

Vancomycin dose conversion from intermittent to continuous infusion

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Background

Patients who are discharged to Hospital in the Home (HITH) from an inpatient ward for administration of intravenous vancomycin require conversion from intermittent infusions to a continuous vancomycin infusion.

According to the Monash Health Vancomycin Hospital in the Home Adult Medication Profile and the Therapeutic Guidelines, these patients should be prescribed the total daily-equivalent intermittent vancomycin dose as a continuous infusion.

The Medication Profile also states to consider decreasing the continuous infusion dose by up to 25% of the daily-equivalent intermittent dose, depending on vancomycin levels achieved whilst on intermittent dosing and the target vancomycin level. Clinical experience has found that using the daily-equivalent intermittent dose without modification frequently results in out of range levels.

Aim

To determine the effectiveness of dose reduction when converting from intermittent to continuous vancomycin infusion in achieving target spot levels, and to explore the feasibility of developing a dose conversion guidance tool.

Method

Merlin® dispensing report

January 2015 – December 2017
Adults discharged to Dandenong and Casey HITH for continuous vancomycin infusion
(n = 192)

Exclusion criteria

- Patients on 8-hourly intermittent dosing.
- Patients with unstable renal function (defined as a change in serum creatinine of 26.4 micromol/L between the most recent serum creatinine prior to and after discharge to HITH)¹.
- Patients not stable on vancomycin prior to discharging to HITH. Stable patient is defined as having the most recent vancomycin trough level within target range at steady state prior to discharge to HITH. Target trough level for intermittent infusions is defined as 15 to 20 mg/L².
- Patients who received a dose change prior to reaching steady state after discharge to HITH. Steady state is defined as 48 hours after administration of first continuous infusion bottle.
- Patients converting from intermittent infusion to continuous infusion with a dose increase.

Data collection

- Scanned Medical Record®
- Monash Health Pathology
- Merlin® dispensing program

Direct dose conversion
(n = 37)

Dose reduction
(n = 14)

Percentage of patients achieving target spot level*

Percentage of patients achieving target spot level*

*Target spot level for continuous vancomycin infusion was defined as either 20 ± 3 mg/L or 20 to 25 mg/L as determined by the treating team depending on the indication.

Results

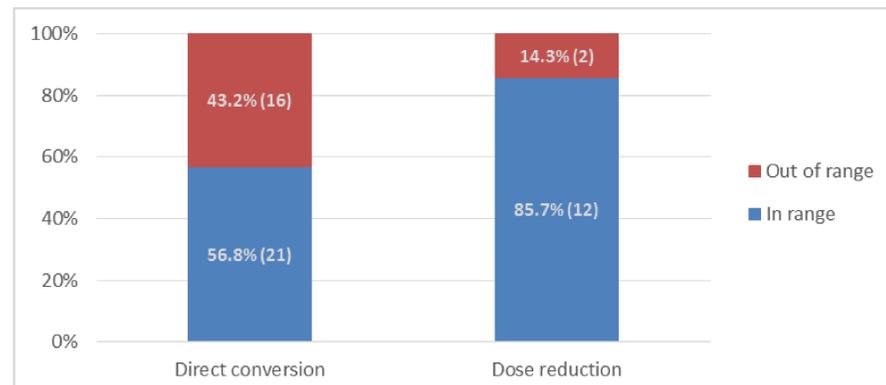


Figure 1. Percentage of patients achieving target spot levels after conversion to continuous vancomycin infusion.

- The average dose reduction was 15.4% (range 8.3% to 33.3%).
- Exploratory analyses revealed that 97.3% (36/37) of patients undergoing direct dose conversion exhibited an increase in vancomycin levels, with a mean change of + 6.22 mg/L (95% confidence interval [CI], 4.84 to 7.59).

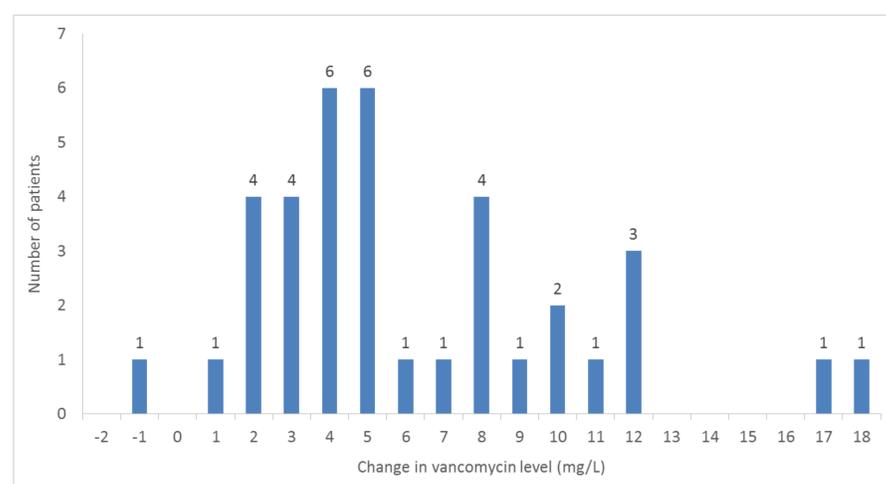


Figure 2. Change in vancomycin level after direct dose conversion from intermittent to continuous infusion.

Discussion

- Results from this audit indicate that dose reduction, when compared to direct dose conversion, was more effective in achieving target spot levels.
- Due to the strict exclusion criteria, 141 patients were excluded from this audit. The subsequent small sample size and uneven distribution of patients across the two cohorts may limit the robustness of this audit.
- This audit showed a wide variability in the degree of dose reduction, indicating a need for a vancomycin dose conversion guidance tool. The consistent increase in vancomycin levels in patients receiving a direct dose conversion can be used to develop this tool.
- Patients excluded in this audit on the basis of unstable vancomycin levels prior to discharge to HITH should be analysed alongside the direct dose conversion cohort to develop a more robust dosing tool.

Conclusion

Dose reduction when converting from intermittent to continuous vancomycin infusion is more effective in achieving target spot levels than direct dose conversion. Direct dose conversion consistently results in an increase in vancomycin levels. This can be used to develop a dose conversion guidance tool for future validation.

References

1. Mehta RL, Kellum JA, Shah SV, et al. Acute Kidney Injury Network: report of an initiative to improve outcomes in acute kidney injury. Crit Care. 2007;11(2):R31.
2. eTG complete [Internet]. Melbourne: Therapeutic Guidelines Limited; 2018. Accessed 2018 June 21 https://tgldcdp.tg.org.au.acs.hcn.com.au/viewTopic?topicfile=vancomycin-use-principles#toc_d1e72.