

UTI: Causes, Treatments and Work-Up

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UTI Causes

- Stasis is the number one cause of UTI
 - Holding urine for too long
 - Not emptying bladder completely
 - Anatomical abnormality
 - Hydronephrosis
- Baths are better than showers - studies have shown it reduces bacteria in the perineum
- Bubble bathes do not cause UTIs - it can cause external irritation in sensitive skin



Urinary Tract Infections

- Inflammatory response of urothelium to bacterial invasion
 - Associated with bacteria and pyuria
- Cystitis- clinical syndrome
 - Dysuria, frequency, urgency, suprapubic pain
- Acute pyelonephritis - clinical syndrome
 - Chills, fevers, and flank pain

Incidence

- Most common bacterial infection
- Pediatric - annually¹
 - 2.4-2.8% office visits/year
 - Account >7 million office visits
 - 1 million ER visits
 - Hospitalizations:
 - 51/100,000 children
 - 174/100,000 infants (<3mo)
 - Estimated \$180 million/year in children²

Shortliffe in Campbell – Walsh Urology 9th edition

Freedman AL, US Dept of Health and Human Services 2007; 439-457

Urinary Tract Infections

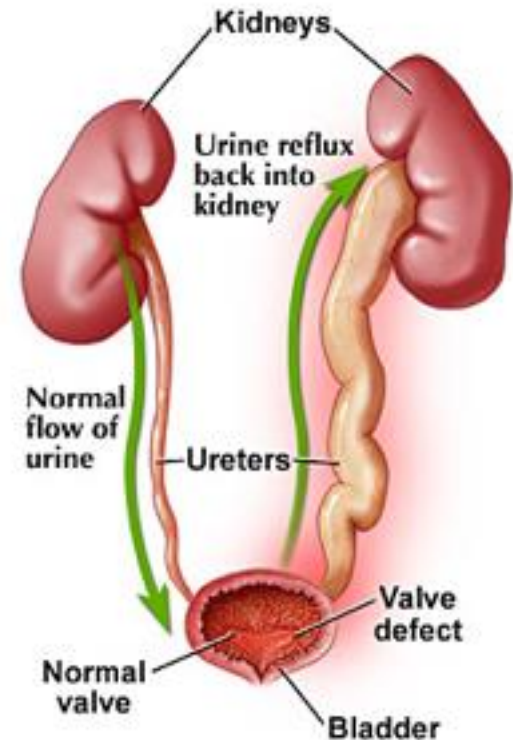
- UTI – first 8 years of life ^{1,2}
 - 7-8% girls
 - 2% boys
- Febrile UTI- highest incidence 1st year of life ²
- Non-febrile UTI - girls >3 y.o. ²
- Recurrent UTI
 - Estimated 12-30% within 6-12 months after initial UTI³



1. Hellström A, et al. Arch Dis Child 1991; 66:232-4
2. Mårild S, et al. Acta Paediatr 1998; 87:549-52
3. Saadeh S and Mattoo T, Pediatr Nephrol 2011;26:1967-76

