Vancomycin Intravenous Infusion for Adults

Who can administer

May be administered by registered competent doctor or nurse/midwife

Important information

- **MUST** be given by **slow infusion**, at a rate not exceeding 10mg/minute
- Effective use of vancomycin is complex and should normally be discussed with micro/ID
- Dose must be individualised according to renal function and weight. Â A Vancomycin Dose calculator on the GAPP antimicrobial app should be used to calculate the dose
- Monitoring requirements- see overÂ
- **Do NOT routinely hold** doses while waiting for levels to be reported, unless specifically requested to do so, or toxicity is suspected
- The **INTRAVENOUS ROUTE** is the **ONLY EFFECTIVE** means of treating **SYSTEMIC INFECTIONS.**
- See under 'Dose' for adjustments required in renal impairment
- **Reserve antimicrobial:** Restricted to indications in the antimicrobial prescribing guidelines, or following approval by microbiology/infectious diseases
- For Y-site compatibility see below

Available preparations

Vancomycin 500mg vial

Vancomycin 1g vial

Reconstitution

Water for injection

10mL per 500mg vial

20mL per 1g vial

Dilute further prior to administration

Infusion fluids

Sodium chloride 0.9% or Glucose 5%

Methods of intravenous administration

Intermittent intravenous infusion (Using an electronically controlled infusion device due to risk of thrombophlebitis and Vancomycin infusion reaction)

- Dilute to a maximum concentration of **5mg/mL** and infuse at a rate not exceeding **10mg/minute.** Example: 1g in 250mL infusion fluid over 100 minutes or more, 1.25g dose in 250ml over 125 minutes
- **Doses greater than 1g**: take care not to exceed 5mg/ml limit and a rate of 10mg per minute. e.g. a 2g dose should be administered in a minimum of 400mL - (in practical terms use 500ml unless fluid restricted) and give over at least 200 minutes (3 hours 20 minutes)

- Use a combination of 500mg and 1g vials where appropriate to avoid wastage
- In selected patients in need of **fluid restriction,** a concentration of up to 10mg per ml may be used- however, this may increase the rate of infusion related reactions. This **concentration (10mg/mL) must be administered via a central line**
- **If using a central line - refer to 'further information'**

Dose in adults

Dose must be individualised according to renal function and weight. The Vancomycin dosing calculator on the GAPP app should be used to calculate the Vancomycin dose

If the GAPP app is not available, please access the link to the calculators via the GUH useful resources folder on computer desktops.

ONLY IF THE ONLINE CALCULATOR IS UNAVAILABLE, calculate dose as below.

Loading dose (Only for Critical care, Haematology/Oncology and if recommended by Microbiology/ID)

- Give 25mg/kg using Actual Body Weight (**MAXIMUM DOSE = 2g**) as a loading dose for one dose, then continue as below [ref 1]
- Round dose to nearest 250mg dose e.g. 83kg patient for 25mg/kg = 2075mg - give 2g dose

Usual dose (see monitoring and results sections also)

- Give 15mg/kg using Actual Body Weight **(MAXIMUM DOSE = 2g)** (e.g. 1g for an average 70kg patient) [ref 1] repeated every twelve hours
- Round dose to **nearest** 250mg e.g. a 63kg patient for 15mg/kg = 945mg - give 1g dose

Consistently low pre-dose (trough) levels

- Where there is difficulty achieving or maintaining levels after a dose increase, contact micro/ID for advice

Renal impairment (empiric dosing) [ref 2]

* Creatinine clearance **must be calculated using Cockcroft and Gault** equation rather than using eGFR

Cockcroft and Gault equation	**(1.23(male) or 1.04 (female) x (140-age) x weight (Ideal body weight)) / serum creatinine (micromol/L)**

- The following table is a guide for **initial** dosing, but ultimately, the frequency is determined by interpretation of pre-dose (trough) level results
- Some patients may require a 25mg/kg loading dose, see above under loading dose

Creatinine clearance	Maintenance Dose	Frequency
Greater than 50mL/minute	15mg/kg (max 2g)	Every 12 hours
20 to 50mL/minute	15mg/kg (max 2g)	Every 24 hours
less than 20mL/minute	15mg/kg stat and re-dose based on levels (max 2g)	Re-dose based on levels (generally every 3-7 days) - discuss with micro/ID or pharmacy
Renal replacement therapy	Consult pharmacy or see antimicrobial guidelines See also GAPP link	

Monitoring

Results

Pre-dose (trough) level [ref 2]	
Which dose	The first pre-dose (trough) level should be taken on day 3 of treatment - and no later than before the 4th or 5th dose
When to take level	Just before dose is due, e.g. dose at 10am - take level between 9am and 10am
Desired pre-dose (trough) level in COMPLICATED INFECTIONS such as: blood stream infections, endocarditis, osteomyelitis, meningitis and MRSA pneumonia	15 to 20mg/L (ref 2)
Desired pre-dose (trough) level in other LESS COMPLICATED infections	10 to 15mg/L Pre-dose (trough) level should always be above 10mg/L to prevent development of resistance (ref 2)
How often	Twice weekly or more often if there is a risk of accumulation e.g. renal impairment, haemodynamic instability
Important	Do not hold doses while waiting on laboratory reports to come back, unless specifically instructed, or toxicity suspected
	Vancomycin may accumulate with prolonged use

