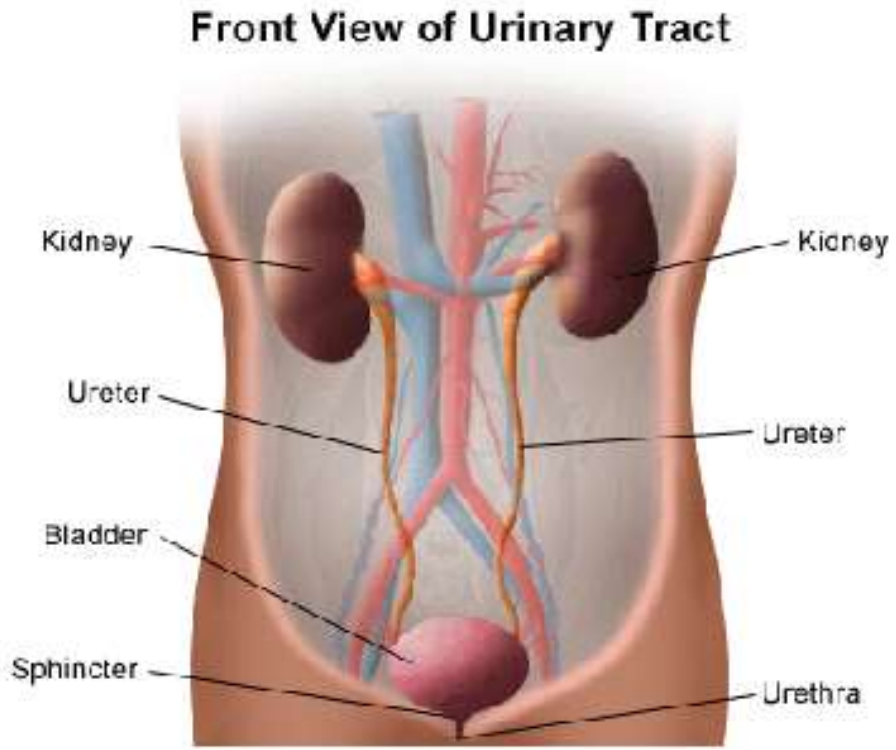
Urology

Pete A. Gutierrez MD, MMS, PA-C
Miami Dade College
June 2009
With added slides, Christopher Hobbs Ph.D.

Urology Outline

- Urinary tract infections
  - Cystitis
  - Pyelonephritis
  - Prostatitis
- Benign prostatic hyperplasia
- Incontinence
- Neoplasms
  - Prostate cancer
  - Bladder polyps, bladder cancer
- Erectile disfunction



General Symptoms

- Urgency, dysuria, nocturia
- Severe, stabbing, intermittent, or cramping pain, over the lower abdomen or lower back or flanks
- Burning upon urination
- Blood in the urine
- Slow or scanty flow
- Fever, chills

Overactive Bladder Syndrome (OAB)
(Irritable Bladder)

- OAB is a general term for any persistent condition where the muscles in the bladder contract involuntarily, resulting in a sudden, urgent, uncontrollable need to urinate (urgency), pain and discomfort
- Etiological factors: urinary tract infections (UTIs), nervous tension, food sensitivities, bladder stones, pregnancy, damage to the nerves that control bladder function, obstruction of the outflow of urine, due to a tumor, urethral stricture, or an enlarged prostate.
- In many cases the cause is unknown.

Urinary Track Infections—Cystitis

- Urinary Track Infections:
  - Cystitis
    - Is an infection of the bladder and most commonly cause by coliform bacteria (especially Escherichia coli) and occasionally Gram-positive bacteria (enterococci).
    - Route of infection: Ascending from the urethra.
    - Clinical features:

      Dysuria and suprapubic discomfort, and in women it may demonstrate with gross hematuria. In women these symptoms usually appear following intercourse.

