HYPERGLYCAEMIA● 1/3

DEFINITION

- There is no established definition of hyperglycaemia. However, treat if:
- 2 blood sugars ≥14 on 2 occasions measured ≥2 hr apart **or**
- blood sugars ≥12 on 2 occasions measured ≥2 hr apart with evidence of significant glycosuria (2+ on urine dipstick)

Do not take sample from an infusion line that has glucose running through it

CLINICAL FEATURES

- Osmotic diuresis leading to dehydration
- Poor weight gain

Risk factors

- Immaturity of pancreatic function (e.g. extremely premature infants and small-for-gestational-age)
- Insulin resistance
- Glucose overload (e.g. equipment failure, administrator error)
- Stress (e.g. infection, pain)
- Side effects of a medication (e.g. glucocorticoid treatment)

MONITORING

- Most blood gas machines provide glucose measurements
- Check blood glucose at least 6–8 hrly in:
- unstable or acutely ill babies [respiratory distress syndrome, septicaemia, necrotising enterocolitis (NEC)]
- Check blood glucose at least once a day in stable babies:
- <32 weeks' gestation for first week
- receiving parenteral nutrition (PN)
- with severe unexpected dehydration or metabolic acidosis
- with poor weight gain while receiving >120 kcal/kg/day

Babies treated with corticosteroids

- Check urine for glycosuria daily
- Check blood glucose if ≥2+ glucose in urine

TREATMENT

- If possible, discontinue or decrease medications that worsen hyperglycaemia
- Lipid component of PN may contribute to worsening hyperglycaemia. If on PN discuss stopping lipid with consultant/pharmacist

Suspected infection/NEC

- Hyperglycaemia in baby with previously stable blood glucose may be an early indicator of infection or NEC
- Assess baby clinically
- After taking appropriate cultures, treat empirically

Fluids

- If blood glucose ≥12 mmol/L, check urine for glycosuria (of ≥2+) and assess clinical hydration and fluid input/output. Check for fluid administration errors
- Calculate amount of glucose baby is receiving (as mg/kg/min) using the formula:

$$\text{Glucose infusion rate (mg/kg/min)} = \frac{\%\ \text{glucose} \times \text{fluid rate (mL/kg/day)}}{144}$$

- If glucose delivery rate >10 mg/kg/min, decrease glucose in decrements to 6–10 mg/kg/min. If on PN, 8–10 mg/kg/min is acceptable
- If glycosuria and hyperglycaemia >12 mmol/L persists despite an appropriate glucose infusion rate, consider treating with insulin

HYPERGLYCAEMIA● 2/3

Insulin

- Commence insulin therapy at 0.05 units/kg/hr and titrate according to response – see **Administration of Actrapid® insulin (soluble insulin)**
- Check blood glucose 1 hr from starting and hourly until target reached
- Increase the insulin by increments of 0.05–0.1 units/kg/hr. Target blood glucose while on insulin is 6–8 mmol/L
- Once blood glucose stable, continue to monitor blood glucose 4-hrly
- When a baby is on insulin it is very important to prevent hypoglycaemia – see below

Preventing hypoglycaemia

Blood glucose (mmol/L)	Insulin infusion rate
>8	• Increase infusion rate in steps of 0.05–0.1 units/kg/hr ◦ rate of increase will be dependent on rate of fall in blood glucose
6–8	• Maintain at current rate
>4–<6	• Reduce infusion rate in steps of 0.05–0.1 units/kg/hr to maintain blood glucose >4 mmol/L ◦ rate of reduction will be dependent on rate of fall in blood glucose
≤4	• Stop infusion

