Clinical Pearls - Overview of Urinary Tract Infection Treatment

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1

Financial Disclosure and Resolution

Under guidelines established under the Standards for Integrity and Independence in Accredited Continuing Education, disclosure must be made regarding relevant financial relationships with ineligible companies within the last 24 months.

Cody Cox, Pharm.D.

Resident Mentor: Jonathan Willett, Pharm.D., M.H.A., BCPS

I have no relevant financial relationships with ineligible companies to disclose.

2

Professional Practice Gap

- Observed prescribing of antibiotics not recommended as appropriate therapy by IDSA for acute uncomplicated cystitis and pyelonephritis
- Observed treatment of asymptomatic bacteriuria when it is not recommended by IDSA

IDSA= Infectious Diseases Society of America

3

Learning Objectives

At the completion of this activity, pharmacists will be able to:

- Identify first-line empiric treatment for uncomplicated urinary tract infection
- Classify patient populations that should be treated for asymptomatic bacteriuria

4

Overview

1. Background
2. Review of IDSA guideline for uncomplicated cystitis and pyelonephritis
3. Review of IDSA guideline for management of asymptomatic bacteriuria
4. Summary

IDSA= Infectious Diseases Society of America

5

Pre-Assessment Question 1

When poll is active, respond at **pollev.com/ou321**
Text **OU321** to **37607** once to join

What is the first line treatment for uncomplicated urinary tract infection?

- Ciprofloxacin 500 mg once daily for 10 days
- Trimethoprim-sulfamethoxazole 1 DS tablet once daily for 14 days
- Nitrofurantoin 100 mg twice daily for 5 days
- Cephalexin 500 mg twice daily for 5 days

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Pre-Assessment Question 2

When poll is active, respond at **pollev.com/ou321**
Text **OU321** to **37607** once to join

What is the first line treatment for pyelonephritis?

- Ciprofloxacin 500 mg once daily for 10 days
- Amoxicillin 1000 mg twice daily for 14 days
- Nitrofurantoin 100 mg twice daily for 5 days
- Levofloxacin 750 mg daily for 5 days

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1. Background

8

Background

- Urinary tract infection (UTI) is one of the most common indications for antibiotic prescribing
  - Highlights importance of antimicrobial stewardship to combat resistance
  - Resistance of common uropathogens has only increased over time
- IDSA practice guideline for acute uncomplicated cystitis and pyelonephritis in women remains the standard for UTI treatment
  - Older guideline issued in 2011
  - Currently under review
- IDSA practice guideline for ASP
  - Recently updated in 2019

ASP= asymptomatic bacteriuria
Gupta K et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women

9

2. IDSA Guideline for Uncomplicated Cystitis and Pyelonephritis

10

IDSA Guideline

- Treatment of uncomplicated cystitis
  - First line
    - Nitrofurantoin 100 mg **twice daily** for 5 days
    - Trimethoprim/sulfamethoxazole 1 double strength tablet **twice daily** for 3 days
      - Local resistance of known common uropathogens must not exceed 20%
    - Fosfomycin 3 g single dose

11

Gupta K et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women

IDSA Guideline

- Treatment of uncomplicated cystitis
  - **Alternative treatment**
  - β-Lactam agents
  - **5-7 days duration**
    - Amoxicillin/clavulanate 500 mg **twice daily**
    - Cefdinir 300 mg **twice daily**
    - Cefpodoxime 100 mg **twice daily**
    - Cephalexin 250-500 mg **every 6 hours**
  - Fluoroquinolones
    - Should only be used if other treatments cannot be used due to safety concerns and increasing resistance
    - Levofloxacin 250 mg daily for 3 days
    - Ciprofloxacin 250 mg twice daily for 3 days

12

Gupta K et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women

Clinical Pearls

Common Side Effects of Treatments	
Nitrofurantoin	Nausea, headache
Trimethoprim-sulfamethoxazole	Rash, urticarial , nausea, vomiting, hematologic, hyperkalemia
Fosfomycin	Diarrhea, nausea ,headache
β-Lactam	Diarrhea, nausea, vomiting, rash, urticaria

Gupta K et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women
Lexi-Drugs. Hudson, OH: Lexicomp, 2015.

13

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<u>Avoid</u> Use Considerations	
Nitrofurantoin	CrCl < 60 mL/min*, pregnancy >38 weeks gestation, suspected pyelonephritis
Trimethoprim/sulfamethoxazole	Sulfa allergy, pregnancy, decreased renal function
Fosfomycin	
β-Lactam	Penicillin allergy

Lexi-Drugs. Hudson, OH: Lexicomp, 2022.
*Lexicomp cites evidence for using in creatinine clearance (CrCl) >30

14

Clinical Pearls

Key Counseling Points	
Nitrofurantoin	Take with food ****increases bioavailability by 40%****
Trimethoprim-sulfamethoxazole	Take with food if nausea occurs
Fosfomycin	Mix with ½ cup of **cold** water
Amoxicillin/clavulanate	Decreased effectiveness of birth control, take with food
Cefdinir	Do not take magnesium or aluminum laxatives within 2 hours of administration
Cefpodoxime	Take with food, increased bioavailability

15

Lexi-Drugs. Hudson, OH: Lexicomp, 2022.

