PEDIATRIC UROLOGY CONDITIONS AND TREATMENT

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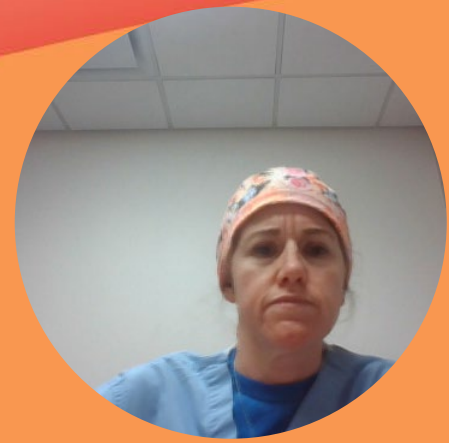


OBJECTIVES

- Discuss UTI pharmacologic and non-pharmacologic treatment and when to refer
- Discuss incontinence, treatment, and when to refer
- Discuss acute scrotal pain, treatment, and when to refer
- Discuss other common urologic conditions that require pharmacologic treatment

URINARY TRACT INFECTION

- The presence of more than 50,000 colonies per milliliter of a single organism from a clean voided urine specimen, or any number of bacteria cultured from a specimen obtained by urethral catheterization or suprapubic aspiration
- CYSTITIS- bladder infection
- PYELONEPHRITIS- kidney infection

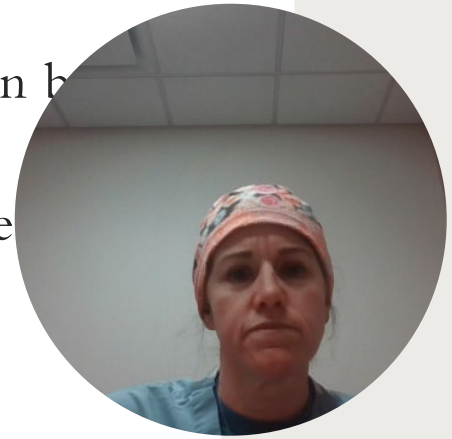
- Symptoms distinguish cystitis from pyelonephritis
  - Cystitis- urinary frequency, urgency, dysuria, foul odor, urine accident
  - Pyelonephritis- fever (>101.0), flank pain, vomiting

UTI RISK FACTORS

- Female- bacteria can gain access to the urinary tract more easily because of the perineal location of the urethral orifice, and the shorter urethra
- Males who are uncircumcised- in boys who are younger than 6 months, and intact foreskin increases the incidence of UTI
- Incomplete bladder emptying
- Difficulty relaxing the pelvic floor- seen in children who hold/wait until the last minute to void
- Constipation
- Congenital GU tract anomalies- most common is vesicoureteral reflux

URINALYSIS EXPLAINED

- pH- high pH can be from UTI and kidney issues
- Bilirubin- Potential liver of bile duct issues
- Blood- UTI, HTN, damage of the urinary tract, bladder irritation
- Glucose-potential diabetes
- Ketones- can see in kids who are dehydrated or haven't drank much that day
- Leukocyte esterase- may be inflammation in the urinary tract. Also seen a lot with kids who have voiding dysfunction
- Nitrites- bacteria creates nitrites. Likely a UTI
- Protein- can be seen in kidney damage. But also overexertion and dehydration can b cause
- Specific gravity- concentration of urine. The lower numbers are what I like to see RARE occasion, low number can mean a concentration defect



BACTERIA ASSOCIATED WITH UTI

- The only way to tell if it is a true infection, MUST do a urine culture. This also tells you what antibiotic(s) will treat the infection

- Escheria Coli- accounts for more than 75% of all infections
- Klebsiella
- Proteus
- Staphylococcus
- Enterococcus
- Enterobacter
- Citrobacter
- Pseudomonas
- Streptococcus

URINE CHECK/RECHECK

- Asymptomatic Bacteriuria

  Many children with voiding dysfunction have asymptomatic bacteriuria

  This does not necessarily mean they have a true infection. Many have bacteria because of not emptying all the way, or not emptying often enough