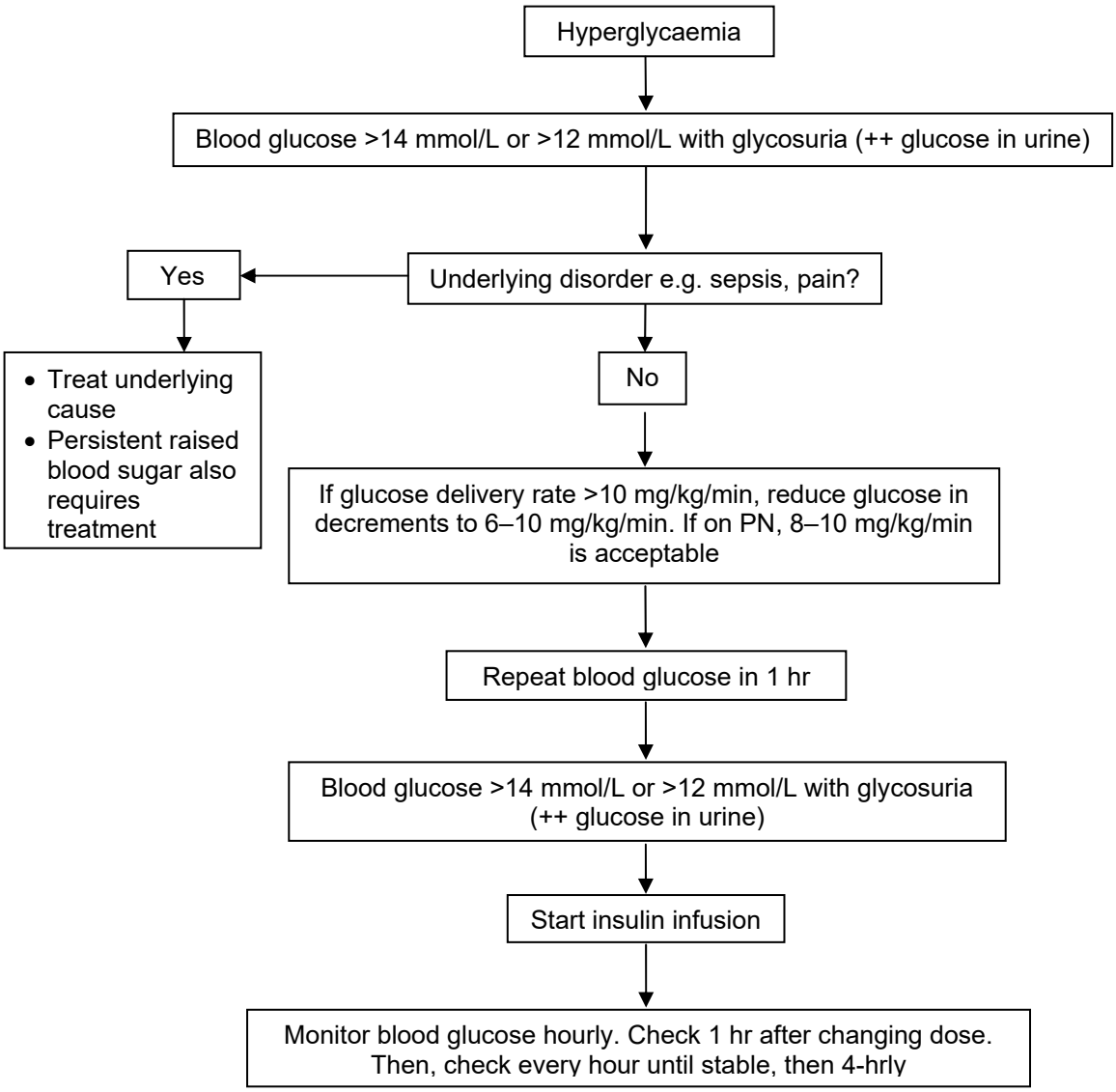
- Recheck blood glucose 1 hr after reducing dose, then 1–2 hrly until stable, then 4-hrly when stable
- If unable to wean off insulin after 1 week, transient neonatal diabetes is possible; consult paediatric endocrinologist
- Early introduction of PN and early trophic enteral feeding will help reduce incidence of hyperglycaemia requiring insulin

ADMINISTRATION OF ACTRAPID® INSULIN (SOLUBLE INSULIN)

- Follow instructions in **Neonatal Formulary** for making up insulin infusion
- Administer Actrapid® insulin infusion via a central line or dedicated peripheral cannula
- Before starting infusion, prime all IV connecting and extension sets and T-connectors with insulin infusion fluid. Check manufacturer's guide on lumen capacity for priming volumes (insulin can adhere to the plastic of the syringe)

HYPERGLYCAEMIA● 3/3

Summary of neonatal hyperglycaemia management



Avoid iatrogenic hypoglycaemia by careful, regular blood glucose monitoring