Toronto Central LHIN: Guidelines for Empiric Treatment of Urinary Tract Infection in Adults

Uncomplicated UTI / Cystitis

Oral Treatment

1st line

nitrofurantoin macrocrystals 100mg bid x 5 days

2nd line

trimethoprim-sulfamethoxazole (TMP-SMX) 1 DS bid x 3 days

3rd line

ciprofloxacin 500mg bid x 3 days

4th line

amoxicillin-clavulanate 875/125mg bid x 5-7 days

5th line

cephalexin◊ 500mg qid x 5-7 days

Urine culture recommended if:

- ☐ **Other than** 1st, 2nd, or 3rd line antibiotic is used
- ☐ Persistent symptoms despite treatment
- ☐ Recurrent UTI within 3 months of treatment

Indications for Hospitalization with Complicated UTI / Pyelonephritis

- ☐ Inability to tolerate oral intake
- ☐ Suspected sepsis (e.g. hypotension, confusion)
- ☐ Urinary tract obstruction
- ☐ Acute renal insufficiency

Complicated UTI / Pyelonephritis

Criteria for Complicated UTI

- ☐ Immunocompromised
- ☐ Sepsis in setting of suspected UTI
- ☐ Male
- ☐ Recent instrumentation
- ☐ Urinary tract catheter/tube
- ☐ Structural abnormality of urinary tract (including stones)*

Oral Treatment

1st line

TMP-SMX 1 DS bid x 7-14 days

or

ciprofloxacin 500mg bid x 7 days

2nd line

amoxicillin-clavulanate 875/125mg bid x 10-14 days

IV Treatment

1st line

ceftriaxone 1g q24h +/- ampicillin† 1g q6h

2nd line

gentamicin 5mg/kg q24h +/- ampicillin† 1g q6h

3rd line

ciprofloxacin 400mg q12h +/- ampicillin† 1g q6h

4th line

Consider infectious disease consult

Routinely send urine culture

Asymptomatic Bacteriuria

No treatment, except if pregnant

UTI in Pregnancy

Oral Treatment for Cystitis/Asymptomatic Bacteriuria

1st line

nitrofurantoin macrocrystals§ 100mg bid x 5 days

2nd line

amoxicillin-clavulanate 875/125mg bid x 5-7 days

IV Treatment for Pyelonephritis°

1st line

ceftriaxone 1g q24h +/- ampicillin† 1g q6h

2nd line

gentamicin 1.5mg/kg q8h +/- ampicillin† 1g q6h

Routinely send urine culture

◊ Use if *E. coli* susceptibility >70% at local hospital.

* Patients with urogenital abnormalities will need 10-14 days of treatment.

† Add ampicillin if prior urine colonization with enterococcus or septic patients with suspected UTI.

§ Use nitrofurantoin macrocrystals if less than 36 weeks gestation.

° Treat pyelonephritis in pregnancy initially with IV antibiotics.

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Guidelines for Empiric Treatment of Urinary Tract Infection in Adults: Appendix

1 The microbial spectrum of uncomplicated UTI and pyelonephritis consist mainly of *E. coli* (75-95%), with occasional other species of *Enterobacteriaceae*, such as *Proteus mirabilis* and *Klebsiella pneumoniae*, and *Staphylococcus saprophyticus*. Other gram-negative and gram-positive species are rarely isolated in uncomplicated UTIs.

2 Local antimicrobial susceptibility patterns of *E. coli* in particular should be considered in empirical antimicrobial selection for uncomplicated UTIs. Since resistance patterns of urinary *E. coli* varies considerably between regions and countries, a specific treatment recommendation may not be universally suitable for all regions or countries.

3 Do **not** use nitrofurantoin to treat pyelonephritis because of negligible drug levels in serum and renal parenchyma. Avoid nitrofurantoin with decreased creatinine clearance (<60 mL/min) and in the elderly (>age 75).

