Treatment of Urinary Tract Infections in Geriatric Patients

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I, Spencer Durham, have no actual or potential conflict of interest in relation to this program.
Objectives

• At the end of the presentation, the audience will be able to:
  – List the reasons why elderly patients are more at risk for UTIs than the general population
  – Apply principles and concepts from the guidelines for the treatment of UTIs in otherwise healthy women to the geriatric population
  – Identify specific antibiotics that may be used for the treatment of UTIs in elderly patients
  – Identify clinical scenarios when the use of specific antibiotics would be both appropriate and inappropriate for elderly patients
A.P. is a 73 year old WF who presents to her PCP with complaints of burning upon urination and dark, discolored urine for 2 days.

- Allergies: NKDA
- PMH: DM, HTN, dyslipidemia
- Meds: insulin, atorvastatin, lisinopril, HCTZ
- PE: BP 136/84; HR 70; RR 22; Temp 98.4
Introductory Case

- What lab tests should be ordered for the patient at this time?
- What drug therapy should be initiated at this time?
- What is the most appropriate duration of therapy?
• Urinary tract infections
  – Broad term that encompasses multiple different disease states
    • Acute cystitis
    • Pyelonephritis
    • Prostatitis
• Common occurrence in the female population across all ages of life
• About equal occurrence in men and women after age 65
Classification

- **Lower UTI**
  - Involvement of the bladder, urethra, prostate, or epididymis
- **Upper UTI**
  - Kidney involvement
- **Uncomplicated**
- **Complicated**
• Two primary mechanisms

  – Ascending infection
    • Bacteria from outside the body (usually fecal matter) colonize the urethra and spread to the bladder
    • Most common means of infection

  – Descending infection (hematogenous)
    • Bacteria from the bloodstream settle in the kidneys and bladder
    • Very rare, likely <5% of all UTIs
Risk Factors

- Female gender
  - Females have an inherently shorter urethra, making ascending entry to the bladder much easier than in men
- Sexual activity
- Pregnancy
- Birth control
  - Diaphragm use
  - Spermicide use
Risk Factors

• Conditions that cause nerve impairment
  – Diabetes
  – MS
  – Parkinson’s disease
  – Spinal cord injuries

• Obstructions
  – Enlarged prostate
  – Kidney stone
Risk Factors

• Anatomical abnormalities
  – Vesicoureteral reflux (VUR)
• Catheter use
• Menopause
• Antibiotic use
• Compromised immune system
Risk Factors in Geriatric Patients

- Hormonal changes
  - Changes to vaginal pH
- Neurologic diseases
  - Parkinson’s disease
- Benign prostatic hypertrophy
- Diabetes
- Weaker immune systems
- Poor personal hygiene
• Acute cystitis – *localized* symptoms
  – Painful urination
    • Classic and most common symptom
  – Urinary urgency
  – Increased urinary frequency
  – Nocturia
  – Suprapubic heaviness
• Pyelonephritis
  – Typically associated with more systemic signs and symptoms
    • Fever
    • Flank pain
    • Nausea/vomiting
    • Malaise
Signs and Symptoms

- Geriatric patients
  - Signs and symptoms may be much less pronounced
  - Atypical signs and symptoms
    - Incontinence
    - Altered mental status
      - Confusion
    - Behavioral changes
    - Change in eating habits
Common Pathogens

• Most common
  – *Escherichia coli*
    • 85% of uncomplicated UTIs
  – *Klebsiella pneumoniae*
  – *Proteus* species

• Less common
  – *Staphylococcus saprophyticus*
  – *Enterococcus* species
  – *Pseudomonas aeruginosa* and other GNRs
Common Pathogens

• The common pathogens are similar in geriatric patients
• *E.coli* still accounts for the majority of infections
• Other gram-negative organisms have a higher prevalence
• Gram-positive organisms, such as *Enterococcus*, are more prevalent
• In young, otherwise healthy women, diagnosis can be made on signs and symptoms alone

• Urinalysis
  – Highly beneficial for initial screening for UTIs
  – Should be performed as a midstream clean-catch sample for highest accuracy
  • Contamination may occur and offset the results if not performed correctly
• **Urinalysis**
  
