

Treatment of UTIs

With rates of resistance to antibiotics on the rise, it is a vital time to ensure that we are prescribing antibiotics only when appropriate. A common reason for prescribing antibiotics is for the treatment of UTI. The McGeer criteria provides a guideline for treatment of UTI when a nonindwelling catheter is present and not.

Criteria for Evaluating and Treating UTI in Long Term Care (Non-Indwelling Catheter)

Resident Without an Indwelling Catheter

- 1. Minimum criteria include one of the following:**
- Acute dysuria or acute pain, swelling or tenderness of testes, epididymis or prostate
- OR**
- Fever* or Leukocytosis** **AND** at least 1 of the following symptoms (1)
- OR**
- At least 2 or more of the following symptoms (1)

Symptoms:

- New costovertebral angle pain or tenderness
- Suprapubic pain
- Gross hematuria
- New or marked increase in urinary incontinence
- New or marked increase in urgency
- New or marked increase in frequency

(1) PRACTICE POINT

Non-specific symptoms which may indicate a UTI include:

- Worsening functional status
- Worsening mental status, increased confusion, delirium or agitation
- Falls (new or more often)

Unless medical status is declining rapidly or resident is on fluid restriction,

PUSH FLUIDS for 24 HRS then REASSESS.

- If typical symptoms develop, treat as for UTI.
- If non-specific symptoms continue without development of typical symptoms, consider alternative diagnosis/infection at other site.
- If symptoms resolve, no further work up is required.

Minimum criteria met?

NO

No UTI present or possible asymptomatic bacteriuria; do not order urine culture, do not treat

YES

2. Order urine for culture and sensitivity (C&S) (2)

(2) PRACTICE POINT

- Urine specimens should be collected **before** antibiotic therapy is initiated,
- Urine specimens should be refrigerated if delay in transport to lab > 30 minutes,

Does urine culture show **one** of the following?

- 10^5 cfu/mL of not > 2 species of microorganisms in a voided sample

OR

- 10^2 cfu/mL of any number of organisms in a specimen collected by in-and-out catheter

NO

3. Not indicative of UTI (3)
Consider alternative diagnosis or infection at other site.

(3) PRACTICE POINT

Results **not indicative of UTI**: DO NOT initiate antibiotics.

YES

4. Indicative of UTI (4)

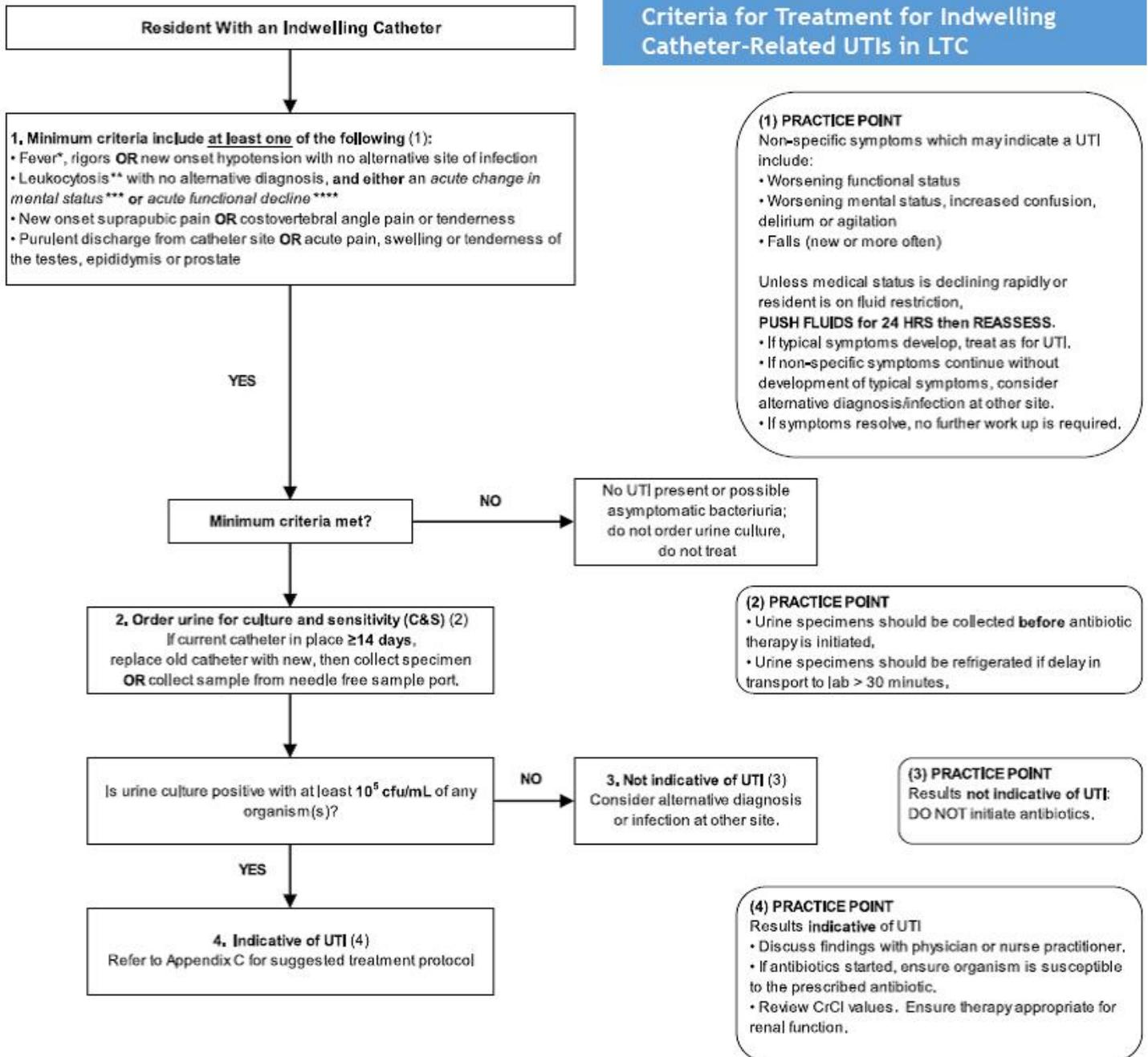
Refer to Appendix C for suggested treatment protocol

