THE EFFECT OF VANCOMYCIN LOADING DOSE ON TREATMENT SUCCESS: A SYSTEMATIC REVIEW AND META-ANALYSIS

TOURO UNIVERSITY CALIFORNIA COLLEGE OF PHARMACY

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Introduction

- Serious methicillin-resistant *Staphylococcus aureus* (MRSA) infections have high morbidity and mortality.
- Guidelines suggest using vancomycin loading doses in critically ill patients or those with suspected serious MRSA infections to maximize early target concentration achievement.
- Though data suggest loading doses effectively achieve therapeutic concentrations quickly, it's unclear if this translates to improved efficacy in patients with confirmed MRSA infections.
- The purpose of this study was to create a consolidated review of the published evidence evaluating the efficacy of vancomycin loading doses in patients with MRSA infections.

Methods

- PubMed and Embase databases were searched from inception to 27th February 2020. Search terms used were "vancomycin" AND "MRSA" AND "(efficacy OR success OR failure).
- Studies included were randomized controlled trials, observational cohort or case-control studies published in English language involving adult patients with culture-confirmed MRSA infections initially treated with IV vancomycin.
- Studies that did not report a clinical efficacy outcome grouped by loading dose vs non-loading dose groups and as well as conference abstracts and posters were excluded.
- The primary outcome assessed was clinical efficacy as defined by the study. A random model effects, Mantel-Haenszel model, was used given the expected heterogeneity in study design, populations, and outcome definitions.
- Odds ratio and 95% confidence interval were used to report combined results.
- Heterogeneity was quantified by I^2.
- Analyses were conducted using Revman 5.3 software.

References

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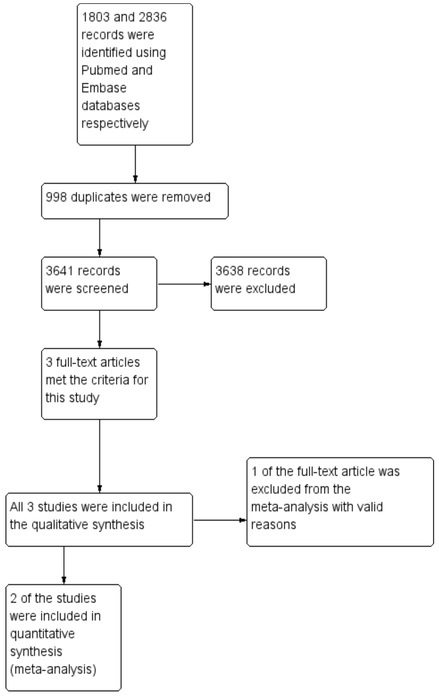
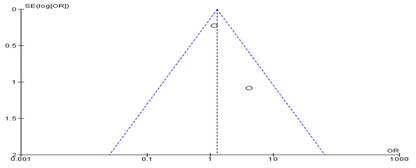


Figure 1 - Flow Diagram of Included Studies



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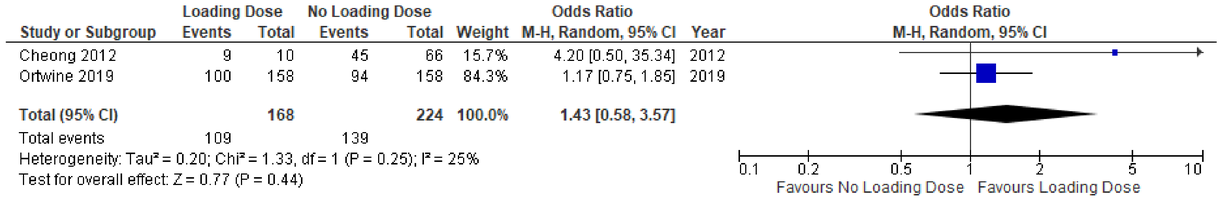

Figure 4- Meta-Analysis of Association between Vancomycin Loading Dose and Clinical Efficacy

