Alprostadil

10microgram/mL injection (WCH), 500microgram/mL injection

Note:

This guideline provides advice of a general nature. This statewide guideline has been prepared to promote and facilitate standardisation and consistency of practice, using a multidisciplinary approach. The guideline is based on a review of published evidence and expert opinion.

Information in this statewide guideline is current at the time of publication.

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Health practitioners in the South Australian public health sector are expected to review specific details of each patient and professionally assess the applicability of the relevant guideline to that clinical situation.

If for good clinical reasons, a decision is made to depart from the guideline, the responsible clinician must document in the patient's medical record, the decision made, by whom, and detailed reasons for the departure from the guideline.

This statewide guideline does not address all the elements of clinical practice and assumes that the individual clinicians are responsible for discussing care with consumers in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes:

- The use of interpreter services where necessary,
- Advising consumers of their choice and ensuring informed consent is obtained,
- Providing care within scope of practice, meeting all legislative requirements and maintaining standards of professional conduct, and
- Documenting all care in accordance with mandatory and local requirements

Synonyms

Prostagladin E_1, PGE_1

Alert 1**micro**gram = 1000**nano**gram

Dose and Indications

Maintain patency of ductus arteriosus in the context of suspected or confirmed duct dependent congenital heart disease

Intravenous infusion

Widely patent duct in a stable neonate (confirmed on echocardiogram)

Initial dose: 5 nanograms/kg/minute

Adjust dose to response in increments up to a maximum 100 nanograms/kg/minute

Symptomatic neonate presenting with a closing duct

Initial dose: 10 to 50 nanograms/kg/minute

Adjust dose to adequate response. Commence at lower end of the range if neonate is stable

Always used in consultation with cardiology.

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Preparation and Administration

Continuous Intravenous Infusion

Select the strength required based on the weight of the infant in the context of any fluid restrictions.

There can be either ONE or TWO steps to prepare this solution, depending on the initial concentration of alprostadil. Follow the directions for each dilution.

The three standard concentrations to select from are:

- alprostadil 1microgram/mL (equivalent to 1000nanograms/mL)
- alprostadil 2micrograms/mL (equivalent to 2000nanograms/mL)
- alprostadil 4micrograms/mL (equivalent to 4000nanograms/mL)

Formulae

To calculate infusion rate (mL/hr):

$$\text{Rate (mL/hr)} = \frac{60 \times \text{dose (nanograms/kg/min)} \times \text{weight (kg)}}{\text{Strength (nanogram/mL)}}$$

To calculate the dose (nanograms/kg/min):

$$\text{Dose (nanograms/kg/min)} = \frac{\text{Rate(mL/hr)} \times \text{Strength (nanograms/mL)}}{60 \times \text{weight (kg)}}$$

Compatible Fluids

Glucose 5%, glucose 10%, sodium chloride 0.9%

Alprostadil

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Alprostadil 1micrograms/mL

STEP ONE: *Only required if using alprostadil 500microg/mL injection solution. Omit this step if using WCH 10microg/mL solution.* Dilute 0.5mL of alprostadil (500micrograms/mL) with 24.5mL of sodium chloride 0.9% injection (total of 25mL). The resulting solution contains 10micrograms/mL.

To make 25mL syringe:

STEP TWO: Dilute 2.5mL alprostadil (10micrograms/mL) with 22.5mL of sodium chloride 0.9% injection (or other compatible fluid). This makes a 1microgram/mL solution (1000nanograms/mL).

To make 50mL syringe:

STEP TWO: Dilute 5mL alprostadil (10micrograms/mL) with 45mL of sodium chloride 0.9% injection (or other compatible fluid). This makes a 1microgram/mL solution (1000nanograms/mL).

