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EPPA Clinical Guidelines ISSUED: MAY 2017 ~ REVISED 2019

MANAGEMENT OF
Adult Urinary Tract Infection

This EPPA Clinical Guideline is intended to guide most, but not all, encounters involving urinary tract infection and should not replace clinical judgment; deviate from or adapt this guideline to meet the individual patient's needs.

Cystitis Definition:

- Positive UA (positive cx, or pyuria + bacteriuria) with signs/symptoms of UTI (dysuria, frequency, urgency, suprapubic pain, hematuria; older – more subtle)
- Should not typically cause systemic symptoms

Pyelonephritis Definition:

- Positive UA with fevers/chills, flank pain, costovertebral angle tenderness, and/or nausea/vomiting (+/- cystitis symptoms)

Urine Culture:

- Generally not indicated for uncomplicated cystitis
- Culture ALL complicated infections and pyelo
- Send culture from newly exchanged catheter
- When available, always use culture results to select antibiotic

Urinalysis:

>3-5 WBC/hpf is abnormal

LCE ≈ WBC (pyuria)
LCE has PPV 19-86, NPV 91-97 for ≥ 10^5 cfu/mL

Nitrite ≈ bacteriuria (Enterobactericiae)
misses Staph saprophyticus, Pseudomonas, Enterococcus
nitrite has PPV 50-78, NPV 82-89 for ≥ 10^5 cfu/mL

LCE plus nitrite has sensitivity 35-84%, specificity 98-100%, PPV 84, NPV 98 for ≥ 10^5 cfu/mL

Flowchart

Symptoms Consistent with UTI?
- No → Do Not Test or Treat for UTI
- Yes → UA Consistent with UTI?
  - No → Evaluate for Alternate Dx
  - Yes → Signs/Symptoms of Pyelonephritis?
    - No → Complicated?*
      - No → **Uncomplicated Cystitis**
      - Yes → **Complicated* Cystitis**
    - Yes → Complicated?*
      - Yes → **Complicated Pyelonephritis (IV abx)**
      - No → **Uncomplicated Pyelonephritis**

Uncomplicated Cystitis
Generally healthy, nonpregnant adult women
Any of the following:
1) Cephalexin 500mg BID x 5-7 days
2) Nitrofurantoin 100mg BID x 5 days
3) Fosfomycin 3g orally once
Allergy to the above or other contraindication:
Cipro 250mg BID x 3 days (discuss risks)
[Bactrim 1 tab DS BID x 3 days (should be rarely if ever used given resistance)]

Complicated* Cystitis
1st line – cephalexin 500mg PO tid x 7-14d
2nd line – ciprofloxacin (preferred) 500mg PO bid x 7d OR bactrim 1 tab DS (160/800mg) PO bid x 7d

Complicated Pyelonephritis (IV abx)
Mild-moderate: ceftriaxone 1g, ciprofloxacin 400mg, levofloxacin 750mg, aztreonam 1g
Severe: Zosyn 3.375g, cefepime 2g, meropenem 500 q8
ESBL: ertapenem 1g
Alternative: gentamicin 3-7mg/kg

Uncomplicated Pyelonephritis
Recommend initial dose of IV antibiotic (from mild-moderate list)
1st line – ciprofloxacin 500 bid x 7d OR levofloxacin 750mg qd x 7d
OR cephalexin 500mg PO qid x 14d
2nd line – Bactrim DS 1 tab bid x 14 days

***Complicated:** Underlying condition that increases risk of failing therapy or progression of disease: immunocompromise, renal insufficiency, urinary tract obstruction, hospital-acquired infection, multiply drug resistant pathogen, functional or anatomic abnormality of the urinary tract, renal transplant

Admission Criteria: Unstable vitals, complicated pyelonephritis, unable to stay hydrated or take PO med, concern for compliance/follow up, intractable pain

MANAGEMENT OF **Adult Urinary Tract Infection**

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Catheters:

- Send UA/UCx from fresh catheter
- Pyuria very common, especially if bacteriuria
- Catheter associated UTI (CAUTI): UCx positive for uropathogen, or abnormal UA, with signs/symptoms compatible with UTI without other identifiable source in patient with indwelling urethral/suprapubic catheter, intermittent catheterization, or had catheter within prior 48 hours
- CAUTI tx: fluoroquinolone or broad spectrum cephalosporin; consider carbapenem if severe

Acute Cystitis in Pregnancy:

- 1st line – cephalexin 500mg PO tid x 7-14d (pregnancy category B)
- 2nd line – nitrofurantoin 100mg PO bid x 7d (pregnancy category B)
- AVOID: Bactrim (cat. D) and fluoroquinolones (cat. C)

Cystitis in Men:

- Can be uncomplicated (less common) or complicated (prostate involvement suspected or other symptoms of complicated infection)
- Uncomplicated UTI's can be treated as you would simple cystitis in women and with antibiotics listed.
- If you suspect subclinical prostate involvement, start an antibiotic that penetrates the prostate tissue (ciprofloxacin 500mg BID x 7 days or levofloxacin 750mg daily x 7 days). Discuss fluoroquinolone risk with patient.
- Males with clinical prostatitis should be on fluoroquinolones for 4-6 weeks and see urology in follow-up to determine duration of therapy, discussing risks of this prolonged antibiotic therapy with patient.

Asymptomatic Bacteriuria:

- Do NOT screen for it, common in elderly and catheters and others
- Definition: UCx positive for uropathogen in patient *without* signs/symptoms of UTI
- If pregnant, treat as for cystitis in pregnancy, guided by culture results

Analgesics:

- NSAIDs, acetaminophen
- Phenazopyridine (Pyridium) – OTC urinary analgesic. 100-200mg tid prn after meals x 2d only
  Avoid in renal insufficiency. Clouds interpretation of subsequent UA.

Microbiology:

- Uncomplicated – E. coli (75-95%), also Proteus mirabilis, Klebsiella pneumoniae, Staph saprophyticus
- Complicated – same as above, plus Pseudomonas, Serratia, Providencia, Enterococci, Staphylococci, and fungi
- Usually contaminants – Lactobacillus, Enterococci, GBS, coag-neg Staph other than saprophyticus

Local Susceptibility Patterns:

- E. coli susceptibility rates at EPPA sites: Bactrim 78-80%, cipro/levo 78-87%, cefazolin 89-94%, ceftriaxone 87-97%, nitrofurantoin 95-96%, Zosyn 90-97%

Miscellaneous:

- DDx: vaginitis, urethritis, prostatitis, PID, painful bladder syndrome (interstitial cystitis), nephrolithiasis, OB complications, retroperitoneal hemorrhage/abscess
- Imaging: Consider CT A/P or Renal US only if concern for obstruction, abscess, stone, anatomic abnormality, alternate dx
- Renal adjustment for cipro/levofloxacin, cephalosporins, Bactrim, nitrofurantoin, carbapenems

Follow-Up:

- **Primary Care Provider in 2 Days, Urology, ID**