FINDINGS SUMMARIZED:

- 1803 and 2836 studies were extracted from PubMed and Embase databases, respectively.
- 998 duplicates were removed with 3641 studies screened, and 3 full-text articles met the study criteria.
- The Newcastle-Ottawa Quality Assessment Scale was used to assess the quality of non-RCT that met the study criteria, and they all showed a low risk of bias. Additionally, publication bias was not detected in all 3 studies using the funnel plot.
- Two distinct studies were used for meta-analysis.
- Wesolek et al. (2018) was excluded from the meta-analysis since it was a smaller population sample size and this patient population overlapped with that of Ortwine et al. (2019) study.
- Although clinical cure was numerically higher among VLD patients, no statistically significant association was observed in the meta-analysis of the two eligible studies (OR 1.43, 95% CI 0.58-3.57, P=0.44).
- Wesolek et al. (2018) determined that receiving a loading dose led to a median time of SIRS resolution of 67 hours compared to the 109 hours due to early target trough attainment. Additionally, the VLD arm had a mean reduction of 3 days in the length of stay (LOS).
- Ortwine et al. (2019) study contributed 84.3% to the meta-analysis; but had significant limitations such as being retrospective, and LD was >20mg/kg.

Conclusions

- There is a dearth of clinical outcomes data evaluating VLD.
- VLD improves target attainment but at this time, there is little evidence showing improved clinical outcomes.
- The limited observational data identified in this systematic review did not show a significant association between VLD and clinical cure.
- One study indicated VLD may be associated with early improvement of signs and symptoms of infection and reduced length of stay.
- Further study, including a well-designed large randomized control trial, is needed to evaluate the clinical efficacy of VLD.

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Introduction

Purpose:

- To conduct a systematic review and meta-analysis on the effect of vancomycin loading dose on treatment success.

Background:

- Serious methicillin-resistant *Staphylococcus aureus* (MRSA) infections have high morbidity and mortality.
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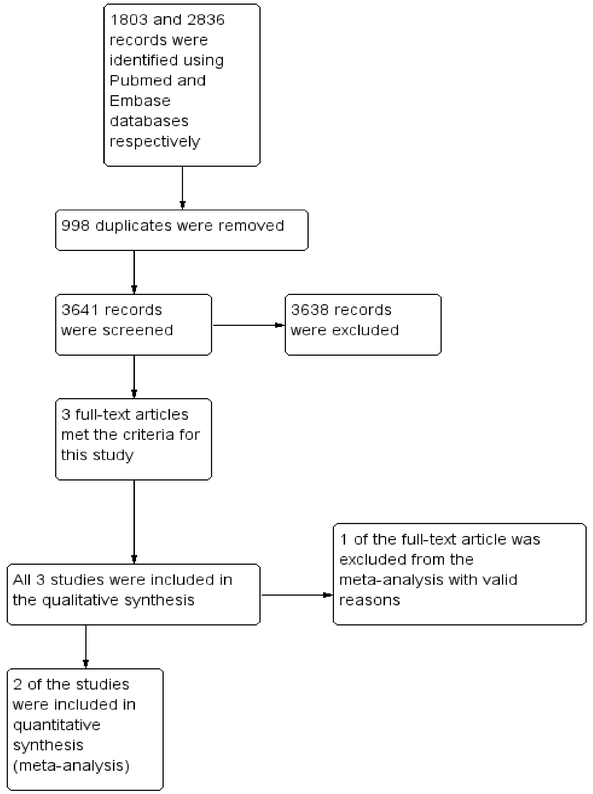

