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Clinical pearls in infectious diseases

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Case 1

A 33-year-old male with diffuse large B-cell lymphoma is admitted to the hospital with undifferentiated fever 7 days after chemotherapy with R-CHOP. He has not recently received any antimicrobials.

BP = 125/85, HR = 85, Temp = 39.0°C, O_2 saturation: 98%; skin: no erythema, warmth, or tenderness surrounding right chest tunneled central venous catheter; ENT: no evidence of mucositis; lungs: clear.

Absolute neutrophil count: undetectable. Chest x-ray is normal, urine and blood cultures are drawn, and results are pending.

Which of the following is the best empiric antimicrobial regimen?

A. IV ertapenem + po azithromycin
B. IV ceftriaxone
C. IV cefepime
D. IV ceftazidime + IV vancomycin
E. No antimicrobials are needed at this time

Discussion

The patient is at high risk of complication from neutropenic fever having undergone chemotherapy for lymphoma and having profound neutropenia (ANC $\leq$ 100) expected to last $\geq$7 days. As such, inpatient treatment with empiric intravenous antimicrobials is indicated. As septicemia with gram-negative organisms (especially *Pseudomonas*) has the highest risk of morbidity and mortality, the empiric antimicrobial choice needs to cover these organisms. Viridans group streptococci are also important pathogens in neutropenic fever, especially in those with mucositis. Although ertapenem + azithromycin and ceftriaxone have coverage of viridans strep and most gram negatives, neither covers *Pseudomonas* and they are thus not recommended for empiric coverage. In order to cover MRSA, resistant pneumococci, and resistant viridans strep, empiric addition of vancomycin is indicated in neutropenic patients with evidence of hemodynamic compromise, pneumonia, skin and soft tissue infection, overt central line infection, or severe mucositis. In the

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absence of these indications, there is no morbidity or mortality difference between neutropenic patients with gram-positive bloodstream infection in whom vancomycin was added empirically at admission and those in whom vancomycin was added when blood cultures were later found to be positive. One can consider adding vancomycin empirically at admission in neutropenic patients who have received neutropenic prophylaxis with a fluoroquinolone antimicrobial and have a central venous catheter in place. For this patient, he has none of the above indications for the empiric addition of vancomycin, and cefepime monotherapy is the preferred regimen.

Clinical pearl

In the absence of specific indications for coverage of resistant gram-positive organisms, cefepime monotherapy is the preferred empiric regimen for neutropenic fever.

Reference

1. Freifeld AG, Bow EJ, Sepkowitz KA, et al. Clinical practice guideline for the use of antimicrobial agents in neutropenic patients with cancer: 2010 update by the infectious diseases society of America. *Clin Infect Dis*. 2011;52(4):e56–e93. doi: 10.1093/cid/cir073. PMID:21258094.

Case 2

A 23-year-old woman without any significant medical comorbidities presents as an outpatient with dysuria and increased urinary frequency. She has no evidence of systemic illness. She has a documented sulfa allergy (urticarial). Dipstick urine test is positive for leukocytes and nitrites, and urine pregnancy test is negative.

Which of the following is a recommended first-line antimicrobial regimen for the treatment of uncomplicated urinary tract infection in this patient?

A. Trimethoprim–sulfamethoxazole
B. Ciprofloxacin
C. Amoxicillin–clavulanic acid
D. Cefuroxime
E. Fosfomycin

Discussion

In the most recent IDSA guidelines on uncomplicated UTIs, there are three first-line antimicrobials recommended that are available in the United States: nitrofurantoin, trimethoprim–sulfamethoxazole, and fosfomycin. These were selected as they have shown efficacy in treating illness and have minimal “collateral” damage to the normal gut microflora, thereby reducing the antimicrobial pressure toward resistance. Fluoroquinolones and beta-lactam antimicrobials are not considered first-line, in part due to their collateral damage to the normal microflora. In this patient, she is allergic to sulfa drugs, and thus only fosfomycin would be a recommended first-line agent.

Clinical pearl

Trimethoprim–sulfamethoxazole, fosfomycin, and nitrofurantoin are the three first-line agents available in the United States for the treatment of uncomplicated urinary tract infection.