NEONATAL HYPOGLYCAEMIA

Definition

Blood glucose level < 2.6 mmol/l in a term or preterm infant

Clinical Features

Symptoms of hypoglycaemia include:

- jitteriness and irritability
- apnoea and cyanosis
- hypotonia and poor feeding
- convulsions

Hypoglycaemia *may be asymptomatic* therefore monitoring is important for high risk infants (see Table 1).

Table 1. High risk infants
infants of diabetic mothers
small for gestational age
preterm infants
macrosomic infants, weight > 4.0kg
sick babies including those with:
- perinatal Asphyxia
- Rhesus disease
- polycythaemia
- sepsis
- hypothermia

Management

Prevention and Early Detection

- identify babies at risk
- for *well* babies who are at risk:
  - immediate feeding: first feed can be given in Labour Room
  - supplement feeding until breastfeeding established
- for *unwell* babies
  - set up dextrose 10% drip
- regular glucometer monitoring
  - on admission and at 1, 2 and 4 hours later
  - 3 to 6 hourly pre-feeding samples once blood glucose stable for 24 - 48 hours

Hypoglycaemia

- repeat the glucometer test and send RBS stat.
- examine and document any symptoms
- note when the last feeding was given
- if on IV drip, check if the IV infusion of glucose is adequate and running well
- if blood sugar level (BSL) <1.5mmol/l or if the baby is symptomatic
  - intravenous bolus Dextrose 10% at 2-3 ml/kg
  - followed by dextrose 10% drip at 60-90ml/kg/day (for day 1 of life) to maintain normal blood glucose
  - if baby is already on dextrose 10% drip, consider increasing the rate or the glucose concentration (usually require 6-8 mg/kg/min of glucose delivery)
- if blood sugar level (BSL) 1.5 – 2.5 mmol/l
  - give supplementary feed (EBM or formula) as soon as possible.
  - if BSL remains < 2.6 mmol/l and baby refuses to feed, set up dextrose 10% drip.
  - if baby is on dextrose 10% drip, consider stepwisewise increment asing of the glucose infusion rate by 2 mg/kg/min until blood sugar is > 2.6 mmol/L
- glucose monitoring
  - if capillary blood sugar (dextrostix) is < 2.6 mmol/l, check glucometer half hourly
  - if capillary blood sugar > 2.6 mmol/l for 2 readings: monitor hourly x 2, then 2 hourly X 2, then 4-6 hourly if blood sugar remains normal
- start feeding when capillary blood sugar remains stable and increase as tolerated. Reduce the IV infusion rate one hour after feeding increment.

Persistent Hypoglycaemia

If hypoglycaemia persists despite intravenous dextrose, consult MO/ specialist and for district hospitals, consider early referral

- re-evaluate the infant
- confirm hypoglycaemia with RBS but treat as such while waiting for RBS result
- increase volume by 30ml/kg/day and/or increase the dextrose concentration to 12.5% or 15% . Concentrations of > 12.5% must be infused through a central line
- if hypoglycaemia still persists despite glucose delivery >10mg/kg/min, consider glucagon IV 30 – 100 mcg/kg over 20 mins. or IM 100 mcg/kg (maximum 3 doses), infusion (1mg or 5-10 mcg/kg/hr) in particularly for infants of diabetic mothers. Glucagon should not exceed 0.5 mg/dose and not to be administered at concentrations >1 mg/mL . Glucagon is only useful where there is sufficient liver stores, thus should not be used for SGA babies or in adrenal insufficiency
- in others especially SGA, give intravenous hydrocortisone 2.5 -5 mg/kg /dose bd There may be hyperinsulinaemia in growth retarded babies as well.

Recurrent or resistant hypoglycaemia

This condition should be considered when there is a failure to maintain normal blood sugarlevels despite a glucose infusion of 12 mg/kg/min or when stabilization is not achieved by 7 days of life. High levels of glucose infusion may be needed in the infants to achieve euglycemia.

Refer chapter on Recurrent Hypoglycaemia (Metabolic section)

Table 2. Prescription to make up a 50mL solution of various dextrose infusions

Infusion concentration	Volume of 10% Dextrose	Volume of 50% Dextrose
12.5 %	46.5 ml	3.5 ml
15.%	44.0 ml	6.0 ml

Pearls and pitfalls in management

- depending on the severity of hypoglycaemia, some orals feeds should be maintained as milk has more calories than 10% dextrose. Breastfeeding should be encouraged as it is more ketogenic.
- the recommended practice is to feed the baby with as much milk as is tolerated and to infuse glucose at a rate sufficient to prevent hypoglycaemia. The glucose infusion is then reduced slowly while milk feeds is maintained or increased.
- avoid giving multiple boluses as they can cause a rapid rise in blood glucose concentration which may be harmful to neurological function and may be followed by rebound hypoglycaemia
- any bolus given must be followed by a continuous infusion of glucose, initially providing 4-8 mg/kg/ min. There is no place for treatment with intermittent glucose boluses alone.
- ensure volume of intravenous fluid is appropriate for patient, taking into consideration concomitant problems like cardiac failure, cerebral oedema and renal failure. If unable to increase volume further, concentration of dextrose can be increased.

$$\text{Glucose requirement (mg/kg/min)} = \frac{\text{\% of dextrose x rate (ml/hr)}}{\text{weight (kg) x 6}}$$