NEONATAL MEDICATION GUIDELINE

Vancomycin
INTERMITTENT REGIMEN FOR EMPIRICAL THERAPY OF LATE ONSET SEPSIS

Scope (Staff): Medical, Nursing and Pharmacy staff
Scope (Area): NICU KEMH, NICU PCH, NETS WA

This document should be read in conjunction with the Disclaimer.

Quick Links

Dose Monitoring Dose Adjustment Preparation & Administration

Restrictions

Formulary: Restricted
Requires Neonatologist or Microbiologist approval within 24 hours of initiation

HIGH RISK Medication!
Incorrect dosing with respect to age, weight and renal function may result in significant ototoxicity and nephrotoxicity. Under dosing may result in treatment failure, monitoring of drug levels is required.

Description

Antibiotic: Bactericidal glycopeptide

Presentation

Vial: 500mg
Pre-filled syringe: 40mg/8mL (5mg/mL) available at KEMH

Storage

Vial: Store at room temperature, below 25°C
Pre-filled syringe: Refrigerate at 2-8°C, do not freeze.

Indications

- Empirical Treatment of late onset sepsis
- Confirmed gram positive infections including Methicillin resistant S. aureus (MRSA) or coagulase negative staphylococcal (CoNS) infections– refer to clinical microbiology or infectious diseases physician for treatment advice
- Antibiotic Prophylaxis: Ventriculoperitoneal (VP) Shunt or CSF Reservoir Insertion
Contraindications and Precautions

- Concurrent nephrotoxic medications (gentamicin, piperacillin with tazobactam, furosemide, aciclovir or indometacin)
- Low urine output (less than 1mL/kg/hour)
- Pre-existing renal impairment (raised serum creatinine from age specific normal ranges)
- Haemodynamic instability
- Confirmed MRSA or CoNS- organism susceptibility may impact drug choice and dosing; a continuous infusion may be preferred

Dosage modification/reduction and earlier/frequent trough level monitoring may be required in patients with above risk factors. Consider contacting microbiology or paediatric infectious diseases physician for advice.

Dose

IV Intermittent Infusion:

Check baseline renal function (creatinine, urea and electrolytes) and repeat when first trough level is sampled.

<table>
<thead>
<tr>
<th>Corrected Gestational Age</th>
<th>Postnatal Age</th>
<th>Dose</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30 weeks</td>
<td>0 – 7 days</td>
<td>10mg/kg/dose</td>
<td>12 hourly</td>
</tr>
<tr>
<td></td>
<td>Greater than 7 days</td>
<td>10mg/kg/dose</td>
<td>8 hourly</td>
</tr>
<tr>
<td>30 - 37 weeks</td>
<td>0 – 7 days</td>
<td>15mg/kg/dose</td>
<td>12 hourly</td>
</tr>
<tr>
<td></td>
<td>Greater than 7 days</td>
<td>15mg/kg/dose</td>
<td>8 hourly</td>
</tr>
<tr>
<td>37 – 44 weeks</td>
<td>All ages</td>
<td>15mg/kg/dose</td>
<td>8 hourly</td>
</tr>
</tbody>
</table>

Monitoring

Sampling of Levels

- First level: trough level 1 hour prior to 4th dose and await result
- Change of dose: trough level 1 hour prior to 4th dose and await result
- Previous level within range: trough level in 3 days’ time and await result

Re-initiation of vancomycin at any time: Perform a trough level prior to commencing treatment and review prior to administering the 2nd dose

Target Trough Levels

Intermittent Dosing:

For empirical treatment: 5-15 mg/L

Blood levels will need repeating if a drug dose is altered or if the infant’s clinical situation (i.e. renal failure) is likely to lead to unpredictable levels.
Renal Function

Check creatinine, urea and electrolytes at baseline, with the first trough level and every 3 days thereafter at a minimum.

Consider more frequent monitoring of trough levels, creatinine, urea and electrolytes in patients with pre-existing renal impairment or at risk of deteriorating renal function (see precautions) or on other nephrotoxic medications.

Dose Adjustment

The following table aims to target a vancomycin trough level of 5-15mg/L (for empirical therapy).

Subsequent doses may be increased incrementally up to a maximum dose of 80mg/kg/day based on serum trough levels if clinically appropriate (e.g. absence of renal impairment or concomitant use of nephrotoxic medications).

In the event that dose escalation to 80mg/kg/day does not achieve the target level, consider changing to a continuous vancomycin infusion, in consultation with Infectious Diseases and/or Clinical Microbiology. Any further dose increases require approval from Infectious Diseases and/or Clinical Microbiology.

Only adjust a dose after confirming last doses were given correctly and at stated times, in addition to checking relevant microbiology results.