Urology

- Cystitis continue:
  - Laboratory studies:
    - Urinalysis may show pyuria, bacteriuria, and varying degrees of hematuria.
    - Urine culture is positive for offending organism.
    - Imaging is only warranted if pyelonephritis, recurrent infections, or anatomic abnormalities are suspected.
    - Treatment:
      - Uncomplicated can be treated with short term antimicrobial therapy:
        - Suggested regimen is fluoroquinolone for 3 days.
        - Resistant E-Coli can be treated with Bactrin DS.
        - Uncomplicated cystitis in male is uncommon
        - Fluids should be encouraged
        - Hot sitz baths or urinary analgesics like Pyridium can be use.

UTI--Pyelonephritis

- Pyelonephritis:
  - Is an infection involving the kidney parenchyma and renal pelvis.
  - Gram-negative bacteria are the most common to include E-Coli, Proteus sp; Klesiella sp; Enterobacter and Pseudomonas.
  - The infection usually ascends from the lower urinary tract.
  - Chronic is usually cause by progressive inflammation of the renal intestitium either cause by bacteria infection or vesicoureteral reflux.

Pyelonephritis—symptoms

- Clinical symptoms:
  - Fever
  - Flank pain
  - Shaking chills
  - Irritable voiding symptoms
  - **Not uncommon**
  - Nausea
  - Vomiting
  - Diarrhea

Pyelonephritis—laboratory

- Laboratory:
  - CBC will show leukocytosis and left shift
  - Urinalysis shows pyuria, bacteriuria, and varying degrees of hematuria
  - WBC casts may be also seen
  - Urine culture if obtained prior to antibiotics demonstrates heavy growth of the offending agent.

Pyelonephritis—treatment

- Treatment:
  - In the outpatient setting, quinolones or Bactrin DS for one to two weeks in immunocompetent patients is OK in patients immunocompromised should be treated for longer time.
  - Hospital admission usually reserve for severe infections or older age, co morbid conditions, or signs of obstruction.
  - IV quinolones or ampicillin and gentamicin should be initiated while waiting for labs and sensitive results. The IV antibiotics should be continued for 24-48 hours after the patient become afebrile then change to oral antibiotics for two weeks of therapy.

Pyelonephritis—treatment, cont.

- Pyelonephritis Treatment continued:
  - Failure to respond to treatment warrants ultrasound to exclude complicating factors.
  - Follow-up urine culture are mandatory 1-2 weeks following treatment.

Prostatitis

- Prostatitis:
  - Is cause by ascending infection of Gram-negative rods into the prostatic ducts.
  - Chronic may be associated with evolution or recurrence of an acute bacterial infection
  - Chronic nonbacterial prostatitis is the most common of the prostatitis syndromes and its cause is unknown.
  - Usually a diagnosis of exclusion, and often associated with the term chronic pelvic pain syndrome.

Prostatitis—clinical features

- Clinical features:
  - Acute infection is characterized by sudden onset of high fever, chills and low back and perineal pain.
  - Chronic infection has more variable symptoms.
  - All forms present with irritable bladder symptoms, (frequency, urgency, and dysuria).
  - The prostate is swollen and tender on examination.
  - Labs:
    - Urinalysis reveals pyuria
    - Prostatic fluid culture typically is positive for E-Coli in acute infections.
    - Chronic infection either E-Coli or enterococcus. In none bacteria cultures are negative.

Prostatitis—clinical features

- The four-glass localization test is the classic means of distinguishing a prostate infection from another urinary tract infection.
  - Urine sample are taken at initial void, midstream, and after prostatic massage; prostatic secretions account for the fourth sample. Assessment of the samples helps to localize the nidus of infection.

Prostatitia—treatment

- Treatment:
  - For men younger that 35 years
    - Ofloxacin for 10 days or ceftiaxone, 250 mg IM, followed by 10 days of doxycycline is recommended.
    - In men older that 35 years a quinolone or Bactrin DS for 10-14 days may be use.
    - Some expects agreed on 3 weeks treatment as the best.
    - In chronic prostatitis 4 weeks treatment with ciprofloxacin or ofloxacin for 6 weeks or bactrin DS for 1-3 months.
    - Nonsteroidal anti-inflammatory drugs are effective analgesics.
    - Chronic may need transurethral resection of the prostate for ultimate resolution.
    - Antibiotics are not effective in nonbacterial prostatitis.

