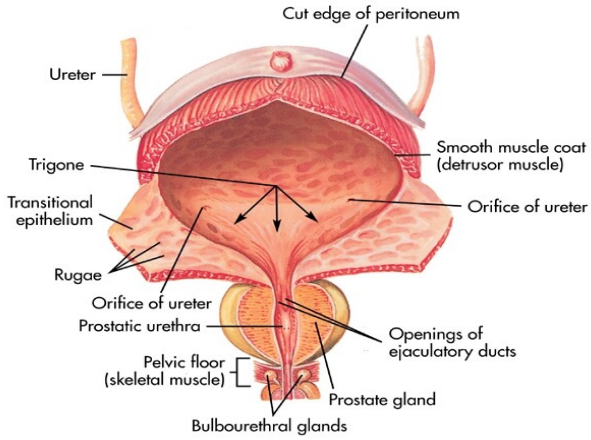
Urinary System:
Conditions of the Prostate



From Thibodeau GA, Patton KT: *Anatomy and physiology*, ed 4, St. Louis, 1999, Mosby.

Prostatitis: inflammation of prostatic acini & surrounding tissue

Types:

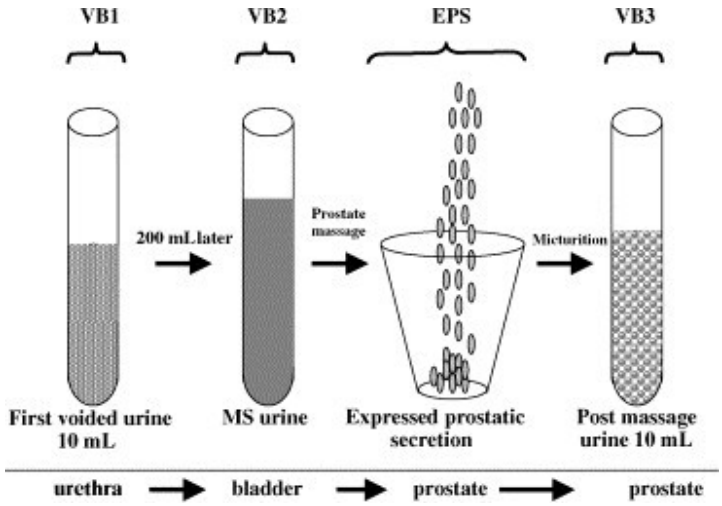
Acute bacterial
Chronic bacterial
Prostatodynia (Chronic Pelvic Pain Syndrome)
Nonbacterial (Asymptomatic Inflammatory Prostatitis) – most common type

Acute Bacterial Prostatitis

- Caused by bacteria via urethra, from bladder, or via bloodstream
- Common pathogens
  - E. Coli, proteus, klebsiella, pseudomonas, enterobacter, GC, chlamydia, streptococcus

- <u>Signs & Symptoms</u>
  - Fever, chills, muscle tenderness, back and perineal pain, arthralgia
  - Urgency, frequency, nocturia, dysuria, burning sensation after voiding, hematuria
  - Urinary obstruction
  - Pain before and after ejaculation
  - Abscess
  - Asymptomatic

- <u>Diagnosis</u>
  - History
  - Physical
- Prostate tenderness & irregularity
- If febrile, needs lab workup
  - UA: + WBC's & bacteria
  - Urine culture
  - Segmental Urine Culture: pre-massage & post-massage test



- NO MASSAGE IF ACUTE SUSPECTED
- CBC
- WBC
- PSA
- TRUS & MRI – not indicative

- Treatment
- Antibiotics – trimethoprim-sulfamethoxazole (Bactrim DS), Ciprofloxacin
- Stool softeners
- Sitz baths
- Increase fluids – fever & infection
- Analgesics
- Antispasmodics – bladder

- Complications
- Abscess, septicemia, obstruction, pyelonephritis, epididymitis

Chronic Bacterial Prostatitis

- Causes
- Ascending urethral infection
- Inadequately treated acute bacterial prostatitis
- Subacute asymptomatic infection
- Recurrent infection – differentiates from acute; most common reason for recurrent UTI's in men
- Signs & Symptoms
- May be asymptomatic
- Milder symptoms than acute infection
- Urinary symptoms – urgency, frequency, dysuria, nocturia, perineal pain, post-ejaculatory pain, hematospermia, mucus discharge; frequent recurring UTI's
- Diagnosis
- History – previous palpation negative
- Physical
  - "boggy" prostate ; WNL =
- Histologic- inflammatory changes, less localized

