

PROTOCOL FOR HYPOGLYCAEMIA IN A&E (Patient not known)

Priority patient: must not wait in A&E

Label

1

IF CAPILLARY BLOOD GLUCOSE < 2.7mmol/L (0.50g/L), take samples for the following tests BEFORE STARTING GLUCOSE ADMINISTRATION



if haemodynamic shock, coma or seizures: the urgency is to restore glucose levels (see §2.)

- Capillary blood ketones if available or urine analysis (ketones)
- Blood glucose, lactate: 1 grey tube (fluoride) - confirmation in all cases by venous blood glucose -
- Insulin, C peptide, GH and IGF1: 1 red tube (dry, min. 3 ml)
- Blood cortisol: 1 violet tube (EDTA, min. 1 ml)
- Blood gases, electrolytes (with bicarbonates), liver function tests, CPK, uric acid: 1 gas syringe + 1 green tube (heparin)
- Blood ammonia: 1 green tube (lithium)
- PT and factor V: 1 blue tube (citrate)
- Acylcarnitine profile: 1 green tube (heparin)
- Urinary organic acid chromatography (collect the first urine sample after the episode, after glucose restoration therapy), minimum 2 ml of urine to be frozen
- Depending on context: Search for toxic drugs in blood and/or urine: hypoglycaemic sulfonamides, oral anti-diabetic drugs, etc. (blood: 1 green heparin tube)

Key investigations: those which must be performed during hypoglycaemia before glucose administration. The others remain interpretable if samples are taken within 1/2 hour after glucose restoration. Samples for metabolic and endocrine biochemistry: take the tubes to the on-call laboratory for centrifugation and storage.

2

TREATMENT TO BE INITIATED AS AN EMERGENCY, after testing

- **Oral or enteral (NG tube) glucose administration until normalisation of blood glucose to > 0.7 g/L:** 30% glucose 1ml/kg max. 30mL, or 1 sugar cube / 20kg weight. **If enteral route not possible: 10% glucose 3mL/kg by direct IV injection** (30% possible by central line or intraosseous route, some teams allow injection of 30% glucose via a peripheral line in cases of refractory hypoglycaemia). Capillary blood glucose test 10 minutes later. If still hypoglycaemic, second glucose administration using the same methods and test 10 min later, to be repeated as many times as necessary.

• Infusion if:

- Food intolerance
- Failure of glucose restoration (persistent hypoglycaemia despite 2 glucose administrations)
- Warning signs below (see §3.)

Infusion using 10% glucose with standard electrolyte additions* (not pure 10% glucose) via a peripheral line. Initial infusion rate according to the table below.

Age	0-1 month	1-24 months	2-14 years	> 14 years / adult	Initial MAX
10% glucose + electrolytes*	6 ml/kg/h (i.e. 10 mg/kg/min)	5 ml/kg/h (i.e. 8 mg/kg/min)	3.5 ml/kg/h (6 mg/kg/min)	2.5ml/kg/h (4mg/kg/min)	120ml/h (3L/24h)

*e.g.: Polyionic, Bionolyte, B45, Glucidion, etc. if no solutes available, 10% glucose + 4 to 6g/L of NaCl (70 meq/L) and 2g/L of KCl (27 meq/L)

If unable to infuse the patient => Nasogastric tube or gastrostomy: prepare the IV fluids listed above and pass them through the tube at the same rates.

• Monitoring while on infusion:

- Check capillary blood glucose, blood ketones or urinary ketones every 3 hours, then depending on progress. Monitor serum electrolytes if initially abnormal.
- Adjust the rate of glucose administration according to the blood glucose level: **target: between 0.7 and 1.2 g/L (4 - 7 mmol/L)**. If necessary, adjust the infusion rate of 10% glucose in steps of +/- 0.3 mL/kg/h (0.5 mg/kg/min).
- Continue infusion until blood ketones are negative (< 1 mmol/L) AND appropriate resumption of eating over 2 successive meals. The infusion must be discontinued progressively.

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WARNING SIGNS: Admission to hospital, opinion of metabolic medicine specialist and/or endocrinologist AND infusion in

- If **profound hypoglycaemia** = 2.2mmol/L (= 0.40g/L) or **causing major symptoms** (altered consciousness, seizures) or **recurrent hypoglycaemia**
- If hypoglycaemia after **short period of fasting** (less than the usual time between 2 meals during the day)
→ *suspect hyperinsulinism or glycogenosis*
- If **blood ketone levels too low** < 2mmol/L or = 1+ ketonuria if fasting for an unusual duration given the age.
→ *suspect fatty acid oxidation disorder*
- If **associated organ failure** (heart failure / liver failure, myolysis), **severe acidosis** (pH < 7.10)
→ *suspect fatty acid oxidation disorder*
- If **hyperlactacidaemia** > 4 mmol/L
→ *suspect disorder of fatty acid oxidation, gluconeogenesis, or glycogenosis*
- If **hepatomegaly**
→ *suspect glycogenosis*
- If **abnormal growth** in height or weight, or **midline syndrome**
→ *suspect GH deficiency*
- If **hyponatraemia, hyperkalaemia, neonatal cholestasis, melanoderma**
→ *suspect corticotropin deficiency*
- If **persistent high blood ketones** > 1 mmol/L after 12 h of infusion
→ *suspect deficiency in ketone breakdown*

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IF NO WARNING SIGNS

- If blood glucose levels are corrected and good food tolerance: discharge from hospital with hypoglycaemia emergency certificate given to parents
- Arrange a consultation with a metabolic medicine specialist

REFERENCE DOCTORS AND CONTACT DETAILS

On-call telephone numbers for metabolic emergencies of:

At night, only the medical teams can call in emergency situations and only if the emergency certificate has not been understood or if the clinical state or test results are worrying. As far as possible make calls before night time.

Secretarial issues must be dealt with via the medical secretariat during the week or by email addressed to the patient's referring metabolic doctor.

Certificate issued on

Dr