- We do not recommend rechecking urine without symptoms

  As long as the infection was treated with the correct antibiotic, and for a correct amount of time, it is not necessary to recheck

UTI MANAGEMENT- MEDICATIONS

- Antibiotic treatment of UTIs depend on the culture and sensitivities

- Common antibiotics used to treat UTI

  Bactrim/Septra

  Keflex

  Omnicef

  Suprax

  Amoxicillin

  Cipro

GRAM POSITIVE BACTERIA

- Enterococcus

  Amoxicillin, Levofloxacin

- Staph aureus

  Septra, Nitrofurantion, Cipro, Levofloxacin

- Strep viridans

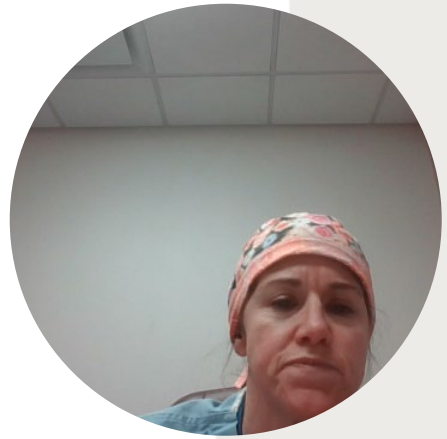
  Omnicef, Amoxicillin

- Group A or B beta strep

  Amoxicillin, Omnicef, Levofloxacin

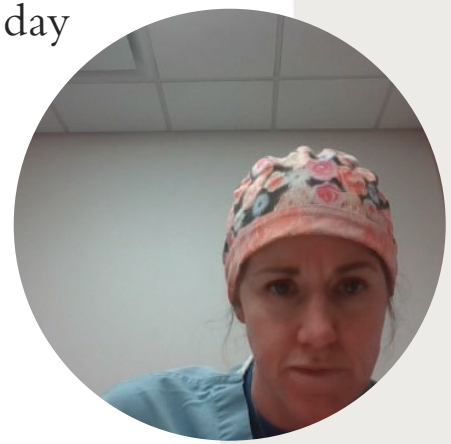
GRAM NEGATIVE BACTERIA

- E Coli
  Amoxicillin, Augmentin, all cephalosporins, Cipro, Levofloxacin, Nitrofurantoin, Septra
- Klebsiella
  Cephalosporins, Cipro, Levofloxacin, Nitrofurantoin, Septra
- Proteus
  Amoxicillin, cephalosporins, Cipro, Levofloxacin, Septra
- Pseudomonas
  Cipro
- Enterobacter
  Omnicef, Cipro, Levofloxacin, Nitrofurantoin, Septra
- Citrobacter
  Cephalosporins, Cipro, Levofloxacin, Nitrofurantoin, Septra



UTI MEDICATION DOSAGES(TREATMENT)

- Amoxicillin
  20-50mg/kg/day, divided every 8 hours to every 12 hours. I usually use about 40mg/kg
- Septra/Bactrim/Sulfa
  8mg/kg/dose (trimethoprim) divided every 12 hours; 1cc/kg/day, divided every 12 hours
- Nitrofurantoin/Macrodantin/Macrobid
  5-7mg/kg/day, divided every 6 hours
  *** DO NOT treat pyelonephritis with nitrofurantoin.
- Keflex (1st generation cephalosporin) = Cefazolin
  25-100mg/kg/day, divided every 6 hours to every 8 hours. I usually use about 40mg/kg/day
  *** MUST be given at least three times per day
- Omnicef (3rd generation cephalosporin)= Ceftriaxone, Cefotaxime
  14mg/kg/day, divided every 12 hours, or can be once daily



UTI MEDICATION DOSAGES(TREATMENT)

- Suprax (3rd generation cephalosporin)

  8mg/kg/day, divided every 12 hours

- Cipro

  20-30mg/kg/day, divided every 12 hours

- Levofloxacin

  10mg/kg/dose given once daily

  It is extremely rare that we would give this medication

NON-PHARMACOLOGIC TREATMENT OF UTI

- Many children with UTIs do not have an anatomic reason for their infections. Even when they do, it is very important to treat their habits
- Voiding schedule