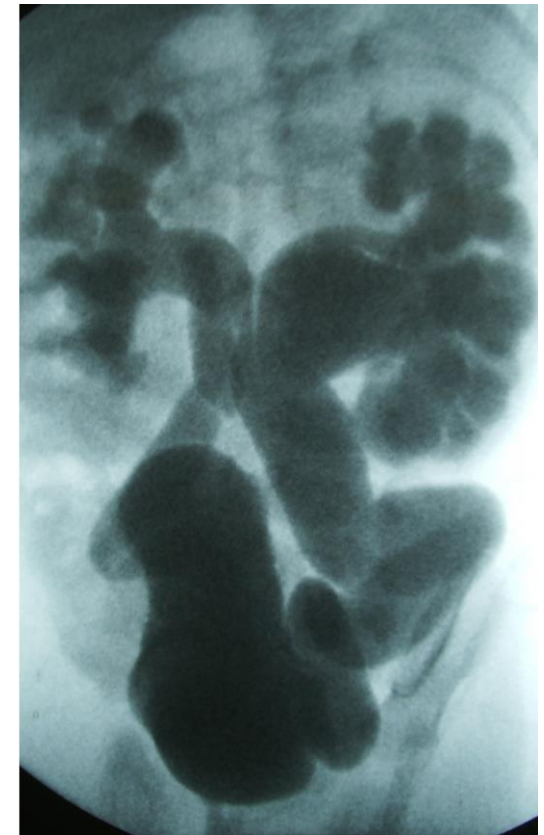
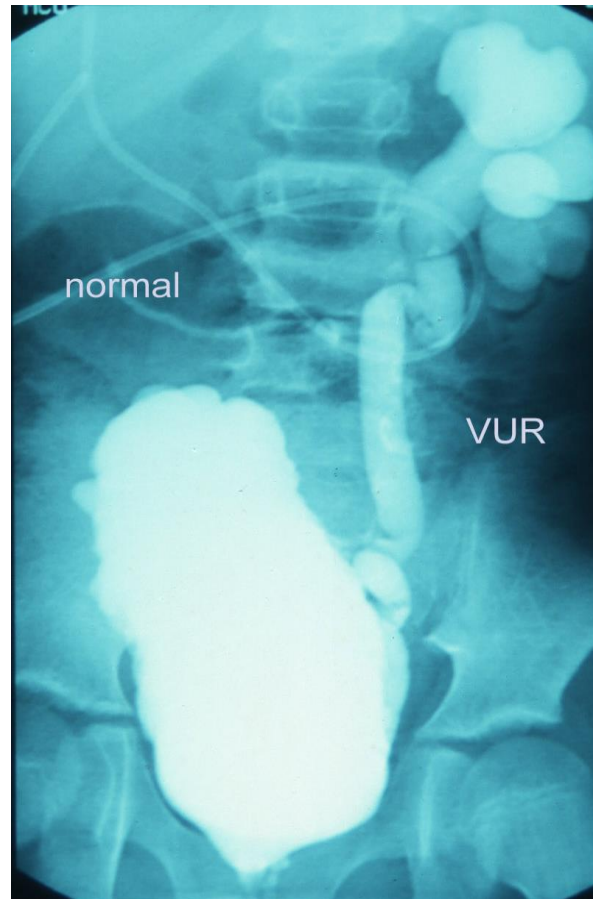
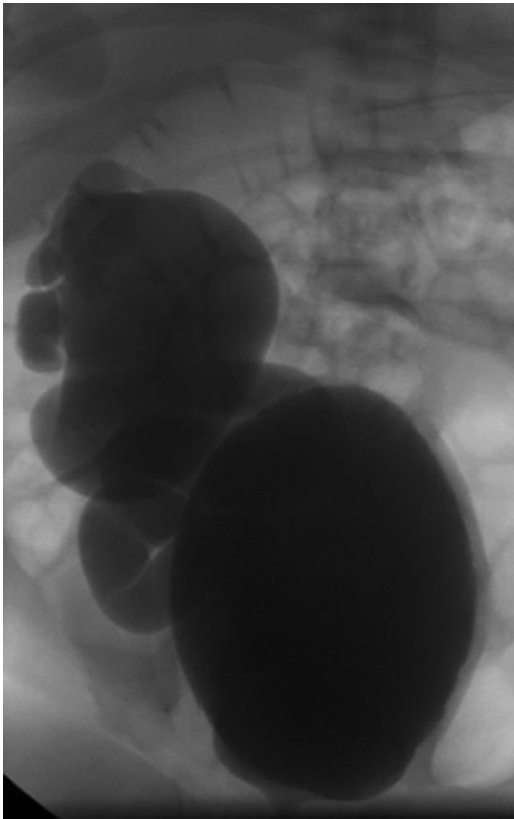
Vesicoureteral Reflux

- Association between febrile UTI and vesicoureteral reflux
 - 30-50% children with febrile UTI have VUR
- 80% all children with VUR- girls
 - Male predominance in neonates

