Glucagon
Newborn use only

2020

<table>
<tr><td>Alert</td><td></td></tr>
<tr><td>Indication</td><td>Management of neonatal hypoglycaemia:
• Refractory to intravenous glucose infusions;
• When glucose infusion is unavailable.
Management of hyperinsulinaemic hypoglycaemia (e.g. congenital hyperinsulinism).
Adjunctive treatment of beta-blocker overdose.</td></tr>
<tr><td>Action</td><td>Stimulates hepatic gluconeogenesis and glycogenolysis. Glucagon has a positive inotropic action.</td></tr>
<tr><td>Drug type</td><td>Polypeptide hormone – hyperglycaemic agent</td></tr>
<tr><td>Trade name</td><td>GlucaGen HypoKit 1 mg/mL</td></tr>
<tr><td>Presentation</td><td>1 mg/mL vial.
1 unit of glucagon = 1 mg (1000 microgram) glucagon</td></tr>
<tr><td>Dose</td><td>IV bolus/IM/SC
200 microgram/kg/dose. Do not exceed 1 mg/dose. IV glucose is to be administered as soon as possible.

IV infusion
5–20 microgram/kg/hour.
Consider starting dose of 20 microgram/kg/hour and decrease carefully, monitoring blood glucose, until the minimum effective dose is reached.

Beta-blocker overdose: Refer to evidence summary.</td></tr>
<tr><td>Dose adjustment</td><td>Therapeutic hypothermia – No information.
ECMO – NO information.
Renal impairment – No information.
Hepatic impairment – No information.</td></tr>
<tr><td>Maximum dose</td><td>Maximum stat dose: 1 mg (1000 microgram)</td></tr>
<tr><td>Total cumulative dose</td><td></td></tr>
<tr><td>Route</td><td>IV, IM, SC</td></tr>
<tr><td>Preparation</td><td><u>IV bolus/IM/SC:</u>
Reconstitute 1 mg (1000 microgram) glucagon vial with 1 mL of diluent provided (water for injection) to make a 1 mg/mL (1000 microgram/mL) solution.

<u>IV infusion</u>
SINGLE STRENGTH infusion:
<table><tr><th>Infusion Strength</th><th>Prescribed amount</th></tr><tr><td>1 mL/hour = 10 microgram/kg/hour</td><td>0.5 mg/kg (0.5 mL/kg) glucagon to make up to 50 mL</td></tr></table>Add 1 mL of diluent provided (water for injection) to the 1 mg vial (1000 microgram of glucagon) to make a 1mg/mL solution.
FURTHER DILUTE
Draw up 0.5 mL/kg (0.5 mg/kg of glucagon) of the above solution and make up to a final volume of 50 mL with glucose 5% to make a final concentration of 10 microgram/kg/mL.
Infusing at 1 mL/hour = 10 microgram/kg/hour.

DOUBLE STRENGTH infusion
<table><tr><th>Infusion Strength</th><th>Prescribed amount</th></tr><tr><td>1 mL/hour = 20 microgram/kg/hour</td><td>1 mg/kg (1 mL/kg) glucagon to make up to 50 mL</td></tr></table>Add 1 mL of diluent provided (water for injection) to the 1 mg vial (1000 microgram of glucagon) to make a 1mg/mL solution.
FURTHER DILUTE
Draw up 1 mL/kg (1 mg/kg of glucagon) of the above solution and make up to a final volume of 50 mL with glucose 5% to make a final concentration of 20 microgram/kg/mL.
Infusing at 1 mL/hour = 20 microgram/kg/hour.</td></tr>
<tr><td>Administration</td><td>Do not use the reconstituted solution unless it is clear.
IV bolus: Administer 0.2 mL/kg of the reconstituted solution (to a maximum 1 mL) over 3 to 5 minutes.
IM: Inject into the anterolateral thigh (preferred) or the ventrogluteal areas [1, 2].
SC: Inject into the area over the deltoid muscle or over the anterolateral thigh [1, 3].
Continuous IV infusion: Via syringe driver.</td></tr>
</table>

Monitoring	Blood glucose concentrations, watch for rebound hypoglycaemia after cessation. Consider cardiorespiratory and blood pressure monitoring. Electrolytes for continuous infusion.
Contraindications	Phaeochromocytoma [4-6], glucagonoma. Hypersensitivity to glucagon or any component.
Precautions	Hypertension. Insulinoma: Glucagon has been used to treat hypoglycaemia caused by insulinoma. However, it should be used cautiously because of the propensity to release insulin [7].
Drug interactions	Drug interactions largely unreported in newborn infants. Glucagon has a positive inotropic action which may counteract effect of beta-blockers. Beta-blockers may reduce hyperglycaemic effect of glucagon [8]. Warfarin: Increased effect of warfarin resulting in increased risk of bleeding.[9] Indomethacin: Glucagon may lose its ability to raise blood glucose or paradoxically may even produce hypoglycaemia [7].
Adverse reactions	Generally well tolerated. Transient increase in blood pressure and pulse rate. [7] Anaphylaxis or hypersensitivity reactions have been reported in adults. [7] Very rare: Hypertension, hypotension, vomiting. [7] Erythema necrolyticum migrans (erythematosquamous skin lesions) has been reported with prolonged glucagon infusion.
Compatibility	Fluids: Glucose 5% and 10%, sodium chloride 0.9%. Y-site: Naloxone.
Incompatibility	Fluids: Solutions that contain calcium. Y-site: No information.
Stability	Discard any unused solution. IV infusion solution is stable for 24 hours.
Storage	Store below 25°C. Do not freeze. The sealed container should be protected from light.
Excipients	Lactose monohydrate, hydrochloric acid (for pH adjustment), sodium hydroxide (for pH adjustment), and water for injections.
Special comments	
Evidence	Refer to full version.
Practice points	Refer to full version.
References	Refer to full version.

VERSION/NUMBER	**DATE**
Original 1.0	**18/05/2017**
Revised 1.1	01/01/2018
Current 2.0	15/12/2020
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