

Stanford Hospital & Clinics Vancomycin Dosing Guidelines 2013

Vancomycin is a tricyclic glycopeptide antibiotic that exhibits bactericidal activity by preventing the synthesis and assembly of a growing bacterial cell wall, altering the permeability of the bacterial cytoplasmic membrane, and selectively inhibiting bacterial RNA synthesis. Vancomycin is considered to be a concentration-independent or time-dependent killer of bacteria.

I. DETERMINE CREATININE CLEARANCE AND DOSE

- A. Determine the dose with total body weight (TBW)
- B. Calculate creatinine clearance with the Cockcroft-Gault equation using an ideal body weight (IBW) or an adjusted body weight (ABW) if the patient is obese (TBW >20% over IBW)

$$\text{CrCL (mL/min)} = \frac{(140 - \text{age}) \times \text{IBW}}{\text{SCr} \times 72} \quad (\times 0.85 \text{ for females})$$

$$\begin{aligned} \text{IBW (male)} &= 50 \text{ kg} + (2.3 \times \text{height in inches} > 60 \text{ inches}) \\ \text{IBW (female)} &= 45 \text{ kg} + (2.3 \times \text{height in inches} > 60 \text{ inches}) \\ \text{ABW (kg)} &= \text{IBW} + 0.4 (\text{TBW} - \text{IBW}) \end{aligned}$$

II. INITIAL EMPIRIC DOSING

- A. **Loading Dose:** A loading dose can be used to facilitate rapid attainment of target trough serum vancomycin concentration
 - i. Normal renal function – Consider a loading dose of **25 – 30 mg/kg** (max 2gm) for severe infections and ICU patients
 - ii. Renal insufficiency – Use a lower loading dose of **15 – 20 mg/kg**

Patient Weight	Recommended Loading Dose	Infusion Rate
25 – 35 kg	750 mg x 1	60 minutes
36 – 45 kg	1,000 mg x 1	60 minutes
46 – 55 kg	1,250 mg x 1	90 minutes
56 – 65 kg	1,500 mg x 1	90 minutes
66 – 75 kg	1,750 mg x 1	120 minutes
≥ 76 kg	2,000 mg x 1	120 minutes

Central line only: Up to 1000 mg in 100 mL of compatible diluent

Peripheral line: At least 500 mg per 100 mL of compatible diluent

Red man syndrome may occur if the infusion is too rapid. It is not an allergic reaction, but may be characterized by hypotension and/or a maculopapular rash appearing on the face, neck, trunk, and/or upper extremities. If this should occur, slow the infusion rate to over 1½ to 2 hours and increase the dilution volume. Reactions are often treated with antihistamines and steroids.

B. Maintenance Dose:

Creatinine Clearance (mL/min)	Dose & Frequency Total body weight (TBW)	Timing Trough Level
> 50	15–20 mg/kg Q8–12H	Before 4 th or 5 th dose
30-49	15–20 mg/kg Q12–24H	Before 3 rd or 4 th dose
15-29	10–15 mg/kg Q24H	Before 3 rd dose
<15	10–15 mg/kg Q24–48H	Q24H – before 3 rd dose Q48H – before 2 nd dose
Hemodialysis	<u>Load:</u> 20 – 25 mg/kg x 1 <u>Maintenance:</u> 10 – 15 mg/kg post-dialysis when levels <15mg/L or <20 mg/L in severe infections	<ul style="list-style-type: none"> • Pre-dialysis – Assumes that HD is high flux and removes ~20% of vancomycin per 3 hour session • Alternative: 4 hours after completion of dialysis session
CRRT	<u>Load:</u> 20 – 25 mg/kg x 1 <u>Maintenance:</u> 10 – 15 mg/kg Q24H	Before 3 rd or 4 th dose

III. THERAPEUTIC DRUG MONITORING

Goal Trough (mcg/mL)	Indication
10 – 15	cellulitis, skin/soft tissue infections
15 – 20	pneumonia, bacteremia, endocarditis, osteomyelitis

Recommend trough levels >10 mcg/mL to avoid microbial resistance