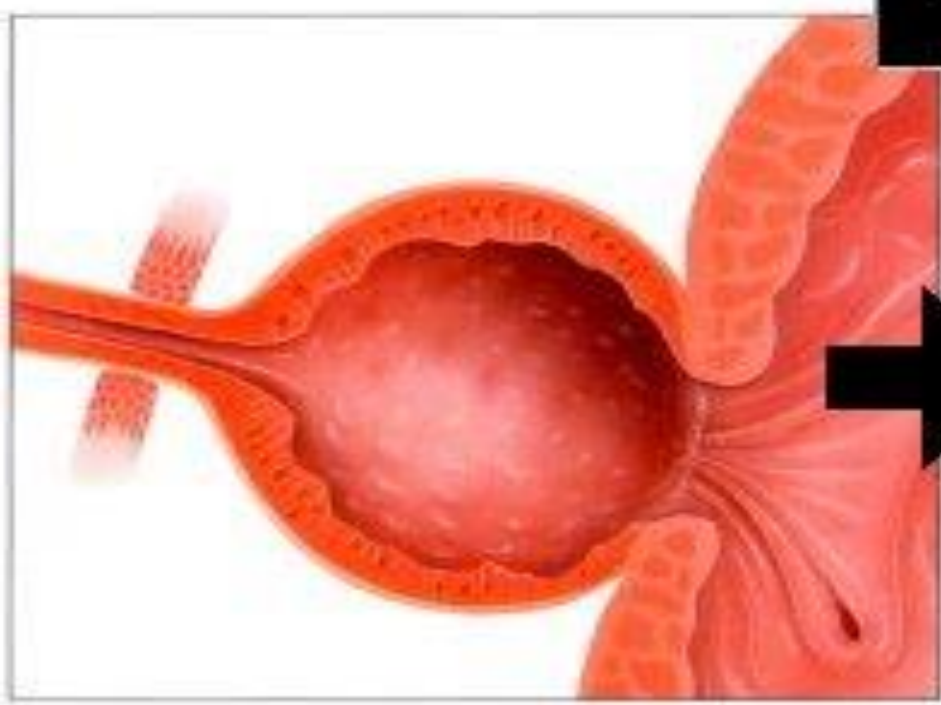
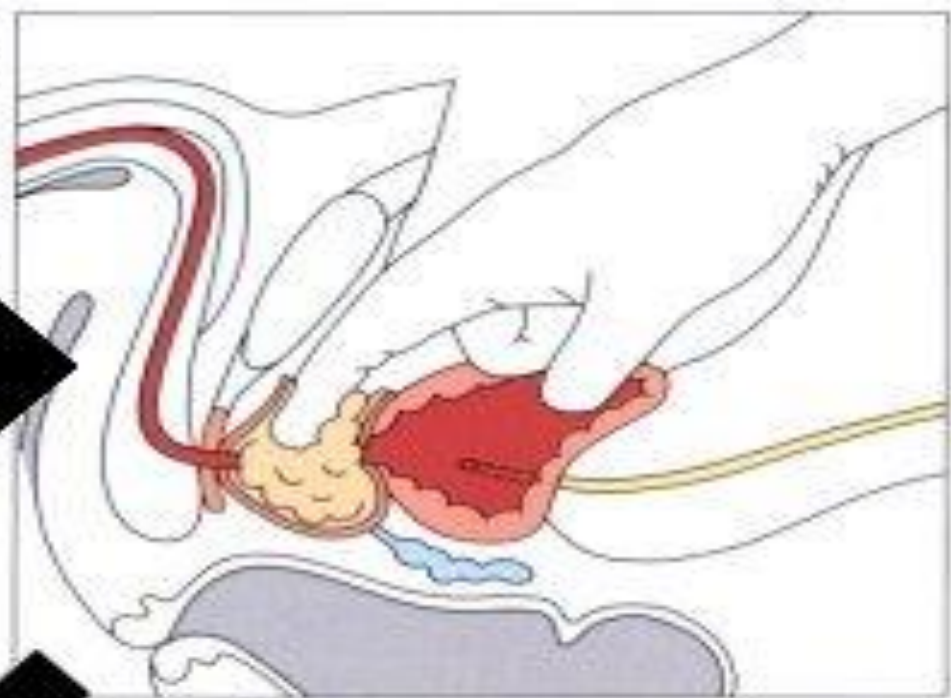