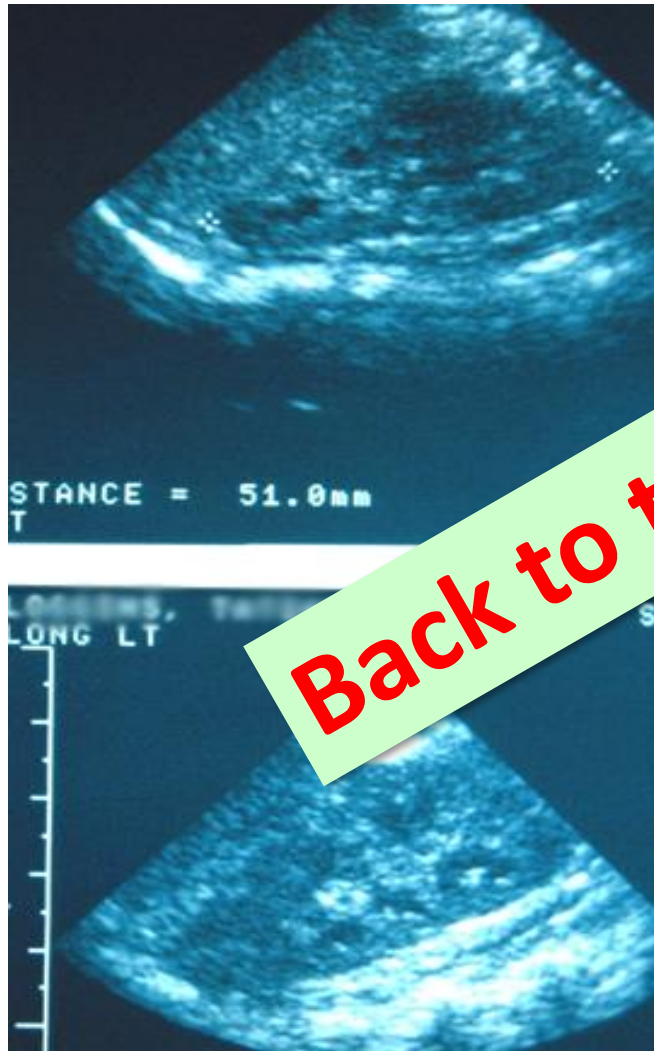


Diagnose Vesicoureteral Reflux

- VCUG needed to diagnose VUR



Normal Sonogram DOES NOT Rule out VUR



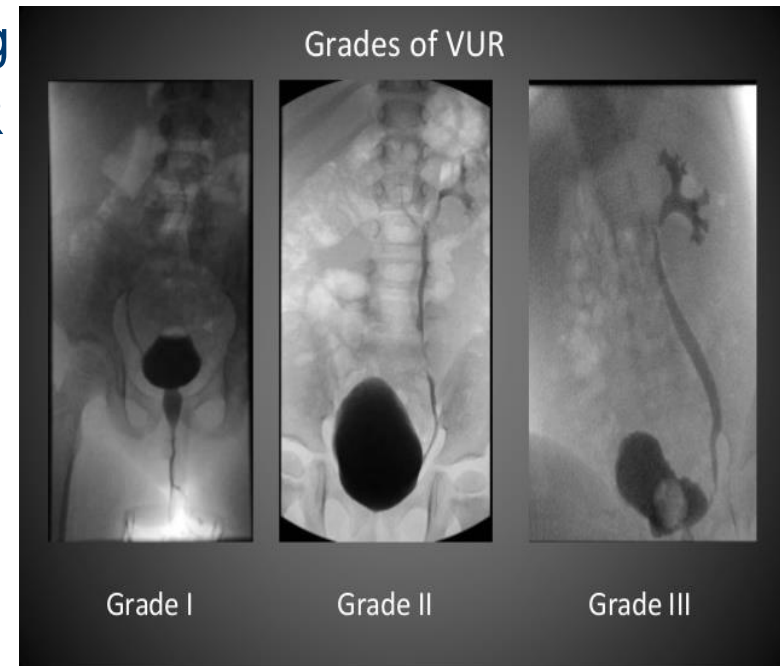
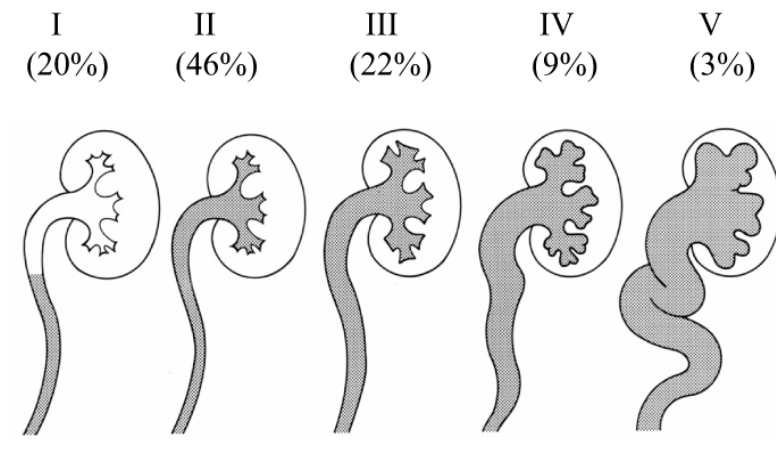
Back to the VCUG!