- Prostatic secretion culture
- Treatment
- Long term antibiotics – resistant; oral for 8-12 weeks or for life with immunocompromised
- Increase fluids
- Sexual activity – drains prostate
- Analgesics, sitz baths

Chronic Pelvic Pain Syndrome (Prostatodynia)

- Prostate & urinary pain
- Unclear etiology
- May occur after viral illness or STI's in younger adult or with a sudden decrease in sexual activity.
- Signs & Symptoms
- Asymptomatic, milder symptoms than acute
- Urinary symptoms
- Diagnosis
- Negative culture; leukocytes in prostatic secretions
- Treatment
- Symptomatic relief
- May be treated as a STI

Asymptomatic Inflammatory Prostatitis

- Inflammatory process of the prostate with no symptoms
- Diagnosed during evaluation of other urinary problems
- Leukocytes present in seminal fluid
- Unknown cause

Benign Prostatic Hypertrophy (BPH) (hypertrophy or hyperplasia)

- 50% of men above age 50
- Hyperplasia can be palpated on rectal exam
- Little evidence that BPH is precancerous
  - Etiology: unknown; ↑ estrogen and ↓ testosterone, ultimately increasing DHT (dihydroxytestisterone) – promotes cell growth

- Abnormal increase in the number of cells (hyperplasia)
- Overgrowth of smooth muscle and connective tissue; also glandular tissue (grows inward)
- S&Sx appear when the enlarged gland obstructs the urethra – partial or complete

- Prostatism- any condition that interferes with flow of urine

Risk Factors for BPH

- Aging, obesity, lack of exercise, alcohol, erectile dysfunction, smoking, diabetes, family history– first degree relative

American Urological Association Symptom Index

Over the past month or so:	*Not at all*	*Less than 1 in 5 times*	*Less than one-half of the time*	*About one-half of the time*	*More than one-half of the time*	*Almost always*
How often have you had the sensation of not completely emptying your bladder after you finished urinating?	0	1	2	3	4	5
How often have you had to urinate again less than 2 hours after you finished urinating?	0	1	2	3	4	5
How often have you found that you stopped and started again when urinating?	0	1	2	3	4	5
How often have you found it difficult to postpone urination?	0	1	2	3	4	5
How often have you had a weak urinary stream?	0	1	2	3	4	5
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 times*
How many times do you typically get up to urinate from the time you go to bed at night until the time you get up in the morning?	0	1	2	3	4	5

Total score: _____

Clinical Manifestations – develops slowly

- Urinary stream lacks force
- Nocturia
- Hesitancy, dribbling at end of stream- progresses to a weak stream
- Strain to urinate, urinates frequently, feeling of inability to empty bladder
- Hematuria
- Increase risk for complete obstruction and retention = renal damage
- Obstruction = immediate treatment
- Acute urinary retention may = 1st s/sx
- S/sx increase due to straining

Palpating the Prostate: rectally

- Prostate is 2-5 cm beyond anal sphincter
- 4cm long and 5 cm wide
- Shaped like a doughnut around the neck of the urethra- surrounded by capsule
- Posterior and lateral lobes only are felt- **normally feels smooth, rubbery, and firm**

Diagnosis

- Rectal exam
- Urinary flow studies (uroflowmetry): speed and force; characteristics of flow
- Lab tests
  - BUN, creatinine, urinalysis – infection, alkaline, specific gravity- high or low
- IVP, MRI
- Cystoscopy – appears as a bulge, may see small bladder hemorrhages
- Transrectal ultrasound - size

Treatment

- Conservative treatment

- Medications
  - **Alpha adrenergic receptor blockers** (terazosin (Hytrin), tamsulosin (Flomax), doxazosin (Cardura)
    Action: decrease smooth muscle tone; relaxes the muscles in prostate that are tightened; increase urine flow; decrease urinary s/sx; takes 2-4 weeks to see results

    Side Effects: hypotension, dizziness, fainting

  - **5 alpha-reductase inhibitors** (finasteride (Proscar) dutasteride (Avodart))
    Action: inhibits 5 alpha which converts testosterone into DHT (growth); decreases prostate size

    Side Effects: decrease libido, ED

    - Combination pill – Jalyn (Proscar & Flomax)

  - Antibiotics if prostatitis

- Prostatic massage / sexual intercourse / sitz bath- helps with mild s/sx & edema; decrease frequency and increases flow

