NT Health Procedure

Due for review: 20/08/2029

Vancomycin Administration for Sepsis PPHC Remote

Applicability

This procedure applies to:

- All clinical staff in PPHC Remote Health Centres.

Procedure statement

To provide guidance for all clinical staff in remote health centres for the safe administration of a single weight-based loading dose of vancomycin.

Policy suite

This procedure forms part of the following policy suite:

- Australian Commission on Safety and Quality in Health Care: Sepsis Clinical Care Standard
- Adult Primary Health Care Sepsis Recognition and Management NT Health Guideline
- Paediatric Primary Health Care Sepsis Recognition and Management NT Health Guideline
- Vancomycin-Adults and Children > 12 years NT Hospital Guideline
- Vancomycin-Children Aged less than 12 years NT Hospitals Guideline
- Primary Health Care Adult Sepsis Pathway Form
- Primary Health Care Paediatric Sepsis Pathway Form
- Remote Primary Health Care Manuals. (2022). CARPA Standard Treatment. Manual (8th edition)

Procedure details

Sepsis is a time-critical medical emergency and early use of antibiotics is crucial to improve outcomes. With increasing rates of methicillin-resistant *Staphylococcus aureus* (MRSA) in the Northern Territory, a single dose of vancomycin is indicated for clients with undifferentiated sepsis prior to evacuation in accordance with the Primary Health Care Sepsis Pathways and CARPA 'Early Recognition of Sepsis' protocol.

Prescribing requirements

A medical consult is always required before vancomycin is administered, and it must be prescribed by a Senior Medical Officer or Retrieval Specialist in Primary Care Information System (PCIS).

Recognition and treatment of sepsis

CARPA 'Early Recognition of Sepsis' protocol, the Primary Health Care Adult Sepsis Pathway and the Primary Health Care Paediatric Sepsis Pathway should be used to guide the recognition and treatment of sepsis in remote clinics. For sepsis of unknown source, a single dose of vancomycin should be used as part of an undifferentiated sepsis antibiotic regimen.

Before administering antibiotics, ensure that the following has been completed:

- Blood cultures x 2 sets collected (same site collection, 10mL in each bottle for adult, 1-4mL in each bottle for paediatric).
- Placement of intravenous cannulas x 2.

If multiple antibiotics are ordered by the Senior Medical Officer or Retrieval Specialist administer antibiotics in the order of increasing duration of administration (i.e., gentamicin first and vancomycin last):

1. Gentamicin
2. Ceftriaxone
3. Flucloxacillin
4. Vancomycin

Preparation and administration

Presentation: 1 g vial (powder):

- Reconstitute 1 g vial with 20 mL of water for injections to make a concentration of 50 mg/mL.
- Dilute the dose to 5 mg/mL with a compatible fluid, i.e., dilute 1 g to at least 200 mL.

If necessary for fluid-restricted patients, the maximum concentration is 10 mg/mL, i.e., dilute 1 g in 100 mL.

For further information regarding the preparation and administration of vancomycin, refer to the Australian Injectable Drug Handbook.

Dose and infusion time

To avoid red man syndrome (refer to adverse effects section below for further information), always administer vancomycin via an infusion pump at a maximum rate of 10mg/minute (i.e.: 1000mg = 100 minutes = 1 hour 40 minutes infusion time).

Paediatric dose and infusion time

Paediatric patients are dosed at 15mg/kg - refer to below table for dosing and infusion time. Contact the Infectious Diseases team for dosing in children with extremes of weight.

Age	Weight	Dose	Time
New-born	3.3Kg	49.5mg	
3 months	6.2Kg	93mg	

Age	Weight	Dose	Time
6 months	7.6Kg	114mg	Infuse over 1-2 hours (Maximum rate of 10mg/minute)
1 year	9Kg	135mg	
2 years	12Kg	180mg	
4 years	16Kg	240mg	
6 years	20Kg	300mg	
8 years	25Kg	375mg	
10 years	32Kg	480mg	
12 years	40Kg	600mg	

Adult dose and infusion time

Adult patients are dosed at 25-30mg/kg- refer to below table for dosing and infusion time: Obtain further specific advice from Retrieval team/Infectious Diseases team (IFD) for dosing in adults with extremes of weight.

Adult vancomycin dose and infusion time									
ABW*	<40kg	40-49kg	50-59kg	60-68kg	69-77kg	78-86kg	87-95kg	96-105kg	>105kg
Dose	Obtain Advice	1250mg	1500mg	1750mg	2000mg	2250mg	2500mg	2750mg	Obtain Advice
Infusion time**	Obtain Advice	2hrs 5 min	2hrs 30min	3hrs	3hrs 20min	3hrs 45min	4hrs 10 min	4hr 35min	Obtain Advice
*ABW= Actual body weight **To avoid red man syndrome, administer at a maximum rate of 10mg/minute									

Adverse effects

Red man syndrome

Red man syndrome is a non-immunological reaction that can occur during or shortly after an infusion of vancomycin and is related to the rate of infusion. The reaction is mediated by histamine release, which can result in pruritus, flushing, erythematous rash (face, neck and upper thorax predominantly), fever, chills and in severe cases angioedema and hypotension. These symptoms are due to non-specific mast cell degranulation. True IgE-mediated allergy (anaphylaxis) can occur but is rare.