- The laboratory will not process any request which does not include a sampling time.
- ALL REQUEST FORMS for vancomycin levels MUST state the SAMPLING TIME
- All patients receiving vancomycin should have regular blood counts, urine analysis.
- Monitor creatinine and renal function daily and review dose if necessary [ref 2]
- If creatinine increases by 45micromol/L or greater than 50% increase from baseline - this may indicate vancomycin toxicity and treatment should be reviewed [ref 1].

Interpretation of vancomycin levels when target trough level is 10 to 15mg/L	
Level	**Advice**
Less than 10mg/L LOW	Is vancomycin still needed
	Is it a true pre-dose trough level (taken within one hour before dose)?
	Is dose correct for weight and renal function?
	Are doses being held/have recent doses been given on time?
	An increase in dose is **likely to be needed - contact Micro/ID/Pharmacy**
	If a dose increase is recommended, re-check level pre-4th dose at new regimen
10 to 15mg/L TARGET RANGE	Is vancomycin still needed?
	Is patient responding clinically?
	Continue same dose if renal function is stable
	Check level in three days
Greater than 15mg/L HIGH	Is vancomycin still needed?
	Is it a true pre-dose trough level (taken within one hour before dose)
	Where was sample taken from? (Falsely high levels can occur if taken from same line used to give vancomycin)
	Is dose correct for weight and renal function?
	Is renal function stable?
	Dose adjustment required - contact Micro/ID. Do not administer a further dose without discussion with Micro/ID
	If the patient is to continue on vancomycin at a reduced dose, recheck level as advised

Interpretation of vancomycin levels when target trough level is 15 to 20mg/L	
Level	**Advice**
Less than 15mg/L LOW	Is vancomycin still needed
	Is it a true pre-dose trough level (taken within one hour before dose)?
	Is dose correct for weight and renal function?
	Are doses being held/have recent doses been given on time?
	An increase in dose is **likely to be needed - contact Micro/ID/Pharmacy**
	If a dose increase is recommended, re-check level pre-4th dose at new regimen
15 to 20mg/L TARGET RANGE	Is vancomycin still needed?
	Is patient responding clinically?
	Continue same dose if renal function is stable
	Check level in three days
Greater than 20mg/L HIGH	Is vancomycin still needed?
	Is it a true pre-dose trough level (taken within one hour before dose)
	Where was sample taken from? (Falsely high levels can occur if taken from same line used to give vancomycin)
	Is dose correct for weight and renal function?
	Is renal function stable?
	Dose adjustment required - contact Micro/ID. Do not administer a further dose without discussion with Micro/ID
	If the patient is to continue on vancomycin at a reduced dose, recheck level as advised

Where there is difficulty achieving or maintaining levels after a dose increase, contact micro/ID for advice

Further information

- **AVOID rapid administration** as it has been associated with occasional severe hypotension (including shock and rarely cardiac arrest) as well as **Vancomycin infusion reaction**.
- Infusion of concentrations greater than 5mg/mL may cause **thrombophlebitis**
- **Central line administration:** A concentration of 20mg per mL (e.g. 1g in 50mL) in Sodium chloride 0.9% may be reasonable [ref 3]. However, this should only be considered where the risks of possible hypotension and thrombophlebitis are deemed to be less hazardous than the consequences of fluid overload.
- Ototoxicity is now rare, unless the patient is also taking an aminoglycoside [ref 1]
- Where oral vancomycin is required (**only used for C. difficile)**
  - Use the injection solution orally
  - Add 10mL water for injection to a 500mg vial
  - A 2.5mL volume of this solution contains 125mg
  - Administer the required dose in 30ml water
  - The vial may be stored in the fridge for up to 24 hours provided it is labelled with an expiry, date, concentration and "for oral administration only"
  - Flavouring syrups may be added to the solution prior to administration [BNF]

- For information on Vancomycin Locks, contact pharmacy (information available on medinfogalway when logged in)
- For **Pregnant patients:** use booking weight for dose calculations (booking weight = obstetric patient's weight at first booking/antenatal appointment)

Storage

- Store below 25^{0}C

References

SPC Vancomycin (Mylan) April 2022

(1) "ASHP report: 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. Vol 66. Jan 1, 2009. pp 82-98.

(2) GUH Antimicrobial Guidelines 2021

(3) Injectable Medicines Administration Guide Medusa Downloaded 20th Jan 2023

Therapeutic classification

Treatment of serious infections such as MRSA