Lancashire and South Cumbria
Critical Care & Major Trauma
Specialist Clinical Services Networks

LANCASHIRE AND SOUTH CUMBRIA CRITICAL CARE NETWORK VANCOMYCIN GUIDELINE

CONSULTATION		
	Committee/Group	**Date**
Consultation	Lancashire and South Cumbria Critical Care Consultants Lancashire and South Cumbria Critical Care Pharmacists Lancashire and South Cumbria Consultant Microbiologists *(forming part of the Lancashire and South Cumbria Critical Care Network – Vancomycin Working Group)*	September 2022 – April 2023
Approval Committee	Lancashire and South Cumbria Critical Care Network Clinical Effectiveness Group (reapproval) Lancashire and South Cumbria Medicines Management Group Lancashire and South Cumbria ICS Aseptics Services Working Party	November 2024 July 2023 Discussed May 2023
NEXT REVIEW DATE:	November 2029	
AMENDMENTS:	Updated badge to reflect organisational name change of the Specialist Clinical Network	

Vancomycin by Continuous Infusion

1) Prescribe and administer STAT dose – dose based on **actual** body weight. Infuse as per table.

2) Once STAT dose completed commence continuous infusion first dose only based on Creatinine clearance, subsequent doses Vancomycin concentration required to determine daily dose. Use infusion rate table to ensure prescribed 24hr dose given.

3) Send daily Vancomycin concentration with morning bloods.

4) Once Vancomycin concentration known, use dose adjustment table to determine daily dose. Use infusion table to determine rate to ensure 24hr dose given.

Infusion via CVC

All infusion bags should be made up containing Vancomycin 1g in 120mL then infusion rate set by following infusion table.

Infusion via Peripheral Line

All infusion bags should be made up containing Vancomycin 500mg in 110mL then infusion rate set as shown in infusion table.

Consult *Lancashire and South Cumbria Drug Monographs - Vancomycin* monograph

If changing infusion from central line to a peripheral line a new infusion bag will need to be made up with the correct concentration.

GUIDELINE FOR THE USE OF VANCOMYCIN BY CONTINUOUS INFUSION

The efficacy of Vancomycin depends on the time for which the serum concentration exceeds the minimum inhibitory concentration for the microorganism rather than the attainment of high peak concentrations. There is evidence that giving Vancomycin as a continuous infusion over 24 hours is as effective as conventional intermittent dosing, whilst being much simpler to organise in terms of monitoring serum concentrations.

This guideline does not cover vancomycin in haemodialysis. Consult local protocol for prescribing in haemodialysis.

LOADING DOSE

Intravenous infusions of Vancomycin must be prescribed in the appropriate section of the critical care prescription chart.

The following parameters must be determined prior to prescribing:

- Patient's weight
- Renal function
- Route of administration (peripheral or central) for the intravenous infusion.

Note that a dedicated lumen will be required.

The initial loading dose should be based upon ACTUAL BODY WEIGHT

Weight (kg)	Dose	Infusion time (Minutes)	Fluid Volume (Sodium Chloride 0.9% **OR** Glucose 5%) for **CENTRAL** use	Fluid Volume (Sodium Chloride 0.9% **OR** Glucose 5%) for **PERIPHERAL** use
50 Kg	1.25g	130 minutes	100mL	250mL
60 Kg	1.5g	160 minutes	250mL	500mL
70 Kg	1.75g	180 minutes	250mL	500mL
80 Kg	2g	200 minutes	250mL	500mL
90 Kg	2.25g	230 minutes	250mL	500mL
100 Kg	2.5g	250 minutes	250mL	500mL
110 Kg	2.75g	280 minutes	250mL	1000mL
120 Kg or greater	3g	300 minutes	250mL	1000mL

MAINTENANCE DOSE

Commence immediately following the loading infusion.
First infusion dose determined using Creatinine clearance; subsequent daily doses determined using Vancomycin concentration. Doses greater than 3g over 24 hours may occasionally be required if therapeutic target not achieved.

Creatinine Clearance mL/min	Dose infused over 24 hours
250 mL/min or greater	**3 g**
200 – 250 mL/min	**2.5g**
150 – 200 mL/min	**2g**
100 – 150 mL/min	**1.5g**
75 – 100 mL/min	**1 g**
50 – 75 mL/min	**750 mg**
20 – 49 mL/min	**500 mg**
< 20 mL/min	**250 mg**
CVVHDF	**1g**

If no creatinine clearance available in the preceding 24 hours, request collection. Commence continuous infusion as follows:

	Dose infused over 24 hours
Serum Creatinine > 100 mmol/L	1g
Serum Creatinine ≤ 100 mmol/L	1.5g

- This dose now needs to be converted to an infusion rate by reference to the maintenance infusion table below, taking into account the proposed route of administration:
- **If administered via a central venous catheter → use a 1g/120mL Vancomycin solution**
- **If administered via a peripheral venous cannula → use a 500mg/110mL Vancomycin solution**
- Multiple infusions may be required over the 24 hour period.

