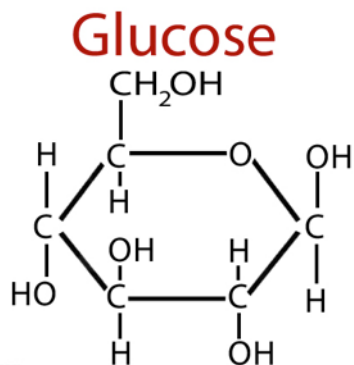


Neonatal hypoglycaemia

2016



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Neonatal hypoglycaemia

- Defined as True Blood Glucose (TBG) of **<2.6mmol/l**
- Bedside blood glucose/ sugar level (BGL or BSL) not reliable at level of 2.6 so check TBG

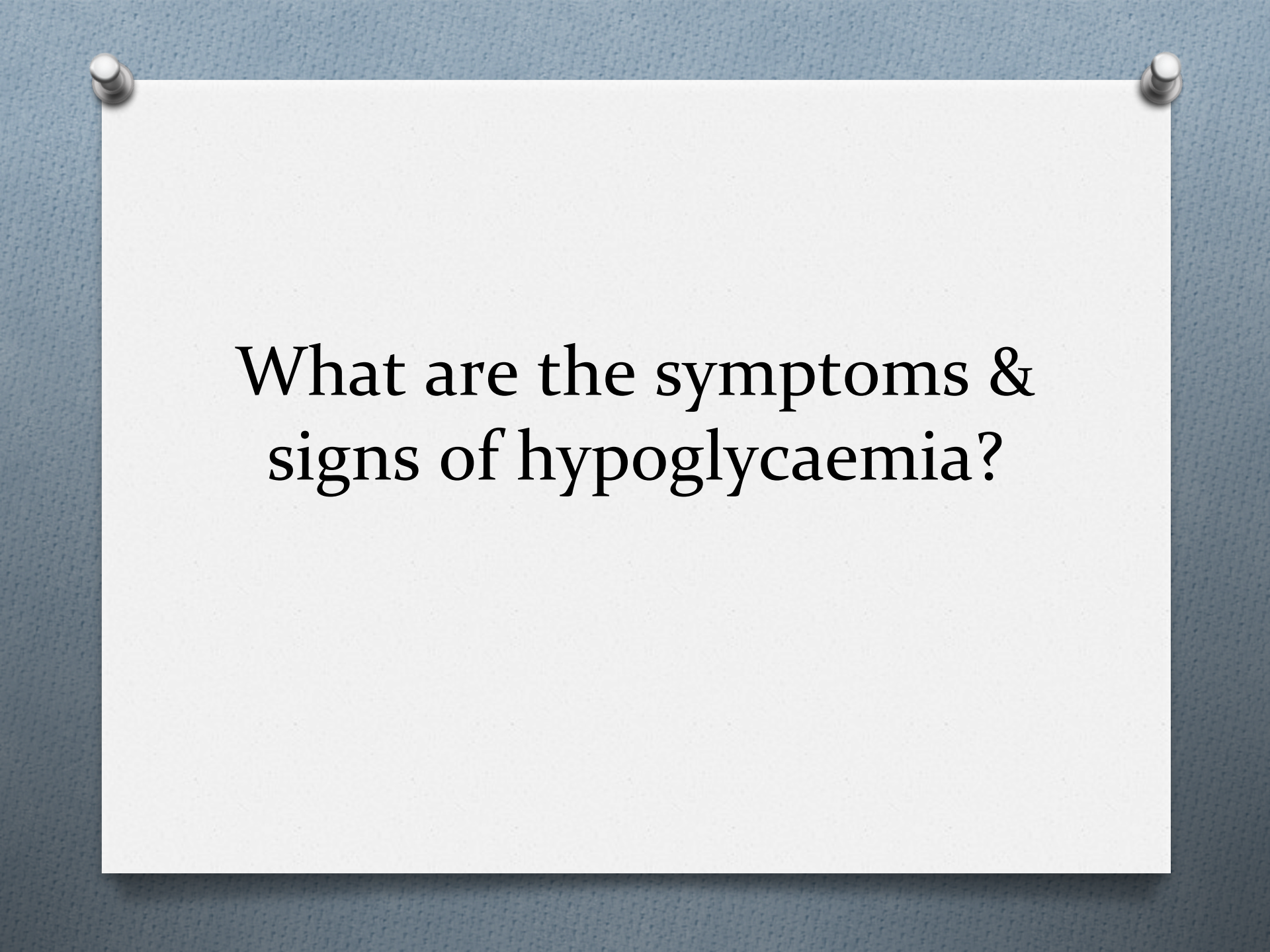
Why 2.6 compared to 4 in adults?