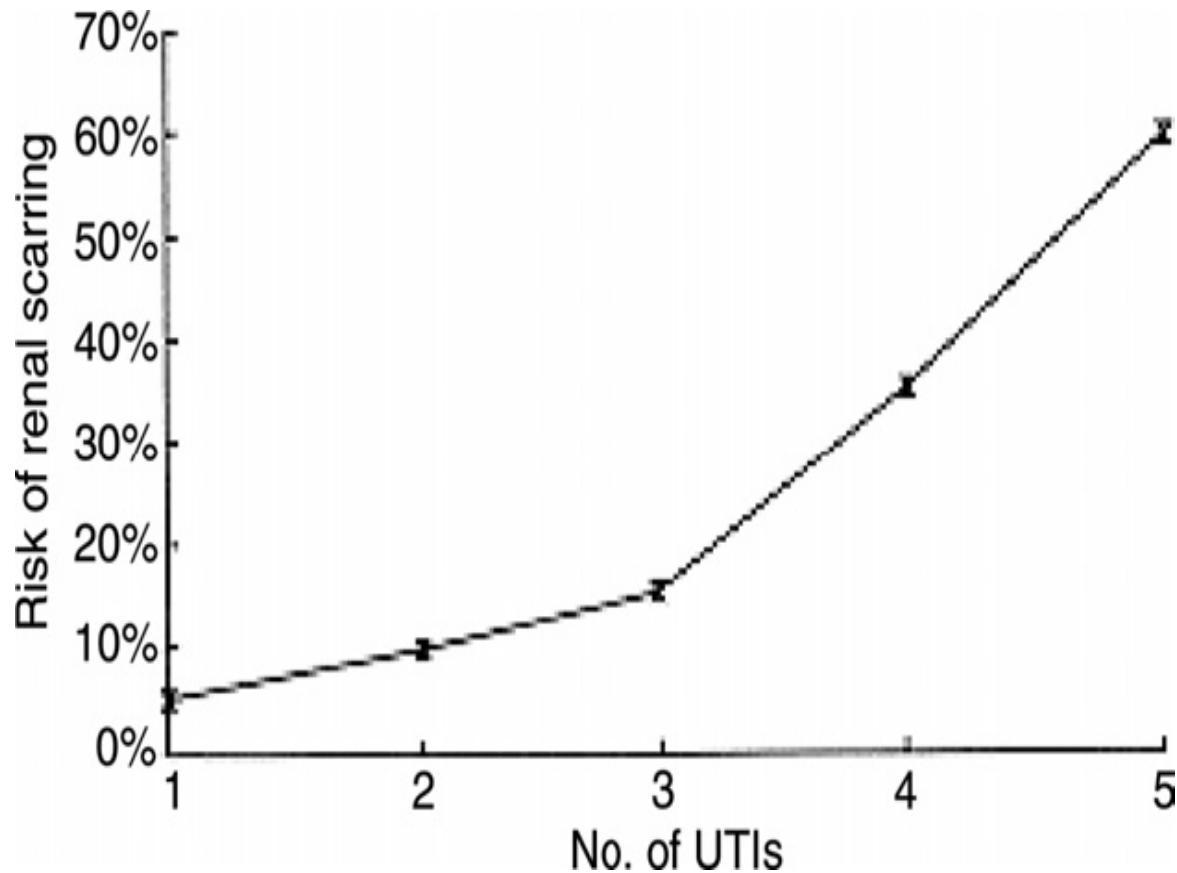
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VUR & UTI