Benign Prostatic Hyperplasia

- Benign Prostatic Hyperplasia:
  - Proliferation of the fibrostromal tissue of the prostate can lead to compression of the prostatic urethra creating an obstruction of the urinary outlet.
  - This is a disease of older men with the mean onset of age of 60-65 years.
  - Clinical features:
    - The symptom (Prostatism) which includes symptoms of obstruction and irritation.
    - Obstructive symptoms which include decreased force of urinary stream, hesitancy and straining, postvoid dribbling, and sensation of incomplete emptying.

Benign Prostatic Hyperplasia

- Irritate symptoms include frequency, nocturia and urgency
- Recurrent urinary tract infections and urinary retention also can occur
- Digital rectal examination typically reveals and enlarged prostate

- Laboratory findings:
  - PSA is slightly elevated
  - Other test done are to rule out renal damage or bladder or prostate cancer.

Benign Prostatic Hyperplasia

- Treatment:
  - Men with mild to moderate symptoms may choose watchful waiting and frequent monitoring
  - Medicine options are Alpha adrenergic blockers and 5/alpha reductase inhibitors
  - Procedures may include:
    - Ballroom dilatation
    - Microwave irradiation
    - Stent placements
    - Surgical treatment is transurethral resection of prostate or transurethral incision of the prostate.

Incontinence

- Incontinence:
  - Means the unintentional leakage of urine at inappropriate times.
  - Women are affected twice as often as men, especially in older women.
  - Incontinence can be classified based on the underlying pathophysiologic mechanism.
    - Urge incontinence results from bladder contractions that cannot be controlled by the brain.
    - Stress occurs when urinary retention leads to bladder distention and overflow of urine through the urethra follows.

Incontinence

- Functional incontinence is untimely urination caused by physical or cognitive disability preventing a person from reaching a toilet
- Mixed incontinence is a combination of elements of both stress and urge incontinence.
  - Clinical features;
  - Reversible causes such as medications side effects, excess fluid intake, atrophic vaginitis, fecal impaction, urinary tract infections, impaired mobility and glycosuria

Incontinence

- Urge incontinence is a strong desire to void, followed by loss of urine.
- Overactive bladder disorder is a related symptom complex characterized by frequency urgency to urinate and nocturia.
- Stress is leakage of urine with increased intra-abdominal pressure
- Common with neurological disease (Stroke, Parkinson’s disease or dementia), metabolic disorders (hypoxemia, diabetic neuropathy, and pelvic disorders like uterine prolapsed).

Incontinence—Laboratory Findings

- Laboratory findings:
  - Urinalysis can identify diabetes glycosuria, or urinary tract infections
  - Postvoid residual urine volume should be measured to identify urinary retention
  - Simple cystometry (instillation of water into the bladder) can identify bladder contractions.
  - Stress test, ultrasonography, cystocopy, and urodynamics also may be used.

Incontinence—Treatment

- Treatment:
  - Pelvic floor muscle training (Kegel exercises) or electrical muscle stimulation biofeedback and bladder training can improve the problem.
  - Pessaries or implants can help to decrease stress incontinence
  - Anticholinergic medications such as oxybutynin or tolterodine, are effective for urge incontinence. Alpha adrenergic or estrogen can be used for stress incontinence
  - Tolterodine and oxybutynin can be used for overactive bladder
  - Catheterization can be also use intermittent or indwelling for overflow Finally surgical intervention is very effective for stress incontinence.

Neoplasms of the UT

- Neoplasm's of the urinary tract:
  - Prostate Cancer
    - Prostate cancer is common, generally slow growing, malignant neoplasm of the adenomatous cells of the prostate gland and can lead to urinary tract obstruction and metastatic disease.
    - A disease of the aging, rarely seen in men younger than 40 years.
    - Cause is unknown, risk factors include genetic predisposition, hormonal influences, dietary and environmental factors and infectious agents.

Neoplasms—Clinical Features

- Clinical features:
  - Many cases not clinically apparent
  - Symptoms of urinary obstruction occur.
  - In advance disease bone pain 2nd to metastases
  - The Prostate may be enlarged, nodular and asymmetric.

