Kentucky Antimicrobial Stewardship Innovation Consortium

Educational Pearl

Dual β-lactam Indications

β-lactam antibiotics include penicillins, cephalosporins, monobactams, and carbapenems. They are commonly recommended as first line options either as monotherapy or in combination with an antibiotic of another class in treatment of most infections. Dual β-lactam therapy may be ordered in error (e.g. escalating or de-escalating spectrum without discontinuing prior orders), in which case discontinuation of at least one β-lactam is needed. However, there are several instances where dual β-lactam therapy is intentional.

What are some indications for dual β-lactam therapy?

1. Empiric meningitis therapy
    a. Ampicillin is recommended in addition to ceftriaxone and vancomycin to provide activity against *Listeria monocytogenes* in patients aged 50 years and older with suspected acute bacterial meningitis[1]
2. Enterococcal endocarditis
    a. Ampicillin in combination with ceftriaxone is a recommended option in the management of enterococcal endocarditis[2]
3. Resistant gram-negative infections
    a. Ceftazidime-avibactam and aztreonam are recommended in combination for infections due to NDM or other metallo-β-lactamase producing Enterobacterales or *Stenotrophomonas maltophilia*[3]
    b. Sulbactam-durlobactam is recommended in combination with meropenem or imipenem-cilastatin for infections due to carbapenem-resistant *Acinetobacter baumannii* (CRAB)[3]
    c. Ampicillin-sulbactam in combination with cefiderocol is a recommended option for infections due to CRAB[3]
4. Surgical prophylaxis
    a. It is suggested that patients undergoing surgery who are already on therapeutic antibiotics receive either a dose of their current antibiotic, if suitable for surgical prophylaxis, or the regular recommended surgical prophylaxis agent within 60 minutes prior to incision.[4] Example: A patient on ceftriaxone who received a dose 12 hours ago and receives a dose of cefazolin for surgical prophylaxis within 60 minutes prior to incision.
5. Enterococcal coverage in intra-abdominal infections
    a. Addition of ampicillin or vancomycin is suggested for empiric anti-enterococcal coverage in higher risk patients with community-acquired intra-abdominal infections if not being treated with piperacillin-tazobactam or imipenem-cilastatin.[5] Example: Cefepime + ampicillin + metronidazole.

Key Takeaway: While sometimes ordered in error, dual β-lactam therapy is appropriate in certain clinical scenarios and should be continued.

References:

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3. Tamma PD, Heil EL, Justo JA, Mathers AJ, Satlin MJ, Bonomo RA. Infectious Diseases Society of America 2024 guidance on the treatment of antimicrobial-resistant gram-negative infections. *Clin Infect Dis*. 2024; ciae403. doi: 10.1093/cid/ciae403.
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