Hypoglycaemia of the neonate

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Why is glucose important?

- It provides 60-70% of energy needs
- Utilization obligatory by red blood cells, brain and kidney as major source of energy
- Other tissues: Glucose uptake under the influence of insulin

Glucose in the newborn

- Almost all fetal glucose comes from mother via transplacental facilitated transport

- Severing of the umbilical cord interrupts source of glucose

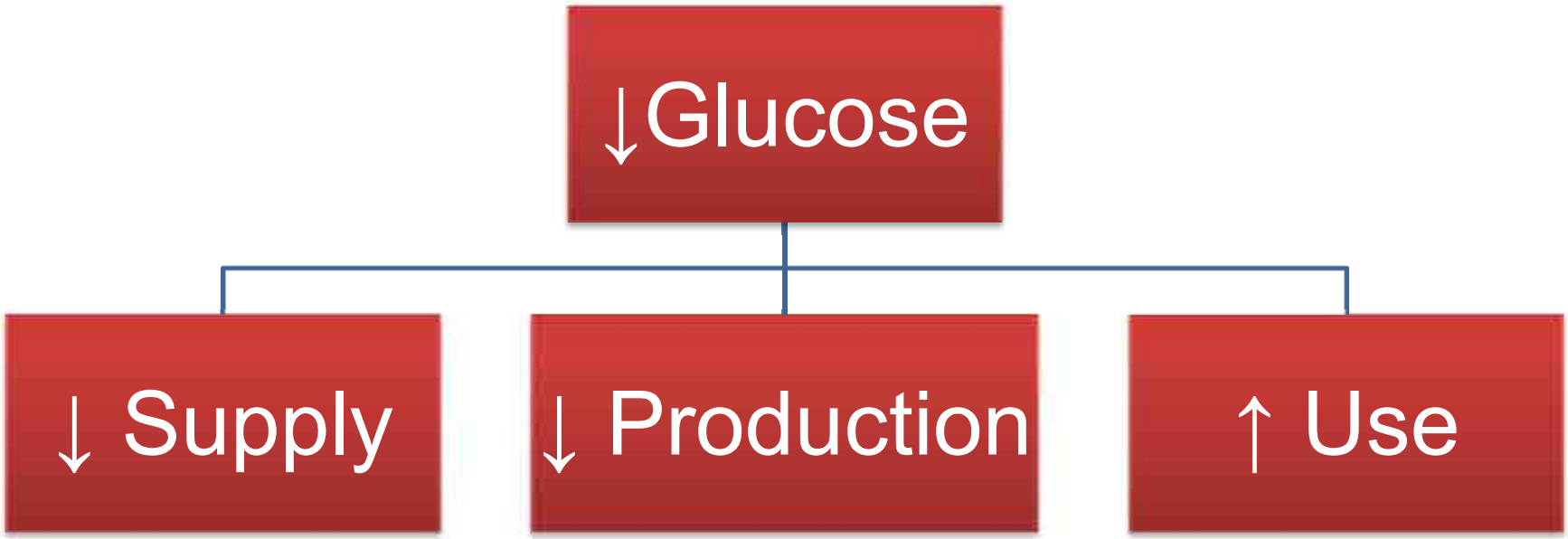
Glucose in the newborn

- Newborn must rapidly respond with hepatic glycogenolysis
  - In response to adrenaline
  - Facilitated by falling insulin levels

Definition of hypoglycaemia

- Blood glucose < 2.0 mmol/l
- Serum glucose < 2.5 mmol/l

Etiology



- ↓ stores
  - Prematures
  - SGA
  - IUGR
  - Chronic intra-uterine asphyxia

- Inborn errors of metabolism
- Endocrine disorders
- Maternal oral hypoglycaemic drugs
- Hypothermia
- Delayed onset of feeding

↑ insulin

- Infant of diabetic mother
- Beckwith-Wiedemann syndrome
- Perinatal asphyxia
- Abrupt interruption of glucose infusion
- Umbilical artery catheter tip near celiac or superior mesenteric artery
- Nesidioblastosis
- Erythroblastosis fetalis

- Normal insulin
  - Sepsis and shock
  - Respiratory distress
  - Polycythaemia, hyperviscosity
  - Anaerobic glycolysis due to decreased tissue perfusion

Symptoms and signs of hypoglycaemia

- Due to deranged cerebral metabolism
- Non-specific, difficult to recognize
- Must monitor risk groups

Symptoms and signs of hypoglycaemia

- Lethargy, irritability
- Hypotonia
- Poor feeding, poor suck
- Apnoea attacks
- Bradycardia
- Hypothermia
- Jitteriness and/or tremors
- Convulsions

Who should be monitored?

- Prematures
- LGA/SGA
- Infants of diabetic mothers
- Erythroblastosis fetalis
- Infants requiring NICU, e.g. sepsis, birth asphyxia
- Infants of mothers treated with beta adrenergic or hypoglycaemic drugs
- Those receiving TPN

When should glucose levels be checked?