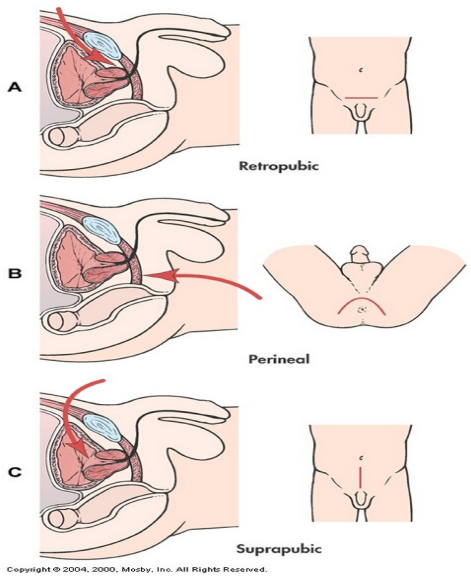
- TUDP (transurethral dilatation of prostate) – balloon enlargement of urethra, not a permanent solution

- Patient education:
  - Void when urge is felt
  - Avoid large quantities of fluid over short amount of time
  - Avoid caffeine and ETOH
  - Avoid OTC cold/cough medications- worsens BPH

- Herbal therapy - palmetto

- Surgical treatments – most common way to relieve obstruction

- TURP
- Suprapubic prostatectomy
- Retropubic prostatectomy
- Perineal prostatectomy



Transurethral Resection of the Prostate (TURP)

- https://www.youtube.com/watch?v=WNCsunVC4Rs

- Closed sx
- Partial Removal
- Fast, less discomfort, fewer complications
- General or spinal
- Tissue cut away with loop, bleeding cauterized, flushed out with saline or suction
- Three-way catheter: hemostasis and drainage

Bladder Drainage & Irrigation

- 3 way Foley catheter
- 24 F (large catheter)- allows for clots to pass, urinary patency
- 30 ml balloon – rests on prostatic bed, applying pressure, decreases bleeding
- Traction tape / leg strap

- May feel the need to void – pressure; sensation will pass

TURP Post-op Care

- Continuous bladder irrigation (CBI)

  - Hematuria – expected for several post-op days
    - 1st 24 hours- red to pinkish, clamp controls flow
    - Amber to slight pink in 3-4 days, may last 6 weeks
  - Purpose: Keeps bladder free of clots
  - No electrolyte solutions used
  - Need order to d/c
  - Rate regulated with clamp

- TURP Syndrome or water intoxication: (hyponatremia)
  - s/sx: N/V, confusion, bradycardia, hypertension
  - hypotonic saline causes fluid to shift into RBC's – decrease Hct
  - if untreated, BP drops, pulmonary edema, renal failure, seizures, and death

- Nsg Interventions:
  - UO: retention and hemorrhage
  - Prevent obstruction
  - Irrigate to remove clots
  - <u>True urine value</u>
  - Remove per MD order
  - Record time & amount of voiding post catheter
  - Education: voiding- urgency, frequency, dysuria, hematuria, dribbling, cloudy

- <u>I & O</u>
  - Subtract amount of CBI input from the total urinary output = <u>true urine value</u>

- <u>Pain relief</u>
  - Bladder spasms: 24-48 hours after (make sure not voiding around catheter)
  - Flush PRN
  - Antispasmodics – constipation

- <u>Risk for thrombosis</u>
  - Venous pooling
  - Interventions:

- <u>Risk for infection</u>

- <u>Sexual function</u>
  - Resume activity in 4-8 wks
  - retrograde ejaculation

- <u>Discharge instructions</u>
  - Tissue sloughing – hemorrhage
  - Perineal exercises – Kegel
  - Avoid heavy lifting for 4-6 wks
  - No straining
  - Avoid long periods of sitting
  - Hydration
  - Follow-up care: recurrent hyperplasia or cancer

Suprapubic Prostatectomy

- Transvesical approach – open procedure; bladder corrections
- For large masses obstruct the urethra
- Post-op suprapubic or Foley catheters – large balloon
- CBI x 24 hrs

- Increased risk of hemorrhage, shock, bladder spasms, incontinence, & erectile dysfunction (ED)
  - Pain: abd incision
  - Infection: UTI, wound
  - Hemorrhage: >blood loss, CBI
  - Thrombosis: > OR time, abd incision
  - Activity: longer recuperation; resume 'activities' 4-8 weeks, retrograde ejaculation, ED

Retropubic Prostatectomy

- Extravesical approach – open; no bladder
- Used to remove large masses high in pelvic area
- Post-op Foley catheter: less dribbling & incontinence; CBI
- Decreased risk of bladder spasms, incontinence, & erectile dysfunction (ED)
  - Infection: incision, pubic bone
  - Hemorrhage: not urine
  - Thrombosis:

