Kentucky Antimicrobial Stewardship Innovation Consortium

Educational Pearl

Adjust Your Adjustments: Considerations for Delayed Antibiotic Renal Dose Adjustments

Most β-lactam antibiotics require a dose adjustment based on a patient's specific renal function. Renal dose adjustments are an important step in managing antibiotic therapy and aim to avoid toxic levels of antibiotics, while also ensuring adequate concentrations to treat infections. While renal dose adjustments should routinely be implemented, are there certain situations where renal dose adjustments should be withheld?

Is all kidney injury the same?

A common issue for patients presenting in sepsis or septic shock is acute kidney injury (AKI), which is often transient without lasting effects.[1] One study determined that for patients presenting with an AKI in conjunction with an infection, 57% of patients were deemed to have transient AKIs with improved renal function by 48 hours.[1] The authors ultimately concluded that it may be preferable to delay renal dose adjustment of antibiotics with wide therapeutic index (e.g. β-lactam) in patients presenting with acute infections and AKI to avoid potential underdosing.

What is the evidence?

A prospective, observational study evaluated the effect of timing for antipseudomonal β-lactam dose adjustments in 224 critically ill patients with sepsis and AKI.[2] Patients were grouped based on whether they had an early β-lactam adjustment (within 24 hours) or a late β-lactam adjustment (>24 hours). Approximately half the patients were classified as having stage II AKI and slightly over half received piperacillin-tazobactam as the initial therapy. Most patients received vasopressors (86.6%) and pneumonia was the most common source of infection. The late β-lactam adjustment group was associated with reduced in-hospital mortality in the adjusted model (HR 0.588, 95% CI 0.355-0.974).

Key Takeaway: Patients presenting with sepsis or septic shock often experience transient AKIs. Delaying renal dose adjustments of antimicrobials such as β-lactams by 24 to 48 hours may be beneficial.

References:

1. Crass RL, Rodvold KA, Mueller BA, P MP. Renal dosing of antibiotics: are we jumping the gun? *Clin Infect Dis.* 2019; 68(9):1596-602. doi: 10.1093/cid/ciy790.
2. Aldardeer NF, Alshreef MM, Alharbi EA, et al. Early versus late antipseudomonal β-lactam antibiotic dose adjustment in critically ill sepsis patients with acute kidney injury: a prospective observational cohort study. *Open Forum Infect Dis.* 2024; 11(3):ofae059. doi: 10.1093/ofid/ofae059.

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