Piperacillin-tazobactam Alternatives

Piperacillin-tazobactam (P/T) is one of the most common antibiotics used at Nebraska Medicine. It has a broad spectrum covering Streptococci, penicillin-sensitive Enterococci and Staphylococci, enteric gram negative rods, *Pseudomonas species*, and anaerobic bacteria. Recent data suggests its use, particularly in combination with vancomycin significantly increases the risk of acute kidney injury (AKI) even in patients at low risk for AKI. Rates of AKI approach 30% with combination use compared to 10% with vancomycin alone. While P/T is a highly effective antibiotic with many advantages, the consequences of AKI are substantial - resulting in significant patient harm and prolonged length of stay. With that in mind, we have produced the following guidance regarding use of combinations of vancomycin and P/T. Links to our clinical guidelines are included.

General Recommendations:

- **Vancomcyin is overused** and should only be used when a significant risk for MRSA infection exists. Examples of appropriate use would include: Hospital or Ventilator-associated Pneumonia (HAP/VAP), Severe purulent skin and soft tissue or bone and joint infection, Sepsis presumed due to central venous catheter infection, and nosocomial sepsis of unknown etiology.
- **P/T is overused**. While it may be appropriate for nosocomial infections, most community-onset infections do not require coverage for Pseudomonas
    - The most common indications for P/T use at NM include: pneumonia, intra-abdominal infection, presumed sepsis, skin and soft tissue and bone and joint infections, and UTI
    - P/T use in SSTI and bone and joint infections and many cases of UTI is inappropriate
- **Just because a patient has "sepsis" doesn't mean they need vancomycin and P/T**
    - Utilize institutional guidelines to assist with appropriate therapy choices based on the most likely organisms at each source

Specific Syndromic Recommendations:

- **Community-onset Sepsis:**
    - Evaluate for source of infection and use institutional guidelines to choose therapy based on most likely cause (pneumonia, SSTI, UTI, etc.)
    - Use of vancomycin and/or piperacillin-tazobactam is rarely indicated for any community onset infection
    - Consider substituting ceftriaxone or cefepime +/- metronidazole depending on possible source of infection
    - https://www.nebraskamed.com/sites/default/files/documents/for-providers/asp/sepsis-antibiotics-2014.pdf
- **Nosocomial-onset Sepsis**:
    - Consider substituting cefepime for P/T

- **Community-onset pneumonia:**

    - P/T is not appropriate for CAP
    - Vancomycin should **only** be considered in severe CAP after influenza
    - https://www.nebraskamed.com/sites/default/files/documents/for-providers/asp/cap-guideance-2015-revision.pdf
- **Healthcare-associated/Nosocomial pneumonia**:
    - Consider substituting cefepime for P/T
    - https://www.nebraskamed.com/sites/default/files/documents/for-providers/asp/hcap-hap-vap-guidance-2015-revision.pdf

- **Intra-abdominal infection (IAI)**:
    - Empiric coverage of Enterococci rarely required
    - Community-onset (IAI): Ceftriaxone + metronidazole or P/T alone adequate
    - Nosocomial (IAI): Cefepime + metronidazole or P/T alone adequate
    - IAI with septic shock: Cephalosporin + metronidazole regimen plus vancomycin

- **Skin and soft tissue infections (SSTI):**
    - Gram negative and anaerobic pathogens are exceedingly uncommon; P/T almost never indicated
        - Exceptions may include Severe Diabetic Foot Infection and Necrotizing Fasciitis although if vancomycin is used P/T alternatives should be considered (ceftriaxone/cefepime + metronidazole)
    - Severe purulent SSTI: Vancomycin alone adequate (**do not use P/T**)
    - Non-purulent SSTI: Cefazolin alone adequate (**do not use P/T**)
    - Bite wounds and contaminated fractures: see SSTI and open fracture guidelines
        - Vancomycin **rarely** indicated but if used alternatives such as ampicillin/sulbactam, ceftriaxone/cefepime + metronidazole appropriate
    - https://www.nebraskamed.com/sites/default/files/documents/for-providers/asp/ssti-guidelines-2014.pdf

- **Urinary tract infections**:
    - Use oral agents for simple and complicated cystitis
    - Pyelonephritis **almost never** requires vancomycin
    - Community-onset pyelonephritis: Ceftriaxone
    - Nosocomial Pyelonephritis or community disease with risk-factors for resistant pathogens: Cefepime, piperacillin-tazobactam, or ertapenem **alone** adequate (no vancomycin)
    - https://www.nebraskamed.com/sites/default/files/documents/for-providers/asp/uti-asbu-guidance-final.pdf

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References

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