



This observational study aims to describe the population pharmacokinetics of vancomycin in adult patients with sepsis or septic shock” Heffernan et al (2019).

Abstract:

PURPOSE: Vancomycin is commonly used for the management of severe infections; however, vancomycin dosing may be challenging in critically ill patients. This observational study aims to describe the population pharmacokinetics of vancomycin in adult patients with sepsis or septic shock.

METHODS: A single-centre retrospective review of adult patients with sepsis or septic shock receiving vancomycin with therapeutic drug monitoring was undertaken. Blood samples taken 1 h after the vancomycin infusion cessation and 30 min prior to the next dose were assayed using the Vitros Crea Slide method. Vancomycin concentrations determined on different days were included. A pharmacokinetic model was developed using Pmetrics for R. Monte Carlo dosing simulations were performed using the final model.

RESULTS: Vancomycin concentrations were available for 27 adult patients admitted to the intensive care unit with sepsis or septic shock. A one-compartment pharmacokinetic model with inter-occasion variability of clearance and volume of distribution before and after 72 h adequately described the data. Creatinine clearance normalized to body surface area was included as a covariate on vancomycin clearance. The clearance and volume of distribution

within 72 h of admission were 7.29 L/h and 54.20 L, respectively. Monte Carlo simulations suggested that for patients with a creatinine clearance of ≥ 80 mL/min/1.73 m², vancomycin doses of ≥ 2 g every 8 h are required to consistently achieve key therapeutic targets.

CONCLUSIONS: Vancomycin doses ≥ 2 g every 8 h in adult patients with sepsis or septic shock with a creatinine clearance ≥ 80 mL/min/1.73 m² are likely needed to achieve an optimal therapeutic exposure.

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Reference:

Heffernan, A.J., Germano, A., Sime, F.B., Roberts, J.A. and Kimura, E. (2019) Vancomycin population pharmacokinetics for adult patients with sepsis or septic shock: are current dosing regimens sufficient? *European Journal of Clinical Pharmacology*. June 1st. doi: 10.1007/s00228-019-02694-1. .