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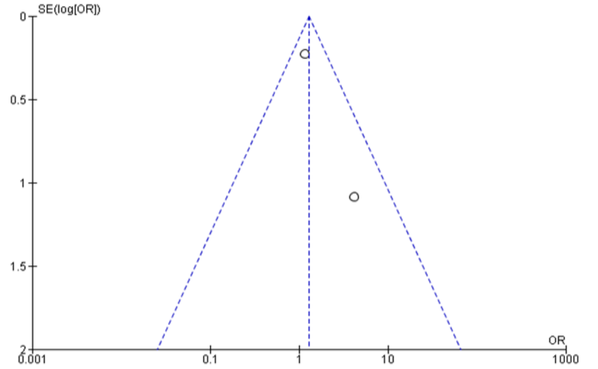

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Results: Figures 3&4

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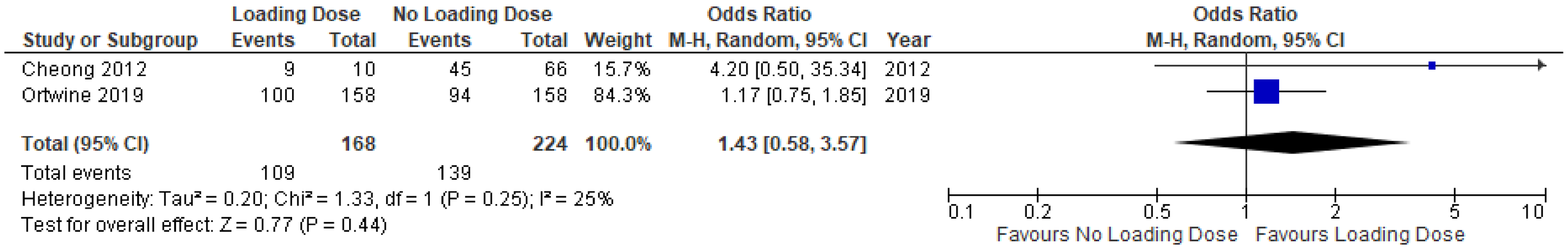

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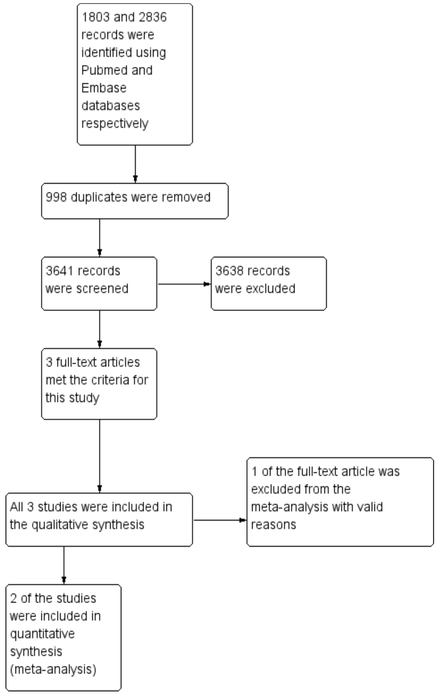

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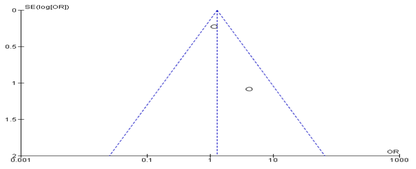

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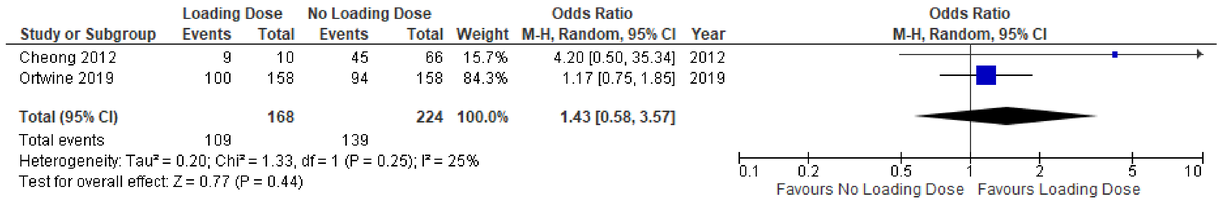

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