Intravenous Vancomycin for Adult Patients - Drug Monograph and Dosing Guide

Reference no.:CG-ANTI/2016/004

Indication	Vancomycin is a glycopeptide antibiotic. It has bactericidal activity against Gram-positive bacteria including MRSA. It has no activity against Gram-negative organisms. Note; Vancomycin should not be given by mouth for systemic infection as it is not significantly absorbed. Oral vancomycin is only used to treat *Clostridioides difficile* infection. Parenteral vancomycin is not effective for treating *C. difficile*. Please refer to separate antibiotic guidelines for therapy recommendations.
Contraindications	Hypersensitivity to vancomycin Previous hearing loss
Preparation	**QHB ONLY** IV vancomycin is kept as stock on the wards at QHB, wards will prepare **all** doses. **RDH ONLY** All doses of IV vancomycin will be supplied for individual patients. Wards to prepare **all** doses. 500mg in 100ml sodium chloride 0.9% (can reconstitute with 100ml Ecoflac®) 1000mg in 250ml sodium chloride 0.9% (can reconstitute with 250ml Ecoflac®) 1250mg in 500ml sodium chloride 0.9% (total volume 525ml) 1500mg in 500ml sodium chloride 0.9% (total volume 530ml) 2000mg in 500ml sodium chloride 0.9% (total volume 540ml) **Please see Medusa for further information.**
Administration	By infusion via a central (including PICC line) or peripheral line (including mid-line) at a rate not exceeding 10mg/min (and over a minimum of 60 minutes for lower doses) Vancomycin has a low pH and is irritant to veins so consider referral for a PICC or midline at an early stage in treatment.
Common Compatibility Issues	Sodium Chloride 0.9% may be used as a diluent. Please refer to product literature for incompatibilities.
Additional information	**Staph aureus bacteriaemias/deep infections due to Staph aureus (MRSA and MSSA)** **It is important that adequate levels of vancomycin are maintained and that treatment is continued for an appropriate duration.** • Ensure adequate IV access • Maintain predose levels between 15-20mg/l. Do not allow the predose level to drop to <15mg/l. • Look for a deep source such as infective endocarditis, discitis, osteomyelitis or septic arthritis. Duration of treatment will depend on the focus of infection. See the *Staph. aureus* bacteraemia guideline for more information.

Step 1 - Prescribe loading dose: based on actual body weight (independent of renal function and age)

Actual Body Weight	Dose	Volume of sodium chloride 0.9%*	Duration of infusion**
< 40 kg	**750mg**	**In at least 250ml**	**90 minutes**
40 - 59 kg	**1g**	**In at least 250ml**	**120 minutes**
60 - 90 kg	**1.5g**	**In at least 500ml**	**180 minutes**
> 90 kg	**2g**	**In at least 500ml**	**240 minutes**

* Glucose 5% can be used as an alternative in patients with sodium restriction.

** Suggested rate, however can be infused at a rate not exceeding 10mg/minute. Administration should be via a Smartpump.

Step 2 – Calculate creatinine clearance (Use CrCl not eGFR)

- **Calculate Ideal Body Weight (IBW) kg**
  - Female: 45.5 + 0.91 (height (cm) - 152.4)
  - Male: 50 + 0.91 (height (cm) - 152.4)
- **Calculate Adjusted Dosing Weight (ADW) kg**
  - IBW + 0.4 (Actual weight - IBW)
- **Calculate creatinine clearance (mL/min)**
  - $\frac{(140 - age) \times ADW \times 1.23^*}{serum\ creatinine}$ *In females 1.04

NB: If patient is underweight (i.e. if their actual body weight is < ideal body weight) use actual body weight for CrCl

Step 3 – Determine initial maintenance dose

CrCl (mL/min)	Maintenance dose and frequency	Time after loading to start maintenance dose (hours)	Volume of sodium chloride (0.9%)	Duration of infusion	Time of 1st vancomycin pre-dose level
< 20	**500mg every 48 hours**	**48**	**100ml**	**60 minutes**	**Before 2nd dose**
20 - 29	**500mg every 24 hours**	**24**	**100ml**	**60 minutes**	**Before 4th dose**
30 - 39	**750mg every 24 hours**	**24**	**250ml**	**90 minutes**	**Before 4th dose**
40 - 54	**500mg every 12 hours**	**12**	**100ml**	**60 minutes**	**Before 4th dose**
55 - 74	**750mg every 12 hours**	**12**	**250ml**	**90 minutes**	**Before 4th dose**
75 - 89	**1G every 12 hours**	**12**	**250ml**	**120 minutes**	**Before 4th dose**
90 - 110	**1.25G every 12 hours**	**12**	**500ml**	**150 minutes**	**Before 4th dose**
> 110	**1.5G every 12 hours***	**12**	**500ml**	**180 minutes**	**Before 4th dose**

*Patients <45kg should be given a maximum starting dose of 1.25g every 12 hours

Target Levels (If unsure what level to aim for, discuss with the consultant microbiologist)

Usual target - pre-dose level 10-15mg/l
MRSA or MSSA bacteraemia or deep seated infection - pre-dose level 15-20mg/l
Infective Endocarditis - pre dose level 15-20mg/l

Suitable for printing to guide individual patient management but not for storage.