- 1 hour after birth in at-risk infants
- Thereafter 2 hourly for first 8 hours
- 6 hourly for rest of the 24 hours

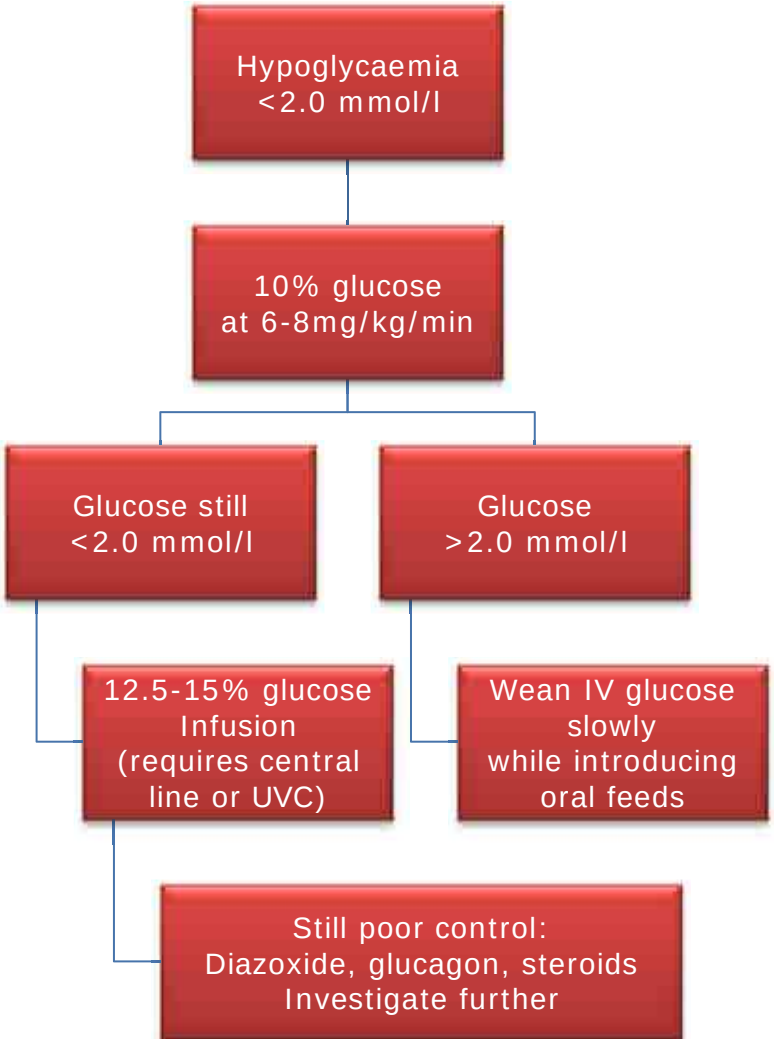
Management

- FEED!
- Commence feeds within 2 hours of birth in at-risk infants
- Low blood sugar in asymptomatic baby may be managed by an oral feed and monitoring of blood sugar

Management: Intravenous glucose

- Indication
  - Not tolerating oral feeds/unable to feed
  - Symptoms of hypoglycaemia
  - Oral feeds not maintaining glucose >2.2mmol/l
  - Glucose <1.4mmol/l

Management: Intravenous glucose



Management: Intravenous glucose

- Bolus infusions are generally not recommended
  - Hyperosmolar solution
  - Effects on insulin levels
  - Unacceptable metabolic stress

Special categories

Infant of diabetic mother

Persistent hypoglycaemia

Infant of the diabetic mother (IDM)

- Prevent with good pre-conceptual glucose control
- Good diabetic control in pregnancy decreases the risk of majority of problems

IDM: Pathogenesis

- Maternal hyperglycaemia
- Continuous hyperinsulinism and accelerated growth
- Relative immaturity for gestational age

IDM: Complications

Congenital malformation (5-13%)

- Neural tube or vertebral defects
- Sacral agenesis
- Cardiac malformations
  - VSD
  - Transposition
  - Coarctation

IDM: Complications

- Birth injuries
  - Brachial plexus injuries
  - Humerus fractures (due to shoulder dystocia)
- Hypoglycaemia
- Poor feeding and sucking
- Jaundice
- Hypocalcaemia
- Respiratory distress syndrome
- Polycythaemia
- Cardiomyopathy
- Small left colon syndrome
- Renal vein thrombosis – Macroscopic haematuria

Persistent hypoglycaemia

- Requires >8-10mg/kg/min infusion to maintain >2.8mmol/l
- Longer than 1 week

Persistent hypoglycaemia

Investigate for rare causes

- Insulin
- Growth hormone
- Cortisol
- ACTH
- T4, TSH
- Glucagon
- Plasma amino-acids
- Urine
  - Ketones
  - Reducing substances
  - Organic acids