

Internal Medicine Small Group Activity (Facilitator Notes)

Curriculum for Antimicrobial Stewardship

Facilitator instructions:

- Read through the facilitator notes and make note of discussion points for each scenario
- Locate your local antibiogram, become familiar with the interpretation of your local susceptibility data

Objectives:

At the completion of this small group activity, the learner should be able to:

1. Define asymptomatic bacteriuria
2. Describe the patients for whom screening and treatment of asymptomatic bacteriuria is appropriate
3. Locate and interpret local antibiogram data
4. Discuss the concept of appropriate antibiotic de-escalation

Case Scenario #1: You are on the General Medicine inpatient service admitting Mrs. Jones, a 62-year-old female, to your hospital. You are called to admit her for management of a congestive heart failure exacerbation. While you are evaluating her, you find that a urinalysis was obtained while the patient was in the Emergency Department. The urinalysis was positive for leukocyte esterase and 5-10 white blood cells. A urine gram stain was performed and showed 1+ white blood cells and many gram-negative rods. In addition to initiating appropriate treatment for her congestive heart failure, how should you proceed with regards to her urinalysis results?

This patient may have asymptomatic bacteriuria, which is the isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen obtained from a person without symptoms or signs referable to urinary infection. It would be important to ask her if she is having symptoms suggestive of cystitis (such as dysuria, urinary urgency, frequency or suprapubic pain) or symptoms of pyelonephritis (such as fever or flank pain). It is important to note that the presence of pyuria in patients with asymptomatic bacteriuria is very common (>90% prevalence) and does not necessitate antimicrobial treatment (unless the patient is pregnant or undergoing a urologic procedure where bleeding is anticipated).

Case Scenario #2: You are in the Internal Medicine pre-operative assessment clinic seeing Mr. Jackson, a 73-year-old male with benign prostatic hypertrophy, chronic obstructive pulmonary disease, hypertension and coronary artery disease who is scheduled to undergo transurethral resection of the prostate (TURP). He states that he has been feeling well and denies fevers, chills or any new urinary symptoms. Would you perform a urinalysis and culture in this patient? If so, why?

This patient is scheduled to undergo a TURP, a urologic procedure for which mucosal bleeding is anticipated. Screening for and treatment of asymptomatic bacteriuria should be performed before TURP. Results of the urine culture should be available to direct antimicrobial therapy prior to the procedure. Antimicrobial therapy should be initiated shortly before the procedure and should not be continued after the procedure, unless an indwelling catheter remains in place. Screening for and treatment of asymptomatic bacteriuria is recommended before other urologic procedures for which mucosal bleeding is anticipated as well. Screening for and treatment of asymptomatic bacteriuria should also be performed in pregnant women, at least once in early pregnancy. Screening for and treatment of asymptomatic bacteriuria is NOT recommended in the following persons: Premenopausal, nonpregnant women; diabetic women; older persons living in the community; elderly, institutionalized subjects; persons with spinal cord injury; and catheterized patients while the catheter remains in situ.

Case Scenario #3: You are in the Internal Medicine outpatient clinic seeing Ms. Brown, a 44-year-old female. She began to experience fevers to 103°F, flank pain, nausea and vomiting yesterday and is now unable to keep down anything she takes by mouth. She has costovertebral angle tenderness on physical examination. Her urinalysis is positive for leukocyte esterase and reveals 20-40 white blood cells. She has no medication allergies and is otherwise healthy. You diagnose Ms. Brown with acute pyelonephritis and would like to start her on ceftriaxone 1gm IV q 24 hours. However, your upper level resident asks you if intravenous ciprofloxacin might also be a reasonable choice for empiric antimicrobial therapy in this patient. What information do you need to know in order to answer this question? How can you find this information?

*Empiric antimicrobial therapy for pyelonephritis should provide good coverage of suspected bacterial pathogens. The microbial spectrum of uncomplicated cystitis and pyelonephritis consists mainly of *Escherichia coli* (75%–95%), with occasional other species of *Enterobacteriaceae*, such as *Proteus mirabilis* and *Klebsiella pneumoniae*, and *Staphylococcus saprophyticus*. In order to know whether intravenous ciprofloxacin is a reasonable choice for the empiric treatment of pyelonephritis in a patient who requires hospitalization, it is important to know your local susceptibility data. Ciprofloxacin would not be recommended for empiric therapy of pyelonephritis in hospitalized patients when local susceptibility data shows >10% resistance to fluoroquinolones among community uropathogens. Locate your local antibiogram. Ask your group members to locate your local antibiogram. Ask your group to find the susceptibilities among *E. coli* to ciprofloxacin and ceftriaxone. Be sure to help your group identify if the susceptibilities are specific to *E. coli* from urine sources or if isolates from other sources were included. Also, were the susceptibilities based on isolates from inpatients, outpatients, patients in the intensive care unit or were all isolates included?*