Perineal Prostatectomy

- ^ shaped incision between anus & scrotum– open
- Used to remove large masses low in pelvic area
- Pre-op: bowel prep
- Post-op: injury to sphincter
- Increased risk of infection, incontinence, & erectile dysfunction (ED)
- Vasectomy
- Incontinence & Impotence
- Pain: sitz, foley

Complications of Prostatic Surgery

Goal- prevent complications, restore urinary control, and maintain sexual function

- Hemorrhage: catheter, clot, increase in abdominal pressure – bed rest
  - Arterial- increase in clots, bright red bleeding, requires surgery
  - Venous- darker
  - Hyperplastic prostate- ↑ risk for bleeding

- Infection
- Thrombosis

Prostate Cancer

Prostate cancer

1: 9

Most common cancer among men, excluding skin cancer

Second leading cause of cancer death in men

Etiology and Pathophysiology

Androgen-dependent adenocarcinoma

Majority of tumors occur in outer aspect of prostate gland
Usually slow-growing
Most common site for metastasis is -

Spreads by three routes

DIRECT

Involves seminal vesicles, urethral mucosa, bladder wall, and external sphincter

LYMPH

To the regional lymph nodes

HEMATOGENOUS

To pelvic bones, head of femur, lower lumbar spine, liver, and lungs

Known risk factors

- Age, ethnicity, and family history - non-modifiable
- Having first-degree relative ^ risk
- Higher rate in African Americans
- Dietary factors and obesity – red & processed meat, high-fat dairy products, low vegetables & fruits
- ? smoking is a risk factor
- ? having BPH puts men at greater risk
- Environment – chemical exposure
- No single gene is the cause (HPC1, BRCA1, BRCA2); no genetic tests- predisposed to developing; family history ≠ certainty of developing; genetic counselor

Clinical Manifestations and Complications

Asymptomatic

Similar to: BPH symptoms

(LUTS) Dysuria, Hesitancy, Dribbling, Frequency
Urgency
Hematuria
Nocturia
Retention
Interruption of urinary stream
Inability to urinate
Recurrent infections
Blood in urine & semen (late)
Loss of libido

Metastasis of Prostate Cancer to Pelvis and Lumbar Spine – management of pain

Diagnostic Studies

Recommendations - vary

Potential risks - evaluation & tx - unnecessary
Benefits - early detection
Many men live and die with prostate cancer but not from it

Two primary screening tools:

1. **PSA** (prostate-specific antigen) blood test: normal level, 0 to 4 ng/mL [0 to 4 mcg/L]
   Elevated levels indicate prostatic pathology not necessarily ca
   other: bike rides, BPH, recent ejaculation, acute/chronic prostatitis, catheters, biopsy
   Decrease: finasteride/Proscar, dutasteride/Avodart
   Marker of tumor volume when cancer exists; monitors treatment

2. **DRE** (digital rectal examination)
   Abnormal – nodular, hardness, asymmetric
   Annual exam >50 yrs of age
   Usually more advanced when detected by DRE

Elevated levels of PAP (prostatic acid phosphatase) –extra-capusular spread
Alkaline Phosphatase -

Neither a PSA nor DRE is definitive

Biopsy - confirm diagnosis.
Done using TRUS

Bone scan, CT, MRI with endorectal probe, and TRUS – location and spread

Collaborative Care

Chemoprevention of prostate cancer
Finasteride (Proscar) and other drugs used to treat BPH

Early recognition and treatment
Control tumor growth
Prevent metastasis
Preserve quality of life

Tumor, node, and metastasis (TNM) system
Staging = extent 1-5

Grading of tumor is done using Gleason scale.
Tumors are graded from 1 (well- differentiated) to 5 (undifferentiated).

Active Surveillance

Watchful waiting

Life expectancy is < 10 years
Presence of low grade, low stage tumor
Serious coexisting medical conditions
PSA measurements & DRE – significant changes

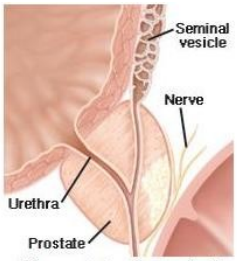
Surgical Therapy

Radical prostatectomy

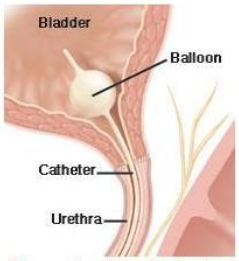
Entire gland, seminal vesicles, and part of bladder neck
Considered most effective for long-term survival
Catheterized
1-3 day stay

Major complications are ED (sildenafil/Viagra) & incontinence

Other complications include: hemorrhage, urinary retention, infection, dehiscence, DVT, pulmonary emboli



The prostate, the seminal vesicles, and a portion of the urethra are removed.



