Kentucky Antimicrobial Stewardship Innovation Consortium

Educational Pearl

Alternatives in Anaphylaxis: Carbapenems in Beta-Lactam Allergies

Penicillins, cephalosporins and carbapenems all fall under the umbrella of beta-lactam antibiotics. Penicillins and cephalosporins are first-line for many infectious diseases whereas carbapenems are less frequently used. Given exposure to penicillins and cephalosporins is far more common, allergies are more likely to be reported by patients. Safe use of cephalosporins in penicillin allergic patients has been well-studied (Alternatives in Anaphylaxis: Cephalosporins and Side Chains - KASIC), but clinicians may hesitate to use carbapenems in patients with reported penicillin and/or cephalosporin allergies. What is the risk of cross-reactivity, and how should these patients be managed?

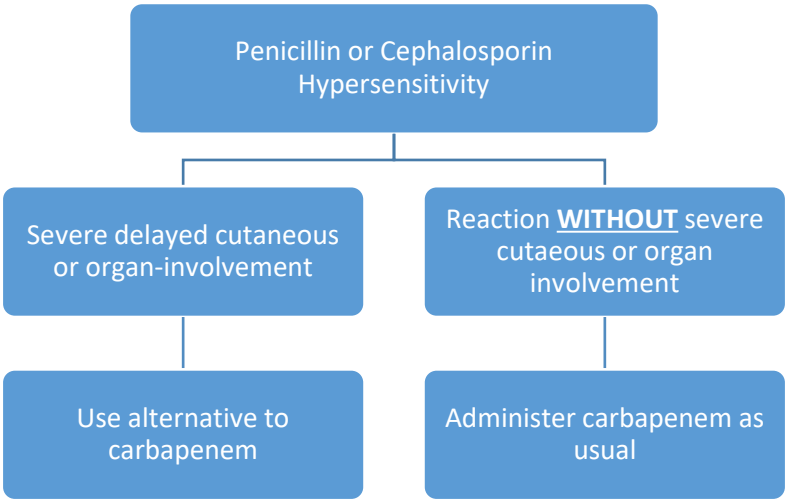
What's the risk?

In patients with a penicillin allergy, the estimated risk of cross-reactivity with a carbapenem is ~1-4%.[1,2] Cross-reactivity with cephalosporins and carbapenems is not as well-studied, but a systematic review reported that in patients with IgE-mediated cephalosporin reactions (n=12), only one case of a possible IgE-mediated reaction to a carbapenem was observed.[3] Even less data is available on patients with both penicillin and cephalosporin allergies and risk of carbapenem cross-reactivity; this same systematic review reported that patients with penicillin and cephalosporin allergies (n=4), only one reaction to a carbapenem was observed.[3]

What do clinical practice guidelines recommend?

Based on these low rates of cross-reactivity, the 2022 AAAAI/ACAAI practice parameter update suggests that in patients WITHOUT severe delayed cutaneous reactions (e.g., Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN), drug reaction with eosinophilia and systemic symptoms, etc.) or organ-involved reactions (e.g., interstitial nephritis, vasculitis, etc.) to penicillins or cephalosporins, carbapenems may be administered safely. This means that patients with a history of anaphylaxis to penicillins or cephalosporins can be administered carbapenems without testing or additional precautions. However, in certain scenarios (e.g., multiple drug allergies, significant patient anxiety regarding carbapenem use) the guidelines note that a graded dose challenge can be utilized.[2]

Figure 1. Carbapenem guidance in penicillin or cephalosporin hypersensitivity



Key Takeaway: In patients WITHOUT severe delayed cutaneous or organ-involved reactions to penicillins or cephalosporins, carbapenems may be administered safely.

References:

1. Picard M, Robitaille G, Karam F, et al. Cross-Reactivity to Cephalosporins and Carbapenems in Penicillin-Allergic Patients: Two Systematic Reviews and Meta-Analyses. *J Allergy Clin Immunol Pract*. 2019;7(8):2722-2738.e5. doi:10.1016/j.jaip.2019.05.038
2. Khan DA, Banerji A, Blumenthal KG et al. Drug allergy: A 2022 practice parameter update. *J Allergy Clin Immunol* 2022;150(6):1334-1393.
3. Kula B, Djordevic G and Robinson JL. A systematic review: can one prescribe carbapenems in patients with IgE-mediated allergies to penicillins or cephalosporins? *Clin Infect Dis*;2014;59(8):1113-1122.

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