  – Abnormalities include presence of:
    
    • Bacteria
    • Leukocyte esterase
    • RBC
    • Nitrites
      
      – Produced by:
        
        » *E.coli*
        » *Klebsiella*
        » *Proteus*
Diagnosis

• Urine culture
  – Vital for targeted antimicrobial therapy
  – >100,000 CFUs of *one* pathogenic organism is diagnostic
  – Should be performed in:
    • Suspected pyelonephritis or complicated infection
    • Uncomplicated cases with symptoms not resolving
    • Catheter-associated infections
    • Geriatric patients
    • Male patients
Question 1

- Which of the following signs and symptoms of uncomplicated cystitis would an 83 year old female be most likely to experience?
  - A) Fever
  - B) Suprapubic heaviness
  - C) Increased confusion
  - D) Nausea
• Which of the following pathogens would most likely cause a UTI in a 78 year old, non-catheterized male patient?

– A) *Klebsiella pneumoniae*
– B) *Enterococcus faecalis*
– C) *Pseudomonas aeruginosa*
– D) *Staphylococcus aureus*
Guidelines associated with UTIs

- Treatment of acute cystitis and pyelonephritis in otherwise healthy women
- Treatment of catheter-associated UTIs
- Treatment of asymptomatic bacteriuria

None of the guidelines make specific recommendations for geriatric patients
• Strong, well-designed clinical trials are lacking for the geriatric population
• Treatment for geriatric patients is largely based on:
  – Data extrapolated from studies performed in otherwise healthy women
  – Clinical experience
Highlights of Guidelines for Uncomplicated Cystitis

- Preferred treatment options:
  - Nitrofurantoin
  - Trimethoprim/sulfamethoxazole (TMP/SMX)
  - Fosfomycin

- Non-preferred options
  - Fluoroquinolones
  - Beta-lactams
Highlights of Guidelines for Uncomplicated Cystitis

• Nitrofurantoin
• Broad-spectrum antimicrobial active against most common UTI pathogens
• Distributes only to the GU tract
• 5 day treatment recommended
• Cannot use in CrCl <60 mL/min
  – Some sources claim effectiveness down to 40 mL/min
Highlights of Guidelines for Uncomplicated Cystitis

- Trimethoprim/sulfamethoxazole (TMP/SMX)
- Highly efficacious 3-day treatment regimen
- Achieves high concentrations in the GU tract
- Active against most common pathogens
- Should not be used *empirically* if *E. coli* resistance in the area is >20%
Highlights of Guidelines for Uncomplicated Cystitis

- Fosfomycin
- Broad-spectrum agent
- Efficacious as a one-time dose
  - Available as an oral powder for suspension
- Inferior efficacy compared to other first-line options
- Useful in patients with potential compliance issues
Highlights of Guidelines For Uncomplicated Cystitis

- Fluoroquinolones
  - Ciprofloxacin
  - Levofloxacin
- Highly efficacious in 3 day treatment regimens
- Potent bactericidal activity and achieves excellent concentrations in the urine
- High propensity for collateral damage
- Should be reserved for cases when other options cannot be used
• In May 2016, FDA issued a new Black Box Warning for the fluoroquinolones:
  – ADRs outweigh the potential benefits for patients with sinusitis, bronchitis, and *uncomplicated UTIs*
  – Fluoroquinolones should be reserved for these patients when there is not alternative treatment option
Highlights of Guidelines for Uncomplicated Cystitis

• Beta-lactams
• Useful in 3-7 day treatment regimens
• Less effective and higher incidence of adverse effects compared to other first-line agents
• Use when other agents cannot be used
• Amoxicillin should NOT be used for the EMPIRIC treatment of UTIs
• What recommendations from the guidelines can be extrapolated to geriatric patients?
  – Same general pharmacologic options can be utilized
  – Rationales for restricted use of the fluoroquinolones and the beta-lactams
  – Empiric use of trimethoprim/sulfamethoxazole
    • Likely should not use when community or institutional resistance is >20%
General Recommendations for Geriatric Patients

