Systematic Review and Meta-Analysis Comparing Nephrotoxicity Between Vancomycin and Linezolid

Vionna Wong[1], Vanessa Ng[1], Steve Liu[1] , Nayle Ibragimova[1], Evan J. Zasowski[1]

1. Department of Clinical Sciences, Touro University California School of Pharmacy, Vallejo, CA, USA

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Introduction

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<u>Purpose</u>: To conduct a systematic review and meta-analysis of RCTs comparing vancomycin and linezolid in patients with MRSA pneumonia and soft-skin tissue infections (SSTI)

- *Background*:
  - *Vancomycin has been the treatment of choice for MRSA pneumonia and SSTI but there are concerns of vancomycin-associated nephrotoxicity*
  - *Linezolid is seen as an alternative to vancomycin with less potential for nephrotoxicity*

Methods

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Design: Systematic Review and Meta-analysis of RCTs

- Databases used: PubMed (MEDLINE) and Embase
- Search Terms used: “Vancomycin”, “Linezolid”, and “Randomized”
- Primary Outcome: nephrotoxicity or as defined within the individual studies

Inclusion Criteria	• Randomized controlled trials • Adults ≥ 18 years of age • Linezolid treatment group • IV Vancomycin treatment group • Reports number or percentage of patients in each group who experience renal toxicity • Studies published in the English language
Exclusion Criteria	• Patients receiving aminoglycosides as combination antibiotic therapy • Studies that are not published.

Data Analysis:

- Risk of Bias via Revised Cochrane risk of bias tool
- Meta-analysis via random-effects Mantel Haenszel model
- Heterogeneity via chi-squared statistical test
- Statistical analysis via RevMan 5.3 (p-value ≤0.05)

Results

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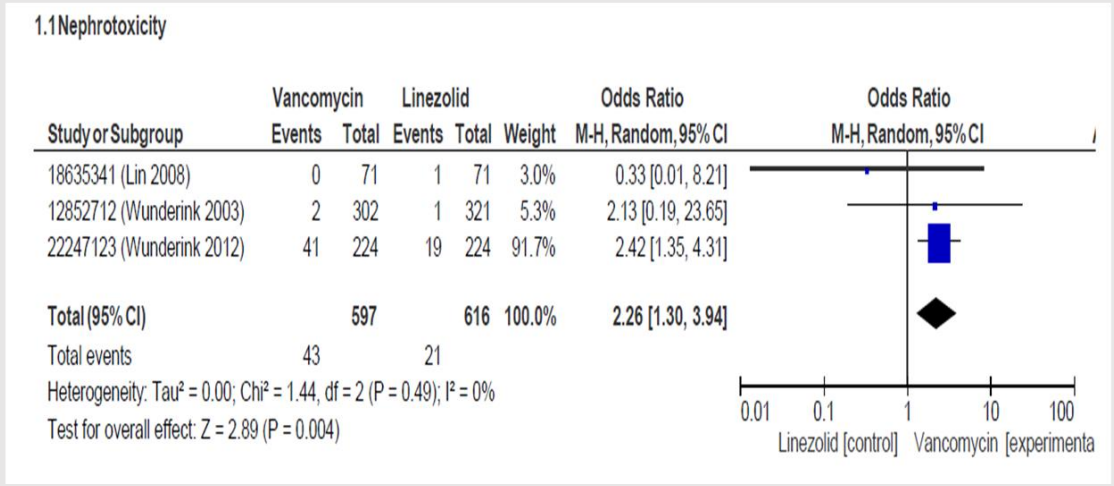
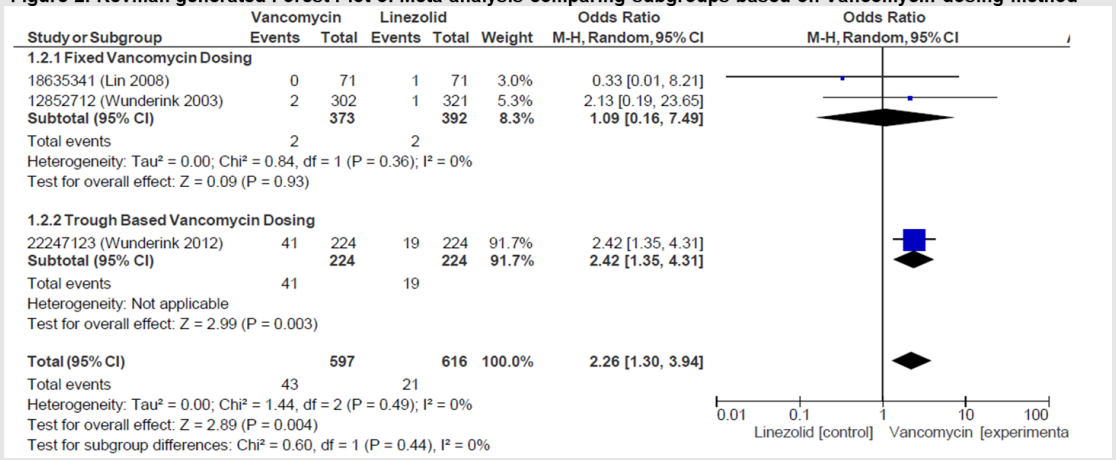
Figure 1: Revman generated Forest Plot of Meta-analysis of all included studies



Meta-analysis of the three trials showed an overall significant association (OR=2.26 [95% CI, 1.30-3.94]; P=0.004) between vancomycin and nephrotoxicity compared to linezolid

Figure 2: Revman generated Forest Plot of Meta-analysis comparing subgroups based on Vancomycin dosing method



Subgroup analysis of dosing strategy indicated an association between vancomycin and nephrotoxicity in the study utilizing trough-based dosing (OR=2.42 [95% CI, 1.35-4.31]) but not in the studies with fixed vancomycin dosing (OR=1.09 [95% CI, 0.16-7.49]).

Conclusion

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- Patients receiving vancomycin had more than 2-fold greater odds of nephrotoxicity compared with those receiving linezolid.
  - The increased toxicity with vancomycin was seen in a single study of patients with pneumonia with vancomycin dosed to achieve trough concentrations between 15 and 20 mg/L suggesting a dose-specific effect
- Such results was based on a single study and it is unclear whether the results are reproducible or apply to other patient populations
- Further randomized studies are needed to draw definitive conclusion

THANK YOU!

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Address correspondence to:
Evan J. Zasowski
evan.zasowski@tu.edu