

Hypoglycaemia (PIP)

Key Document code:	WAHT-TP-045	
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Approved by:	Paediatric Quality Improvement meeting	
Date of Approval:	9 th March 2024	
Date of review:	9 th March 2027	

The following guidance is taken from the Partners In Paediatrics (PIP)

Date	Key Amendment	Approved by:
9 th March 2024	Document reviewed and amended: - Flow chart (Differential diagnosis SI not detected) - Glucose infusion rate calculator (link)	Paediatric Governance Meeting

Hypoglycaemia 2018–20

HYPOGLYCAEMIA

Management of unexplained and prolonged hypoglycaemia

RECOGNITION AND ASSESSMENT

Definition

- Blood glucose <2.6 mmol/L in child aged >1 month

Symptoms and signs

- Lethargy
- Tremulousness
- Loss of consciousness
- Seizure
- Autonomic effects
 - sweating
 - shaking
 - tachycardia
 - anxiety
 - hunger

Previous history

- Ask about:
 - antenatal history e.g. small-for-dates, gestational diabetes
 - prematurity
 - history of neonatal hypoglycaemia
 - early or prolonged jaundice
 - family history of sudden infant death
 - development, especially developmental regression
 - medication (steroids)
 - access to glycopaenic agents (e.g. metformin, insulin)
 - onset and frequency of hypoglycaemia
 - history of infection/food intake

Investigations

Certain pointers to cause of unexplained hypoglycaemia are detectable only during episode. Take blood samples BEFORE correcting blood glucose

Immediate samples

- Before treating, take blood samples (**Table 1**)
- Bloods must arrive in laboratory within 30 min
- Include clear clinical details on request form
- If sample volumes limited prioritise glucose, insulin and C-peptide
- Request urgent analysis of insulin and C-peptide (discuss with duty biochemist)
- routine analysis for obese child with insulin resistance
- Blood ketones for ketone bodies on ward (glucometer)
- Once samples obtained, correct hypoglycaemia. See **Immediate treatment**
- Collect first urine voided after correction. Check for ketones using urine dipstick, send remaining urine for organic/amino acid metabolites and reducing substances

Table 1: Total blood requirement (5 mL minimum)

Fluoride (grey top)	1.3 mL (1 bottle)	Glucose, lactate, beta-hydroxybutyrate, free fatty acids
Lithium heparin (green top)	2.6 mL (2 bottles – 1 bottle on ice)	U&Es, LFTs, blood amino acids, Acylcarnitines, ammonia