The urethra is reattached to the bladder. A catheter is inserted to drain urine while you heal. A balloon holds the catheter in place.

Nerve-sparing surgical procedure

Spares nerves - erection

No guarantee

Cryosurgery (cryoablation)

-Destroys cancer cells by freezing tissue
-Initial and second-line treatment – after Rad failed
-TRUS, liquid nitrogen; takes 2 hours, under general or spinal
-Complications: damage to urethra, urethrorectal (urethra/rectum) fistula, and urethrocutaneous fistula, Tissue sloughing, ED, urinary incontinence, prostatitis, and hemorrhage

Radiation Therapy

External beam radiation

-Most widely used method
-Common side effects: skin changes (dryness redness irritation pain), GI (diarrhea cramping bleeding) UT (dysuria frequency hesitancy urgency nocturia), ED, fatigue

-Side effects - acute or delayed; may lessen 2-3 wks after completion

Brachytherapy

-Seed into prostate gland
-Spares surrounding tissue
- Best for early stages
-Irritative or obstructive urinary problems- side effects
- ED
-Combination with external beam radiation treatment

Drug Therapy

Androgen deprivation

Reducing levels of androgens to reduce tumor growth
Tumors become resistant – few years; first sign: ↑ PSA

Androgen deprivation therapy – 2 classes:
-*Androgen synthesis inhibitors*
-*Androgen receptor blockers*

Risks: cardiovascular side effects (elevated cholesterol,^ triglycerides, CAD); OP & fractures (recommend zoledronic acid/Reclast & raloxifene/Evista)

Androgen synthesis inhibitors

-Luteinizing hormone–releasing hormone – **(LH-RH) agonists** & **LH-RH antagonist**

1. Luteinizing hormone–releasing hormone **agonists**

   Agonists super-stimulate the pituitary which makes the pituitary unresponsive to LH-RH (LH-RH stimulates pituitary to make LH) LH ➔testosterone; initial FLARE➔worsening symptoms; chemical castration

   With continued administration, **LH and testosterone levels decrease**.

   Side effects: hot flashes, gynecomastia, loss of libido, ED

   Current therapy: leuprolide/Lupron/Eligard, goserelin/Zoladex, triptorelin/ Trelstar

   Route: SubQ or IM (q 3, q4, q6 months - dosage dependent how often)

2. Luteinizing hormone–releasing hormone **antagonist** (Degarelix/Fermagon) (Abiraterone / Zytiga - oral)

   Blocks LH receptors

   Immediate testosterone suppression – 3 days

   No flare

   Side effects: pain, redness, swelling at the site, and ^ liver enzymes

Androgen receptor blockers

Compete with circulating androgens for receptor sites

Can be combined with LH-RH agonists= combined androgen blockade

Side effects: loss of libido, ED, hot flashes, breast pain, and gynecomastia

Daily PO

Flutamide (Eulexin), nilutamide (Nilandron), enzalutamide (Xtandi), and bicalutamide (Casodex)

Chemotherapy/Antineoplastic

Primarily limited to treatment for those with hormone-resistant prostate cancer (HRPC)

Palliative

docetaxel (Taxotere) – given with prednisone, paclitaxel (Abraxane), mitoxantrone (Novantrone), vinblastine (Velban), cyclophosphamide (Cytoxan), and estramustine (Emcyt)

sipuleucel-T [Provenge] – vaccine

Orchiectomy

Bilateral orchiectomy – with or without prostatectomy

- Cancer control for advanced
- Rapid relief of bone pain

Culturally Competent Care

Be aware of ethnic differences (incidence, health promotion practices)
Note socioeconomic conditions & influence to care
Coping strategies, communication strategies
African American men – incidence, socioeconomic conditions vs. Caucasian men
Prostate cancer being advanced at time of diagnosis = not utilizing early screening guidelines
Lack of financial support, transportation, health care costs, utilizing religious coping strategies

Nursing Diagnoses

Decisional conflict
Acute pain
Urinary retention
Impaired urinary elimination
Sexual dysfunction

Anxiety

Nursing Implementation

Health Promotion: annual DRE and PSA starting at age 50 (or earlier if higher risk)
African American men and men with family h/o prostate cancer- annual PSA and DRE at age 45

Acute Intervention

Sensitive, caring support
Encourage support groups

Ambulatory and Home Care

Teach catheter care; report s/sx of infection

Teach pelvic floor exercises; incontinence care products

Administer pain medication; opioid, non-opioid, non-pharmacological pain management

NI's for: fatigue, obstruction, pain, fractures, spinal cord compression, etc..

https://youtu.be/_ZIz4Fxqio8