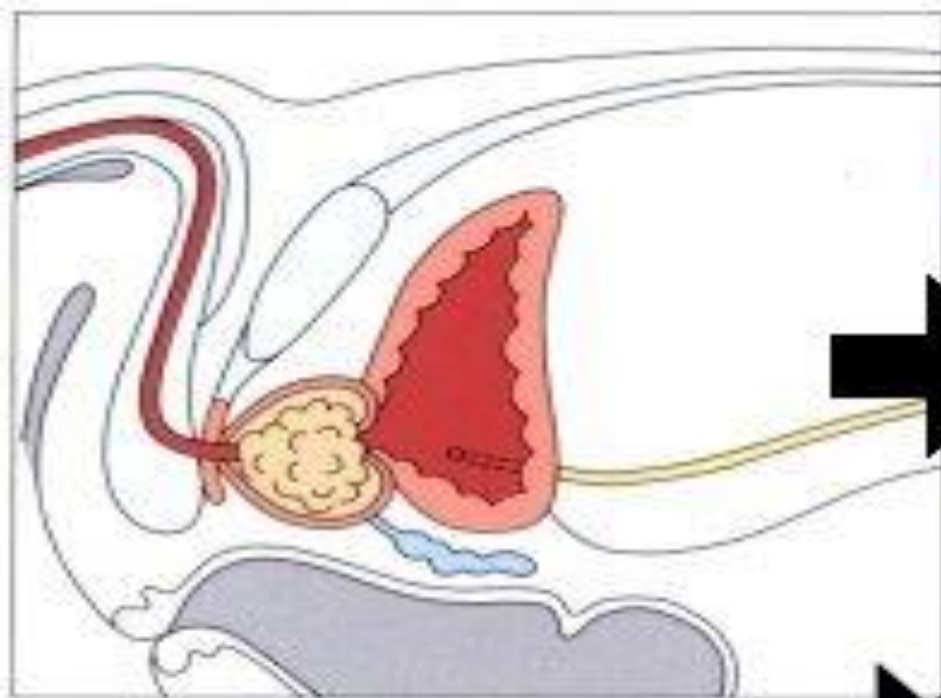


