Optimizing Vancomycin Dosing & Monitoring

BOTTOM LINE: Use guideline based vancomycin dosing and monitoring to maximize treatment success and reduce unnecessary serum vancomycin levels and needless dosage changes.

Recommendations:

Adult Dosing[1,2]

For more details and pediatric dosing, see Vancomycin Dosing

Clcr = creatinine clearance

Loading dose[1-5]:

- Use a loading dose in:
  - o serious infections where rapid attainment of target trough level of 15-20 mg/L is desired, e.g. vertebral osteomyelitis, MRSA pneumonia, epidural abscess, septic shock
  - o patients with significant renal dysfunction in order to decrease the time required to attain target trough level
- 25-30 mg/kg (based on actual body weight; no maximum dose) IV single dose, followed by maintenance dose separated by recommended dosing interval

Maintenance dose: 15 mg/kg (based on actual body weight) IV/dose (maximum of 2 g/dose)

- o Doses greater than 500 mg - round to nearest 250 mg
- o Doses less than 500 mg - round to nearest 50 mg

Dosing interval:

Calculated Clcr (mL/min)	Dosing Interval for trough 10-20mg/L	Dosing Interval for trough 15-20mg/L
80 or greater	q12h	q8h
40 - 80	q24h	q12h
20 - 40	q36h	q24h
10 - 20	q48h	q48h
Less than 10	Consider loading dose. Obtain pharmacist consult.	

Levels[1,2]

For more details, see Vancomycin Monitoring

Infection	Desired Trough Level (mg/L)
Osteomyelitis	15-20
Pneumonia	
CNS infections	
Endocarditis	
Bacteremia	
Serious MRSA infections	
Other infections	10-20

*Steady state (SS) occurs in 4 to 5 half lives and can be estimated for vancomycin by using the following equations:

k_e = Clcr*0.00083 + 0.0044

$t_{1/2}$ = 0.693 / k_e

SS = 4-5 * $t_{1/2}$

- Peak (post) levels are NOT recommended.
- Trough (pre) levels (taken 30 minutes or less prior to next dose) are recommended in:
  - o patients with deteriorating/unstable renal function (increase in baseline Scr of 40 µmol/L or greater, or increase of 50% or more from baseline)
  - o morbidly obese patients [190% or greater of ideal body weight or BMI 40kg/m^2 or greater]
  - o patients with anticipated therapy greater than/equal to 7 days[6]
  - o patients who are severely ill (i.e. sepsis) and/or require target trough of 15-20mg/L
  - o patients with altered volume of distribution or clearance of vancomycin (e.g. cystic fibrosis, pediatrics, elderly 60 years or older, cancer, burns more than 20% BSA)
  - o selected dialysis patients [e.g. high flux and continuous hemodialysis/filtration.
- First trough level should be taken at steady state* and after at least 2 maintenance doses (~ 30 hours if normal renal function: prior to 4th dose if q12h or prior to 5th dose if q8h).
  - o vancomycin clearance is enhanced in obesity. For morbidly obese patients, consider drawing first level sooner (e.g. before 2nd or 3rd dose).
- Subsequent trough levels:
  - o with dosage change: trough should be taken at new steady state* as described above
  - o once target trough achieved: trough should be taken every 7-10 days in hemodynamically stable patients; may need more frequently if hemodynamically unstable, renal function changing, or patient is on concurrent nephrotoxic drugs

NB: Do NOT hold next vancomycin dose while waiting for results of serum levels unless there is a specific order to do so, e.g. because of concerns of toxicity/adverse events and/or significant decline in kidney function.

References:

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