**Urinary Tract Infections: Treatment and De-escalation**

****The previous article “Urinary Uncertainty: Desmystifying Culture Collection in Urinary Tract Infections (UTI)” discussed the antimicrobial stewardship principles of diagnostic testing for UTIs. As a follow-up in the series focusing on UTIs, this article will discuss antimicrobial stewardship principles of treatment and de-escalation which include a follow-up assessment of the continued need for antibiotic therapy, recommendations for antibiotic therapy choices, balancing treatment efficacy and severity of illness, and using the results of cultures and diagnostic tests to de-escalate to the lowest risk, most effective regimen for the patient.1

***Asymptomatic Bacteriuria (ASB):***

Updated practice guidelines from 2019 define ASB as the “presence of 1 or more species of bacteria growing in the urine at specified quantitative counts (> 105 CFU/mL), irrespective of the presence of pyuria, in the absence of signs or symptoms attributable to urinary tract infection (UTI).” It is a common finding particularly in elderly persons in long term care facilities, where it can occur in up to 50% of residents, and persons with long term indwelling catheters (100%).2

ASB guidelines direct that ASB should NOT be screened for and should NOT be treated in the majority of patients. The two exceptions for which screening and treatment for ASB are indicated are 1) pregnant women and 2) patients undergoing endoscopic urologic procedures associated with mucosal trauma.2 It is recommended that pregnant women receive 4-7 days of antibiotic treatment, using the shortest effective course depending on the antibiotic selected (see A2SC guidelines for guidance on possible agents).2 Patients undergoing urologic procedures should receive a short course (1 or 2 doses) initiated 30-60 minutes prior to the procedure. Selection of an antibiotic in this case would be directed therapy based on pre- procedure screening urine culture and susceptibility results.2

Inappropriate treatment of ASB with antibiotics has been a significant driver of antibiotic resistance in addition to placing patients at risk for adverse events such as *Clostridioides difficile* infection and adverse drug effects.2 When presented with results from a urinalysis and urine culture, the clinician must take into context the original indication for performing the test. If no localizing symptoms referable to the urinary tract were present, presence of bacteria in urine culture would not indicate infection but asymptomatic bacteriuria and should be labeled as such rather than as infection. Bacteriuria and delirium are commonly found together in older adults and causal relationships can be erroneously made. Delirium, falls or confusion by themselves, without localizing genitourinary symptoms, are not symptoms associated with UTIs. Mental status changes and ASB is not an indication for antibiotic treatment. However, if patients have signs and/or symptoms of systemic infection antibiotic therapy would be warranted.2

***Acute Cystitis and Pyelonephritis***

Urine cultures are not typically required in the outpatient care setting for uncomplicated acute cystitis in women without risk factors for resistant pathogens. In those cases, empiric treatment options recommended by the A2SC guidelines include nitrofurantoin (100mg twice daily for 5 days) or cephalexin (500mg twice daily for 7 days).3 Bactrim, endorsed by the IDSA for uncomplicated cystitis, is generally not recommended as an empiric choice in the State of Alaska at this time due to *E coli* resistance rates exceeding 20%4; however, this would be an appropriate choice if susceptibilities to Bactrim were known or local susceptibilities varied from those outlined by the State of Alaska antibiogram. The cost and availability for fosfomycin somewhat limit it’s use, but it is also endorsed by IDSA guidelines and remains an option for cystitis when available. Fluoroquinolones are effective in 3 day regimens but are not preferred for uncomplicated cystitis and should only be used if the first line options are not appropriate. Fluoroquinolones have a high propensity for collateral damage (selection of drug resistant organisms) and their adverse effects limit their use in uncomplicated cystitis.3

For those patients with acute pyelonephritis, ideally cultures should have been obtained prior to the initiation of antibiotic therapy. Empiric treatment can begin with an extended spectrum cephalosporin (such as ceftriaxone 1gm), a fluoroquinolone (if resistance rates of E coli do not exceed 10%), or a consolidated 24-h dose of an aminoglycoside. Other options including extended-spectrum penicillins or carbapenems may be selected depending on local resistance data. Once cultures and susceptibilities are available, therapy should be reviewed and de- escalated to the most effective, narrowest spectrum, safest regimen taking into consideration patient specific factors (allergies, drug interactions/contraindications, compliance etc). Recommended regimens (based on known susceptibilities) include fluoroquinolones (ciprofloxacin 7 days, levofloxacin 5 days), TMP/SMX (10-14 days) and cephalosporins (10-14 days) and switch from IV to PO therapy if this has not already been initiated.3 Of note, nitrofurantoin and fosfomycin are not indicated for pyelonephritis or perinephric abscesses and are inappropriate choices as step down therapy for pyelonephritis.

***Complicated UTI***

Complicated UTI encompasses a variety of syndromes including catheter-associated UTI (CAUTI), UTI in males, UTI in the presence of urologic abnormalities and UTI during pregnancy. In addition to antibiotic therapy, source control measures may need to be undertaken. Empiric therapy should be based on prior culture data if available, how ill the patient appears and whether the symptoms are more suggestive of a lower urinary tract infection (cystitis) versus an upper urinary tract infection (pyelonephritis). Definitive therapy will be dependent on culture and susceptibility results. Shorter courses of therapy (7 days) are reasonable if symptoms promptly resolve and longer courses (10-14 days) if there is a delayed response to therapy. Oral cephalosporins, fluoroquinolone and TMP/SMX can all be used as options for oral step down therapy, factoring in the time on IV therapy when determining total duration. If bacteremia is present, the selection of an agent with high oral bioavailability such as fluoroquinolones and TMP/SMX may be preferred.5,6

For more information on the diagnosis, testing, and treatment of urinary tract infections, please refer to the Alaska Antimicrobial Stewardship Collaborative’s statewide UTI guidelines.

1. Antibiotic Stewardship Statement for Antibiotic Guidelines - Recommendations of the Healthcare Infection Control Practices Advisory Committee. [www.cdc.gov/hicpac/](http://www.cdc.gov/hicpac/) recommendations/antibiotic-stewardship.html accessed 9/23/19.

2. Nicolle LE, Gupta K, Bradley S, et al. Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria: 2019 Update by the Infectious Diseases Society of America. CID 2019;68(10):e83–e110,

3. 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 Disease Society of America and the European Society for Microbiology and Infectious Diseases. CID 2011;52(5):e103-e120.

4. Alaska Antibiogram 2018. Available at [www.ashnha.com/wp-content/uploads/2019/09/](http://www.ashnha.com/wp-content/uploads/2019/09/) AK-2018-Antibiograms.pdf. Access 10/1/19

 5. Hooton TM, Bradley SF, Cardenas DD, et al. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 international clinical practice guidelines from the Infectious Diseases Society of America. CID 2010;50:625-663.

6. AHRQ Safety Program for Improving Antibiotic Use. Asymptomatic Bacteriuria and Urinary Tract Infections 3/3/18.