• What recommendations from the guidelines should NOT be extrapolated to geriatric patients?
  – Use of nitrofurantoin
    • Many geriatric patients will not be candidates due to CrCl
  – Fosfomycin not well-studied
  – Length of therapy recommendations associated with each drug not applicable to geriatrics
General Recommendations for Geriatric Patients

• In general, obtain urinalysis and urine culture
  – UA may help guide empiric therapy
  – Culture is useful to target therapy, especially since pathogens may be more varied in geriatrics

• Empiric therapy should be based on local or institutional antibiogram
  – If one is not available, consider using state antibiogram
Pharmacotherapy for Geriatric Patients

- Trimethoprim/sulfamethoxazole is still a prudent option if area susceptibility is appropriate.
  - Also a good option for targeted therapy if culture results are known

- Fluoroquinolones as empiric therapy should be reserved for cases where there is no good alternative option
Pharmacotherapy for Geriatric Patients

• Beta-lactams may be considered a first-line therapy for many geriatric patients
  – Efficacious options that likely have good susceptibility to the major pathogens
  – From a resistance standpoint, these may be bet

• Specific agents to consider
  – Amoxicillin/clavulanate
  – Cefpodoxime
  – Cefdinir
Pharmacotherapy for Geriatric Patients

• If culture results are obtained, try to target therapy with the most narrow-spectrum yet effective option available

• Length of therapy should generally be 7 days
  – Consider 10-14 day durations if clinical response is suboptimal or delayed
  – Can also consider longer courses if the infection is considered complicated
A.P. is a 73 year old WF who presents to her PCP with complaints of burning upon urination and dark, discolored urine for 2 days.

- Allergies: NKDA
- PMH: DM, HTN, dyslipidemia
- Meds: insulin, atorvastatin, lisinopril, HCTZ
- PE: BP 136/84; HR 70; RR 22; Temp 98.4
• What lab tests should be ordered for the patient at this time?
• What drug therapy should be initiated at this time?
• What is the most appropriate duration of therapy?
Question 3

- T.I. is an 84-year-old female who is diagnosed with an uncomplicated UTI by her PCP. Her PCP asks for your recommendation on an empiric antimicrobial.
- Allergies: NKDA
- PMH: Dementia, CHF, HTN
- Meds: metoprolol, lisinopril, furosemide, memantine
- PE: BP 140/90; HR 76; RR 22; Temp 97.7
- The local antibiogram shows *E.coli* susceptibility to TMP/SMX is 72%.
Which of the following would be the most appropriate recommendation for T.I. at this time?

A) Cefpodoxime
B) Nitrofurantoin
C) TMP/SMX
D) Ciprofloxacin
• What should be the recommended duration of therapy for T.I.
  – A) 3 days
  – B) 5 days
  – C) 7 days
  – D) 10 days
• Diagnosis and treatment of catheter-associated UTIs are difficult for the clinician.
• Patients are often asymptomatic, except for visible changes in color/clarity of voided urine, and this is not specific or diagnostic for infection.
• Catheter colonization by bacteria is inevitable and does not indicate that a true infection is occurring.
Catheter-associated UTIs

- Urinalysis results are often unreliable
  - Abnormalities associated with infection in non-catheterized patients are common in patients with catheters
    - Presence of bacteria
    - WBC and leukocyte esterase
    - RBC
- Diagnosis should **not** be made on urinalysis results alone
Catheter-associated UTIs

• Urine cultures should always be obtained prior to initiating antimicrobial therapy
• If the catheter has been in place for >2 weeks at the onset of infection, the catheter should be replaced
• The culture should be obtained from the newly replaced catheter
Catheter-associated UTIs

- Guidelines do not recommend any specific antimicrobial agents
- Empiric treatment should be based on local antibiogram
- Duration of therapy
  - 7 days for patients with fast resolution of symptoms
  - 10-14 days for patients with a slower or delayed symptomatic response
• Which of the following abnormalities on a UA would be unexpected in a patient with a chronic indwelling Foley catheter?
  – A) Presence of bacteria
  – B) Positive for leukocyte esterase
  – C) Positive for nitrites
  – D) Presence of RBC
QUESTIONS???