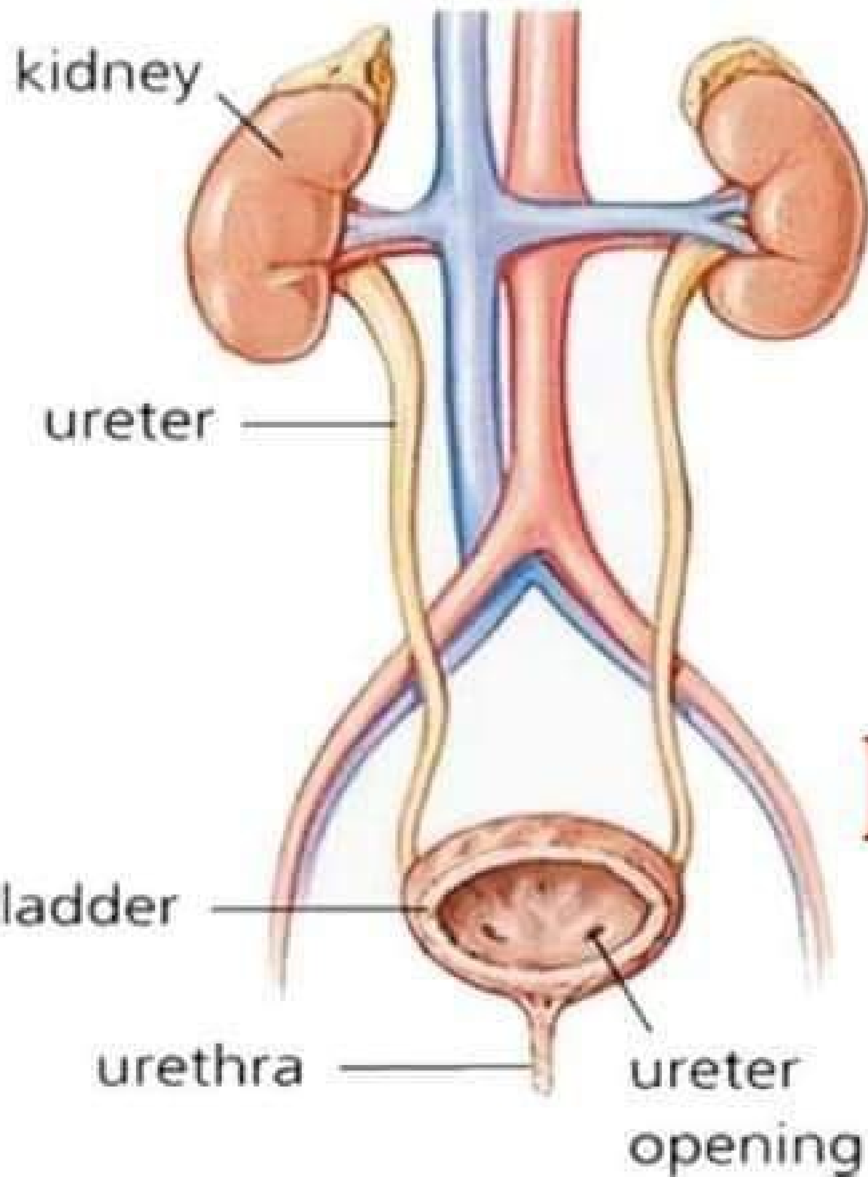

Urinary Tract Infection

Fb/Nurse-Info

DEFINITION

Acute infection of the bladder or kidneys

- **Asymptomatic bacteriuria:** Positive urine culture (>100,000 CFU/hpf) with NO signs or symptoms
- **Acute cystitis:** S/Sx (dysuria/urgency/suprapubic pain) ***AND*** pyuria (>10 WBC/hpf) ***AND*** positive urine culture (>100,000 CFU/hpf of ≤2 organisms, not yeast or other mixed flora)
- **Acute pyelonephritis:** S/Sx (fever/flank pain) ***AND*** pyuria (>10 WBC/hpf) ***AND*** positive urine culture (>100,000 CFU/hpf of ≤2 organisms)
- **Urosepsis:** Sepsis with urinary source. "Urosepsis" is no longer an accepted medical term.

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- **Uncomplicated UTI:** Bladder or kidney infection in non-pregnant women without underlying structural or neurologic abnormality
- **Complicated UTI:** Bladder or kidney infection in the presence of male gender, possible stones, urologic abnormalities, pregnancy
- **Catheter associated UTI:** S/sx (fever with or w/o suprapubic or flank pain) AND pyuria AND positive urine culture (>1000 CFU, drawn from freshly placed catheter)

ETIOLOGY

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- Causes of uncomplicated UTI: E. coli (75–95%), Klebsiella pneumoniae, Enterococcus faecalis, proteus, Staph saprophyticus, Strep agalactiae
- Causes of complicated UTI: Same as above + Enterobacter, Citrobacter, Serratia, Pseudomonas, Staph spp
- Uncomplicated RFs: previous UTI, sexual intercourse, new sexual partner in last year, spermicide use, DM, postmenopausal state
- Complicated RFs: DM, immunocompromised, pregnancy, neurogenic bladder, renal insufficiency, nephrolithiasis, indwelling catheter, urinary obstruction
- Staph aureus is NOT a typical urinary pathogen if no recent catheter/instrumentation. Likely indicates hematogenous spread and blood cultures should be ordered.