  Every two hours, preferably at the same time every day
- Double voiding if necessary

  Pee, get up and do something active for about 20 seconds, pee again
- Elimination Diet

  Caffeine, carbonation, citrus, tea, chocolate are all known bladder irritants

NON-PHARMACOLOGIC TREATMENT OF UTI

- Relaxation techniques with voiding and stooling

  Sit with legs apart, feet flat on the ground

  If feet are not flat, get a stool for feet (squatty potty)

  Exhale while trying to void- like blowing out candles, or blowing on a pinwheel

- Constipation management

  Many children with UTI have constipation. It significantly contributes, so not treating both bowel and bladder makes it much more likely to have further UTI

- Elimination diet

  Meat, cheese, peanut butter, bananas

- Corn test

  Eat corn and evaluate the transit time. Should be less than 24 hours

CONSTIPATION MEDICATIONS

- Miralax

  Start with ½ to 1 capful and titrate according to bowel movements, corn test

- Lactulose

  10-15 ml given BID to TID

  Adjust according to bowel movements

- Colace

  50-100mg daily to start, and can increase as needed

Next, refer to GI

WHEN TO REFER TO UROLOGY FOR UTI

- Any febrile UTI/episode of pyelonephritis

  Febrile UTI makes us more worried of an anatomical abnormality such as vesicoureteral reflux, posterior urethral valves (males), ureteroceles

- More than two episodes of cystitis

  Usually these kids have bad voiding dysfunction and we can work further on this

  Biofeedback as an option in older children

- "Bad Bug" in urine

  E Coli is most common bacteria

  Refer if has a strange organism, or multi-drug resistant organism

VESICOURETERAL REFLUX (VUR)

- The abnormal retrograde flow of urine from the bladder into the upper urinary tract through an incompetent ureterovesical junction
- Reflux in and of itself not usually harmful to the kidneys
- Reflux in the presence of bacteria is a risk for upper urinary tract infections (pyelonephritis)
- If untreated, pyelonephritis can lead to renal scarring

DIAGNOSING VUR

- VCUG

  Voiding Cystourethrogram

  Dye injected into bladder and images taken as bladder is filling and emptying

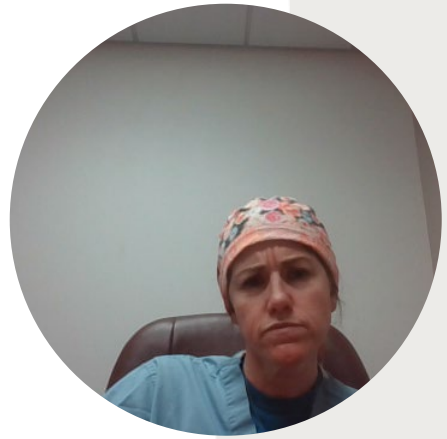
  It is important to have images while filling AND voiding- some only reflux with voiding

- PIC cystogram

  Positional Instillation of Contrast

  Done in the operating room

  Sometimes done with children who have negative VCUG but continue to get UTI



GRADING OF VUR

- Grade I

  Contrast into the ureter only

- Grade II

  Contrast in the ureter and renal pelvis without dilation or blunting of calyces

- Grad III

  Mild calyceal dilatation without ureteral tortuosity

- Grade IV

  Moderate calyceal dilatation and blunting without ureteral tortuosity

- Grade V

  Severe calyceal dilation with ureteral tortuosity

RISK FACTORS FOR VUR

- History of UTI

  20-50% of children with history of symptomatic UTI

- Age

  Varies with age, but spontaneous resolution occurs usually as children get older

- Race

  More common in fair-skinned children

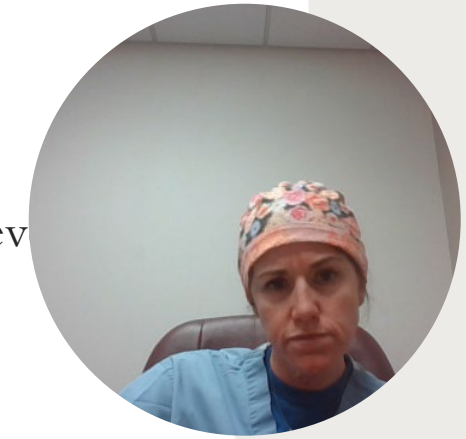
  Significantly lower among children of Mediterranean origin and African American