IDSA Guideline

Overview of Uncomplicated UTI Treatment	
First Line Agents	
Nitrofurantoin	100 mg twice daily x 5 days
Trimethoprim-sulfamethoxazole	800-160 mg twice daily x 3 days**
Fosfomycin	3 g as single dose
Alternative Agents	
Amoxicillin/clavulanate	500 mg twice daily
Cefdinir	300 mg twice daily
Cefpodoxime	100 mg twice daily
Cephalexin	250-500 mg 4 times daily

**Local resistance must not exceed 20%

16

Gupta K et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women

IDSA Guideline

- Treatment of pyelonephritis
  - Must obtain urine culture with susceptibility
  - **Not requiring hospitalization**
    - Ciprofloxacin 500 mg twice daily for 7 days
      - With or without initial 400 mg IV dose
    - Ciprofloxacin ER 1,000 mg once daily for 7 days
    - Levofloxacin 750 mg daily for 5 days
    - Trimethoprim-sulfamethoxazole 160/800 mg twice daily for 14 days
      - For known susceptibility
      - If not known, 1-time 1 gram ceftriaxone dose in addition
    - β-Lactam agents are less effective
      - Require 1 gram ceftriaxone dose in addition and 10-14 days of therapy
  - **Requiring hospitalization**
    - IV regime→ fluoroquinolone, aminoglycoside ± ampicillin, extended-spectrum cephalosporin or penicillin, or carbapenum
  - Unclear what resistance level requires alternate therapy

17

Gupta K et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women

IDSA Guideline

Avoid Use Considerations	
Fluoroquinolones	**Elderly:** Adverse effects (eg, hepatotoxicity, tendon rupture, QT changes, aortic dissection) may be increased in the elderly **Renal impairment:** Use with caution in patients with renal impairment; dosage adjustment required **History of seizures**

18

Lexi-Drugs. Hudson, OH: Lexicomp, 2022.

3. IDSA Guideline for Management of Asymptomatic Bacteriuria

19

IDSA Guideline

- Asymptomatic bacteriuria (ASB)→ presence of 1 or more bacteria species with ≥10^5 CFU/mL
  - Pyuria does not matter
  - Absence of signs or symptoms of UTI
- Common in healthy female populations
- Occurs in women or men with impaired voiding
- UTI symptoms→ increased urinary frequency, urgency, dysuria, and costovertebral tenderness
- **Bottom line** → treat pregnant women and endoscopic urologic procedures with mucosal trauma

CFU= colony forming units

Nicolle LE, Clinical Practice Guideline For the Management of Asymptomatic Bacteriuria

20

IDSA Guideline

- **Do not** screen or treat
  - Pediatrics
  - Nonpregnant women
  - Functionally impaired older women or men in the community
  - Functionally impaired older men or women in long-term care facilities
  - Diabetic patients
  - Kidney transplant >1 month
    - Insufficient evidence for <1 month
  - Other solid organ transplant
  - Spinal cord injury
  - Indwelling catheters long and short term <30 or >30 days)
  - Nonurologic surgery
  - Implantation of urologic devices

21

Nicolle LE, Clinical Practice Guideline For the Management of Asymptomatic Bacteriuria

IDSA Guideline

- **Treat**
  - Pregnant women → 4-7 days of antimicrobial therapy
  - Endoscopic urologic procedures with mucosal trauma
- Consider ruling out other causes before treating
  - Older patients with cognitive impairment with delirium and absence of systemic signs of infection
- Consider prophylactic treatment before indwelling catheter removal
  - No recommendation by IDSA (lack of evidence)
- Consider treating high-neutropenia (ANC <100 cells/mm^3)
  - No recommendation by IDSA (lack of evidence)

