CLINICAL BIOCHEMISTRY

Revision of Vancomycin Reference Interval and Clinical Practice Guideline

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In line with current Manitoba expert consensus and clinical guideline on the use of plasma/serum vancomycin levels to monitor treatment and determine dosing of Vancomycin (enclosed document), the following changes have taken place with respect to Vancomycin reference interval:

- Target plasma/serum trough vancomycin concentration is now 10–20 mg/L. Toxic trough level are unchanged (> 28 mg/L).
- The laboratory report will only flag results that are <10mg/L and >20mg/L.
- Trough vancomycin concentrations of 15 - 20 mg/L are recommended for serious MRSA infections
- Frequent monitoring (more than one trough before the fourth dose) for short course or lower intensity dosing is not recommended.
- All patients on prolonged courses of vancomycin (exceeding three to five days) should have at least one steady-state trough concentration obtained no earlier than at steady state following the fourth dose, and then repeated as deemed clinically appropriate.
- Vancomycin is nephrotoxic, therefore, it is important to monitor renal function with creatinine as part of therapeutic drug monitoring for vancomycin.

Reference

1. 2020 Shared Health Intravenous Vancomycin Trough Therapeutic Clinical Guideline

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Intravenous Vancomycin Trough Therapeutic Clinical Guideline

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Summary

- The recommended therapeutic trough range for vancomycin is 10-20 mg/L.
- Vancomycin concentrations should be assessed and interpreted before adjustment of the vancomycin dose. Discussion with a pharmacist to will optimize vancomycin TDM.

Preamble

This document provides guidance to the Shared Health change (February 2019) in vancomycin therapeutic trough range. Clinicians are encouraged to assess and interpret desired targets and vancomycin concentrations before adjusting vancomycin doses. Pharmacists are available to assist in the interpretation and therapeutic drug monitoring (TDM) of vancomycin. Consultation with an Infectious Diseases physician is suggested for serious methicillin-resistant *Staphylococcus aureus* (MRSA) infections or when questions regarding medical management arise. Procedures for vancomycin blood sampling times for vancomycin levels are defined in the Shared Health Lab Manual found at https://apps.sbgh.mb.ca/labmanual/test/view?seedId=1526

Guideline

The Sections of Adult and Pediatric Infectious Diseases (Max Rady College of Medicine), Section of Nephrology (Max Rady College of Medicine), Manitoba Renal Program, the Winnipeg Regional Health Authority (WHRA) Antimicrobial Pharmacotherapy Subcommittee and the WRHA Adult and Pediatric Pharmacotherapeutic Committees recommend the following vancomycin trough range of **10-20 mg/L** as a strategy to minimize the risk of nephrotoxicity and promote optimal vancomycin use:

Population	Vancomycin Trough Range
Adult and Pediatric	**10-20 mg/L** (15-20 mg/L for severe documented MRSA infections)*

*Serious infections defined as blood stream infections, and deep seated infections such as bone, joint, visceral abscesses, pneumonia, empyema, peritonitis, meningitis or CNS infections

Background

Vancomycin is a glycopeptide antibiotic used in the treatment of infections caused by Gram positive bacteria such as *Staphylococcus aureus*, *Staphylococcus epidermidis* and susceptible *Enterococcus spp.* Vancomycin is the drug of choice for the treatment of MRSA and methicillin-resistant *S. epidermidis* (MRSE) infections. When vancomycin is initiated empirically before there are microbiologic results, prescribers are encouraged to evaluate the ongoing need for vancomycin based on clinical and microbiologic data to streamline antimicrobial therapy.

Vancomycin Therapeutic Range Revision

Guidelines in 2009 suggested vancomycin troughs of 15-20 mg/L for serious MRSA infections.[2] Clinical and pharmacodynamic studies in the last 10 years suggests a vancomycin trough range of 10-20 mg/L. This change is reflected in the recent 2015 infective endocarditis guidelines which revised the trough vancomycin range for MRSA endocarditis from 15-20 mg/L to the current recommendation of 10-15 mg/L.[3] Further refinement in the vancomycin therapeutic range may occur in the future as the literature evolves.

Nephrotoxicity secondary to vancomycin exposure is a recognized adverse effect. There is greater awareness that **the risk of vancomycin associated nephrotoxicity to the patient increases with vancomycin troughs greater than 15 mg/L.**[4-7] Limiting unnecessary patient exposure to high vancomycin troughs is recommended to minimize patient harm. **Vancomycin toxicity is also potentiated in the presence of other factors such as pre-existing renal disease and concomitant other antimicrobials.**

References

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4. Filippone EJ, Kraft WK, Farber JL. The nephrotoxicity of vancomycin. Clin Pharmacol Ther 2017;102:459-69.
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