- Sibling Predisposition

  Siblings of patients with VUR have a 30% prevalence of reflux

- Associated Anomalies

  Posterior urethral valves; duplicated collecting system; Prune-belly; Bladder exstrophy; sev
  voiding dysfunction



TREATMENT OF VUR- MEDICATIONS

- Many children will "grow out" of VUR. It can resolve on its own
- Prophylactic antibiotic

  Amoxicillin

  10mg/kg/day given once daily

  Used until age of 2-3 months, then changed due to increased resistance

  Furadantin/Nitrofurantoin

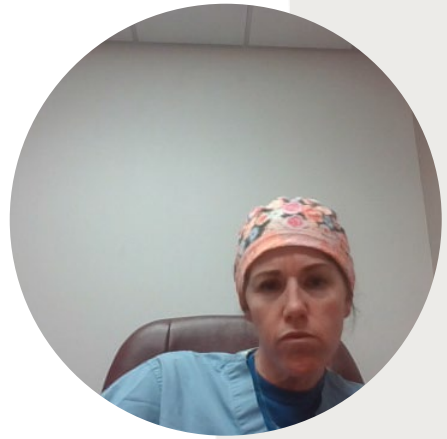
  1-2mg/kg/day given once daily

  Septra/Bactrim

  2mg/kg (trimethoprim) given once daily; 1cc per every 8 pounds given once daily

  Keflex

  10mg/kg/day given once daily



TREATMENT OF VUR

- Medication forms

  Amoxicillin

  125mg/5cc; 250mg/5cc

  Furadantin/Nitrofurantoin

  25mg/5cc

  Macrodantin/Nitrofurantoin

  25mg; 50mg

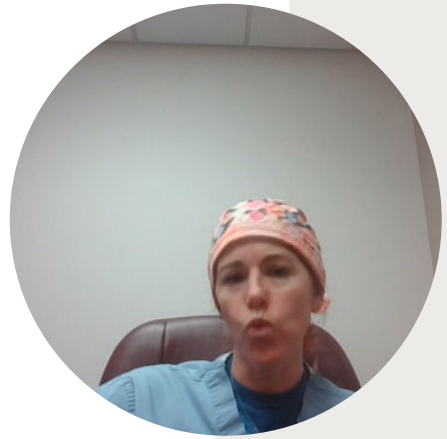
  ★★★ Furadantin and Macrodantin can be very expensive. Will sometime have patients break capsule open and sprinkle half of the capsule per day

  Septra/Bactrim

  SS-80mg trimethoprim; DS- 160mg trimethoprim

  Keflex

  125mg/5cc; 250mg/5cc



TREATMENT OF VUR-MEDICAL MANAGEMENT

- Bladder and bowel program

  VUR can resolve, and there are much better chances of it resolving with good bladder and bowel habits

  Timed voiding schedule

    Every two hours, same time every day

    Elimination diet

    Good toileting techniques

  Constipation management

    Miralax, lactulose, colace, etc

    Timed toileting- 10 minutes after meals

    Corn test

TREATMENT OF VUR- SURGERY

- Performed when children have breakthrough pyelo, medical noncompliance, persistence of reflux
- Endoscopic

  Deflux- an injectable agent

  Performed by inserting a cystoscope through the urethra. A small amount of the Deflux is injected into the wall of the bladder near the opening of the ureter

  "Bulks up" the ureter
- Open with incision

  Ureteral reimplant- rerouting the ureter

  The ureter is mobilized and reimplanted using a stronger muscular backing

WHEN TO REFER TO UROLOGY FOR VUR

- We generally recommend anyone with a diagnosis of vesicoureteral reflux to see urology
- Each person varies with treatment and is on case by case basis

NOCTURNAL ENURESIS

- Primary NE
  - This is about 90 percent of children
  - They have never achieved nighttime dryness
- Secondary NE
  - This is about 10 percent of children
  - They have experienced at least six months of dryness, then resume wetting at night

NOCTURNAL ENURESIS

- How common is bedwetting

  One in 20 children have bedwetting at age 10

  At age 15, 1-6% of children are still wetting the bed

  I always tell the children I see that bedwetting is not something that is generally talked about amongst friends, parents, etc. But that it is probably a lot more common than they think.