Clotted (red top)	2.6 mL (2 bottles)	Insulin, C-peptide, growth hormone, cortisol
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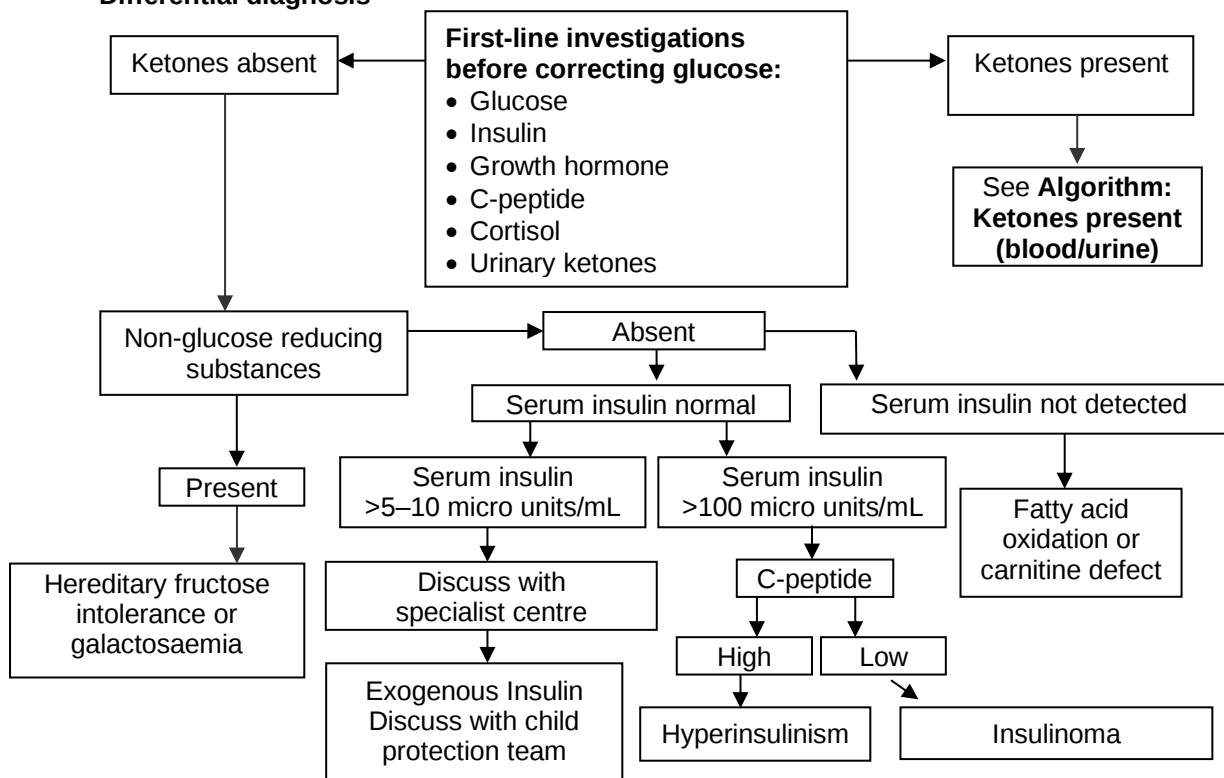
Investigations

- In all prolonged unexplained hypoglycaemia:
 - glucose – point of care
 - ketones. Urine dipstick or blood ketones (glucometer)
 - capillary blood gas
 - laboratory glucose to confirm hypoglycaemia
 - insulin
 - C-peptide
 - U&E
 - growth hormone
 - cortisol
 - 17-hydroxyprogesterone in infant if hyponatraemia present
 - if urgent analysis required contact duty biochemist**
- Further investigations may be required, depending on results from above:
 - IGF-1
 - beta-hydroxybutyrate
 - free fatty acids
 - carnitines
 - urinary reducing substances
 - urine organic acids
 - urine and plasma amino acids

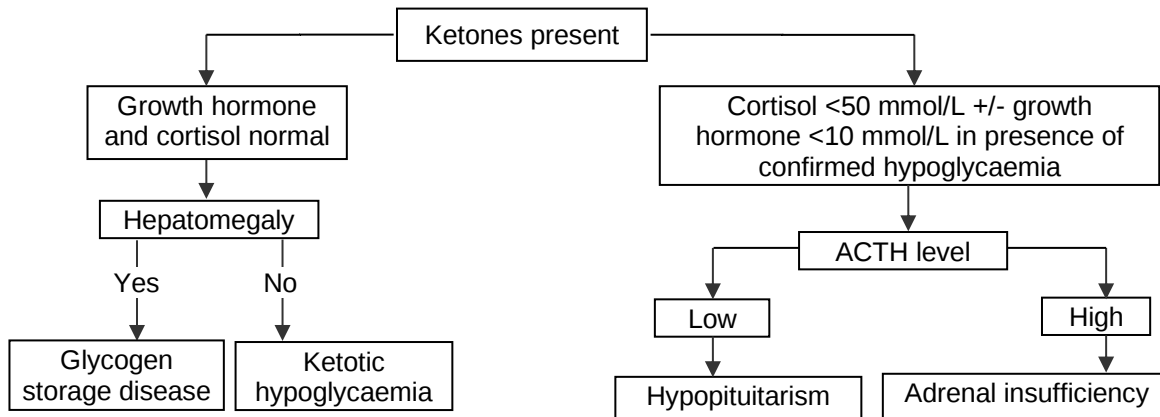
Physical examination

- Height and weight
- Midline defects, micropenis, optic nerve hypoplasia (pituitary disorder)
- Dysmorphic features: macroglossia, macrosomia, ear lobe crease (Beckwith-Wiedemann)
- Skin hyperpigmentation (adrenal insufficiency)
- Hepatomegaly (glycogen storage disorder)