If a patient experiences an infusion-related reaction to vancomycin:

1. Cease infusion (do not discard the remaining dose until consulted with Infectious Diseases team).
2. Administer oral loratadine at the following doses:

Oral loratadine dosing			
Age	1-2 years of age	2-12 years of age and less than 30kg	Adult and child over 30kg
Dose	2.5mg	5mg	10mg

3. If newly hypotensive (SBP less than 90mmHg):
    - Contact an RMP/DMO for urgent assessment (ask to be put through 'urgently').
    - Prepare and consider administering adrenaline for anaphylaxis.
4. Consult Infectious Diseases team for advice on recommencement of vancomycin at a slower rate of infusion.

Nephrotoxicity

Vancomycin is a nephrotoxic antimicrobial, and its use requires concentration monitoring. Documentation and handover of the loading dose administered and administration time is important to ensure the accurate timing of the collection of the first vancomycin level once transferred to hospital.

The loading doses 25-30mg/kg for adults and 15mg/kg for children has been chosen as they are relatively safe. Subsequent vancomycin doses should be given at intervals dictated by the patient's weight and renal function, with renal function tested and monitored in a regional or tertiary hospital.

The risk of acute kidney injury with vancomycin can be reduced by avoiding concurrent administration with other nephrotoxic medications such as ibuprofen and ACE inhibitors (e.g.: ramipril) and avoiding dehydration.

Procedural roles and responsibilities

The following roles and responsibilities are set out for this procedure.

Role	Responsibility
Senior Rural Medical Practitioner/Retrieval Consultant/District Medical Officer	• Prescribe vancomycin for sepsis indication only.
Pharmacist/Delegates	• Monitor/audit vancomycin use for sepsis indication only.
Aboriginal Health Practitioner/Registered Nurse/Registered Midwife	• Safe administration of vancomycin as per this procedure.

Procedural compliance

The NT Health compliance indicators for this procedure are set out below. These indicators are required to be met and regularly evaluated by the respective business unit or responsible officer.

Any instances of non-compliance should be reported on the branch or divisional risk register. Where staff or patient-related non-compliance occurs in the clinical settings, register in the risk management system.

Indicator	Description	Responsibility
Vancomycin use	Vancomycin dose administered for sepsis indication only.	Pharmacist, PPHC Remote or delegate

Definitions

Term	Definition
ACE inhibitor	Angiotensin Converting Enzyme inhibitor
DMO	District Medical Officer
IFD	Infectious Diseases Team
kg	Kilogram
mg	Milligram
mL	Millilitre
MRSA	Methicillin-resistant *Staphylococcus aureus*
PCIS	Primary Care Information System
Policy suite	A collection of documents on a specific subject matter that is corporate or clinical in nature, in order of hierarchy as per the document pyramid in the Policy Governance Framework Model. A policy suite would usually consist of a parent policy and be supported by a procedure and guideline (NT Health Policy Development Procedure).
PPHC	Population and Primary Health Care; Primary and Public Health Care
Procedure	A set of prescribed instructions with steps on how to operationalise, implement and/or comply with corresponding legislation or policy. Procedures detail the process to be followed to deliver policy objectives. Other document terms that are included are: protocol, process (NT Health Policy Development Procedure).
RMP	Rural Medical Practitioner
SBP	Systolic blood pressure

Appendices

Appendix A: References

Reference	Type of Study	Evidence level I-V	Summary of recommendation from this reference
Vancomycin-Adults and Children > 12 years NT Hospital Guideline	Local Guideline	Based off evidence from level I resources	Loading doses 25-30mg/kg
Vancomycin-Children Aged less than 12 years NT Hospitals Guideline	Local Guideline	Based off evidence from level I resources	Loading doses 15mg/kg
Therapeutic Guidelines: Antibiotic (2019). Therapeutic Guidelines Limited. Melbourne. Available online within eTG	National Guideline	Based off evidence from level I resources	Loading doses 25-30mg/kg Loading doses 15mg/kg
Tsai D, Stewart PC, Hewagama S, et al. Optimised dosing of vancomycin in critically ill Indigenous Australian patients with severe sepsis. Anaesth Intensive Care. 2018; 46(4) 374-380.	Prospective, observational, population PK study	Level III	Consideration of inter-ethnic variation on PK/PD of Vancomycin dosing. May need adjustments in dosing Minimum Inhibitory Concentration (MIC) targets based on the individual
Australian Injectable Drugs Handbook. 20254. 9th edition [updated 2024 May 24]. Available online on NT Health library	National Guideline	Based off evidence from level I resources	Guidance for vancomycin preparation and administration

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National Safety and Quality Health Service standards

National Safety and Quality Health Service standards							
Clinical Governance	Partnering with Consumers	Preventing and Controlling Healthcare Associated Infection	Medication Safety	Comprehensive Care	Communicating for Safety	Blood Management	Recognising & Responding to Acute Deterioration
☒	☐	☐	☒	☐	☐	☐	☒