Transuraethral procedure.

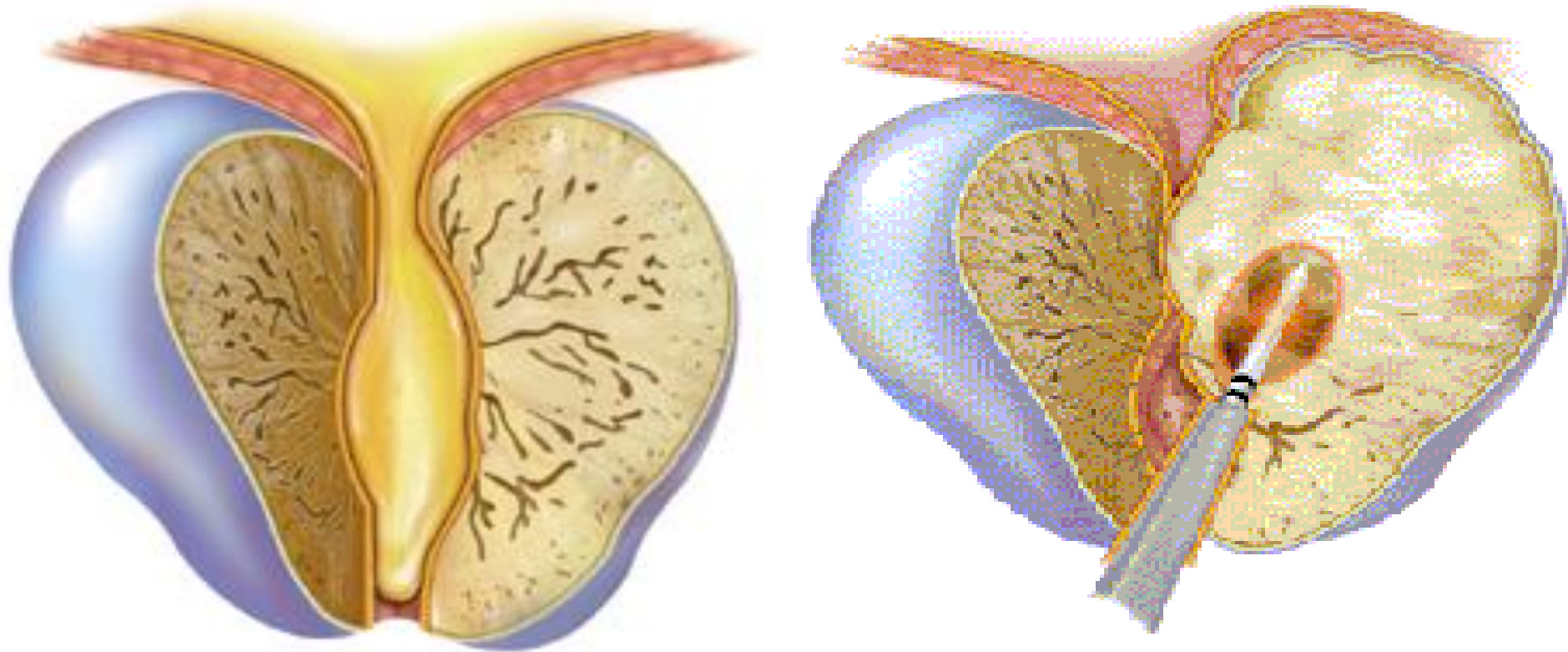
- Small cuts made in bladder neck and Prostate to widen urethra.
- No prostate tissue removed.
- Less risk of side effects when compared to TURP.
- **more rapid and less morbid thanTURP.**
- Not suitable for large glands.