- The definition of clinically significant hypoglycemia remains one of the most confused and contentious issues in contemporary neonatology.

Cornblath M, Hawdon JM, Williams AF, Aynsley-Green A, Ward-Platt MP, Schwartz R, Kalhan SC. Controversies regarding definition of neonatal hypoglycemia: suggested operational thresholds. Pediatrics. 2000 May;105(5):1141-5.

Glucose physiology in a neonate

- Insufficient stores so must rely on **gluconeogenesis**
- Glucose is **main oxidative fuel**, *also oxidize ketone bodies, lactate & amino acids*
- Greater glucose requirements compared to adults - increased ratio of brain to body mass
- Low blood glucose values are usually NOT related to any significant problem but are 2^o to normal process of metabolic adaptation to extrauterine life.
- *Hence why BSL testing occurs at 1-4 hours after birth (2 hours at BHS)*



What are the symptoms &
signs of hypoglycaemia?

Symptoms and signs

o Jitteriness

o jittery baby

o Irritability

o Hypotonia

o Lethargy

o Poor feeding

o High-pitched cry

o Hypothermia

o Poor suck

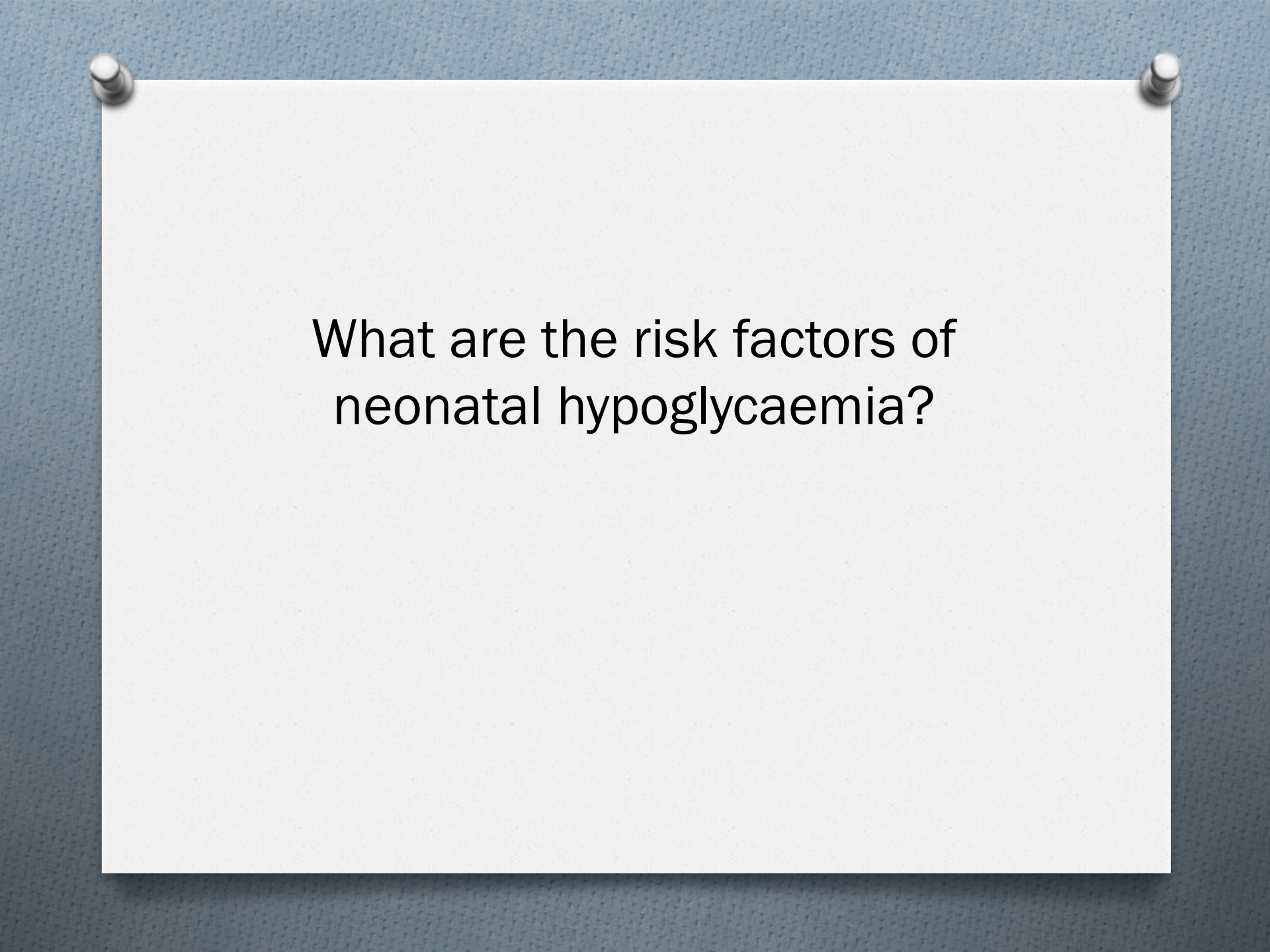
o Tachypnea

o Cyanosis

o Apnoea

o Seizures

o Cardiac arrest



What are the risk factors of neonatal hypoglycaemia?

Risk factors

- o Gestation

 - o <37 weeks (pre term)

- o Size

 - o <2.5kg or >4kg (term)

- o Risk of sepsis

- o Maternal Diabetes

 - o Type 1, 2 and Gestational

- o Maternal medication

 - o Beta blockers

- o Unwell infant
(increased metabolism)

 - o eg intrapartum asphyxia/ resus at birth

Reasons for risk factors

- o Increased metabolic demand

 - o eg sepsis/ unwell; small/ preterm

- o Increased circulating insulin

 - o maternal diabetes/ insulin growth factors; betablockers – which also decrease glucagon and impair gluconeogenesis response)

- o Inadequate glycogen stores

 - o (eg prem)

Case 1

- o You are called to review a baby on the postnatal ward with a BSL of 2.3