- UTI in presence of Vesicoureteral Reflux can ascend to become pyelonephritis
- Pyelonephritis can lead to renal scarring in 50% of children
- High grade VUR correlates with scarring
 - 4-6x more likely than low grade VUR
 - 8-10x more likely than no VUR
- Reflux does not cause infections
- Bacteria causes infection



Clinical Consequence of VUR



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Yale
NewHaven
Health
Yale New Haven
Children's Hospital

Treatment Options

When should we **do** something????

Prophylactic Antibiotics



Not Curative

5 – 13% Annual Resolution

Duration of Treatment

1 – 5 years*

Cost of Treatment

\$2,200¹(3-year)

Open Surgery



Curative

95% Success Rate

Duration of Treatment

up to 3 days (inpatient)¹

Cost of Treatment

\$15,410¹

Endoscopic Injection



Curative

69% Success Rate**

Duration of Treatment

1 day (outpatient)¹

Cost of Treatment

\$6,530¹

* Optimal duration of antibiotic prophylaxis is undetermined but clinical studies have used 1-5 years

** Majority of patients are cured after a single treatment

Reflux and Bowel and Bladder Dysfunction

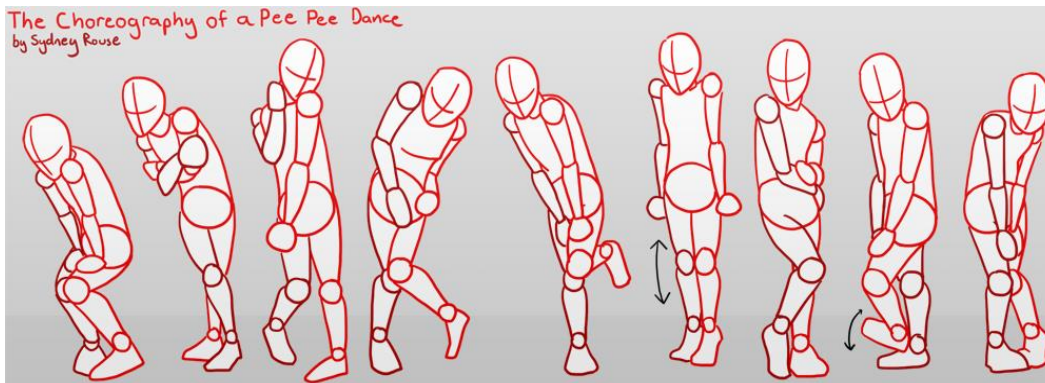
Correlation between reflux and constipation

- Children with reflux & constipation:
 - Treatment of constipation led to quicker resolution of reflux
 - Dysfunctional elimination:
 - Associated with delayed reflux resolution
- AND
- Increased rate of urinary tract infection while on preventative antibiotics

