Case

- An 11 mo old female with a fever x 1 day.
- She is fully vaccinated and had one episode of AOM in the past. She is eating and acting well.
- VS - T 104.6F, HR 150, RR 30
- Well-appearing child, smiling, playful, reaching for your stethoscope
- Ears and OP are normal
- Lungs are clear
- Abd is soft, nontender
- No rash on exam
History of Bacteremia

• Occult Bacteremia
  – Well appearing, bacteremic
  – H. flu, Strep pneumo
  – Meningitis, sepsis, pneumonia, septic arthritis
  – Lots of CBC, blood cultures, Ceftriaxone
  – Vaccines
    • Hib (H. flu type B), Prevnar (S. pneumo)
      – 7-valent to 13-valent
  – Bacteremia < 1%

We needed a new obsession...

What is the risk??
Risk of UTI

• Overall risk, 3-7%
  – Febrile young
    • Morley Peds Emerg Care Feb 2012
  – Higher fever (>39C)
  – No other source for fever


Risk of UTI

• Higher risk:
  – Girls less than 2 years old
  – Uncirc boys less than 1 year old
  – Circ boys less than 6 months old
  – Boys worse < few months old
  – Caucasian race


Risk of UTI

• Higher risk:
  – History of UTI
    • Conway JAMA 2007
  – Suprapubic pain or tenderness
    • Shaw Pediatrics 1998
  – Foul-smelling urine, crying with urination
Risk of UTI

• Duration of Fever?
  – Longer duration of fever = higher rates of UTI
    • Salleeh J Pediatrics 2010

Risk of UTI

• Higher risk:
  – Common but non-definitive sources for fever such as URI, gastroenteritis, otitis media

Risk of UTI

• Lower Risk:
  – True definitive source e.g. Croup, RSV, bronchiolitis, Influenza A, herpangina, pneumonia
    • Levine Peds 2004, Melendez Peds Inf Dis J 2003, Smitherman Peds 2005
Neonatal Pearl!

• Newborn, older than 1 week + new jaundice…..think UTI!

One percent of normal children have baseline bacteruria

Why is this Important?

• Pyelonephritis can lead to renal scarring

• Estimated that 27-64% develop renal scarring

• Renal scarring can lead to hypertension and renal failure
Best way to collect urine?
• Bag urines have higher risk of contaminated specimens, 12-83%  
• Catheterization or suprapubic aspiration recommended
• Use ultrasound !!

How do you diagnose a UTI?
• Infants often unable to mount inflammatory response
• Converting to nitrites take time
• 10-50% culture-positive specimens have false-negative urinalysis  

How do you diagnose a UTI?
• Urinalysis:  
  – If used alone, nitrites are less sensitive but more specific  
  – Range for each test is wide  
  – If leukocyte or nitrite is positive, sensitivity is 88%  
  – If both are positive, specificity is 96%  
    • Gorelick Pediatrics 1999  
  – Microscopy, enhanced urinalysis using a cell-count chamber or gram stain all enhance sensitivity
What about clear urine?

• “Clear” urine on visual inspection, negative predictive value 97%
  – Bulloch Pediatrics 2000

What about a culture?

• Because of insensitivity of urinalysis, cultures should be ordered on kids < 2yrs

Pathogens?

• E. coli still accounts for over 80%
  – Bhat Emerg Med Clinics North Amer Aug 2011

• Also Klebsiella, Proteus, Enterobacter, and occasional Pseudomonas
Positive Culture?

- Colony counts threshold lowered
  - 50,000 cfu, instead of 100,000
  - AAP 2011

Delay in diagnosis?

- Doganis Pediatrics Oct 2007
  - Prospective, 278 infants, <12mo, 1st UTI
  - Recorded timing of treatment and onset of fever
  - Ultrasound and DMSA scans performed acutely and within 6-24 months
  - Renal defects (inflammation) initially seen
    41% if tx within 24 hrs; 75% if tx on 4th day
  - Renal defects (scars) on follow-up seen in 11 of 24 (46%) within 24 hrs and in 28 of 52 (54%) treated later (diff not significant)

How to Treat?

- Infants < 3 months old should be admitted
- Older infants, good family, good PO’s can be discharged
- Longer course of antibiotics
Antibiotics

**TABLE 3: Same-Site, Antimicrobial Agents for Oral Treatment of UTI**

<table>
<thead>
<tr>
<th>Antimicrobial Agent</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin-clavulanate</td>
<td>30–40 mg/kg per d in 3 doses</td>
</tr>
<tr>
<td>Sulfinamide</td>
<td>6–12 mg/kg bid × 3 doses</td>
</tr>
<tr>
<td>Trimethoprim-sulfamethoxazole</td>
<td>30/480 mg/kg per d in 2 doses</td>
</tr>
<tr>
<td>Sulfasalazine</td>
<td>120–160 mg/kg per d in 4 doses</td>
</tr>
<tr>
<td>Cefixime</td>
<td>8 mg/kg per d in 1 dose</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>10 mg/kg per d in 5 doses</td>
</tr>
<tr>
<td>Cefpodoxime</td>
<td>30 mg/kg per d in 2 doses</td>
</tr>
<tr>
<td>Ceftriaxime axetil</td>
<td>30–60 mg/kg per d in 4 doses</td>
</tr>
<tr>
<td>Cephalaxin</td>
<td>10–100 mg/kg per d in 4 doses</td>
</tr>
</tbody>
</table>

7-14 days

Still Febrile?

- Currie Arch Peds Adol Med Dec 2003
  - Reviewed all cases of kids, <18yo, admitted with UTI over 5 years
  - 364 kids
    - 80% had follow-up cultures
    - 32% still febrile at 48 hours
      - Older kids more at risk
      - No difference in kids with reflux disease
      - All cultures were negative at 48 hrs