  It's likely that there is a person in their class who have bedwetting

CAUSES OF NOCTURNAL ENURESIS

- There are many factors that contribute to nocturnal enuresis
  - Decreased arousal from sleep in response to a full bladder
    - The brain and bladder aren't able to communicate about what to do when the bladder is full
  - Small functional bladder capacity
    - Normal average capacity is age +2 in ounces
  - High nighttime urine production/concentrating defect
  - Food sensitivities
    - Carbonated drinks
    - Artificial colors
    - Citric acid
    - Milk
    - Sugary foods
    - Vitamin supplements, especially Vitamin C

CAUSES (CONT)

- Constipation
  - A full rectum restricts the bladder's expansion and causes the bladder to contract
  - A full rectum presses on the bladder and causes the bladder to squeeze and push urine out
- Voiding dysfunction
  - Holding urine during the day causes bladder irritation
  - Kids can sometimes feel the bladder squeeze during the day and "run" to get to the bathroom
  - At night, when sleeping, they can't "run" and get there, so urine comes out

TREATMENT OF NOCTURNAL ENURESIS

- Bladder and bowel program

  Voiding schedule every two hours, same time every day

  Elimination diet, especially afternoon and beyond

  Limit fluids after dinner

  Constipation management

  Biofeedback

    pelvic floor rehab

    this helps to control daytime voiding problems, which is often the culprit of bedwetting

TREATMENT- MEDICATIONS

- DDAVP (desmopressin)

  I always make sure to tell parents that DDAVP is not a cure, but is a "cover up"

  Does not work for everyone

  Makes the child produce less urine

  If going to use long-term, should check a sodium level after 6 months to ensure they are not hyponatremic

  Generally, I will use for sleepovers, camp, vacation, etc

DDAVP

- Dosage form is pill and comes in 0.2mg tablets

  Dose may need to be titrated

  Start at 0.2 (1 tablet) and go up to 0.6 (3 tablets)

  If going to use long-term, should obtain sodium level after 6 months

  If using long-term, should stop for roughly a week after4-6 months

OTHER MEDICATIONS FOR NOCTURNAL ENURESIS

- Tofranil

  An anti-depressant used for nocturnal enuresis

  25-50mg 1 hour prior to bedtime

  SIDE EFFECT of cardiotoxicity. Not used often at all. I have actually never prescribed it, but have seen patients who are on it.

  Can not stop abruptly

- Ditropan

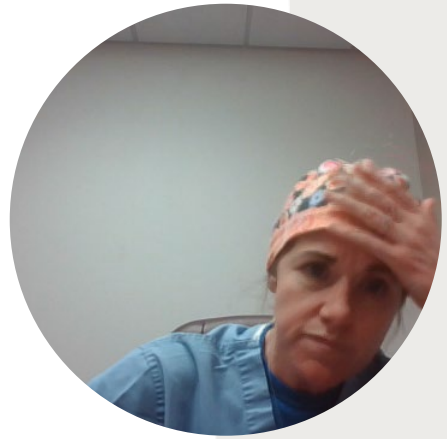
  Used to increase bladder storage and minimize bladder contractions

  Dose is 5, 10, or 15mg. Comes in long and short acting.