4 In patients with pyelonephritis who will be managed as out-patients, a select proportion based on severity of illness will benefit from an initial one-time dose of a long-acting parenteral antibiotic (beta lactam or aminoglycoside) and continued treatment with oral antibiotics. This practice allows administration of an antibiotic with better coverage of *E. coli* while awaiting culture and sensitivity results.

5 The addition of ampicillin to empiric treatment should be based on both prior urine colonization with enterococcus **and** clinical stability of patient (enterococcal coverage should be included in septic patients with suspected complicated UTI until C&S results are available).

6 Avoid gentamicin with impaired renal function. Caution is advised regarding the risk of ototoxicity, especially with prolonged use of gentamicin. If >24 hours of treatment with gentamicin is required, then pharmacy involvement is recommended.

7 Avoid using the same antibiotic if recurrent UTI within 3 months.

8 Beta-lactam agents are appropriate choices for therapy when other recommended agents cannot be used. However, they have higher failure rates even when cultured organisms are deemed susceptible and require longer duration of treatment (5-7 days for uncomplicated UTI and 10-14 days for pyelonephritis).

9 Collateral damage (e.g. *Clostridium difficile* colitis and selection of drug-resistant organisms) is more likely to occur with use of fluoroquinolones and broad-spectrum cephalosporins over TMP-SMX and nitrofurantoin.

10 Shortening the duration of antibiotic therapy is one of the strategies to reduce increasing antibiotic resistance in patients with mild symptoms or early clinical response.

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Guidelines for Empiric Treatment of Urinary Tract Infection in Adults: Additional Tools

Toronto Central LHIN Emergency Department Urine *E. coli* Susceptibility (%) 2012 - 2013

Emergency Department	nitrofurantoin	TMP-SMX	ciprofloxacin	amoxicillin-clavulanate	cephalexin	cefazolin	ceftriaxone	gentamicin
MSH	96	75	79	81	52		90	92
SB	91	71	72			84	88	90
SMH	90	63	69	84		79	82	89
TEGH	94	74	80		87	86	88	92
TGH	90	66	68	75	46		87	87
TWH	93	76	75	80	54		90	90
St. Joseph's (in & out pts.)	95	84	84	88		73	97	92

Guide to Selecting Antimicrobials Used to Treat Urinary Tract Infections

Antimicrobial	Pro's	Con's
nitrofurantoin	• Lower rates of resistance • Generally well tolerated • Limited effects on resistance to other antimicrobials	• Cannot use in pyelonephritis • Unsafe with impaired creatinine clearance • Use with caution in elderly • More expensive than alternatives
TMP-SMX	• Reasonable resistance rates with *E. coli* • Lower rates of *C. difficile* than fluoro-quinolones or amoxicillin-clavulanate • Inexpensive	• Many potential adverse effects, primarily with prolonged use • Potential for drug-drug interactions • Not recommended in pregnancy
ciprofloxacin	• Reasonable resistance rates with *E. coli* • Generally well-tolerated • Allows for shorter course of therapy (especially pyelonephritis)	• Induces resistance to fluoroquinolones and other antimicrobials • Increased risk of *C. difficile* • Potential for drug-drug interactions • Risk of QT-prolongation • Relatively contraindicated in pregnancy
amoxicillin-clavulanate	• Lower rates of resistance • Fewer side effects	• Longer courses needed • Relatively broad-spectrum activity • Can cause diarrhea
cephalexin	• Generally well tolerated	• Local susceptibility rates vary • QID dosing

Approximate Antimicrobial Costs

Antibiotic	Cost/Course‡
nitrofurantoin macrocrystals 100mg po bid x 5d	$7.40
TMP-SMX 1 DS po bid x 3d	$0.30
ciprofloxacin 500mg po bid x 3d	$1.00
amoxicillin-clavulanate 875/125 po bid x 7d	$5.00
cephalexin 500mg po qid x 7d	$4.20

Antibiotic	Cost/Day
ceftriaxone 1g iv q24h	$8.10
gentamicin 5mg/kg iv q24h	$21.00 (70kg)
ciprofloxacin 400mg iv q12h	$4.20
ampicillin 1g iv q6h	$18.00

‡ Does not include dispensing fee.