Simple (subtotal) prostatectomy

- **Open prostatectomy may be initiated when:**
 - concomitant bladder diverticulum or a large bladder stone
 - if dorsal lithotomy positioning is not possible.
 - Used for very enlarged prostates(over 100 gm).
- **Major surgery requiring abdominal incision.**
- **Enlarged portion of prostate removed by surgeon.**
- **Greater risk of surgical complications**
- **Longer recovery time.**
- A simple suprapubic prostatectomy**
operation of choice with bladder pathology.
- A simple retropubic prostatectomy**
The bladder is not entered.



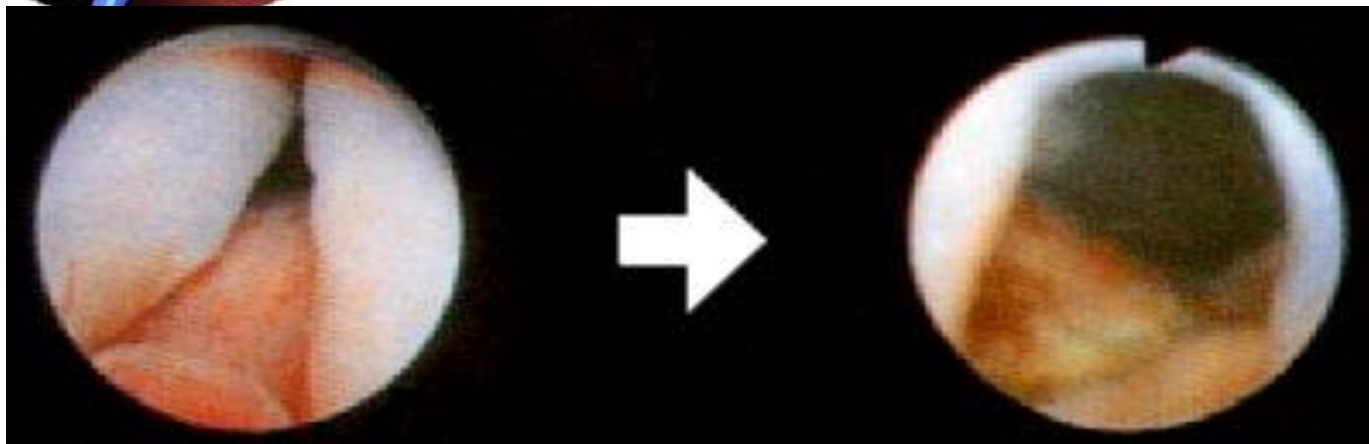
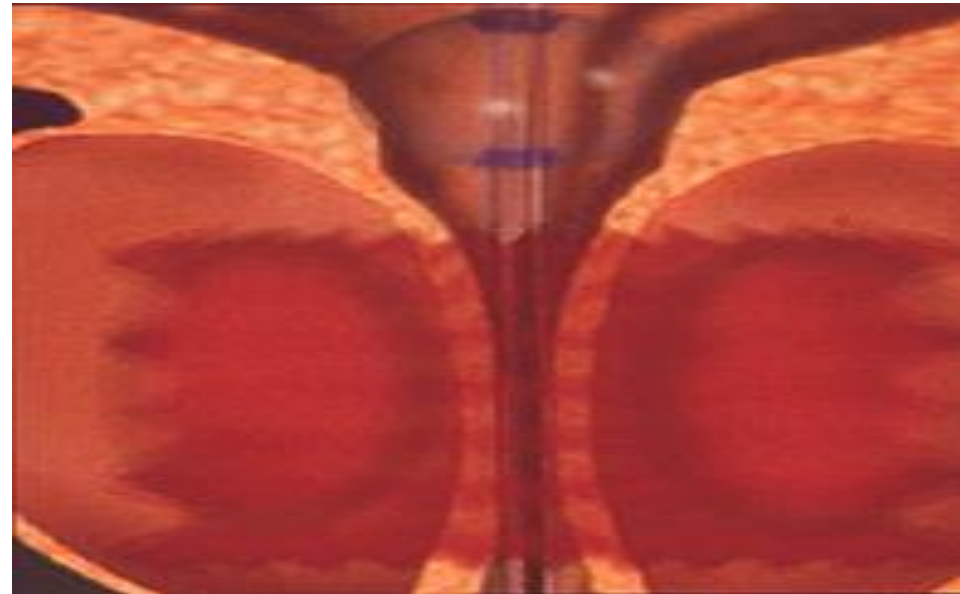
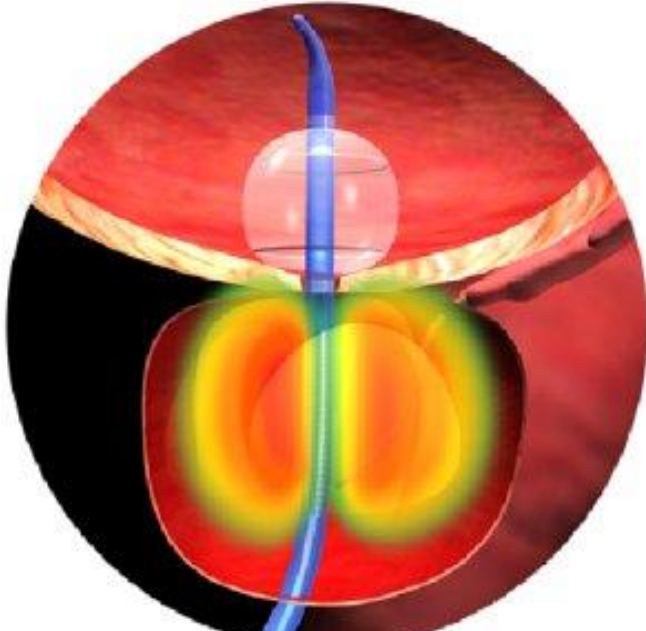
Interstitial laser coagulation (ILC)



