

MRSA

An Evidence-Based Review of the Literature

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QUESTION:

Is Linezolid as efficacious as Vancomycin for the Treatment of Methicillin-Resistant *Staphylococcus aureus* Infections?

MRSA Background

- Gram-positive pathogen that is intrinsically resistant to beta-lactam antibiotics via one of five *SCCmec* genes encoding PBP2a.
- MRSA is seen with increasing frequency both in healthcare settings and the community.

Treatment of MRSA Infection

- Severe MRSA infections are usually treated with **vancomycin**.
 - Alternative Agents: TMP-SMX, clindamycin, minocycline, **linezolid**, daptomycin and dalbapristin-quinupristin.
- To prevent emergence of new antimicrobial resistance, these agents are primarily reserved for severe infections.
 - Documented vancomycin resistance, treatment failure, or intolerance.

Antibiotics

- **Vancomycin**: The glycopeptide vancomycin hydrochloride is the current treatment of choice for MRSA infections.
 - Inhibits synthesis and assembly of cell wall → *Bacteriocidal*.
 - Administered only by IV infusion standard adult dose of 1 g (15mg/kg) every 12 h or 500 mg every 6 h.
 - Emergence of **VISA/VRSA**
- **Linezolid**: A new class of antibiotics, the oxazolidinones, active against a broad range of Gram-positive bacteria
 - Inhibits protein synthesis → *Bacteriostatic*.
 - Standard dose is 600 mg twice daily PO or IV.
 - Bioavailability nearly 100%, favorable tissue penetration.

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- MRSA infections are associated with increased morbidity, mortality, excess length of hospital stay, and increased hospital charges.
- **Linezolid** has been suggested to have economic advantages for both inpatient and outpatient treatment.

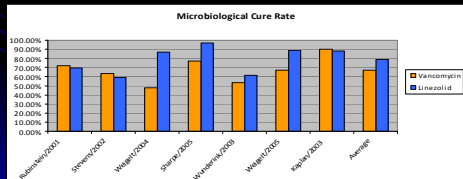
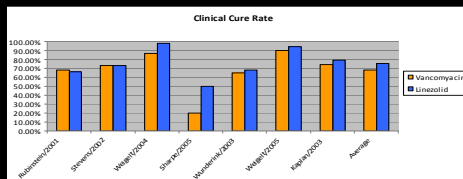
Methods

- Main purpose: To review the published literature regarding the efficacy of linezolid compared to vancomycin for the treatment of MRSA infections.
 - Utilization of electronic databases
 - Inclusion criteria
- After careful examination of all 122 abstracts, 114 articles were eliminated, and eight were selected for inclusion in the review.

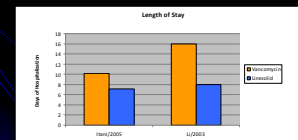
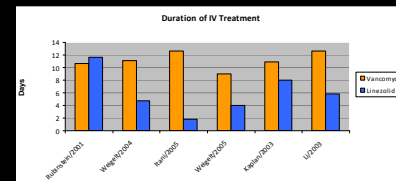
Results

- Cure rate, microbiological success rate, and pathogen eradication rates were generally high in both treatment arms.
- **Safety Analysis**
 - Several studies noted significant differences in drug-related adverse events, while others reported comparable rates of events.
- **Length of Stay (LOS)**
 - Compared to vancomycin, treatment with linezolid resulted in:
 - A shorter duration of IV antibiotic use
 - Higher odds of hospital discharge within the first two weeks
 - Shorter LOS

Cure Rate



Treatment Duration / LOS



Discussion

- **Comparable clinical efficacy**
 - Linezolid and vancomycin were both generally well tolerated.
- **Linezolid** suggested to have economic advantages for both inpatient and outpatient treatment
 - Shorter duration IV treatment
 - Shorter hospitalizations
 - Lower health care costs
- Current use of linezolid remains limited

Conclusion

- **Vancomycin** remains the drug of choice for most serious MRSA infections.
- **Linezolid** is proving to be a significant alternative to vancomycin.
- The availability of oral **linezolid** offers health care practitioners and patients a convenient dosing option that may reduce medical resource use and length of hospitalization.

Clinical 's



- Once primarily a healthcare-associated infection, MRSA is now an increasingly prevalent community-associated pathogen.
- Increasing Resistance
 - VISA/VRSA
- The type of treatment and specific antimicrobial therapy for patients with MRSA infections must be individualized, with treatment choices guided by susceptibility testing.

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