Alert

The Antimicrobial Stewardship Team recommends this drug is listed under the following category: Restricted. Continuous infusion is the recommended regime.

Indication

Infections due to susceptible strains of the following organisms: Staphylococci (including MRSA), Streptococci, Enterococci, Diptheroids, Listeria monocytogenes, Actinomyces, Bacillus spp.

Action

Bactericidal agent which interferes with cell wall synthesis, inhibits RNA synthesis and alters plasma membrane function.

Drug Type

Glycopeptide antibiotic.

Trade Name

Vancocin CP, Vancomycin Hydrochloride DBL, Vancomycin Alphapharm, Vancomycin Sandoz,

Presentation

Vancomycin hydrochloride 500 mg vial
Vancomycin hydrochloride 1000 mg vial

Dosage / Interval

<table>
<thead>
<tr>
<th>Corrected gestational age/Postmenstrual age</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;29⁰⁰ weeks</td>
<td>24 hourly</td>
</tr>
<tr>
<td>Measure trough levels before 2⁰ dose</td>
<td></td>
</tr>
<tr>
<td>29⁰⁰–35⁰⁰ weeks</td>
<td>12 hourly</td>
</tr>
<tr>
<td>Measure trough levels before 3⁰ dose</td>
<td></td>
</tr>
<tr>
<td>36⁰⁰–44⁰⁰ weeks</td>
<td>8 hourly</td>
</tr>
<tr>
<td>Measure trough levels before 3⁰ dose</td>
<td></td>
</tr>
<tr>
<td>≥45⁰⁰ weeks</td>
<td>6 hourly</td>
</tr>
<tr>
<td>Measure trough levels before 3⁰ dose</td>
<td></td>
</tr>
</tbody>
</table>

Severe sepsis: 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.

Renal impairment

- For infants with renal impairment, consider using an antibiotic without nephrotoxicity in consultation with an infectious diseases specialist.
- If vancomycin is used, perform a trough level before the 2⁰ dose.
- Adjust the dosage interval⁵,²¹ to achieve a trough level 10–20 mg/L (higher trough level 15–20 mg/L in suspected severe sepsis). Repeat the trough level before the next dose after each dosage adjustment or before every 3⁰ dose for infants within the target range.

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. Adequately flush the intravenous lines before and after administration of vancomycin.
Monitoring

Monitor renal function, full blood count, hearing function and serum vancomycin concentrations.

Measure trough vancomycin concentration immediately prior to 3rd dose with the exception of:
(1) <29+0 weeks – before 2nd dose and (2) renal impairment – see below. Once target trough levels are reached, measure trough levels every 3 days prior to the dose. More frequent monitoring may be required as follows: in renal impairment, those receiving other nephrotoxic drugs or in suspected severe sepsis.

Trough concentration: 10–20 mg/L (aim for higher trough level: 15–20 mg/L in suspected severe sepsis e.g., MRSA, bone infection, meningitis, endocarditis).

Recommended adjustment based on trough concentration:
Adjusted dose (mg/dose) = last maintenance dose (mg/dose) × (target trough concentration ÷ last vancomycin concentration).5 After dose adjustment, repeat trough levels prior to next dose until target trough levels are reached. Once target levels are reached check trough concentrations every 3 days prior to the dose.

For example, last dose was 45 mg/dose 8 hourly and your target vancomycin trough concentration is 10 mg/L but the last vancomycin trough concentration was 5 mg/L:

Adjusted dose = 45 mg/dose x (10 mg/L ÷ 5 mg/L)
= 90 mg/dose 8 hourly

Renal impairment
For infants with renal impairment, consider using an antibiotic without nephrotoxicity in consultation with an infectious diseases specialist. If vancomycin is used, perform a trough concentration before the 2nd dose, irrespective of corrected gestational age.

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
Neurotoxic and nephrotoxic drugs – concurrent use of these agents may contribute to the additive neurotoxic and nephrotoxic effects.
Diuretics – potent diuretics (e.g., furosemide) 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. Severe reactions may require treatment with adrenaline (epinephrine), corticosteroids or oxygen.
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 furosemide.
Neutropenia and thrombocytopenia have been reported in adults. Risk is increased with prolonged therapy >1 week but they appear to be reversible when vancomycin is discontinued.

Compatibility
Fluids: Glucose 5%, glucose 10%, sodium chloride 0.9%.

Y site: amino acid solutions and fat emulsions, aciclovir, adrenaline (epinephrine) hydrochloride, amifostine, amiodarone, anidulafungin, atracurium, caspofungin, cisatracurium, dobutamine, dopamine, dexmedetomidine, esmolol, filgrastim, fluconazole, gentamicin, granisetron, hydromorphone, insulin regular, labetalol, linezolid, magnesium sulfate, meropenem, midazolam.
### Incompatibility
- Fluids: No information.
- Y-site: albumin, aminophylline, azathioprine, beta-lactam antibiotics (eg. penicillins, cephalosporins), bivalirudin, calcium folinate, chloramphenicol, daptomycin, foscarnet, furosemide, ganciclovir, heparin sodium, indometacin, 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.

### Evidence summary
Extravasation may cause tissue necrosis.

### References
Refer to full version.

---

**Vancomycin – intermittent regime**

**Newborn Use Only**

- milrinone, morphine sulfate, mycophenolate mofetil, noradrenaline (norepinephrine), palonosetron, pancuronium, pethidine, potassium chloride, remifentanil, tigecycline, vecuronium, zidovudine.

**Incompatibility**
- Fluids: No information.
- Y-site: albumin, aminophylline, azathioprine, beta-lactam antibiotics (eg. penicillins, cephalosporins), bivalirudin, calcium folinate, chloramphenicol, daptomycin, foscarnet, furosemide, ganciclovir, heparin sodium, indometacin, 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**
Refer to full version.

**References**
Refer to full version.

---

**Authors Contribution**
- Original author/s: David Osborn, Srinivas Bolisetty
- Evidence Review - original: David Osborn
- Expert review: Amanda Gwee, Tony Lai, Brendan McMullan, Alison Kesson, Hemalatha Varadhan
- Nursing Review: Eszter Jozsa
- Pharmacy Review: Jing Xiao, Michelle Jenkins, Cindy Chen
- ANMF Group contributors: Niklant Phad, Himanshu Popat
- Final editing and review of the original: Ian Whyte
- Electronic version: Cindy Chen, Ian Callander
- Facilitator: Srinivas Bolisetty

---

This is a printed copy refer to the electronic system for most up to date version

ANMF Consensus Group
Vancomycin
Page 3 of 3