**Vancomycin**

**Newborn Use Only**

### Alert
The Antimicrobial Stewardship Team recommends vancomycin is listed under Restricted category.

### Indication
Infections due to susceptible strains of the following organisms: Staphylococci (including MRSA), Streptococci, Enterococci, Diphtheroids, *Listeria monocytogenes*, Lactobacilli, Actinomyces, *Bacillus* sp.

### Action
Bactericidal agent. Interferes with cell wall synthesis, inhibits RNA synthesis and alters plasma membrane function.

### Drug Type
Glycopeptide antibiotic.

### Trade Name

### Presentation
Vancomycin hydrochloride 500 mg vial; Vancomycin hydrochloride 1000 mg vial

### Dosage / Interval

<table>
<thead>
<tr>
<th>Standard infections: 15 mg/kg/dose. Dosing interval as per table below</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td><strong>Corrected Gestational Age/Postmenstrual Age</strong></td>
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<tr>
<td><strong>Postnatal Age</strong></td>
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<tr>
<td><strong>Interval</strong></td>
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<tr>
<td>&lt; 30&lt;sup&gt;th&lt;/sup&gt; weeks</td>
</tr>
<tr>
<td>0–2 days</td>
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<tr>
<td>18 hourly</td>
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<tr>
<td>&lt; 30&lt;sup&gt;th&lt;/sup&gt; weeks</td>
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<tr>
<td>3+ days</td>
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<tr>
<td>12 hourly</td>
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<tr>
<td>30&lt;sup&gt;th&lt;/sup&gt;–36&lt;sup&gt;th&lt;/sup&gt; weeks</td>
</tr>
<tr>
<td>0–14 days</td>
</tr>
<tr>
<td>12 hourly</td>
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<tr>
<td>30&lt;sup&gt;th&lt;/sup&gt;–36&lt;sup&gt;th&lt;/sup&gt; weeks</td>
</tr>
<tr>
<td>15+ days</td>
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<tr>
<td>8 hourly</td>
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<tr>
<td>37&lt;sup&gt;th&lt;/sup&gt;–44&lt;sup&gt;th&lt;/sup&gt; weeks</td>
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<tr>
<td>0–7 days</td>
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<tr>
<td>12 hourly</td>
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<tr>
<td>37&lt;sup&gt;th&lt;/sup&gt;–44&lt;sup&gt;th&lt;/sup&gt; weeks</td>
</tr>
<tr>
<td>8+ days</td>
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<tr>
<td>8 hourly</td>
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<tr>
<td>≥ 45&lt;sup&gt;th&lt;/sup&gt; weeks</td>
</tr>
<tr>
<td>0+ days</td>
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<tr>
<td>6 hourly</td>
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</tbody>
</table>

Consider giving a loading dose of 20 mg/kg/dose in suspected severe sepsis e.g., MRSA, bone infection, meningitis, endocarditis. However, data in neonates are limited.

### Route
IV

### Preparation/ Dilution
Add 10 mL of water for injection to the 500 mg vial to make a 50 mg/mL solution. Draw up 1 mL (50 mg) of vancomycin and add 9 mL glucose 5% or sodium chloride 0.9% to make a final volume of 10 mL with a final concentration of 5 mg/mL.

In special circumstances, e.g. fluid restricted infants, vancomycin can be diluted to 10 mg/mL, however this dilution increases the risk of infusion related events (see adverse reactions).

To prepare 10 mg/mL concentration: Add 10 mL of water for injection to the 500 mg vial to make a 50 mg/mL solution. Draw up 2 mL (100 mg) of vancomycin and add 8 mL glucose 5% or sodium chloride 0.9% to make a final volume of 10 mL with a final concentration of 10 mg/mL.

### Administration
IV infusion over ONE hour.

### Monitoring
Monitor renal function, full blood count, hearing function and serum vancomycin concentrations. Trough level: 10–20 mg/L (Aim for higher trough level: 15–20 mg/L in suspected severe sepsis).

Trough concentration should be taken within an hour prior to the:

2<sup>nd</sup> dose for 18 hourly dosing and 4<sup>th</sup> dose for all other frequencies

Check concentration prior to the 4<sup>th</sup> dose after any change in dose or frequency. Perform weekly monitoring for prolonged courses.