ANC= absolute neutrophil count

22

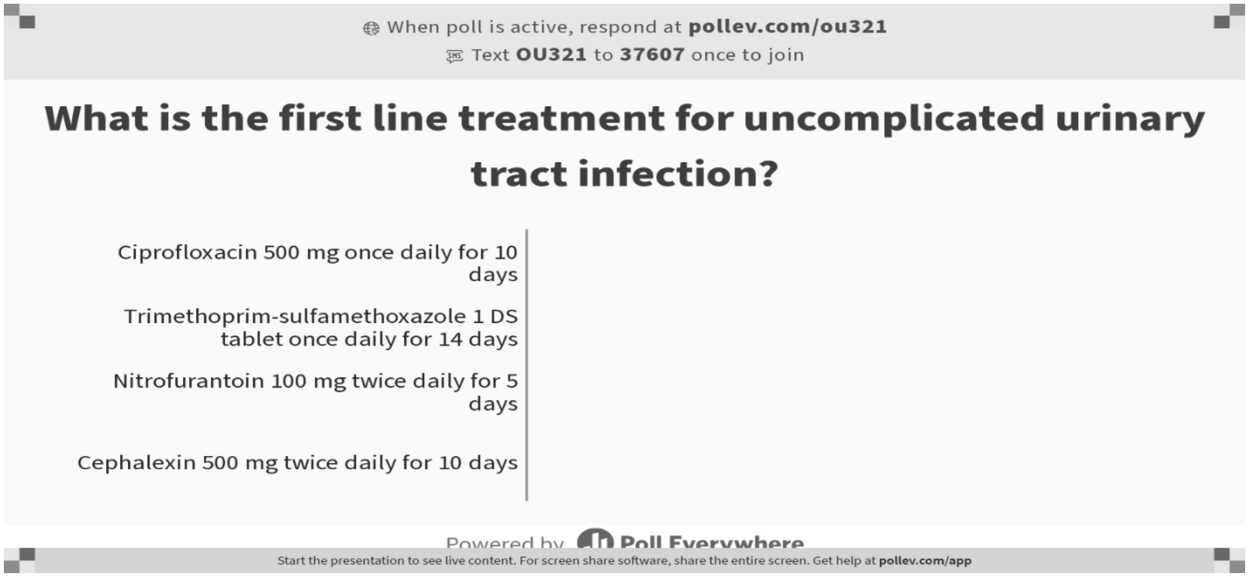
Nicolle LE, Clinical Practice Guideline For the Management of Asymptomatic Bacteriuria

Conclusion and Clinical Pearls

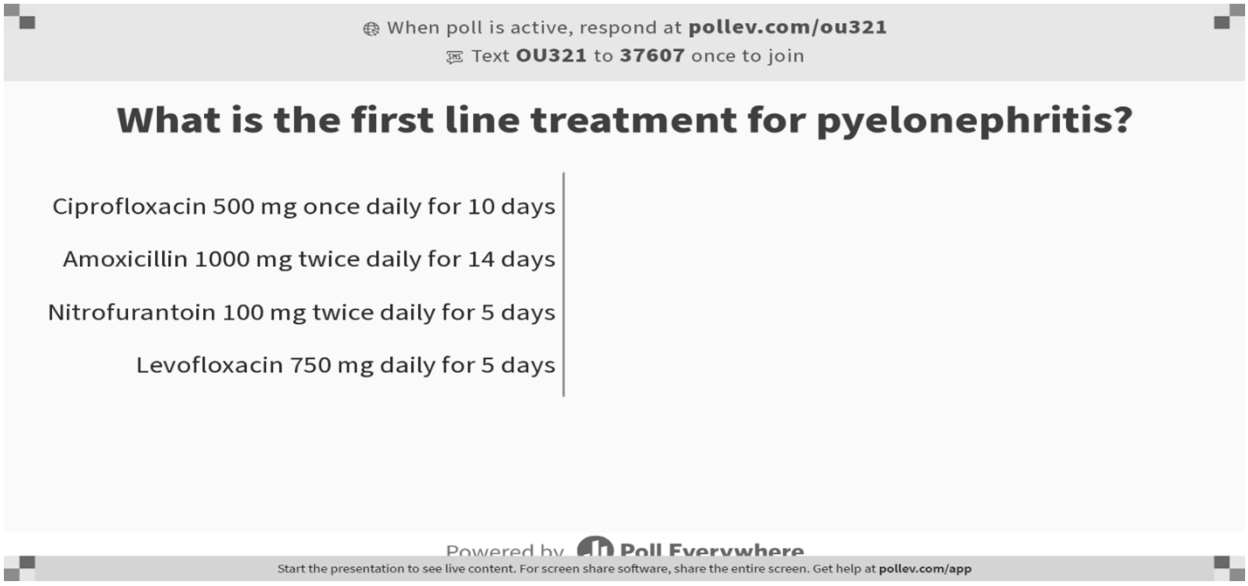
- Urinary tract infections are one of the most common indications for antibiotics
- Highlights importance of antimicrobial stewardship
- Pharmacists play a key role in recommending appropriate antibiotics
- Uncomplicated UTI treatment first line therapy
  - Nitrofurantoin 100 mg twice daily x5 days
- Pyelonephritis first line treatment
  - Levofloxacin 750 mg daily x5 days or ciprofloxacin 500 mg twice daily x7 days
- Only patients requiring screening and treatment for asymptomatic bacteriuria
  - Pregnant women and endoscopic urologic procedures with mucosal trauma

23

Post-Assessment Question 1



Post-Assessment Question 2



Thank You

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26

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1. Gupta K, Hooton TM, Naber KG, 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. Clinical Infectious Diseases. 2011;52(5). doi:10.1093/cid/ciq257
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27

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28