(4) PRACTICE POINT

Results **indicative** of UTI

- Discuss findings with physician or nurse practitioner.
- If antibiotics started, ensure organism is susceptible to the prescribed antibiotic.
- Review CrCl values. Ensure therapy appropriate for renal function.

Criteria for Treatment for Indwelling Catheter-Related UTIs in LTC



Asymptomatic bacteriuria is defined as the presence of ≥ 100000 CFU/mL in two consecutive midstream urine samples without any signs or symptoms specific to UTI. In males, only one clean catch is required.⁽³⁾ Treatment is not warranted as there has been no evidence of any benefit in rates of symptomatic infection, improved survival, or changes in chronic genitourinary symptoms.⁽³⁾ It is important to not screen individuals unnecessarily for UTI as positive urinalysis tends to lead to increased prescribing.

If therapy is warranted, then it is important that the antibiotic chosen is safe and appropriate. Treatment should be based on susceptible organisms from urinalysis. Antibiotic options and suggested treatment durations for acute uncomplicated cystitis are the same for any adult woman with acute uncomplicated cystitis.⁽¹⁾ If the patient has diabetes or has been symptomatic for greater than 7 days, then longer courses may be warranted. It has been conventional to consider all UTIs in men as complicated since in seniors it is generally due to urologic abnormalities, such as bladder obstruction (prostatic hyperplasia) or instrumentation.⁽²⁾ It should be noted that in both men and women hematuria is not an indicator for a complicated infection.^(1,2)

Treatment is based on whether it is considered acute uncomplicated cystitis, complicated UTI, pyelonephritis and prostatitis. Acute uncomplicated cystitis is infection of the urinary tract in an otherwise healthy individual.

Pyelonephritis has kidney involvement with fever, flank pain, or other suspicion for more serious infection. A complicated urinary tract infection, is associated with an underlying condition that increases the risk of infection or of failing therapy (such as obstruction, anatomic abnormality, urologic dysfunction, or a multiply-resistant uropathogen.)⁽¹⁾

Drug	Susceptible Bacteria	Acute Cystitis	Complicated (Tx 10-14 d)	Pyelonephritis	Prostatitis	Dose / Duration	Common Drug Interactions
SMX/TMP	Some E. Coli resistance. Enterococci resistant	✓ X3days	✓	✓	✓	1 DS tab BID x 3 days RF: >25 mL/min: no change 15-25 mL/min: half dose <15 mL/min: not recommended	ACE/ARB-> 7x increase risk of hyperkalemia Increases phenytoin levels-> 2 fold risk of phenytoin toxicity increases INRwith warfarin (4x risk for hospitalization due to hemorrhagic complications within 14 days) Hypoglycemia with sulfonylureas->7fold increase risk of hypoglycemia, increased nephrotoxicity with cyclosporine. Spironolactone-> 12 fold increase risk of hyperkalemia
Trimethoprim	Use with sulpha allergy					200 mg daily or 100 mg BID RF: >30 mL/min: no change 15-30 mL/min: 50 mg BID <15 mL/min not recommended	
Nitrofurantoin	Good activity against E.Coli	✓ X5-7d	✓			MacroBID 100 mg BID x 5-7 days Macrochantin 50 mg QID x5-7 days Do not use if CrCl <30 mL/min	Antacids may decrease absorption. Spironolactone-> 2 fold increase risk of hyperkalemia
Fosfomycin	Less effective than SMX/TMP for S. Saprophyticus Good for E. Coli resistant organisms	✓				3 g x 1 dose (dissolve in ½ cup of water) No dosage requirements in renal failure.	Metoclopramide slows absorption of fosfomycin.
Amoxicillin	Some E.Coli resistance	✓				500 mg po TID; 500 mg BID if CrCl ≤30 mL/min 250-500 Q24H if CrCl is less than 10 mL/min	increases methotrexate serum levels
Amox/Clavulanate	Less E. Coli resistance		✓	✓		875 po BID; 500 mg BID if CrCl ≤30 mL/min (do not use extended release if CrCl <30) Less than 10 mL/min: 250-500 mg Q24H	
Ampicillin	Adds coverage for streptococcus & enterococcus			✓	✓	500 mg- 1g IV Q6H CrCl <50 mL/min: Q6-12H CrCl <10 mL/min: Q24H	

