



Urinary Tract Infection (UTI)

APPROACH

- Acute uncomplicated UTI: when normal peri-urethral flora are replaced by pathogenic bacteria, which ascend and cause inflammation of the bladder (cystitis). Likely diagnosis if ≥ 2 of:

- Dysuria (pain or burning sensation while voiding)
 - Frequency (frequent, small urine volumes; sensation of incomplete emptying)
 - Urgency (persistent urge to void; fear of incontinence if can't void immed.)
- ** Children may also present with new daytime incontinence or abdominal pain**

- Complicated UTI: symptoms of uncomplicated UTI in patients with any of:

- Biological male
- Obstruction (stone or tumor)
- Pregnant
- Renal insufficiency or transplantation
- Structural abnormality
- Presence of indwelling catheter or stent
- Recent instrumentation
- Neurological disease (e.g. MS)
- Post-void residual >100cc

- Pyelonephritis: bacterial infection above the bladder to the ureters and kidneys; pts with fever ($>38^{\circ}\text{C}$), chills, flank pain, CVA tenderness, and nausea +/- vomiting

Diagnosis requires confirmation at least by urinalysis (dipstick or microscopy); C&S depending on patient age and UTI type (see treatment). **General rules:**

- Collect urine samples for culture and sensitivity prior to initiating antibiotics.
- Decant a small volume from collection container for dipstick analysis rather than dipping unsterile dipstick directly into specimen (risk for contamination).
- Reassess culture and sensitivity results and modify therapy.
- Cloudy/foul-swelling urine is not a reliable indicator of UTI.

RED FLAGS and special circumstances Management

RED FLAGS and special circumstances	Management
Pruritus, discharge, sexually active	Pelvic exam, investigations for STIs
♂ with perineal pain, recurrent or treatment-refractory UTI	Rule out prostatitis, infected stone/stent, perinephric abscess
Males with frequency alone, or nocturia, difficulty initiating/maintaining stream, incomplete voiding	Rule out benign prostatic hyperplasia (BPH)
Infant <2mos, immunocompromised, hemodynamically unstable, fever ($>38^{\circ}\text{C}$)	Rule out bacterial sepsis → blood culture
MRSA or MSA +ve urine culture	r/o bacteremia, perinephric abscess

Notes on urine specimen collection

- **Patients who can follow instructions:** midstream collection is preferred:
 - Wash hands with soap + water, cleanse the urethral area (♀: separate labia and cleanse front-to-back; ♂: retract foreskin, if present, for duration of collection), start void into toilet, then without stopping, collect urine in container
- **Adult patients unable to follow instructions** (e.g. cognitively impaired, physically unable): in/out catheter is most reliable; suprapubic aspiration is an alternative
- **Pediatric patients:** collection presents many challenges, depending on age.
 - **Toilet-trained and cooperative:** midstream collection is preferred. Try giving the child something to drink, this may stimulate the urge to void. Parents can ask little girls to sit backward on the toilet seat to separate the labia.
 - **Not toilet trained:** a urine collection bag, which adheres to the skin surrounding the urethral area, is least invasive → -ve dipstick rules out UTI, but +ve is inconclusive and would require in/out catheter or suprapubic aspiration for culture and sensitivity. A clean catch sample is an alternative; instruct caregiver to wipe, leave diaper off, hold child up, catch eventual stream (takes a while).

TREATMENT

Asymptomatic bacteriuria: +ve urinalysis or culture in a patient without UTI symptoms; usually diagnosed in patient populations prone to asymptomatic bacteriuria (e.g. elderly or catheterized patients) for whom specimen collection was not indicated (i.e. no UTI localizing symptoms).

- Only treat if pregnant or pending genitourinary procedure.

Uncomplicated UTI - Send specimen for culture and sensitivity prior to initiating treatment, if any of:

- <2 UTI symptoms (see acute UTI check boxes on prev. page)
- Quinolone/Cephalosporin use (≤ 6 mo)
- Known previous UTI caused by atypical pathogen
- Foreign travel (≤ 6 mo)
- Hospitalized or frequent health facility visits

- **Treat empirically for *E. coli* if ≥ 2 of:**

- ≥ 2 UTI symptoms OR
- Pyuria (>trace on dipstick) OR
- Nitrites (>trace on dipstick)

- **Culture and sensitivity not required**

- Usual pathogens: *E. coli* (75-95%) and *S. saprophyticus* (5-15%)
- Nitrofurantoin 100mg PO BID x 5d

Complicated UTI - **Always** collect urine culture prior to treatment → increased risk of failing empiric therapy as pathogens are variable, more resistant, and difficult to predict: *E. coli* (50%), enteric gram-negatives (*Klebsiella* species, *Proteus* species), enterococci, *Pseudomonas*, yeast

- **Cystitis, systemically well:** Cefixime 400mg PO daily x 10d (least resistance; Amoxicillin-clavulanate, Ciprofloxacin, and TMP/SMX are second line as frequent resistance is observed)
- **Pyelonephritis or systemically unwell:** alternative regimen req.

Pediatric - **Always** collect urine culture prior to treatment

- Usual pathogens if healthy with no previous antibiotic: *E. coli*, enteric gram-negatives (*Klebsiella* species, *Proteus* species); *S. saprophyticus* common in adolescent ♀
- **Infants (<1mo):** hospitalization and aggressive IV antibiotics
- **Infants (>1mo) and children with non-toxic febrile UTI (usually pyelonephritis) with no underlying structural abnormality:**
 - Cefixime 8mg/kg/day PO x 10d OR
 - Ceftriaxone 50mg/kg IV q24h x 10d
- **Older child with no fever and presumed cystitis:** Cefixime 8mg/kg/day PO x 2d

→ Does this child need imaging?

- **Sometimes** indicated to confirm that the child had pyelonephritis and identify whether severe vesicoureteral reflux (VUR) or structural anomalies exist.

- Perform renal and bladder ultrasound **only** if any of:

- Hemodynamically unstable
- Not improving clinically within 24 hr
- Elevated serum creatinine level at any time
- Persistent fever after 48 hr of starting appropriate antibiotics
- Poor urine flow
- <2 y.o. with first febrile UTI
- Bladder or abd mass present