American Urological Association

Advancing Urology™

Pediatric Urinary Tract Infection

Medical Student case-based learning

14 month old female with 5 days of crying with voids, lower abdominal tenderness, increased urinary frequency, pink urine, and fever to 38.3 C/101 F

- What are the clinical symptoms associated with UTI?
- What else do you want to know?

UTI clinical symptoms

- May be non-specific for infection
  - Fever, lethargy, decreased oral intake, signs of dehydration, vomiting
- Irritation symptoms (bladder)
  - Dysuria (pain during urination)
  - Suprapubic pain
  - Incontinence, new
  - Frequency
  - Urgency
  - Hematuria
  - Foul odor
  - Changes in bowel habits (constipation and/or diarrhea)

UTI clinical symptoms

- Upper tract infection/pyelonephritis
  - Fever
  - Flank pain/costovertebral angle tenderness
  - Nausea/emesis

- However, pediatric bladder infection without upper tract involvement can often have a fever, unlike most adult UTIs.
  - While other pediatric patients may have renal involvement and normo- or hypothermia

UTI additional history

- Pre- and post-natal medical and surgical history, including prenatal kidney abnormalities
- Family history of urogenital anomalies and urologic conditions (e.g. VUR, frequent UTIs)
- Current medications
- Ill contacts

What symptoms suggest possible upper tract involvement in this case?

Imaging (AAP Recommendations)

- Renal-bladder US for screening after 1st febrile UTI
- Voiding cystourethrogram should be obtained if screening US demonstrates collecting system dilatation or renal parenchymal abnormality, or if second febrile UTI occurs
- ***Renal DMSA nuclear scan**, either acutely or within 3 months, will indicate upper tract involvement by photopenic areas, which may become areas of permanent scar or may return to normal by the 3 month mark

Chronic renal scarring clinical symptoms

- High blood pressure (21%), ESRD (10%)

How do you diagnose a UTI?

Diagnosis of UTI in children

- Clinical symptoms
- Physical examination of abdomen, external genitalia
  - Don’t forget to consider sexual abuse as a coexisting factor
- Urine sample
  - Best: urethral catheterization
  - Clean catch midstream void, if toilet trained
  - Bag specimen in infants is strongly discouraged due to high risk of contamination
- If sample non-catheterized, an abnormal urinalysis (dipstick and micro) should be not be relied upon for diagnosis – rather, immediately confirm with catheterization and then send for culture and sensitivity

A clean catch showed leukocyte esterase, nitrites, blood, specific gravity 1.025, pH8; microscopic confirms 50-100 WBC/hpf and bacteria

- What should you do next about this abnormal UA?

- Ideally, you would obtain a catheterized sample for culture, so that there would be no question about the diagnosis, because of significant implications for child/workup
- If unable to catheterize, send the sample for culture
- In any case, usually looking for > 50,000 cfu/mL of a single pathogen as significant

Catheterized culture sent; you and parent want to start empiric treatment due to symptoms while awaiting culture. You start amoxicillin.

- What choices and considerations are important in regard to treatments?

- Consider that cystitis could be viral or bacterial – concomitant viral upper respiratory or viral GI infection could lead to same symptoms and urine findings, but negative bacterial culture
- Most community UTIs are E.coli, but about half may be resistant to Ampicillin/Amoxicillin
- Therefore, could choose first gen cephalosporin or TMP/SMX; adjust after culture/sensitivity
- Consider patient's age and ability to clear antibiotic (e.g. renal, hepatic function) when selecting a medication
- Consult institutional antibiogram for local pathogens and antibiotic coverage (N.B.: most institutional antibiograms are derived from adult, not pediatric, infections)

Child without clinical improvement after 24 hours on Amoxicillin

- Await culture (48-72 hours to result)
- Symptom amelioration support with analgesics, increased fluids, antipyretics

Culture returns; need to change antibiotics due to resistant E.coli; rapid clinical improvement; back to normal by end of 7 day treatment course

- What is next?

- Repeat culture or urinalysis for test of cure is not indicated in the absence of persistent symptoms

- If VUR suspected and/or sonographic anomalies, consider starting prophylactic antibiotics (again, choice based on patient age and general health and local antibiograms)

- If a structural abnormality suspected or found on ultrasound, may want to proceed to VCUG

- Most important in older children: check for functional bladder or bowel dysfunction and aggressively work on correcting constipation, elimination avoidance behaviors, hydration. Failure to correct will lead to continued risk of UTI, no matter what else may be wrong.