

## Urinary Tract Infections (UTI)

### MICROBIOLOGY

- The bladder is not sterile and can often become colonized by bacteria and yeast resulting in positive cultures.
- **Organisms commonly identified in symptomatic UTI:** *E. coli*, *Klebsiella*, *Proteus*, *S. saprophyticus*
- **Organisms found in both colonization and symptomatic UTI:** *Enterococcus*, *Pseudomonas*
- **Organisms that are generally considered colonization:** *Candida*, *Lactobacillus*, Group B *Streptococcus*, coagulase negative staphylococci.

### CLASSIFICATION

<b>Acute simple cystitis</b>	Acute UTI confined to the bladder: - Dysuria, frequency, urgency, hematuria, and/or suprapubic pain - No signs or symptoms of upper tract or systemic infection.
<b>Acute complicated UTI</b>	Acute UTI accompanied by signs or symptoms of extension of infection beyond bladder: - Fever, chills, rigors, significant fatigue or malaise, nausea, vomiting - Flank pain, CVA tenderness - Pelvic or perineal pain in men Patients may or may NOT have cystitis symptoms. Bacteremic UTI and “urosepsis” are managed the same as acute complicated UTI
<b>Special populations with unique features</b>	Pregnant women Renal transplant recipients

### DIAGNOSIS

#### Urine Testing

- **Positive leukocyte esterase** as a surrogate
  - ! the absence of pyuria strongly suggests an alternative diagnosis other than UTI
  - ! cloudy or malodorous urine is NOT diagnostic for UTI and should NOT be used as an indication for urine culture or antimicrobial therapy
- **Urine microscopy is not needed to diagnose a UTI** and does not provide an advantage over dipstick testing.
- **Collect urine culture PRIOR to initiation of antimicrobial therapy whenever possible.**

#### Non-specific symptoms

- Confusion, decreased appetite, falls, disorientation, wandering, and verbal aggression are not specific for UTI.
- Before mental status or behavioural changes are attributed to UTI, consider other common causes: dehydration, drug interactions, sleep disturbances, sensory deprivation, constipation, hypoxia, or hypoglycemia.

#### Catheter-associated UTI (CA-UTI)

- Typically present as acute complicated UTI: fevers or rigors without other source, flank pain or CVA tenderness
- May occasionally present with acute simple cystitis with no complicated UTI findings: pelvic discomfort, suprapubic tenderness, or acute gross hematuria.
- **Asymptomatic bacteriuria is common in catheterized patients (~100% after 1 month of catheterization).**
- Collect urine culture from voided midstream urine if catheter can be discontinued. If catheter cannot be discontinued, collect urine culture from a freshly replaced catheter.

#### UTI in men

- A thorough search for BPH, stones, and strictures must be undertaken. Chronic pelvic symptoms, or recurrent UTIs with the same organism, should trigger assessment for prostatitis. Urology and/or Infectious Diseases consultation recommended.

#### UTI in patients with spinal cord injury

- Often lack typical UTI symptoms. Symptoms compatible with UTI in this patient population include:
  - New fevers or rigors without other source
  - Increased spasticity, autonomic dysreflexia, or sense of unease