<table>
<thead>
<tr>
<th>Reported Trough level</th>
<th>Current Dose Frequency</th>
<th>Suggested adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 mg/L</td>
<td>Every 12 hours</td>
<td>Use the same dose, increase frequency to every 8 hours.</td>
</tr>
<tr>
<td></td>
<td>Every 8 hours</td>
<td>Increase dose by 50% (1.5 times current dose) and keep frequency at every 8 hours.</td>
</tr>
<tr>
<td>5 to 15 mg/L</td>
<td>Every 12 hours</td>
<td>No Adjustment required</td>
</tr>
<tr>
<td></td>
<td>Every 8 hours</td>
<td>Check renal function (creatinine, urea and electrolytes). Reduce dose by 30% (0.7 times current dose) – frequency to remain the same. Repeat level in 24 hours.</td>
</tr>
<tr>
<td>16 to 20mg/L</td>
<td>Every 12 hours</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Every 8 hours</td>
<td></td>
</tr>
</tbody>
</table>

Vancomycin trough level greater than 20mg/L consultation with Microbiology/Paediatric ID and Pharmacy

<table>
<thead>
<tr>
<th>Greater than 20 mg/L</th>
<th>Current Dose Frequency</th>
<th>Suggested adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Every 12 hours</td>
<td>Check renal function (creatinine, urea and electrolytes). Withhold further doses and contact clinical microbiology or paediatric infectious diseases. Repeat level 24 hours after last dose (write urgent on pathology form).</td>
</tr>
<tr>
<td></td>
<td>Every 8 hours</td>
<td></td>
</tr>
</tbody>
</table>
Preparation

Use pre-filled syringes where available to prevent any need for double-dilutions. Doses can also be ordered from Pharmacy at PCH.

Safety Tip: Discard an appropriate volume from a pre-filled syringe to achieve the correct dose prior to administration

IV Infusion: Method for double dilution

Safety Tip: Preparation requires a double dilution-minimise distractions during the preparation of this solution

Step 1 Reconstitution:
Add 10mL of water for injections to a 500mg vial. Concentration is now 50mg/mL

Step 2 Dilution:
Withdraw 1mL of the above solution and dilute to 10mL with glucose 5% or sodium chloride 0.9%

Safety Tip: Discard the contents of the first syringe immediately after the 1mL is withdrawn

Final Concentration is 5mg/mL

Maximum concentration: Concentrations of up to 10mg/mL may be used if neonate is fluid restricted. 10mg/mL solutions must be infused through a central line.

Administration

IV Intermittent Infusion

Infuse over one to two hours via syringe pump. A two hour infusion is recommended for the first dose or after an incidence of “Red man Syndrome”.

Pre-filled syringes do not need to remain protected from light during the infusion.

IV Continuous Infusion

Refer to: KEMH Neonatal Medication Guideline: Vancomycin Continuous Infusion

Compatible Fluids

Glucose 5% (Preferred), Glucose 10% or Sodium Chloride 0.9%

Adverse Effects

Common: Local pain, thrombophlebitis, erythematous rash

Serious: Nephrotoxicity, auditory and vestibular deafness, tachycardia, palpitations, red man syndrome, neutropenia, eosinophilia, thrombocytopenia

The symptoms of red man syndrome are fever, chills, erythema, rash (head, neck and upper chest), hypotension
Interactions

There is an increased risk of nephrotoxicity in patients who receive combination therapy with other nephrotoxic medications such as NSAIDs (Indometacin), gentamicin or piperacillin with tazobactam.

Guidelines & Resources

- Sepsis: Neonatal
- Ventriculoperitoneal (VP) Shunt or CSF Reservoir Insertion
- Neonatal Vancomycin Monograph - Continuous Infusion
- Neonatal Vancomycin Monograph - Highly Restricted Intermittent Infusion for Blood Culture Positive Infections

References


Frymoyer, Adam, et al. "Association between vancomycin trough concentration and..."
References

area under the concentration-time curve in neonates." Antimicrobial agents and chemotherapy 58.11 (2014): 6454-6461.


Vancomycin Intermittent Empirical Therapy

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V10 – separation of empirical and targeted therapy guidelines; updated dose for 37-44 weeks to be in line with national guidelines and current neonatal references, dose adjustment table to target level of 5-15mg/mL

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Neonatal Directorate Management Group

NSQHS Standards Applicable:
- Std 1: Clinical Governance
- Std 2: Partnering with Consumers
- Std 3: Preventing and Controlling Healthcare Associated Infection
- Std 4: Medication Safety
- Std 5: Comprehensive Care
- Std 6: Communicating for Safety
- Std 7: Blood Management
- Std 8: Recognising and Responding to Acute Deterioration

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