Drug Therapy Protocols: Glucagon

Policy code	DTP_GLC_0722
Date	July, 2022
Purpose	To ensure a consistent procedural approach to glucagon administration.
Scope	Applies to all Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless specifically mentioned.
Source of funding	Internal – 100%
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Glucagon

Drug class[1,2]

Hyperglycaemic

Pharmacology[1,2]

Glucagon is a hyperglycaemic agent that mobilises hepatic glycogen, which is released into the blood as glucose.[1–3] Glucagon has inotropic and chronotropic effects that are not mediated through beta-receptors.

Metabolism

Glucagon is metabolised by the liver, kidneys and in the plasma.[1]

Indications[1–3]

- **Symptomatic hypoglycaemia** (with the inability to self-administer oral glucose)
- **Refractory anaphylaxis with persistent hypotension/ shock** (unresponsive to 3 x IM adrenaline injections and adequate fluid challenges)

Contraindications

- Allergy AND/OR adverse drug reaction

Precautions

- Nil

Side effects

- Nil

Presentation

- Vials (powder and solvent), 1 mg *glucagon* (GlucaGen® Hypokit)[4]

Onset (IM)	Duration (IM)	Half-life
4–7 minutes	Variable	3–6 minutes

Schedule

- S3 (Therapeutic poisons).

Routes of administration

Intramuscular injection (IM)	AT, P, ACP1, ACP2, CCP
Intravenous injection (IV)	ACP2, CCP

Glucagon

Adult dosages [1–5]

Symptomatic hypoglycaemia
(with the inability to self-administer oral glucose)

AT P ACP1 ACP2 CCP	IM	**1 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL.*

Refractory anaphylaxis with persisent hypotension/ shock (unresponsive to 3 x IM adrenaline injections and adequate fluid challenges)

ACP2 CCP	IM	May be administered when paramedics are unable to achieve IV access. **1 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL.*
ACP2 CCP	IV	**1 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL.*

Paediatric dosages

Symptomatic hypoglycaemia
(with the inability to self-administer oral glucose)

AT P ACP1 ACP2 CCP	IM	> 25 kg – **1 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL.* ≤ 25 kg – **0.5 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL. Decant 0.5 mL of the prepared solution to achieve a final concentration of 0.5 mg/0.5 mL.*

Paediatric dosages[1–5]

Refractory anaphylaxis with persistent hypotension/ shock (unresponsive to 3 x IM adrenaline injections and adequate fluid)

ACP2 CCP	**IM**	May be administered when paramedics are unable to achieve IV access. > 25 kg – **1 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL.* ≤ 25 kg – **0.5 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL. Decant 0.5 mL of the prepared solution to achieve a final concentration of 0.5 mg/0.5 mL.*
ACP2 CCP	**IV**	> 25 kg – **1 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL.* ≤ 25 kg – **0.5 mg** **Single dose only.** ***Syringe preparation:*** *Reconstitute 1 mg of glucagon with 1 mL of water for injection in a 3 mL syringe to achieve a final concentration of 1 mg/1 mL. Decant 0.5 mL of the prepared solution to achieve a final concentration of 0.5 mg/0.5 mL.*

Special notes

- Ambulance officers must only administer medications for the listed indications and dosing range. Any consideration for treatment outside the listed scope of practice requires mandatory approval via the *QAS Clinical Consultation and Advice Line*.
- Glucagon may be ineffective in patients lacking stored glycogen (e.g. alcoholic patients with impaired liver function and neonates).
- Oral carbohydrates should be given when the patient has responded to glucagon treatment to restore liver glycogen and to prevent secondary hypoglycaemia.
- Administered for hypoglycaemia if IV glucose 10% cannot be administered in a suitable time frame.
- Clinicians should have a low threshold for glucagon administration in the hypotensive/shocked anaphylaxis patient when presenting with heart failure and/or prescribed beta blocker therapy.
- All parenteral medications must be prepared in an aseptic manner. The rubber stopper of all vials must be disinfected with an appropriate antimicrobial swab and allowed to dry prior to piercing.