Patient Label

HYPERINSULINISM

Priority patient: must not wait in A&E / ED

If presenting with fever, vomiting, diarrhea or fasting state
= risk of hypoglycaemia / seizure or hypoglycaemic coma

Do not wait for signs of hypoglycaemia, in all cases initiate management as set out below

1 EMERGENCY WORKUP

Capillary blood glucose, venous blood glucose if possible without delaying treatment.

2 IF HYPOGLYCAEMIA < 60 mg/dL (3.3 mmol/L)

- **If coma, seizure or difficulty setting up an intravenous line rapidly:**
  - **GLUCAGON** 1mg/mL: inject **1mg subcutaneously**, whatever the patient's age
  - Then **in all cases start: Infusion** using **10% glucose (=dextrose) in water** with standard electrolyte additions* (never pure 10% glucose): table showing initial infusion rates, to be adjusted subsequently (see paragraph below)

Age	Infant 0-24 months	Child 2-14 years	> 14 years / adult	**MAX INITIAL RATE**
Polyionic 10% Glucose (glucose infusion rate)	5mL/kg/h (8mg/kg/min)	3.5mL/kg/h (6mg/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 + 4 to 6g/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.

  - If persistent hypoglycaemia or if impossible IV access, with food intolerance: Continuous glucagon subcutaneous or IV, 1mg/24h. Dilute 1mg =1mL in 11mL normal saline, and administer continuously at 0.5mL/h.

- **If conscious :**
  - **Rapid glucose administration by oral or enteral route:** 30% glucose in water 1 mL/kg (max. 30 mL) or 1 sugar cube per 20kg of body weight. Check capillary glycaemia 5 to 10 min later. If still hypoglycaemic, second glucose administration with a new glycaemia 5 to 10 min later.
  - **If hypoglycaemia persists:** see above infusion and/or glucagon.
  - **If glycaemia normalised:**
    1/ Give a snack immediately, then resume normal oral or enteral feeding.
    2/ If refusal or food intolerance (vomiting, diarrhea): infusion (see above).

- **Titrating the infusion:**
  - Check capillary glycaemia every 30 min and adjust flow rate by +/- 10% of the initial infusion rate until 2 successive glucose test results are in target range between 3.3 mmol/L (0.6g/L) and 5.5 mmol/L (1g/L).
  - If capillary glycaemia < 3.3 mmol/L (0.60 g/L): Administer 30% glucose in water orally (see above) and increase the infusion rate by 10%, check 10 minutes later.
  - If persistent hypoglycaemia despite increasing the infusion rate: Give continuous glucagon IV or SC (see above).

NEVER clamp off the glucose infusion: neither in A&E, in theatre, nor when moving the patient (porter / nurse), risk of coma/seizure.

3 IN THE ABSENCE OF HYPOGLYCAEMIA

- Assess food intake and compliance to treatment.
- If food intolerance, even in the absence of hypoglycaemia: start the above-mentionned infusion.

4 CONTINUE THE USUAL TREATMENTS (depending on the patient)

- Diazoxide (Proglycem®) orally or by NG tube.
- Somatostatin analogues by continuous subcutaneous administration (pump) or as regular IM injections.
  → NEVER INTERRUPT THESE TREATMENTS! Continue without change following the patient's prescription.
  → If necessary removal of the pump (e.g., for an MRI): give a subcutaneous injection of 1/3 of the daily dose.

This emergency protocol is proposed by the French National Metabolic network (G2M) working group. The protocol may be modified under the responsibility of the referring doctor. In no circumstances does it replace the responsibility of the doctor treating the patient in A&E.

centre de référence

PATHOPHYSIOLOGY:

Patients with congenital hyperinsulinism have a dysregulation of **insulin secretion**, leading to its excessive secretion, causing **hypoglycaemia.**

The usual treatment is, depending on the patient:

- A somatostatin analogue by SC or IM routes;
- Diazoxide;
- Sometimes extra snacks and/or continuous enteral feeding during day or night-time.

WARNING : never stop the food administration in the absence of infusion!

CIRCUMSTANCES WITH RISK OF HYPOGLYCAEMIA:

- **Unplanned discontinuation of treatment** / situations in which food or treatments are no longer being absorbed (vomiting, diarrhea).
- Intercurrent infectious disease, fever, anorexia, vomiting, surgery.

In all these situations, the patient must be kept under surveillance, and an infusion started if feeding is not possible, in order to avoid hypoglycaemia.

ASSISTANCE WITH PRACTICAL ADMINISTRATION OF TREATMENTS / ADVERSE EFFECTS:

- GLUCAGON if severe hypoglycaemia / comatose : 1mg=1mL as a single subcutaneous injection.
- GLUCAGON by continuous SC or IV: If hypoglycaemia persists despite infusion: 1mg / 24h, Dilute 1mg =1mL in 11mL normal saline, and administer continuously at 0.5mL/h.
- Somatostatin analogues (SANDOSTATIN® / SOMATULIN® / OCTREOTIDE® / PASIREOTIDE®): by continuous subcutaneous administration (pump) or regular IM injections.
  - Personalised prescriptions: continue without change following the patient’s prescription.
  - If necessary removal of the pump (e.g., for an MRI): give a subcutaneous injection of 1/3 of the daily dose.

  Known possible side effects: up to 1 month of age: enterocolitis or poor gastrointestinal tolerance. After 1 month of age: gallstones formation, drug-induced hepatitis.
- DIAZOXIDE / PROGLYCEM® : 25mg or 100mg capsules or 50mg/mL oral suspension.

  Known possible side effects: before 6 months of age: pulmonary hypertension and oedema - to be monitored. After 6 months of age: rarely, pericarditis.

DRUG CONTRAINDICATIONS / GENERAL ADVICE:

- No treatment is contraindicated.
- All vaccinations are recommended (particularly influenza).
- Prolonged fasting is contraindicated: follow the patient’s own maximum fasting time.

SURGERY:

WARNING: never leave the patient fasting without a glucose infusion.
Implement the emergency protocol with infusion as described overleaf, in preparation for surgery.

REFERENCE PHYSICIANS 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 the outpatient office during the week or by email addressed to the patient’s referring metabolic physician.

Certificate issued on : Dr