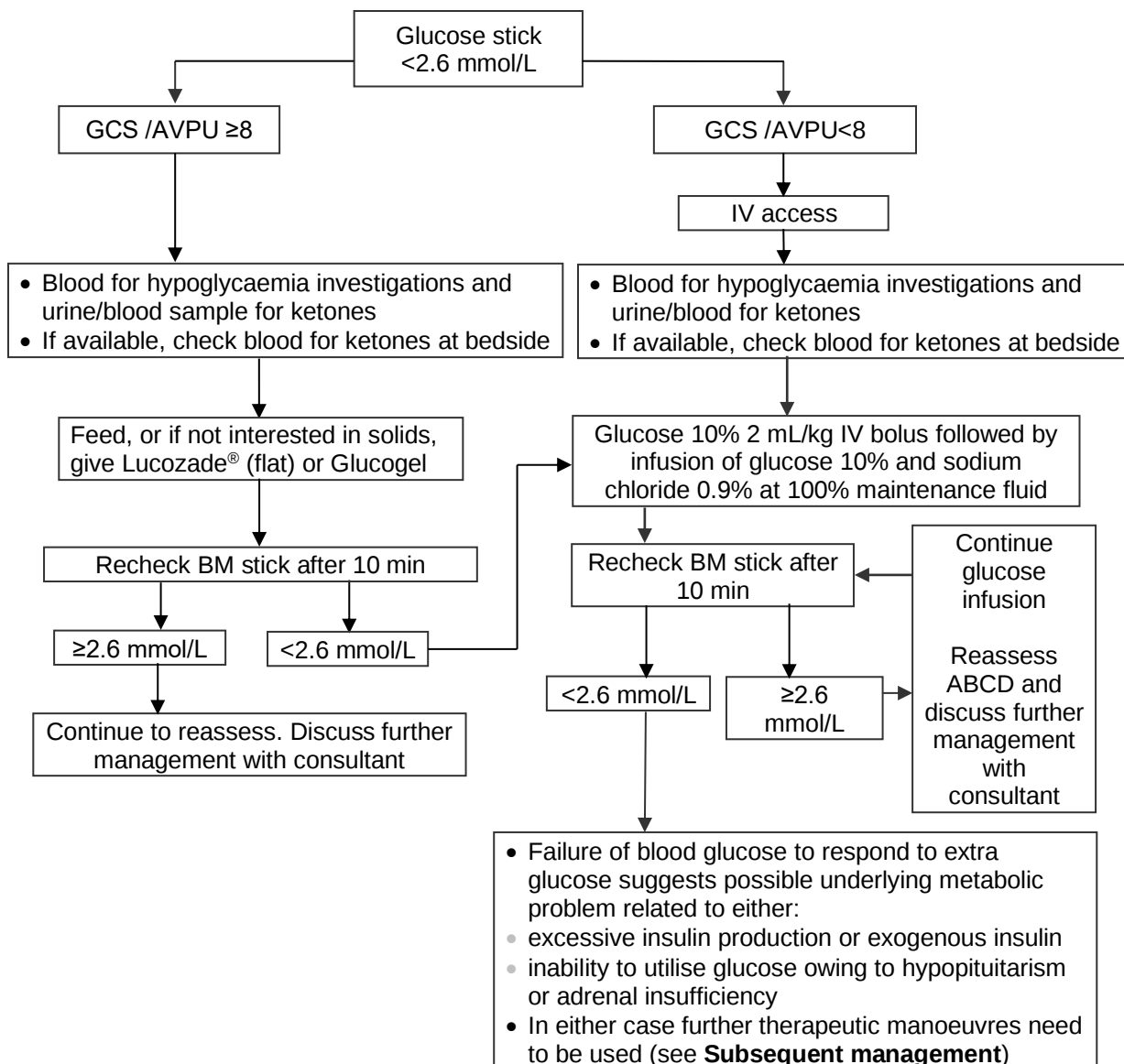
Differential diagnosis



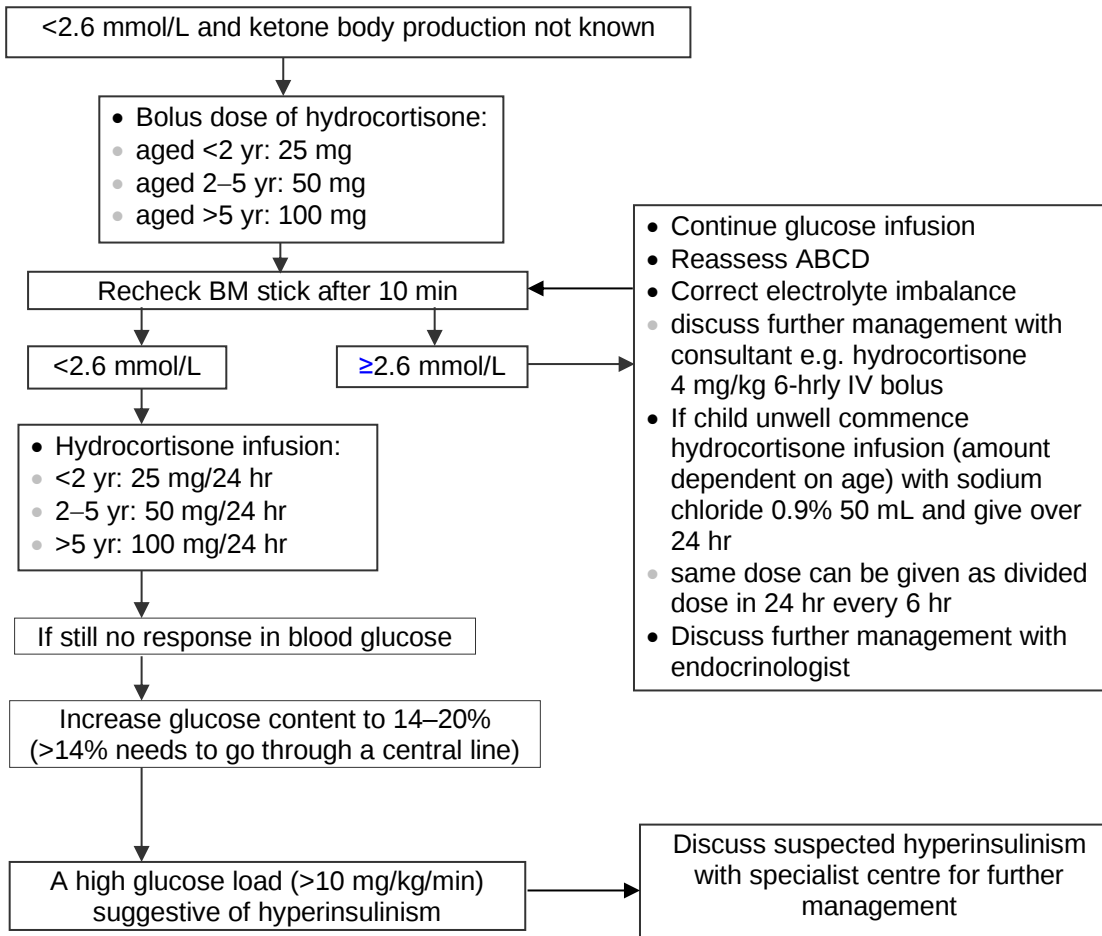
Algorithm: Ketones present (blood/urine)



IMMEDIATE TREATMENT



SUBSEQUENT MANAGEMENT



To calculate the amount of mg glucose/kg/min:
$$\frac{\% \text{ glucose} \times 10 \times \text{mL/hr}}{60 \times \text{wt (kg)}}$$

Glucose infusion rate calculator: <https://www.pediatriconcall.com/calculators/glucose-infusion-rate-gir-calculator>