  - Laboratory studies:
    - PSA is usually elevated
    - Pathologic examination of tissue removed for treatment reveals malignancy
    - Tranrectal ultrasound reveals hypoechoic lesions in prostate
    - Biopsy confirms the diagnosis of adenocarcinoma, and allows histological grading

Neoplasms—Treatment

- Treatment:
  - Appropriate treatment depends on the staging which is done with abdominal CT or MRI
  - The Gleason score is based on the architectural pattern. Low grade tumors that are well differentiated may not required treatment.
  - Stage A and B (Tumor confined to the prostate) may be treated with radical retropubic prostatectomy, brachytherapy or external-beam radiation therapy.
  - Stage C treated the same way as A, and B but with reduced effectiveness.
  - Stage D (distant metastases) is treated with hormonal manipulation using ochiectomy, antiandrogens, luteinizing hormone-releasing hormone agonist,

    or estrogens.

    Chemotherapy has limited usefulness and palliative treatment is given for advanced disease.

Neoplasms—bladder cancer

- Bladder Cancer:
  - Causal factors include exposure to tobacco, occupational carcinogens from rubber, dye, printing, and chemical industries; schistosomiasis, and chronic infections.
    - Clinical features:
      - Hematuria is the most common
      - Bladder irritability and infection are other presenting symptoms
      - Laboratory findings:
        - CBC and blood chemistry should be done to evaluate for infection and renal functions
        - Cystoscopy which has an accuracy rate of nearly 100% is the definitive diagnosis; with biopsy confirming the diagnosis.
        - Radiologic procedures which include IV urogram, pelvic abdominal CT, chest X-Ray, bone scan, and retrograde pyelography for renal pelvic tumors and staging.

Neoplasms—bladder treatment

- Treatment:
  - Depends on the stage
  - Superficial lesions are treated with endoscopic resection and fulguration, followed by cystoscopy every 3 months..
  - Recurrent of multiple lesions can be treated with an intravesical instillation of thiotepa, mitomycin, or bacillus Calmette-Guerin.
  - Radical cystectomy is used for recurrent cancer, diffuse transitional cell carcinoma in situ, or tumors that have invaded the muscle
  - Combination chemotherapy has been used in bladder sparing trials with or without radiation therapy.

Erectile Dysfunction

- Erectile Dysfunction:
  - Is defined as the inability to maintain an erect penis with sufficient rigidity to allow sexual intercourse.
  - Normal erection requires intact parasympathetic and somatic nerve supply, and unobstructive blood flow.
  - Most have a primary organic and a psychogenic cause, and nearly all cases have a secondary psychogenic component.
  - This condition affects millions of American men and its incidence is age related.
  - Erectile dysfunction in men with type 2 diabetes can be an indicator of early silent cardiovascular disease.

Erectile Dysfunction—Clinical Features

- Clinical features:
  - Medical history must be adequately evaluated.
  - A completed sexual history should be taken including amount of partners and timing of intercourse.
  - Past medical history should document Hypertension, diabetes, endocrine disorders, medications, and pelvic surgery or trauma.
  - Physical examinations should look for penile deformities, testicular atrophy, vascular or neurological abnormalities.

Erectile Dysfunction—Laboratory Findings

- Laboratory findings:
  - CBC
  - Urinalysis
  - Lipid Profile
  - Thyroid function
  - Serun testosterone
  - Glucose
  - Prolatin
  - Measuring of follicle-stimulating hormone and luteinizing hormone may be required for patients with abnormalities of testosterone or prolactin.

