UTI: Causes, Treatments and Work-Up

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- I have NO disclosures

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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 - annually\(^1\)
  - 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 children\(^2\)

Shortliffe in Campbell – Walsh Urology 9\(^{th}\) 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 UTI$^3$

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!
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

![Graph showing the risk of renal scarring vs. the number of UTIs.](image)
Treatment Options

When should we do something?

<table>
<thead>
<tr>
<th>Treatment Options</th>
<th>Curative</th>
<th>Duration of Treatment</th>
<th>Cost of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophylactic Antibiotics</td>
<td>Not Curative</td>
<td>1 – 5 years*</td>
<td>$2,200(^3) (3-year)</td>
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<tr>
<td></td>
<td>Curative</td>
<td>95% Success Rate</td>
<td></td>
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<tr>
<td></td>
<td>Duration of Treatment</td>
<td>up to 3 days (inpatient)(^1)</td>
<td></td>
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<tr>
<td></td>
<td>Cost of Treatment</td>
<td>$15,410(^1)</td>
<td></td>
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<tr>
<td>Open Surgery</td>
<td>Curative</td>
<td>69% Success Rate**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duration of Treatment</td>
<td>1 day (outpatient)(^1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cost of Treatment</td>
<td>$6,530(^1)</td>
<td></td>
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</tbody>
</table>

* 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

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.

 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

AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE.
~Benjamin Franklin
Thank you & Questions???

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