Drug	Susceptible Bacteria	Acute Cystitis	Complicated (Tx 10-14 d)	Pyelonephritis	Prostatitis	Dose / Duration	Common Drug Interactions
Piperacillin / Tazobactam	Broad spectrum; covers pseudomonas			✓		3 g/0.375 IV Q6H CrCl: 20-40 mL/min: 2.25 g Q6H CrCl<20 mL/min: 2.25 g Q6H	
Cephalexin	Option only if C&S suggests sensitivity	✓		✓		250-500 mg po QID x 7d CrCl 15-29 mL/min: 250 mg Q8-12H	Increased INR with warfarin
Cefixime						400 mg po QD x7d CrCl 21-59 mL/min: 260 mg QD CrCl <20 mL/min: 200 mg QD	
Cefprozil		✓		✓		250-500 mg Q12H x7d Reduce dose by 50% if CrCl <30 mL/min	
Ceftriaxone	No coverage against enterococcus		✓	✓	✓	1 g IV q24H No dosage adjustment in RF	
Cefotaxime			✓	✓		1 g IV q8-12H CrCl <20 mL/min: reduce by 50%	
Ceftazidime	Reserve for pseudomonal coverage		✓	✓		1 g IV Q8H CrCl 31-50 mL/min: Q12H CrCl 16-30 mL/min: 1 g Q24H	
Norfloxacin	Increasing resistance by gram positives and strep pneumo Cipro has pseudomonal coverage	✓	✓		✓	400 mg BID CrCl<30 mL/min: QD	
Ciprofloxacin (oral)		✓	✓	✓	✓	250-500 po BID x3days if uncomplicated; 10-14ds if complicated 500 mg 1g XL po daily Decrease dose if CrCl <50 mL/min	Do not take with Calcium, Iron, and vitamins Warfarin: 2 fold increase in bleeds Phenytoin: May decrease levels of phenytoin
Ciprofloxacin IV			✓	✓	✓	200-400 mg IV Q12H	
Levofloxacin	Less pseudomonal coverage than cipro	✓ X3days	✓	✓	✓	250-500 mg po daily x3days uncomplicated; 10-14 for complicated. Pyelonephritis: 750 mg po QD x5days Less than 20 mL/min: Q48H	
Gentamicin	Gm -ve coverage. Q24H dosing safe and effective					Treat < 7 days to lower toxicity. Adjust dose in renal failure. See monographs	Increases ototoxicity with loop diuretics, increases nephrotoxicity with other nephrotoxic drugs.
Tobramycin	Reserve tobramycin for pseudomonal coverage			✓	✓		

Fosfomycin has equivalent efficacy to nitrofurantoin but is about 10% less effective than SMX/TMP or fluoroquinolones.⁽⁴⁾

Nitrofurantoin should be used only short term in the elderly due to risk of pulmonary fibrosis, peripheral neuropathy and liver toxicity. Recent information has revealed that it can now be used safely short term in patients with CrCl >30 mL/min (previously 60 mL/min.)

Fluoroquinolones are useful if allergy or intolerance to other agents. Reserve for more severe, complicated or resistant infections since there is increasing resistance with these agents.

References

- [1] Uptodate. Acute uncomplicated cystitis and pyelonephritis in women. Hooton. Accessed 2.8.2016
- [2] Uptodate. Acute uncomplicated cystitis and pyelonephritis in men. Accessed 2.8.2016
- [3] Antimicrobial Therapy in Long Term Care. The Consultant Pharmacist. Vol. 30, No.9 p. 519 September 2015
- [4] Therapeutic Choices. UTI. Accessed. 2.8.2015

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