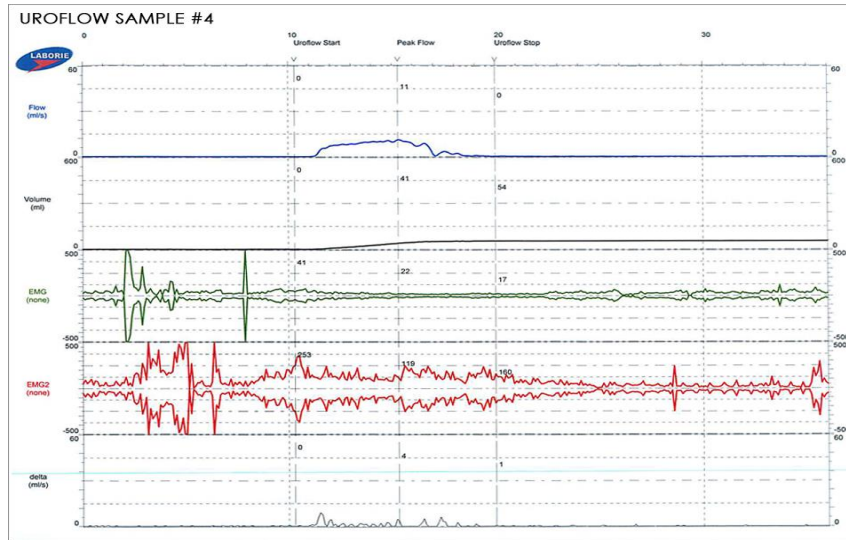
Koff SA, et al. J Urol 1998: 1019-22

Recurrent UTI & Older Children

- Associated with lower urinary tract dysfunction
 - Dysfunctional voiding
 - Dysfunctional elimination
 - Bladder bowel dysfunction
- Incomplete bladder emptying
- Constipation/Encopresis
- Management
 - Timed and Double Voiding
 - Treatment of constipation
 - Biofeedback



Uroflow/EMG & Biofeedback



- ❑ Non-Invasive Testing that yields a lot of information
- ❑ Helps determine if biofeedback would be beneficial by identifying dyssynergia
- ❑ Biofeedback is typically 6-10 sessions long
- ❑ Bowel & Bladder Clinic at Greenwich Pediatric Specialty Center



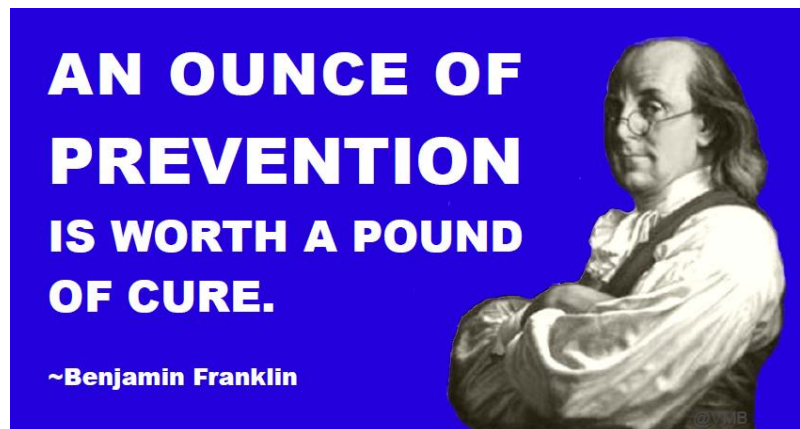
Asymptomatic Bacteriuria

- Historically, asymptomatic bacteriuria (ABU) was treated with antibiotics in all populations, including in children. However, more recent evidence has shown no benefit and often harm associated with the use of antibiotics to treat pediatric ABU
 - Approximately 6% of children will have ASU (Egypt study of 1000 school aged children 6-12 yrs old)
- **The "Choosing Wisely" initiative in infectious diseases**
 - "Choosing Wisely" is a growing international campaign aiming at practice changes to improve patient health and safety by both, conduct of essential and avoidance of unnecessary diagnostic, preventive and therapeutic procedures.
 - (7) Do not treat asymptomatic bacteriuria with antibiotics.

[Mohammad, A, et.al. Afr Health Sci. 2016 Mar;16\(1\):69-74](#)

Pearls:

- ☐ An Empty Bladder is a Happy Bladder
- ☐ Kids almost always declare themselves
- ☐ Treat the patient & symptoms and not culture results
- ☐ Always get a UA & Culture
- ☐ If a bagged urine is positive get a catheterized sample
- ☐ There is no need to repeat culture for test of cure
- ☐ Bubbles baths do not cause UTI
- ☐ Always think about and treat bowel and bladder dysfunction



Thank you & Questions???

- ❑ Thank you for your time and attention
- ❑ Thank you to Dr. Hittelman, Dr. Franco and Kaitlyn Murphy, APRN for sharing slides
- ❑ Our Team: RN Coordinators, Social Work, Psychologists, Child Life, Nutrition and other Pediatric Specialists (GI)