More frequent monitoring may be required in renal impairment, those receiving other nephrotoxic drugs or in suspected severe sepsis.

Recommended adjustment based on trough concentration:

- < 5 mg/L – increase total daily dose by 50–75% by either increasing frequency (preferred) or increasing each dose.
- 5–9.9 mg/L – increase total daily dose by 25–50% by either increasing frequency (preferred) or increasing each dose.
- 10–20 mg/L – no change in dose required.
- 20.1–30 mg/L – decrease total daily dose by 10–30% by decreasing each dose.
- > 30 mg/L – withhold dose. Repeat trough concentration 24 hourly until plasma concentration is 10–20 mg/L, then restart at a dose decreased by 50%.

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Neonatal Medicines Formulary Consensus Group

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Example of Dose adjustment:
Case scenario: Infant 30.2 weeks corrected GA & 15 days old. Birth weight 1.2 kg. Current weight 1.1 kg. He was given 18 mg vancomycin 8 hourly. (Using birth weight as his current weight didn’t exceed birth weight).
Trough levels prior to 4th dose = 4 mg/L.
Calculations for adjusted vancomycin dose*:
Calculate total daily dose: 18 mg x 3 = 54 mg per day.
Add 50% of daily dose = 54 mg x 1.5 = 81 mg per day.
Administer 81 mg in 4 divided doses = 20 mg 6 hourly.
*Note: The goal is to increase the daily dose by 50% by increasing frequency of administration.

Contraindications
Known hypersensitivity to vancomycin.

Precautions
Use with caution in patients with renal impairment or those receiving other nephrotoxic, neurotoxic or ototoxic drugs.

Drug Interactions
Beta-lactam antibiotics have been shown to be physically incompatible. The likelihood of precipitation increases with higher concentrations of vancomycin.
Neurotoxic and nephrotoxic drugs – concurrent use of these agents may contribute to the additive neurotoxic and nephrotoxic effects.
Diuretics – potent diuretics (e.g., frusemide) may add to the ototoxic effect.
Neuromuscular blocking agents (e.g., pancuronium, suxamethonium, vecuronium) – vancomycin may enhance neuromuscular blockade.
Vancomycin may be combined with an aminoglycoside, cephalosporin or rifampicin for synergistic activity.

Adverse Reactions
Infusion related events: Rapid infusion may cause red man syndrome – a predominately histamine mediated reaction with pruritus, tachycardia, hypotension and rash. It appears rapidly and usually dissipates in 30–60 minutes, but may persist for several hours. Increasing the infusion time usually eliminates the risk for subsequent doses.
Anaphylactic reactions may occur.
Phlebitis and tissue irritation and necrosis may occur, especially after extravasation. Intramuscular injection is not recommended.
Neurotoxicity, ototoxicity and nephrotoxicity – these are more pronounced with the addition of other medications such as aminoglycosides or frusemide.
Neutropenia and thrombocytopenia have been reported in adults; risk is increased with prolonged therapy > 1 week that and they appear to be reversible when vancomycin is discontinued.

Compatibility
Fluids: Glucose 5%, glucose 10%, sodium chloride 0.9%, Amino acid solutions, lipid solution.
Y site: aciclovir, amifostine, amiodarone, anidulafungin, atracurium, caspofungin, cisatracurium, dexametomidine, esmolol, filgrastim, fluconazole, granisetron, hydromorphone, labetalol, linezolid, magnesium sulfate, midazolam, morphine sulfate, mycophenolate mofetil, palonosetron, pancuronium, pethidine, remifentanil, tigecycline, vecuronium, zidovudine.

Incompatibility
Fluids: No information.
Y-site: Adrenaline hydrochloride, albumin, aminophylline, azathioprine, bivalirudin, calcium folinate, chloramphenicol, daptomycin, foscarin, frusemide, ganciclovir, heparin sodium, indomethacin, ketorolac, methylprednisolone sodium succinate, moxifloxacin, omeprazole, rocuronium, sodium bicarbonate, sodium valproate, streptokinase, urokinase.

Stability
Administer immediately, discard unused portion of reconstituted solution.

Storage
Store below 25°C. Protect from light.

Special Comments
Extravasation may cause tissue necrosis.

Evidence summary
As per NeoMed Consensus Group. Refer to reference manual or electronic version.

References
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