24 hour Vancomycin dose (maintenance infusion)	**Infusion rate via a CENTRAL line (1g/120mL) using an infusion pump (mL/hr)**	**Infusion rate via a PERIPHERAL line (500mg/110mL) using an infusion pump (mL/hr)**
5 grams	**25**	**45.8**
4.5 grams	**22.5**	**41.3**
4 grams	**20**	**36.7**
3.5 grams	**17.5**	**32.1**
3 grams	**15**	**27.5**
2.5 grams	**12.5**	**22.9**
2 grams	**10**	**18.3**
1.5 grams	**7.5**	**13.8**
1 gram	**5**	**9.2**
750 mg	**3.75**	**6.9**
500 mg	**2.5**	**4.6**
250 mg	**1.25**	**2.3**

REQUESTING VANCOMYCIN CONCENTRATIONS – required to determine daily dosing / adjustments

- Request a serum Vancomycin concentration every day with the routine bloods.
- Until the patient's Vancomycin dose is stable, concentration must be taken daily. Once stable, alternate days concentrations are sufficient. This concentration should be taken with routine bloods and sent urgently to Clinical Biochemistry.
- Do not take concentration if Vancomycin has been started within the last 6 hours, i.e., after 22:00. Instead, wait until the following morning to check concentrations.

DOSE ADJUSTMENT

- Adjust the maintenance infusion dose (by altering the infusion rate) according to reported the serum concentration, using the infusion adjustment table below. The target serum concentration for continuous Vancomycin infusion is 20mg/L.
- The daily dose should be adjusted by the medical staff on the ward round according to the serum concentration. If treatment with Vancomycin is started within 6 hours of the usual morning concentration, wait for the following morning's concentration before adjusting the dose.

The new infusion rate must be prescribed:

Vancomycin concentration	Suggested action	Infusion Rate Adjustment
<5 mg/L	Repeat concentration and discuss with senior medical staff or pharmacist	
< 10 mg/L	Repeat loading dose based on actual body weight and increase daily dose by 500mg	Increase infusion rate to appropriate hourly rate using table
< 15 mg/L	Increase the daily dose by 500 mg	Increase infusion rate to appropriate hourly rate using table
15 – 25 mg/L	**No change**	
> 25 mg/L	Decrease the daily dose by 500 mg (Stop infusion if dose less than 500mg)	Reduce infusion rate to appropriate hourly rate using table
≥ 30 mg/L	Stop infusion and repeat concentration the next morning. Restart at a lower dose	Restart at a reduced dose as agreed on ward round

SPECIAL CIRCUMSTANCES

If a patient is already receiving Vancomycin when admitted to Critical Care, a serum Vancomycin concentration should be taken on arrival. If the patient has renal failure and has received Vancomycin within the last 24 hours, wait for the concentration. If the patient is not in renal failure switch the total daily dose of vancomycin to a 24hour infusion and take a Vancomycin concentration on the next working morning for interpretation.

If renal function is satisfactory, prescribe the appropriate continuous maintenance infusion rate and review once the concentration is available.

DISCHARGE FROM CRITICAL CARE

On discharge from Critical Care, the continuous infusion of Vancomycin should be stopped. The patient should revert to a conventional intermittent dosing regimen. The total daily dose of Vancomycin received in Critical Care should be divided into 2 easy to measure twelve hourly doses. Refer to the maintenance infusion table to convert back from infusion rate to total daily dosage. The first intermittent dose should commence 12 hours after the continuous infusion has been stopped. This should be prescribed by Critical Care prescribers before the patient leaves the Critical Care Unit. Advice may be sought from the Critical Care pharmacist and antimicrobial pharmacist.

Ready to use infusion bags are available on request from Pharmacy Aseptic Unit. Discuss with your pharmacist if ready to use infusion bags are needed.

INFUSION COMPATIBILITY

A separate lumen should be used for the Vancomycin infusion. If this is not possible, please discuss with medical staff or pharmacist.

The following drugs are Y-site **compatible** with Vancomycin at usual concentrations:
Atracurium
Fluconazole
Potassium
Magnesium
Midazolam
Morphine
Meropenem
Amiodarone

REFERENCES

1.James et al, Comparison of conventional dosing versus continuous infusion Vancomycin therapy for patients with suspected or documented grampositive infections. Antimicrob Agents Chemother 1996; 40: 696700.
2.Matthews, Vancomycin continuous infusions: a cohort of 23 intensive care unit patients. Aus J Hos Pharm 2001; 31: 108110.
3.Wysocki et al, Continuous versus intermittent infusion of Vancomycin in severe staphylococcal infections: prospective multicentre randomised study. Antimicrob Agents Chemother 2001; 45: 24602467.
4.Giles et al, Guidelines for the use of Vancomycin by continuous infusion therapy – regimen 2. Guy's and St Thomas' Hospital NHS Trust (2002).
5.Rello J. et al. Pneumonia caused by oxacillinresistant Staphylococcus aureus treated with glycopeptides. Crit Care Med 2005; 33(9): 19831987