- o What is your management plan?

Case 1

o HISTORY

- o Assess for risk factors
- o Assess age of baby/ nature of delivery; feeding history
- o Maternal feeding preference?

o EXAMINATION

- o A,B,C – CHECK TBG
- o ? Symptomatic (low threshold for admission to SCN)

o GUIDELINE: (*insert link*)

USING DEXTROSE GEL – for mothers wanting to breast feed

- The midwife nurse or doctor will administer the oral dextrose gel with / without an enteral feed of parents choice (breast feed and/or formula), as discussed with the treating team. A top up feed of 60ml/kg/day is NOT mandatory.
 - Babies will have the inside of the mouth dried with gauze square. The gel (0.5 ml/kg) will then be massaged into the buccal (inside of cheek) membrane using a gloved hand
- Encourage breast feeding. Record feed duration, volume and type
- Repeat blood glucose after 30 minutes. If $<2.6\text{mmol/L}$ repeat dose 0.5ml/kg 40% dextrose after consulting Paediatric registrar or Paediatrician
- Repeat blood glucose again after 30minutes. If BSL is $< 2.6\text{mmol/L}$ consult Paediatrician for orders.
- If the infant remains hypoglycaemic after two treatment doses of dextrose gel, **do not** give further doses unless instructed by Paediatrician.

- Once BSL ≥ 2.6 mmol/L, a minimum of three pre-feed BSL ≥ 2.6 mmol/L should be recorded before ceasing monitoring of same, or as directed by the Paediatrician.
- Once opened, Dextrose gel should be stored in the fridge in a sealed bag, labelled with Baby UR and details, time and date opened. Each tube is for single patient use only and should be discarded after 24hrs.
- Should the medical team decide to treat the baby with intravenous cannula and intravenous dextrose at any point this will be documented and recorded as a treatment failure.
- It will be the treating clinicians decision to treat with intravenous dextrose

PRECAUTIONS

A maximum of 6 doses of 40% dextrose gel can be given in 48 hours.

