PROTOCOL FOR HYPOGLYCAEMIA IN A&E (No diagnosis known)

Priority patient: must not wait in A&E

Label

1 IF DEXTRO < 2.7mmol/L (0.50g/L), take samples as follows BEFORE GLUCOSE ADMINISTRATION

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

- Capillary blood ketones if available or on urine analysis (ketones)
- Blood glucose, lactate: 1 grey tube (fluoride) - confirmation of hypoglycemia 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 acids (collect the first urine sample 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)

Underlined tests: *those must be performed during hypoglycaemia and before glucose administration. The others remain interpretable if samples are drawn 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 drawing blood samples

- **Oral or enteral (NG tube) glucose administration until normalisation of blood glucose > 0.7 g/L:** 30% glucose 1ml/kg max. 30mL, or 1 sugar cube / 20kg of body weight. **If enteral route impossible: 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:**
  - o **Food intolerance**
  - o **Failure of glucose restoration** (persistent hypoglycaemia despite 2 glucose administrations)
  - o **Warning signs** below (see §3.)

  Infusion using **10% glucose** with standard electrolyte additions* (never pure 10% glucose) via a peripheral line

  Initial infusion rate :

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.: Bionolyte®, Glucidion®, etc. if no pre-made solution available, use 10% glucose in water + 4g/L NaCl (70 mEq/L) + 2g/L KCl (27 mEq/L)

If IV line is impossible => Nasogastric tube or gastrostomy: prepare the IV fluids listed above and pass them through the tube at the same rates.

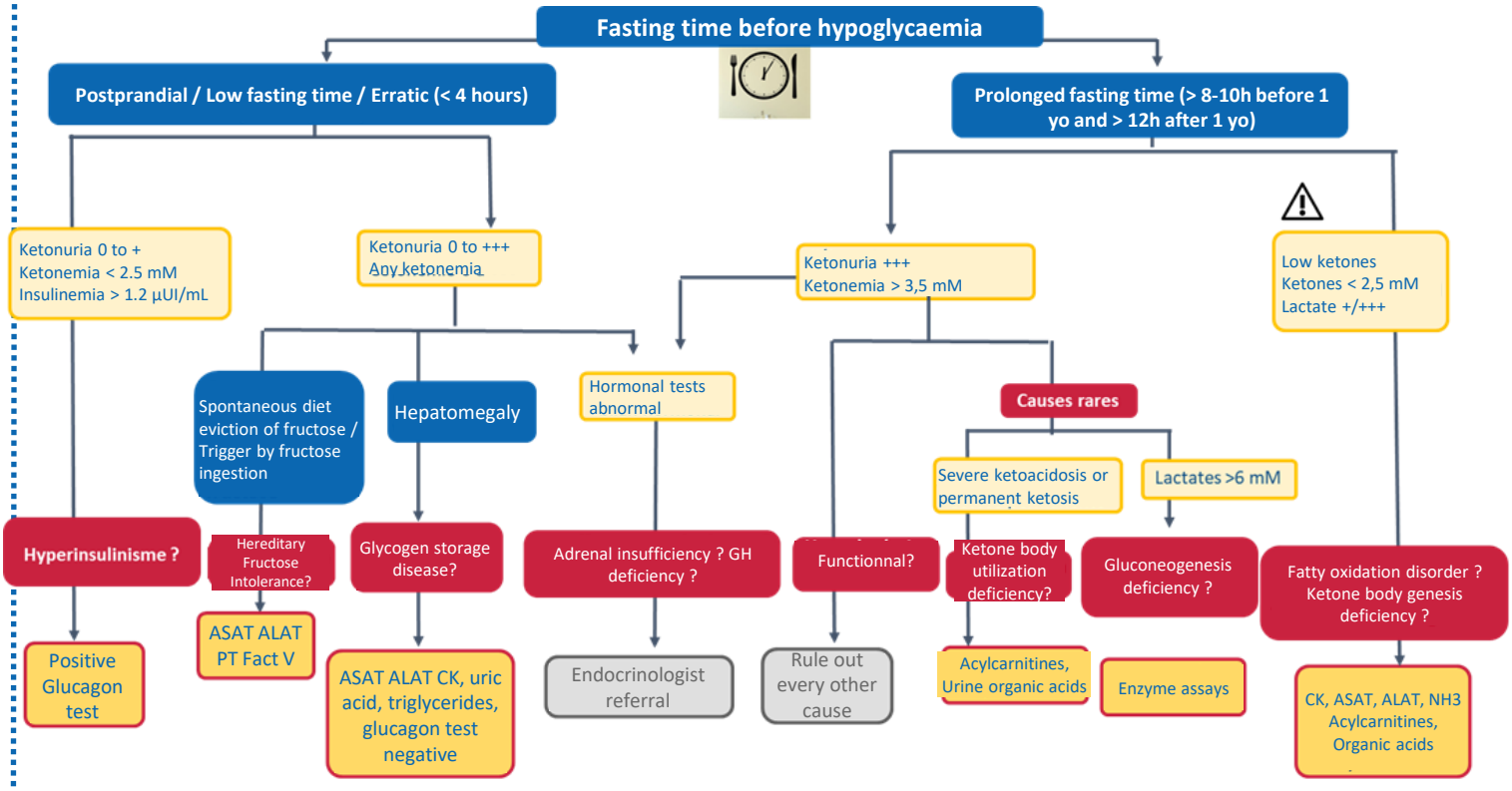
- **Monitoring while on infusion:**
  - o Check capillary blood glucose, blood ketones or urinary ketones every 3 hours, then depending on progress. Monitor serum electrolytes if initially abnormal.
  - o Adjust the rate of glucose administration according to the blood glucose level: **target: between 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).
  - o 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.

3 WARNING SIGNS: Admission to hospital, metabolic medicine and/or endocrinologist referral AND infusion in all cases

- **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 glycogen storage disorder*
- 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 disorder, or glycogen storage disorder*
- If **hepatomegaly**
  → *suspect glycogen storage disorder*
- If **abnormal growth** in height or weight, or **midline syndrome**
  → *suspect GH deficiency*
- If **hyponatraemia, hyperkalaemia, neonatal cholestasis, melanoderma**
  → *suspect adrenal insufficiency*
- If **persistent high blood ketones** > 1 mmol/L after 12 h of infusion
  → *suspect defects of ketone body utilization or transport*

4 IF NO WARNING SIGNS

- If blood glucose levels are corrected and food is well tolerated: discharge from hospital with hypoglycaemia emergency certificate given to the patient
- Arrange a consult with a metabolic medicine clinician.



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