PATHOPHYSIOLOGY

- Translocation of bacteria from the vagina or rectum to the urethra → colonization → ascending infection
- Certain bacteria, namely E. coli, have uropathogenic specific virulence factors

DIFFERENTIAL DIAGNOSIS

- Acute urethritis: Cystitis sx with or without urethral discharge. Includes STIs and pelvic inflammatory disease
- Vulvovaginitis
- Interstitial cystitis
- Prostatitis: P/w hesitancy, weak urine stream, perineal pain, prostate tenderness
- Nephrolithiasis
- Renal abscess

PATIENT HISTORY

- Cystitis:
  - Dysuria?
  - Frequency?
  - Urgency?
  - Suprapubic pain?
  - Hematuria?
- Pyelo: Above symptoms PLUS
  - Fevers?
  - Flank pain?
  - Nausea or vomiting?
- Chills? Night sweats? Anorexia? Malaise? AMS?
- Atypical symptoms: new incontinence?
- Presence of RFs?

PHYSICAL EXAM

- GEN: Fever
- ABD: suprapubic tenderness, CVA tenderness. If transplant, allograft tenderness
- GU: urethral or vaginal discharge, prostate tenderness (indc. prostatitis)

WORKUP

Laboratory:

- Urinalysis: Look for pyuria (>10 WBC/hpf. Sens 95%, spec 71%). Nitrites = bacteria in urine. Leukocyte esterase = WBC in urine.
- Urine culture: Obtain prior to antibiotics. Clean catch or straight cath. >100,000 colonies per HPF is positive. Negative UA with positive cx is likely contamination or colonization.
- If febrile, blood cultures
- If high risk, screen for chlamydia, gonorrhea. If child-bearing age, HCG.

Imaging:

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- Persistent fever with >72 hours abx or suspicion for anatomic abnormality: abdominal CT or renal ultrasound

TRIAGE

- Consider IMC or ICU level of care if urosepsis is present.
- Consult urology and/or interventional radiology for:
    - Emphysematous cystitis
    - Impacted stone or outflow obstruction not relieved by catheter
    - Need for decompression of collecting system

TREATMENT

- Treatment consists of antibiotics ***AND*** source control (relief of obstruction, removal of infectious nidus)
- Always consult local antibiotic guides and resistance patterns. Bactrim and fluoroquinolone resistance are common in many areas.
- Use each patient's past culture data to guide antibiotic decision making.

Asymptomatic bacteriuria:

No treatment UNLESS pregnant, undergoing urologic procedure, post-renal transplant, or neutropenic

Acute cystitis:

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- Uncomplicated:
  - Nitrofurantoin 100mg po BID x 5 days *only if CrCl >50ml/min*
  - Fosfomycin 3g po ONCE*
  - Bactrim DS po BID x 3 days
- Complicated
  - Extend treatment course for 7-14 days
  - If known resistance to above, fluoroquinolones or B-lactams are alt choice (avoid ampicillin or amoxicillin alone)
  - *Should not be used if pyelo suspected

Acute pyelonephritis:

- Uncomplicated or mild-to-moderately ill complicated:
  - Cipro 500mg po BID x 7 days, if susceptible
  - Levofloxacin 750mg po daily x 5 days, if susceptible
  - Alternative: Augmentin, Cefdinir, Cefaclor, Cefpodoxime
- Severely ill, complicated infection:
  - Cefepime 2g IV q12h
  - Ceftazidime 2g IV q8h
  - Pip-tazo 3.375-4.5g q6h
  - Imipenem 500mg IV q6h
  - Meropenem 1g IV q8h

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Catheter Associated UTI

- *Remove the catheter*. If a catheter is still necessary, replace with a clean catheter and collect a culture from the clean catheter, ideally before antibiotics.
- Duration of treatment: 7-14 days depending on the speed of symptom resolution (7 days if prompt, 10-14 days if delayed).

References

1. Gupta K et al: International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women: A 2010 update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases. *Clin Infect Dis* 52:e103, 2011 [PMID:21292654]
2. Naber KG et al: EAU guidelines for the management of urinary and male genital tract infections. Urinary Tract Infection (UTI) Working Group of the Health Care Office (HCO) of the European Association of Urology (EAU). *Eur Urol* 40:576, 2001 [PMID:11752870]