BRIEF ADMINISTRATION GUIDE

For detailed information refer to The Australasian Neonatal Medicines Formulary **glucagon** guideline

Critical Note: there are minor variations between the ANMF and Waikato DHB best practice within this drug guideline – see yellow shaded text

Indications: Treatment of severe acute hypoglycaemia

Route: Intravenous, intramuscular, or subcutaneous

- Supplied as glucagon hydrochloride 1 mg vial, powder for reconstitution and prefilled syringe containing diluent (1.1 ml water for injection)
  - pH of glucagon when reconstituted is 2.5 to 3.5

Dose:

Direct IV, IM or subcut injection

- 200 micrograms/kg (maximum 1 mg) as a single dose
- Dose may be repeated after 20 minutes if necessary

Continuous intravenous infusion

- Initially 10 to 20 microgram/kg/hr
- Titrate dose according to response and blood glucose levels (usual range 5 to 20 microgram/kg/hr)
- Doses up to 50 microgram/kg/hr have been used (but may produce little benefit)

Preparation and administration

Compatible fluids: glucose 5%, glucose 10%, sodium chloride 0.9%

Direct IV, IM or Subcut Injection

- Reconstitute each vial using the diluent provided (final concentration = 1 mg/ml).
- Gently shake the vial until the powder is completely dissolved and the solution is clear.
- Draw up prescribed dose and expel any air that remains in the syringe.
- IV: Administer by slow IV injection over 1 minute
- IM: Administer by IM injection into muscle of the thigh (preferred) or buttocks
- Subcut: Administer by subcutaneous injection into the area over the deltoid muscle or over the anterolateral thigh

Continuous IV Infusion

- Reconstitute each vial using the diluent provided (final concentration = 1 mg/ml).
- Gently shake the vial until the powder is completely dissolved and the solution is clear.
- Select the concentration of glucagon required based on the weight of the infant and in the context of any fluid restrictions (refer to Appendix for assistance) and dilute the appropriate volume of glucagon injection using compatible fluid in accordance with the table below:

Final Glucagon Concentration	50 microgram/mL	160 microgram/mL
Volume of glucagon (1 mg/mL)	1 mL	2 mL
Volume of compatible fluid	19 mL	10.5 mL
Total volume	20 mL	12.5 mL

- Administer at the prescribed rate by continuous IV infusion using a syringe driver with Guardrails settings

$$\text{Rate (mL/hr)} = \frac{\text{Dose (microgram/kg/hr) x Weight (kg)}}{\text{Concentration (microgram/mL)}}$$

Monitoring

- Blood glucose concentrations every 30 minutes for the first hours, then at least hourly
  Note: Rebound hypoglycaemia may occur, ensure adequate carbohydrate/glucose supplementation following administration
- Consider cardiorespiratory and blood pressure monitoring
- Electrolytes (for continuous infusion)

Storage and Stability

- Discard any unused injection solution

Competency for Administration

This procedure is carried out by, or under, the direct supervision of a registered nurse/registered midwife who holds current Waikato DHB Generic Medicine Management and IV certification plus Guardrails competency (if administering IV) as well as Neonatal specific competency NCV/NAC (if administering via CVAD).

Guardrails Information

Glucagon will be Guardrail profiled on the CC syringe driver for NICU. Following are the guardrail limits:

Guardrails Drug Name	**Glucagon**
Concentration (mcg/ml)	
Minimum	20
Maximum	250
Dose rate (mcg/kg/hour)	
Default	10
Soft minimum	5
Soft maximum	21
Hard max	50

Associated Documents

- Waikato DHB NICU guideline “Hypoglycaemia – guidelines for management”, reference 3122.

References

- Australian Neonatal Medicines Formulary. Glucagon Drug Guideline, 2020. Available from: https://www.slhd.nsw.gov.au/rpa/neonatal/NeoMedPaperCopy.html
- New Zealand Formulary for Children (NZFC). Glucagon hydrochloride. Accessed 21st June 2021. Available from: https://www.nzfchildren.org.nz/nzf_3753
- Truven Health Analytics Inc. Pediatrics and Neofax®. Glucagon monograph. Accessed June 2021. Available from: http://www.micromedexsolutions.com.
- Novo Nordisk Pharmaceuticals Ltd. DBL GlucaGen Hypokit Data Sheet. 10 October 2017. Available from: http://www.medsafe.govt.nz/profs/datasheet/g/GlucaGeninj.pdf
- Auckland DHB Neonatal services. Glucagon Drug Protocol. 2018. Available from: http://www.starship.org.nz
- Canterbury DHB Neonatal Services. Glucagon Drug Information Sheet. 2021. Available from: http://www.cdhb.health.nz/Hospitals-Services/Health-Professionals/Neonatal-Clinical-Resources/Neonatal-Drug-Information-Sheets.
- Australian Injectable Drugs Handbook 8th edition. The Society of Hospital Pharmacists of Australia, 2020.

Note: **Printed copies are only valid on the day of printing – they are not controlled and may not be the current version in use. Please refer to the online version.**

Appendix

Infusion tables

Table 1: Infusion rates when using glucagon concentration **50 microgram/mL**
(most useful for neonates ≤ 3 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate microgram/kg/hour**									
0.5	10	20	30	40	50	60	70	80	90	100
1	5	10	15	20	25	30	35	40	45	50
1.5	3	7	10	13	17	20	23	27	30	33
2	3	5	8	10	13	15	18	20	23	25
2.5	2	4	6	8	10	12	14	16	18	20
3	2	3	5	7	8	10	12	13	15	17
3.5	1	3	4	6	7	9	10	11	13	14

Table 2: Infusion rates when using glucagon concentration **160 microgram/mL**
(most useful for neonates > 3 kg)

Rate (mL/hr)	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Weight (kg)	**Approximate microgram/kg/hour**									
1	16	32	48	64	80	96	112	128	144	160
1.5	11	21	32	43	53	64	75	85	96	107
2	8	16	24	32	40	48	56	64	72	80
2.5	6	13	19	26	32	38	45	51	58	64
3	5	11	16	21	27	32	37	43	48	53
3.5	5	9	14	18	23	27	32	37	41	46
4	4	8	12	16	20	24	28	32	36	40
4.5	4	7	11	14	18	21	25	28	32	36
5	3	6	10	13	16	19	22	26	29	32