KY Antimicrobial Stewardship Innovation Consortium

Vancomycin and Linezolid Use Criteria

Background

A request was received from a member of the KASIC network inquiring about antimicrobial stewardship program's definition of appropriate use criteria for vancomycin and linezolid. Their institution had repeatedly identified low compliance with their current use criteria and asked for feedback from other programs.

The KASIC advisory board was contacted to provide input on their current practices. Use criteria and restrictions for vancomycin and linezolid from six different hospitals/health systems were complied. Overall, one program employs a formulary restriction strategy to vancomycin, whereas 4 of the 6 antimicrobial stewardship programs restrict linezolid.

	Vancomycin Restricted?	Linezolid Restricted?
Program 1	✗	✓
Program 2	✗	✗
Program 3	✗	✗
Program 4	✓	✓
Program 5	✗	✓
Program 6	✗	✓

Vancomycin Use Criteria

Program 1: Vancomycin is unrestricted, but we have a 3 day default duration for empiric use and 7 day default for culture driven use. Pharmacy reviews orders every day for appropriateness.

Program 2: Vancomycin is unrestricted. No use criteria.

Program 3: Vancomycin is unrestricted. No use criteria.

Program 4: Vancomycin for less than 72 hours requires no approval. Any orders for vancomycin beyond 72 hours that DO NOT meet one of the below criteria require approval by the antimicrobial stewardship team.

- Treatment of serious infectious proven to be caused by resistant gram positive bacteria (e.g. MRSA)
- Treatment of serious infectious caused by gram-positive bacteria in patients who have type-1 anaphylactic allergic reactions to beta-lactams
- Treatment of moderate or severe skin and soft tissue infections when resistant gram positive bacteria are suspected and specimen collection is not feasible (e.g., cellulitis)
    - NOTE: Cultures should be advocated whenever possible and helped to narrow therapy and oral switch should occur when clinically appropriate per IV to oral (PO) policy

    - Moderate is defined as purulent infection with systemic signs of infection; temperature > 38°C, heart rate > 90 beats per minute, respiratory rate > 24 breaths per minute, white blood cell count > 12,000 or < 400 cells/mm^3
    - Severe is defined as systemic signs of infection (as above), failure of incision and drainage plus oral antibiotics, immunocompromised, or clinical signs of deeper infection such as bullae, skin sloughing, hypotension, or organ dysfunction
- Surgical prophylaxis in patients with type-1 anaphylactic allergic reactions to beta-lactams or in patients with a history of resistant gram positive infections
    - NOTE: Vancomycin is less effective for preventing skin and soft tissue infections caused by methicillin-susceptible *S. aureus* compared to cefazolin
- Treatment of patients with febrile neutropenia in the setting of suspected catheter-related infection, skin or soft tissue infection, pneumonia, or hemodynamic instability

Not approved for use beyond 72 hours:

- Treatment when cultures are negative for resistant gram positive organisms at the suspected site of infection
    - NOTE: Obtaining an MRSA nares screen can aid in antibiotic de-escalation in patients with severe community-acquired pneumonia
- Treatment in an adult patient of a single blood culture positive for a gram positive organism typically associated with contamination (e.g., coagulase negative Staphylococci, *Corynebacterium sp.*, *Micrococcus sp.*, Viridans group Streptococci, *Bacillus species* other than *B. anthracis*); this statement may not be applicable to patients who are only able to have a single blood culture taken due to limited access or blood availability (e.g., neonatal patients)

Program 5: Vancomycin is formulary unrestricted to any provider. After 72-96 hours, the clinical pharmacists are supposed to contact the provider to determine need for vancomycin should an indication (e.g., MRSA identified) not be found.

Program 6: Vancomycin is open to any provider but all dosing except surgical prophylaxis is automatically managed by pharmacy.

Linezolid Use Criteria

Program 1: Linezolid has the below selectable use criteria built on order. Providers are encouraged to consider using vancomycin if none of the criteria are met. Linezolid is not to be used solely for convenience of dosing or monitoring.

- Treatment of proven vancomycin-resistant organisms (e.g. VRE, VISA, VRSA)
- Treatment of MRSA infectious where an alternative agent is not available
- Serious infection in patient with true allergy or serious intolerance to daptomycin or vancomycin
- Treatment of Enterococcus in patient with true allergy to penicillin
- Salvage therapy in patients with documented MRSA/MRSE infectious who are failing treatment with vancomycin
- Ordered by Infectious Disease physician
- Other (specify)

Program 2: No criteria for use. Pharmacists are encouraged to evaluate if linezolid is really needed. Active orders for linezolid populate to list for review by antimicrobial stewardship pharmacist.

Program 3: Linezolid is unrestricted. No use criteria.

Program 4: Linezolid requires approval by a member of the antimicrobial stewardship team, unless one of the approved use criteria are met:

- Treatment of proven or possible ventilator-associated pneumonia (VAP) or hospital-acquired pneumonia (HAP) due to documented or suspected multi-drug resistant (MDR) gram positive organisms (e.g. MRSA and VRE) requiring intensive care unit access when appropriate cultures have been obtained prior to starting therapy
- Treatment of complicated skin and soft structure infectious due to documented or suspected MDR gram positive organisms (e.g. MRSA and VRE) when vancomycin may not be optimal
    - Vancomycin should be used unless not optimal for the following conditions:
        - Vancomycin allergy defined by anaphylaxis, shortness of air, or severe rash (rash resembling red man syndrome should be resolved by extending the infusion time)
        - Worsening clinical picture or failure to improve at 72 hours on vancomycin therapy despite adequate source control and therapeutic vancomycin concentration
- Treatment of VRE urinary tract infections when other first -line agents cannot be used (e.g. nitrofurantoin, amoxicillin)
- Treatment of MDR gram positive organisms (e.g. MRSA and VRE) for oral therapy administration

Not approved use:

- Surgical prophylaxis
- Treatment of non-resistant gram positive infections
- Any use not approved by the antimicrobial stewardship team or does not meet the above criteria

Program 5: Linezolid tablets are formulary unrestricted. IV linezolid is restricted to one of the following criteria. Any use outside of the below criteria requires a conversation with the antimicrobial stewardship pharmacist.

- Vancomycin allergy
- VRE infection
- Receiving linezolid prior to admission
- One time dose to expedite transition to discharge
- Recommended by our guideline or order set (note: IV linezolid is recommended empirically for *S. pyogenes* bacteremia due to high rates of clindamycin resistance)

Program 6: Linezolid is restricted as follows:

- ID / Pulmonology / Critical Care physicians
- Approval by antimicrobial stewardship program
- Alternatively, the following criteria:
    - Documented cultures with gram positive organisms resistant to vancomycin and other 1st line antibiotics
    - Patient cannot safely tolerate vancomycin
    - Known history of infection with vancomycin resistant organisms
    - Suspected gram positive infection that has not adequately responded to vancomycin
    - Transition therapy to facilitate discharge