Erectile Ddysfunction—Labs

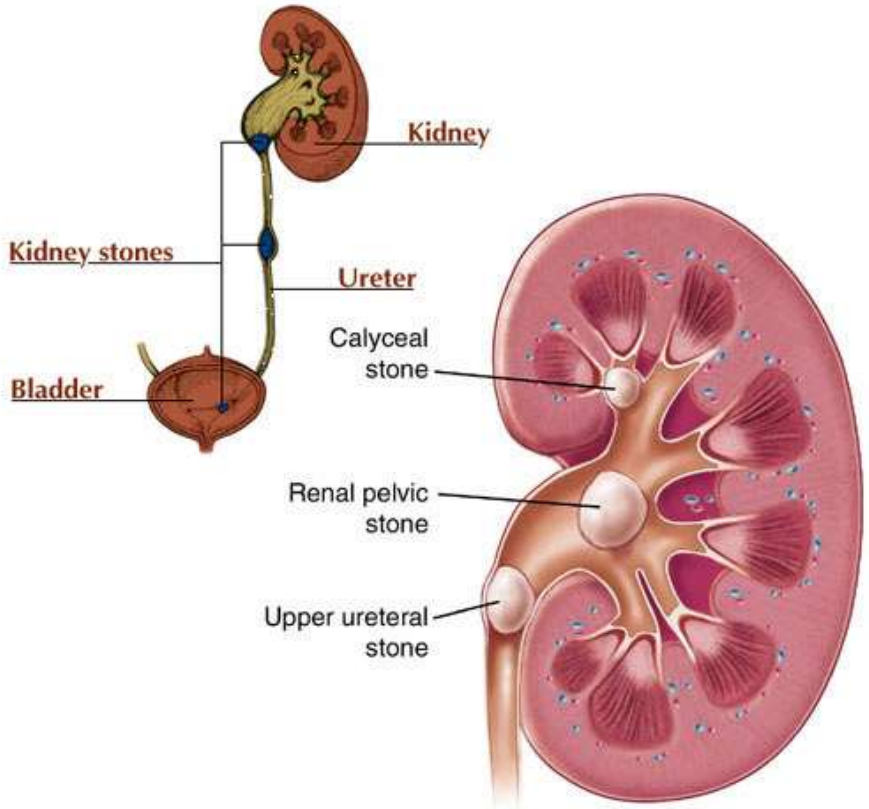
- Nocturnal penile tumescence testing can be done to differentiate between organic and psychogenic impotence.
- Direct injection of vasoactive substances into the penis induces erections in men with intact vascular systems.
- Patients who do not need to undergo vascular studies such as ultrasound of the cavernous arteries, pelvic arteriography, and cavernosonography.

Erectile Dysfunction—Treatment

- Treatment:
  - True psychogenic causes can be treated with behavioral oriented sex therapy.
  - Patient with organic causes may also benefit from this form of therapy.
  - Phosphodiesterase-5 (PDE-5) inhibitor therapy is now the standard treatment.
  - For those that cannot use this medication there are also form of treatment to included vacuum constriction devices, use of injected vasoactive substances, and penile prostheses. Patients with arterial system disorders are candidates for arterial reconstruction.

Urolithiasis—gravel and stones

- Definition—stones or “gravel” in the kidney, bladder, ureters or urethra
- Kidney stones can cause blood in the urine and pain in the abdomen, flank, or groin
- Kidney stones: 10-15% people at some time in their life
- Pain can be severe
- Oxalate, calcium, urate, cysteine, phosphate stones
- 2/3 of stones can be passed spontaneously
- Men, 4x risk of women
- Southern states, middle east “stone belt”



Source: medical miragesearch.com

kidney stone risk--#1, lack of hydration

- If you are a man, your risk for kidney stones is four times greater than if you are a woman. And if you live in the southeastern part of the U.S., also referred to as the "Kidney Stone Belt," your risk is even greater due to higher rates of dehydration.
- In the Middle East, kidney stone rates are nearly double what they are in the U.S., due to the warmer climate.

Stone Types (thanks to Dr. F. Coe)

- Calcium oxalate (ca. 65%)
  - not too big, between 1 and 10 mm and most of those less than 7 mm will pass without need of surgery or lithotripsy
  - The kidneys themselves are not obviously injured except when obstruction lasts too long, or something happens during surgery
  - most of the time these stones are not due to a systemic disease but to the interplay between inheritance, diet, and aspects of daily living
- Calcium phosphate (15%)
  - calcium phosphate stones have more numerous and often larger stones than people with calcium oxalate stones
  - Brushite stones are very hard and do not break well with shock wave treatments
  - Hydroxyapatite crystals can plug the kidney tubules and injure kidney cells
- Uric acid (ca. 10%)
  - uric acid stones can become very large
  - uric acid may be only part of a stone problem, as it is commonly mixed with calcium oxalate. In this case, one needs to track down the cause of the calcium oxalate stones

Urology: The End