  For bedwetting only, would use short acting

NOCTURNAL ENURESIS

- When to refer to urology
  - If there any associated UTIs
  - If there are any daytime incontinence issues
  - If the patient is over the age of roughly 7-9



ACUTE SCROTUM

- Acute scrotal pain is an EMERGENCY
- Testicular torsion

  Testicle twists and cuts off the blood supply

  Best chance of salvage is if blood flow is restored within the first 8 hours
- Epididymitis

  Inflammation of the epididymis

  Often, there is inflammation of both epididymis and testis (epididymoorchitis)

DISTINGUISHING BETWEEN TESTIS TORSION AND EPIDIDYMITIS

- Torsion
  - Sudden onset of horrible pain 10/10
  - Usually not associated with voiding complaints
  - May have associated nausea and vomiting
  - Not associated with urethral discharge
  - Physical exam may demonstrate
    - Angry redness
    - High riding testis
    - Absence of cremasteric reflex

DISTINGUISHING (CONT)

- Epididymitis
  - Gradual onset
  - Urethral discharge may be present
  - Voiding symptoms may be present
  - Physical exam
    - EARLY: Enlarged and tender "mass" posterior to and distinct from the testis
    - LATE: entire testis enlarged and tender
      - this is why it is difficult to distinguish between torsion and epididymitis

CAUSES

- Testis torsion

  ? Deformity in the way the epididymis attaches to the testis- can't be determined on exam

  No certain cause

- Epididymitis

  Sexually transmitted infection- most commonly chlamydia or gonorrhea

  Urinary tract infection

  Voiding dysfunction

  Constipation

TREATMENT

- Epididymitis

  Treating bladder and bowel dysfunction

  If caused by a UTI, treat culture with sensitive antibiotic. If UA is positive, start antibiotic

  I usually start with Bactrim DS- 1 BID for 10 days

  If caused by STI

  Doxycycline 100mg BID for 10 days

- Torsion

  SURGERY

WHEN TO REFER TO UROLOGY

- Anyone with testis torsion should be referred to urology immediately
- Refer epididymitis is welcome after first episode

  After second episode for sure, as there may be something anatomic but rare that causes repeated epididymitis

PHIMOSIS

- Phimosis is a narrowing of the opening of the prepuce, preventing it from being drawn back over the glans penis
- Phimosis can be physiologic or pathologic.
- Physiologic phimosis

  Normal phimosis that babies are born with

  NO treatment is necessary. DO NOT pull skin back. It will eventually start retracting on its own. Can be several years
- Pathologic phimosis

  Can occur after circumcision –foreskin comes over glans and heals tight

  Can occur when not pulling skin back to void after it will easily come back

  Recurrent balanoposthitis can also cause this

TREATMENT FOR PHIMOSIS

- NO treatment for physiologic phimosis. Just needs time
- Betamethasone diproprionate 0.05% cream

  Augmented is contraindicated in under 13, so I use non-augmented for anyone

  Start with using pea-sized amount around the rim

    TID for two weeks, BID for two weeks, then daily

    I see them back in about 6 weeks
- Kenalog cream 0.1% cream

  Use the same way as betamethasone
- Circumcision if absolutely necessary

WHEN TO REFER TO UROLOGY

- If cream has not worked after two months
- If considering circumcision

LABIAL ADHESIONS

- Labia minora stuck together
  - Will never close completely
  - Will open on own eventually, sometimes not until puberty
  - Is sometimes related to irritation, rather than lack of hormone production

TREATMENT OF LABIAL ADHESIONS

- Treatment is not always necessary

  UTI

  Pain

  Urine leakage, post void dribbling

  Parental concern

TREATMENT OF LABIAL ADHESIONS

- Betamethasone 0.05% cream
  - Apply TID for two weeks, then BID for two weeks, then daily
  - I see them back in 6 weeks
- Kenalog 0.1% cream
  - Apply TID for two weeks, then BID for two weeks, then daily
- Premarin
  - No longer used in urology office
  - Potential for more side effects
- Office labial adhesion release
- OR labial adhesion release

WHEN TO REFER TO UROLOGY

- Any episodes of UTI, especially febrile
- Anyone non-responsive to treatment with other contributing factors

THANK YOU!

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- Call or message me any time! I love answering questions/teaching
- If there are any of the charts you'd like I'm happy to send to you as well