Rate (mL/hr)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	approximate nanograms/kg/minute								
0.5	7	10	13	17	20	23	27	30	33
1.5	2	3	4	6	7	8	9	10	11
2.5	1	2	3	3	4	5	5	6	7
3.5	1	1	2	2	3	3	4	4	5

Discard any remainder

Alprostadil 2micrograms/mL

STEP ONE: *Only required if using alprostadil 500microg/mL injection solution. Omit this step if using WCH 10microg/mL solution.* Dilute 0.5mL of alprostadil (500micrograms/mL) with 24.5mL of sodium chloride 0.9% injection (total of 25mL). The resulting solution contains 10micrograms/mL.

To make 25mL syringe:

STEP TWO: Dilute 5mL alprostadil (10micrograms/mL) with 20mL of sodium chloride 0.9% injection (or other compatible fluid). This makes a 2micrograms/mL solution (2000nanograms/mL).

To make 50mL syringe:

STEP TWO: Dilute 10mL alprostadil (10micrograms/mL) with 40mL of sodium chloride 0.9% injection (or other compatible fluid). This makes a 2micrograms/mL solution (2000nanograms/mL).

Rate (mL/hr)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	approximate nanograms/kg/minute								
1	7	10	13	17	20	23	27	30	33
2		5	7	8	10	12	13	15	17
3			5	6	7	8	9	10	11
4					5	6	7	8	8

Discard any remainder

Alprostadil

10microgram/mL injection (WCH), 500microgram/mL injection

Alprostadil 4micrograms/mL

STEP ONE: *Only required if using alprostadil 500microg/mL injection solution. Omit this step if using WCH 10microg/mL solution.* Dilute 0.5mL of alprostadil (500micrograms/mL) with 24.5mL of sodium chloride 0.9% injection (total of 25mL). The resulting solution contains 10micrograms/mL.

To make 25 mL syringe:

STEP TWO: Dilute 10mL alprostadil (10micrograms/mL) with 15mL of sodium chloride 0.9% injection (or other compatible fluid). This makes a 4micrograms/mL solution (4000nanograms/mL).

To make 50mL syringe:

STEP TWO: Dilute 20mL alprostadil (10micrograms/mL) with 30mL of sodium chloride 0.9% injection (or other compatible fluid). This makes a 4micrograms/mL solution (4000nanograms/mL).

Rate (mL/hr)	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	approximate nanograms/kg/minute								
2	7	10	13	17	20	23	27	30	33
3		7	9	11	13	16	18	20	22
4		5	7	8	10	12	13	15	17
5			5	7	8	9	11	12	13

Discard any remainder

Adverse Effects

Common

Apnoea, hypotension, fever, cutaneous flushing, bradycardia, leukocytosis. Gastric outlet obstruction and reversible cortical proliferation of the long bones (with treatment >120 hours). Hypokalaemia (with treatment >20 days)

Infrequent

Seizures, hypoventilation, tachycardia, cardiac arrest, oedema, sepsis, diarrhoea, disseminated intravascular coagulation

Rare

Urticara, bronchospasm, haemorrhage, hypoglycaemia and hypocalcaemia. Widened fontanels, pretibial and soft tissue swelling and swelling of the extremities (> 9 days therapy).

Monitoring

- Respiratory and cardiovascular status, including improvement in oxygenation
- Blood pressure
- Temperature
- Intravenous access
- Blood glucose levels
- Electrolytes and full blood count

Practice Points

- Adjust rate of infusion until patency of the ductus arteriosus has been established through improvement in oxygenation, palpable femoral pulses, improved lower extremity perfusion and increased urine output
- Maintenance dose is usually with one half or less of the initial effective dose
- Intravenous route is preferred, although effective with intra-arterial infusion
- Doses greater than 100nanograms/kg/minute are rarely more effective and may cause serious adverse effects
- Alprostadil is a peripheral vasodilator and can decrease blood pressure significantly. If using in the higher doses consider giving a volume load if blood pressure is low
- It is preferable to have a central line or two peripheral venous lines available when using alprostadil
- Use with CAUTION in patients with bleeding tendencies and seizure disorders.

Document Ownership & History

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