**EMPIRIC THERAPY**

Severity		Duration (days) <sup>1</sup>
Asymptomatic Bacteriuria	NONE – Exceptions: <ul style="list-style-type: none"> <li>• Pregnancy (see below)</li> <li>• Prior to urologic procedure where bleeding/trauma is expected</li> </ul>	
<b>Acute Simple Cystitis</b>		
Non-Pregnant Females & Males	<b>First Line:</b> nitrofurantoin (MacroBID) 100 mg PO BID x 5 days (CrCl>30 only) <b>Second Line:</b> TMP/SMX 1 DS tab PO BID x 3 days <b>OR</b> fosfomycin 3 g PO once (Males: 3 g PO every 3 days x 3 doses) <b>Third Line:</b> amoxicillin-clavulanate 875-125 mg one tab PO BID x 5 days <b>OR</b> cefixime 400 mg PO daily x 5 days <b>Fourth Line:</b> ciprofloxacin 500 mg PO BID x 3 days	<b>Females</b> <b>3 – 5</b> <b>Males</b> <b>7</b>
Pregnancy	Same regimens as above, except: <ul style="list-style-type: none"> <li>• Ciprofloxacin should be avoided unless necessary due to resistance</li> <li>• Nitrofurantoin should be avoided after 34 weeks gestation</li> <li>• TMP/SMX should be avoided in 1<sup>st</sup> trimester and after 34 weeks gestation</li> </ul>	<b>7</b>
<b>Acute Complicated UTI (Acute Pyelonephritis, Febrile UTI, or Catheter-Associated UTI)</b>		
<b>Review recent urine cultures and antibiotic resistance risk factors</b> (consider ESBL coverage in severely ill patients, known prior ESBL colonization, recent broad-spectrum antimicrobial use, or recent travel to endemic areas)		
Not severely ill <i>Oral therapy</i>	<b>First Line:</b> amoxicillin-clavulanate 500-125 mg one tab PO TID <b>OR</b> cefixime 400 mg PO daily <b>Second Line:</b> TMP/SMX 1 DS tab PO BID <b>OR</b> ciprofloxacin 500 mg PO BID  Consider initial one-time dose of parenteral agent below Confirm empiric therapy once urine culture results available	<b>7</b>
Not severely ill <i>Intravenous therapy</i>	ceftriaxone 1 g IV/IM q24h <b>OR</b> cefotaxime 1 g IV q8h in pregnant patients after 22 weeks gestation <i>If known/suspected ESBL OR severe cephalosporin allergy:</i> meropenem 500 mg IV q6h ( <b>OR</b> ertapenem 1 g IV q24h for outpatients)  Oral transition once patient clinically improving and culture results available	
Severely ill (septic shock)	piperacillin-tazobactam 3.375 g IV q6h <i>If known/suspected ESBL OR severe cephalosporin allergy:</i> meropenem 500 mg IV q6h  Oral transition once patient clinically improving and culture results available	
<b>Oral transition for complicated UTI if organism is susceptible and patient clinically improving.</b>		
<b>First Line</b> amoxicillin 500 mg PO TID cephalexin 500 mg PO QID TMP/SMX 1 DS tab PO BID	<b>Second Line</b> amoxicillin-clavulanate 500-125 mg one tab PO TID cefixime 400 mg PO daily	<b>Third Line</b> ciprofloxacin 500 mg PO BID

Doses may require adjustment in renal insufficiency.

<sup>1</sup>. See "Oral Transition & Duration" section below for details.

Prepared by the Fraser Health Antimicrobial Stewardship Program

Revised: September 20, 2022

**ORAL TRANSITION & DURATION**

- *Acute simple cystitis*
  - Oral regimen preferred from outset in most patients. If started on parenteral agent, transition to oral agent as soon as feasible.
- *Acute complicated UTI* (Acute Pyelonephritis, Febrile UTI, or Catheter-Associated UTI)
  - If started on parenteral agent, transition to oral agent once patient clinically improving and culture results available.
  - A 7 day treatment course is appropriate in most patients without ongoing source control issues.
  - Can consider 3 day treatment course in female patient  $\leq 65$  years old with catheter-associated UTI who have catheter promptly removed.
  - **Men with prostatic involvement may require more than 7 days of total therapy.** There are limited data for efficacy of oral beta-lactams in men with prostatic involvement.
- *Renal parenchymal abscess, perinephric abscess, or emphysematous pyelonephritis* often requires longer duration of therapy. Urology & Infectious Diseases consultation recommended.
- *Renal transplant patients with UTI* may require different durations than those recommended above. Infectious Diseases or Nephrology consultation recommended.
- *How about bacteremia?*
  - Multiple RCTs of gram-negative bacilli bacteremia, predominantly from UTI source, demonstrates no benefit to extending antibiotics beyond 7 days. Note caution above in patients with ongoing source control issues and men with prostatic involvement.
  - Duration of therapy in bacteremic enterococcal UTI is not well established but is typically 7-14 days. See “Bacteremia – Enterococcus” chapter in ASP Handbook.
- *Follow-up urine culture* as a test of cure is NOT recommended unless patient has not responded to therapy OR is pregnant.