

Neonatal Medication Guideline

Clinical Guideline

Glucagon

Policy developed by: SA Maternal, Neonatal & Gynaecology Community of Practice

Approved SA Health Safety & Quality Strategic Governance Committee on: 6 October 2017

Next review due: 6 October 2020

Summary The purpose of this guideline is to guide nursing, midwifery, medical and pharmacy staff in the dosing and administration of glucagon

Keywords Glucagon, neonatal medication guideline, hypoglycaemia, glucose, neonatal hypoglycaemia, insulinoma, hypokalemia, hyponatremia

Policy history Is this a new policy? **N**
Does this policy amend or update an existing policy? **Y v1.0**
Does this policy replace an existing policy? **N**
If so, which policies?

Applies to All SA Health Portfolio
All Department for Health and Ageing Divisions
All Health Networks
CALHN, SALHN, NALHN, CHSALHN, WCHN, SAAS

Staff impact All Clinical, Medical, Midwifery, Nursing, Students, Allied Health, Emergency, Mental Health, Pathology, Pharmacy

PDS reference CG030

Version control and change history

| Version | Date from | Date to | Amendment |
|---------|----------------|--------------|------------------|
| 1.0 | November 2012 | October 2017 | Original version |
| 2.0 | 6 October 2017 | Current | Complete review |
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glucagon

1mg injection

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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

Dose and Indications

1mg = 1000micrograms = 1 unit

Management of Neonatal Hypoglycaemia

Intravenous Bolus, Intramuscular, Subcutaneous

200 microgram/kg (maximum of 1000micrograms) as a single dose

Intravenous Infusion

Commence with 10 microgram/kg/hr to 20 microgram/kg/hr and titrate up to a maximum of 50 microgram/kg/hr

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Contact: South Australian Neonatal Medication Guidelines Workgroup at:
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glucagon

1mg injection

Preparation and Administration

Intravenous Bolus, Intramuscular, Subcutaneous

Add 1mL of the diluent provided (water for injection) to the 1mg (1000 microgram) vial; this will give a resulting solution of 1000 microgram/mL

| Dose | 100 micrograms | 200 micrograms | 400 micrograms | 600 micrograms | 800 micrograms | 1000 micrograms |
|--------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| Volume | 0.1mL | 0.2mL | 0.4mL | 0.6mL | 0.8mL | 1mL |

Intravenous Infusion

Select the strength required based on the weight of the infant in the context of any fluid restrictions. Glucagon Concentration Selection Table can be found on the following pages of this guideline to assist prescribers to gauge which strength is best for the patient.

There are **TWO STEPS** to this process.

STEP ONE: Add 1mL of the diluent provided (water for injection) to the 1mg (1000 microgram) vial; this will give a resulting solution of 1000 microgram/mL.

STEP TWO: Dilute the appropriate volume of the 1000microgram/mL glucagon injection using compatible fluid; and administer by continuous infusion.

The three standard strengths used are:

- > Glucagon 40microgram/mL
- > Glucagon 80microgram/mL
- > Glucagon 160micrograms/mL

Formulae

To calculate infusion rate (mL/hr):

$$\text{Rate (mL/hr)} = \frac{\text{dose (micrograms/kg/hour)} \times \text{weight(kg)}}{\text{Strength (microgram/mL)}}$$

To calculate the dose (micrograms/kg/hour):

$$\text{Dose (micrograms/kg/hour)} = \frac{\text{Rate (mL/hr)} \times \text{Strength (microgram/mL)}}{\text{Weight (kg)}}$$

glucagon 1mg injection

Glucagon Concentration Selection Table for **25mL** syringes

Double Dilution for Glucagon 40micrograms/mL

STEP ONE: Add 1mL of the diluent provided (water for injection) to the 1mg (1000 microgram) vial; this will give a resulting solution of 1000 microgram/mL.

STEP TWO: Add 1mL of the 1000microgram/mL glucagon solution to 24mL 5% glucose (to a total of 25mL). This makes a 40microgram/mL solution.

| Rate (mL/hr) | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
|--------------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|----|
| Weight (kg) | Approximate micrograms/kg/hour | | | | | | | | |
| 1 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 3 | 3 | 4 | 5 | 7 | 8 | 9 | 11 | 12 | 13 |
| 4 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Discard remaining solution

Double Dilution for Glucagon 80micrograms/mL

STEP ONE: Add 1mL of the diluent provided (water for injection) to the 1mg (1000 microgram) vial; this will give a resulting solution of 1000 microgram/mL. Prepare 2 vials.

STEP TWO: Add 2mL of the 1000microgram/mL glucagon solution to 23mL 5% glucose (to a total of 25mL). This makes an 80microgram/mL solution.

| Rate (mL/hr) | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
|--------------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|----|
| Weight (kg) | Approximate micrograms/kg/hour | | | | | | | | |
| 1 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 2 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 3 | 5 | 8 | 11 | 13 | 16 | 19 | 21 | 24 | 27 |
| 4 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 5 | 3 | 5 | 6 | 8 | 10 | 11 | 13 | 14 | 16 |

Discard remaining solution

Double Dilution for Glucagon 160micrograms/mL

STEP ONE: Add 1mL of the diluent provided (water for injection) to the 1mg (1000 microgram) vial; this will give a resulting solution of 1000 microgram/mL. Prepare 4 vials.

STEP TWO: Add 4mL of the 1000microgram/mL glucagon solution to 21mL 5% glucose (to a total of 25mL). This makes a 160microgram/mL solution.

| Rate (mL/hr) | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1 |
|--------------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|----|
| Weight (kg) | Approximate micrograms/kg/hour | | | | | | | | |
| 2 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 |
| 3 | 11 | 16 | 21 | 27 | 32 | 37 | 43 | 48 | 53 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 |
| 5 | 6 | 10 | 13 | 16 | 19 | 22 | 26 | 29 | 32 |

Discard remaining solution

Compatible Fluids

Glucose 5%, sodium chloride 0.9%

Adverse Effects

Infrequent

Vomiting, paroxysmal insulin secretion and rebound hypoglycaemia

Rare

Hypokalaemia (large doses), allergic reactions, hyponatraemia, thrombocytopenia

Monitoring

- > Blood glucose levels
- > If on continuous infusion consider periodic electrolytes and platelets

Practice Points

- > Glucagon is not usual first line treatment of hypoglycaemia; consider in cases of hypoglycaemia refractory to intravenous glucose infusion, or when glucose infusion is unavailable, or in cases of documented glucagon deficiency
- > When considering original vial strength and possible patient condition, it is recommended that only 25mL volume infusions are prepared
- > Watch for rebound hypoglycaemia. Rise in blood glucose will last approximately 2 hours
- > Persistent hypoglycaemia should not be treated with repeated doses of glucagon alone. Glycogen stores in preterm and growth retarded infants are limited and easily depleted
- > Evaluate glucose levels prior to each dose
- > Do not add to infusion fluids containing calcium—precipitation may occur
- > Subcutaneous glucagon infusions have been used.

Version control and change history

PDS reference: OCE use only

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