Monitoring levels *(For further advice on adjusting the dose to achieve the target level contact a pharmacist)*

- Pre-dose levels are taken immediately prior to the next dose being given. The dose should then be given without waiting for the level to come back (unless advised otherwise) but the level should be interpreted before any further doses are given after that.
- The early levels do not represent steady state (may take up to 5 dosing intervals) and will continue to increase (see dose adjustments)
- Once the steady state level is in the required range, check a pre-dose level and U+Es twice a week.
- Monitor more frequently in patients with impaired renal function, or on other nephrotoxic drugs. If serum creatinine rises by ≥40micromol/l or by 50% above baseline, seek advice. Higher trough levels may be associated with increased nephrotoxicity, and renal function should be carefully monitored. Monitor for ototoxicity

Dose adjustments (state new regime on dosing chart)

Doses should not usually be adjusted until steady state has been achieved unless

- the patient is clearly not on a big enough dose e.g. first level <5mg/l OR
- the level is likely to increase to >20mg/l if continued at this dose

Vancomycin exhibits linear kinetics, so doubling the dose, should approximately

double the serum level.

$$\text{New 24 hour dose} = \frac{\text{target level (mid range) } \mathbf{\text{at steady state}} \text{ x current 24 hour dose}}{\text{Current level at steady state}}$$

If the patient is already on ≥3G in 24 hours but the level is still low, the dose should not usually be increased by more than 1G within a 24-hour period without rechecking the level. A higher pre-dose level can sometimes be produced by spliting the dose and giving more frequently.

New 24hr dose (total)	Recommendation
<1G in 24 hours	increase the dosing interval e.g. 1G every 36 hours rather than 750mg every 24 hours. If the dose required is <1G every 48 hours, reduce the dose.
1G-3G in 24 hours	split into 2 divided doses, rounded to the nearest 250mg
>3G in 24 hours	split into 3 or 4 divided doses, rounded to the nearest 250mg

INTRAVENOUS VANCOMYCIN PRESCRIPTION CHART FOR ADULT PATIENTS – FOR USE AT RDH ONLY
For QHB please prescribe, administer and monitor on the Meditech EPMA system

These guidelines do NOT apply to patients on haemodialysis (see separate chart) or with stage 3 acute kidney injury. Vancomycin dosing in these patients should be done with advice from a Consultant Nephrologist

Hosp	Ward		Pts Name	Hosp No.
Cons				
Ht	Wt	Serum Cr	Address	Date of birth
eGFR =	ml/min/1.73m^2			
CrCl =	ml/min			
Indication for vancomycin:				

Target level 10-15mg/l o **15 – 20mg/l** o

See below for guidance on initial dosing and overleaf for guidance on dosage adjustment. *A Doctor must prescribe the first dose*. After that, either a Doctor or pharmacist can confirm the dose as long as the target level box is ticked. If a Doctor does not agree, sign below, and ensure further doses are prescribed in a timely manner to avoid any delay in treatment.

I do NOT want a pharmacist to dose vancomycin and will continue to prescribe for this patient

Signature …… Date …….

Dosing (see overleaf for guidance on dosing)

Loading dose (First dose)

Date	Dose	Infusion duration	Time to be given	Prescribers signature	Supplied & checked by pharmacist date/time	Administered by	Checked by	Time	Date

Maintenance dose (prescribe all doses up to and including the dose to be given after the next level)

Date	Current regime (Dose and frequency)	Pre dose level required? (tick)	Level	Dose	Time to be given	Infusion duration (10mg/min, minimum 60 mins)	Dose authorised by Doctor or pharmacist (signature)	Supplied & checked by pharmacist & date/time	Administered/ checked by	Date/ time given

THIS CHART SHOULD BE CROSS REFERENCED ON EPMA OR ON THE PRESCRIPTION CHART

Development of Guidelines:	Antimicrobial Pharmacist
Consultation With:	Consultant Microbiologists Pharmacy
Version	3.0
Approved By:	Antimicrobial Stewardship Group - 05.11.2024 D+T committee - 19.11.2024 CDCS governance - 05.11.24
Changes from previous version	Update of supply details Addition of dose banded table
Date uploaded	07/01/2025
Next review date	November 2027
Key Contact:	Kayleigh Lehal Antimicrobial Pharmacist kayleigh.lehal@nhs.net Ellie Birnie Antimicrobial Pharmacist Ellie.birnie1@nhs.net

References

1. BNF accessed via https://www.medicinescomplete.com
2. Therapeutic monitoring of vancomycin in adult patients: A consensus review of the American Society of Health-System Pharmacists, the Infectious Diseases Society of America, and the Society of Infectious Diseases Pharmacists. Am J Health-Syst Pharm. 2009; 66:82-98
3. Summary of product characteristics for vancomycin https://www.medicines.org.uk/emc/medicine
4. Thomson AH et al Development and evaluation of vancomycin dosage guidelines designed to achieve new target concentrations Journal of Antimicrobial Chemotherapy Advance Access published March 19, 2009
5. intravenous-vancomycin-use-in-adults-intermittent-pulsed-infusion-v01.pdf (sapg.scot)
6. opac-retrieve-file.pl (koha-ptfs.co.uk)