Case Scenario #4: You are starting on the inpatient General Medicine service and are assuming care of Ms. Smith, an 84-year-old female who was initially admitted from an assisted living facility for respiratory failure due to a pulmonary embolus. She has had a prolonged hospitalization, but was weaned from the ventilator and is no longer hypoxic. She

still has an indwelling foley catheter in place. During her hospitalization, she developed a fever. Blood cultures, a chest x-ray and a urinalysis with culture were obtained. The urinalysis revealed leukocyte esterase and 20-40 white blood cells. She was started empirically on intravenous piperacillin-tazobactam. A chest x-ray was obtained and showed no acute cardiopulmonary disease. 72 hours later, her fever has resolved. Her blood cultures are negative. Her urine culture shows 10^5 cfu/ml of *K. pneumoniae* sensitive to piperacillin, piperacillin-tazobactam, ceftriaxone, cefepime, meropenem, ciprofloxacin and tobramycin, but resistant to TMP/SMX (Bactrim). She has no allergies. You anticipate that she will be discharged to a skilled nursing facility within the next 48 hours. What changes, if any, should be made to her antimicrobial regimen? Why?

*After empiric antibiotic therapy has been initiated, the regimen should be re-assessed at 72 hours to determine whether discontinuation or de-escalation/streamlining of antimicrobial therapy is appropriate. All existing culture and sensitivity data should be examined at 72 hours and should be used to guide antimicrobial decision making. In this case, antimicrobial therapy could be de-escalated from broad therapy with piperacillin-tazobactam to a more narrow-spectrum antibiotic such as ciprofloxacin or ceftriaxone based on the sensitivity results of the patient's *K. pneumoniae* isolated from her urine culture. Also, an assessment should be made to determine whether or not the patient's foley catheter is necessary as any unnecessary catheters or lines should be removed as soon as possible.*

Scenario #5: You are in the General Medicine outpatient clinic seeing Ms. Johnson. She is a 96-year-old nursing home resident. The nursing home staff reports malodorous urine as well as altered mental status, which has steadily worsened over the past two days. She is afebrile and has not had any other focal symptoms. Her urinalysis is positive for leukocyte esterase and many bacteria with 20-40 white blood cells. What is the most appropriate next step in her management?

*This patient has altered mental status without other signs of sepsis. Changes in mental status are often multi-factorial in nursing home residents. A change in mental status alone should not prompt empirical antibiotic therapy for urinary tract infection. Therefore, the most appropriate next step in her management is to withhold antimicrobial therapy at this time and continue the workup for etiologies of her altered mental status. Of note, the presence of pyuria does not warrant antimicrobial treatment and is very common in certain patient populations. For example, 50% of all long-term care facility residents over the age of will have pyuria (>10 wbc/hpf). 50% of all patients with spinal cord injuries will have pyuria as well. Nearly 100% of patients who have either chronic urinary catheters, ureteral stents or ileal loop conduits will have pyuria. Antibiotics are commonly overprescribed in nursing home residents with bacteriuria or pyuria. This leads to increased adverse drug events (such a *Clostridium difficile* infection and renal dysfunction) and the selection of multi-drug resistant bacteria.*

Resources:

- Nicolle LE, Bradley S, Colgan R, Rice JC, Schaeffer A, Hooton TM. Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults. Published in: *Clinical Infectious Diseases* 2005; 40:643–54. Also available at www.idsociety.org
- Gupta K, Hooton TM, Naber KG, Wullt B, Colgan R, Miller LG, Moran GJ, Nicolle LE, Raz R, Schaeffer AJ, Soper DE. Guidelines for Antimicrobial Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women. Published in: *Clinical Infectious Diseases* 2011; 52:e103-e120. Also available at www.idsociety.org
- Hooton TM, Bradley SF, Cardenas DD, Colgan R, Geerlings SE, Rice JC, Saint S, Schaeffer AJ, Tambayh PA, Tenke P, Nicolle LE. Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. Published in: *Clinical Infectious Diseases* 2010; 50:625-663. Also available at www.idsociety.org
- Woodford HJ, George J. Diagnosis and Management of Urinary Tract Infection in Hospitalized Older People. *Journal of the American Geriatrics Society* 2009;57:113-49
- Rituparna D, Towle V, Van Ness PH, Juthani-Mehta M. Adverse Outcomes in Nursing Home Residents with Increased Episodes of Observed Bacteriuria. *Infection Control and Hospital Epidemiology* 2011;32(1):84-6