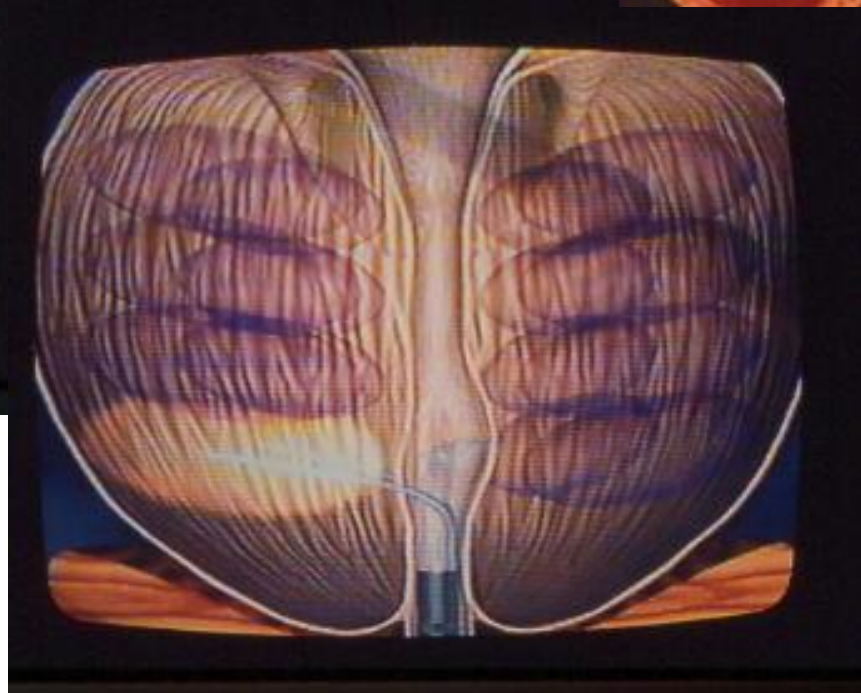
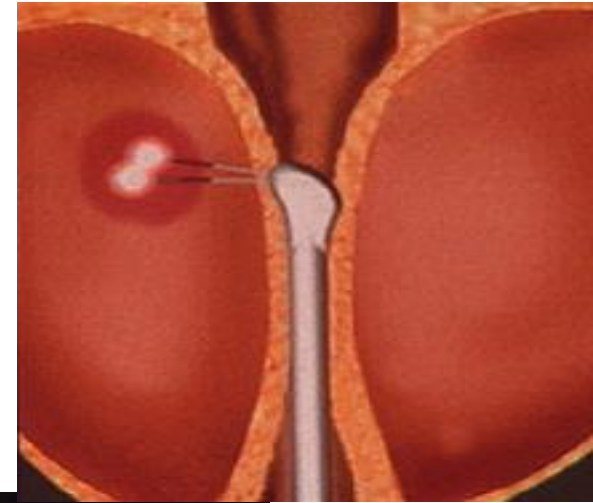
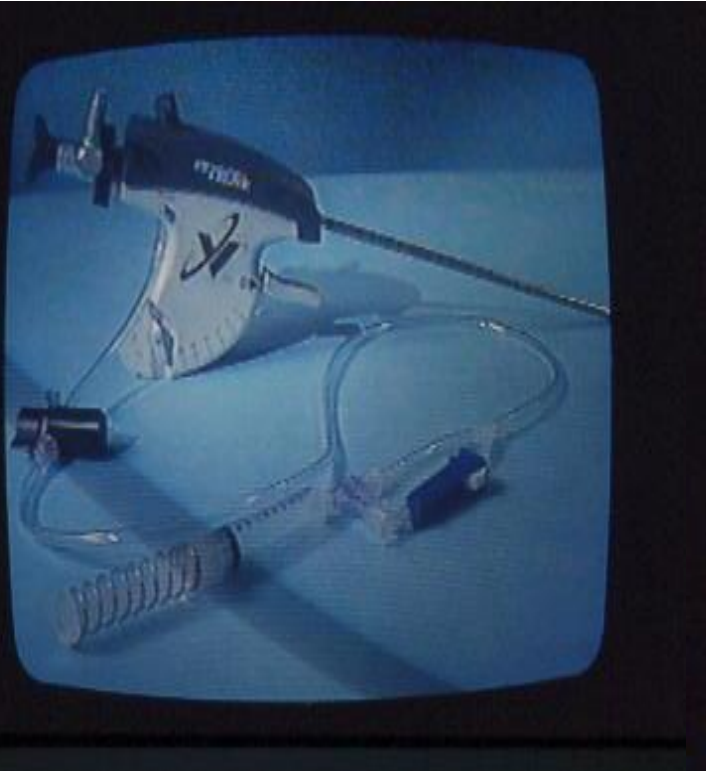
Transurethral microwave thermotherapy

Microwave hyperthermia is most commonly delivered with a transurethral catheter.

Some devices cool the urethral mucosa to decrease the risk of injury. However, if temperatures are not $>45^{\circ}\text{C}$, cooling is unnecessary



Transurethral Needle Ablation (TUNA)



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, but entails a longer learning curve than TURP or TUVP.



Thank you

