### Alprostadil (Prostaglandin E₁)

**Alert**  
1 microgram = 1000 nanogram.

**Indication**  
For temporary maintenance of ductus arteriosus patency until corrective or palliative surgery can be performed in neonates with ductal-dependent congenital heart defects.

**Action**  
Relaxes the ductus arteriosus in early postnatal life and supports its patency.

**Drug Type**  
Prostaglandin E₁ or PGE₁

**Trade Name**  
Prostin VR.

**Presentation**  
Ampoules (sterile solution) 500 microgram/mL 1 mL

### Dosage / Interval

<table>
<thead>
<tr>
<th>During Initial Consideration</th>
<th>Dose</th>
<th>Maintenance Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting Dose</td>
<td>10 nanogram/kg/minute (range: 5 to 50 nanogram/kg/minute).</td>
<td>3-20 nanogram/kg/minute. Aim is to be on the lowest dose that safely maintains ductal patency.</td>
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<tr>
<td>For known congenital heart disease patients and prior to ductal closure: Start at 10 nanogram/kg/min.</td>
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<tr>
<td>If there is no clinical or echocardiographic response to the maximum dose of 50 nanogram/kg/min, then consult a paediatric cardiologist. Very rarely they may suggest a very short trial of up to 100 nanogram/kg/min.</td>
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</table>

**Maximum dose**  
Higher doses ≥50 nanogram/kg/minute may be needed to resuscitate infants with poor perfusion and oxygenation ('grey baby') and with ductal closure in suspected ductal-dependent congenital heart disease.

**Route**  
Continuous IV infusion.

### Preparation/Dilution

**LOW DOSE continuous IV infusion [use if attempting to avoid ventilation and keep ductus open]**

<table>
<thead>
<tr>
<th>Infusion strength</th>
<th>Prescribed amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mL/hour = 10 nanogram/kg/minute</td>
<td>30 microgram/kg alprostadil (Prostin VR, PGE₁) and make up to 50 mL</td>
</tr>
</tbody>
</table>

First dilution: Draw up 1 mL (500 microgram) of alprostadil and add 9 mL of sodium chloride 0.9% or glucose 5% to make a final volume of 10 mL with a concentration of 50 microgram/mL.

Second dilution: From this, draw up 0.6 mL/kg (30 microgram/kg) and dilute to 50 mL with sodium chloride 0.9% or glucose 5%. Infuse at rate of 1 mL/h = 10 nanogram/kg/minute.

**HIGH DOSE continuous IV infusion [consider if ductus closed and/or mechanically ventilated]**

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<tr>
<td>1 mL/hour = 50 nanogram/kg/minute</td>
<td>150 microgram/kg alprostadil (Prostin VR, PGE1) and make up to 50 mL</td>
</tr>
</tbody>
</table>

First dilution: Draw up 1 mL (500 microgram of alprostadil) and add 9 mL of sodium chloride 0.9% or glucose 5% to make a final volume of 10 mL with a concentration of 50 microgram/mL.

Second dilution: From this, draw up 3 mL/kg (150 microgram/kg) and dilute to 50 mL with sodium chloride 0.9% or glucose 5%. Infusing at rate of 1 mL/h = 50 nanogram/kg/minute.

**Administration**  
Continuous intravenous infusion. Ensure reliable intravenous access as short half-life.
Alprostadil (Prostaglandin E₁)

Monitoring
Continuous pulse oximetry, heart rate, ECG and blood pressure monitoring. Assess urine output and peripheral perfusion frequently.

Contraindications
Ensure adequate cardiorespiratory monitoring and cardiorespiratory resuscitation equipment available for immediate use if necessary. Apnoea is frequent. Commencement of alprostadil ≤ 20 nanogram/kg/min and low maintenance dose reduces apnoea incidence. Titrate to infant’s response (increased oxygenation, echo findings and side effects) - Aim is to be on the lowest dose that safely maintains the ductal patency. Hyperosmolar – infuse at concentrations < 20 microgram/mL. Neonates with total anomalous pulmonary venous return below the diaphragm – may precipitate pulmonary oedema because of increased pulmonary blood flow.

Precautions

Concomitant administration with heparin may result in an increased risk of bleeding.

Adverse Reactions
Apnoea is frequent. Commencement of alprostadil ≤ 20 nanogram/kg/min and low maintenance dose reduces apnea incidence. Methylxanthines (caffeine or aminophylline) may be used to prevent or treat apnoea. [4] May lower blood pressure by relaxing the vascular smooth muscle causing vasodilatation and can elevate body temperature. Other reported effects include abdominal distension, bradycardia, enterocolitis, vomiting and skin rash. [5] With prolonged use, skeletal changes [10] and hypertrophic pyloric stenosis [11, 12] have been reported. Extravasation may cause tissue necrosis.

Compatibility
Fluids: Glucose 5%, sodium chloride 0.9%.
Y-site: Amino acid solutions, ampicillin; cefazolin; cefotaxime; chlorothiazide; dobutamine; dopamine; fentanyl; gentamicin; methylprednisolone; nitroprusside; potassium chloride; tobramycin, vancomycin; vecuronium.
Syringe: Caffeine; dobutamine; dopamine; adrenaline (epinephrine); fentanyl; midazolam; morphine.

Incompatibility
Y-site: Levofloxacin

Stability
Diluted solution stable for up to 24 hours.

Storage
Ampoule: Store at 2 to 8°C. Do not freeze.

Special Comments
Do not use if cloudy (crystallised). Undiluted solution (500 microgram/mL) is hyperosmolar. Dilute before administration to a concentration of 20 microgram/mL or less.

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

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

Original version Date: 23/06/2016
Current Version number: 1
Risk Rating: Medium
Due for Review: 23/06/2019
Approval by: JHCH CQ&PCC
Approval Date: 26/07/2016