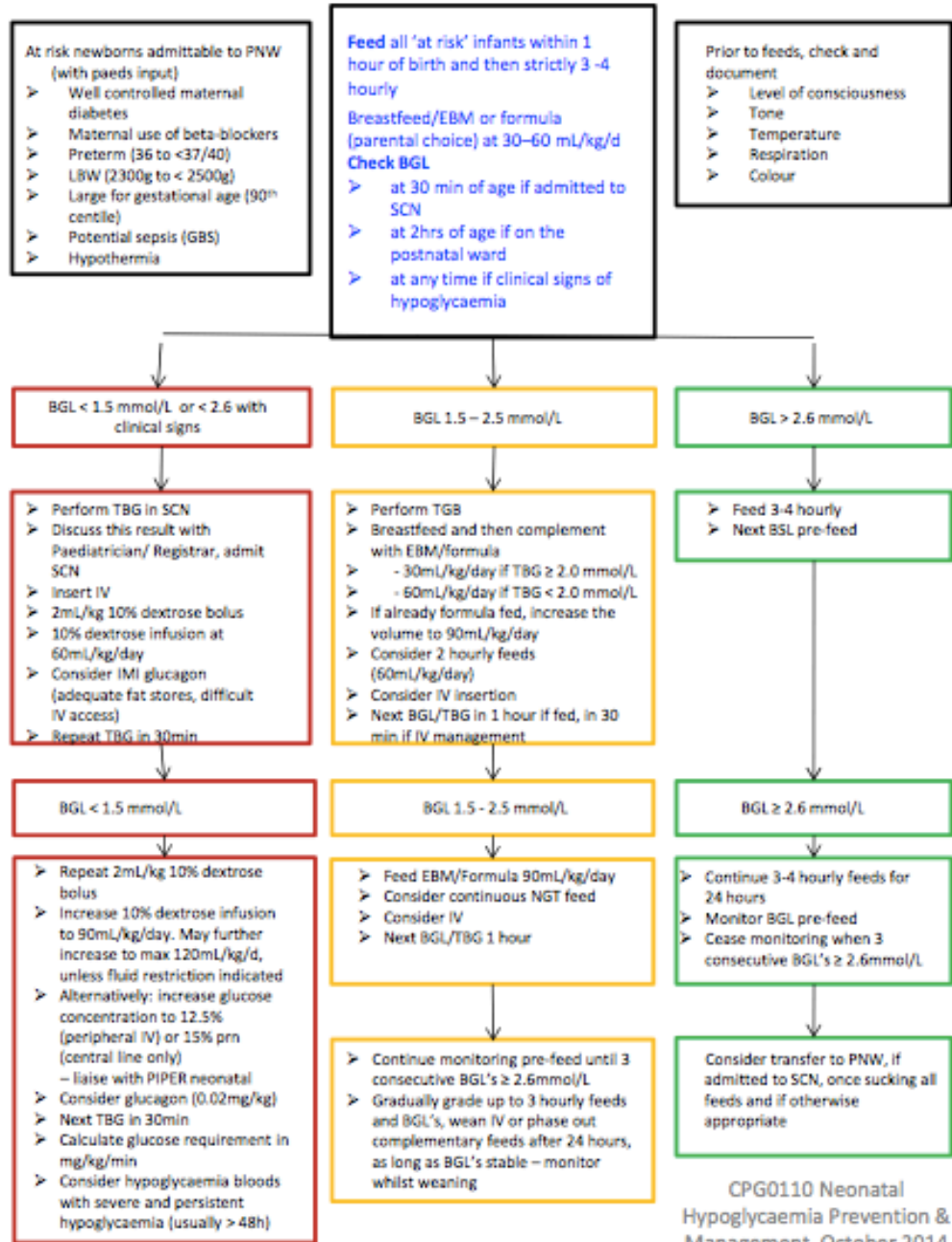
Infants who are unconscious, experiencing hypoglycaemic seizures, or severely hypoglycaemic should receive an urgent bolus of Dextrose IV or Glucagon IM, as prescribed by Paediatrician. However, dextrose gel can be administered while venous access is gained|

Artificial feed/ formula

- Mothers known to have babies at risk should have expressed breast milk (EBM) available (if possible)
- Some mothers will not want to breast feed – so in those please follow the “enteral feed guideline”
- For other mother who are unwell after delivery eg PPH/ GA and are unlikely to have a great milk supply in the short term – short term formula may be a reasonable option

Appendix 2: Neonatal hypoglycaemia

Management of the 'at risk' or hypoglycaemic infant on enteral feeds



Case 2

- o You are called to assess a baby on the postnatal ward with a TBG of 1.9 who is jittery
- o What is your management?

Case 2

o HISTORY

- o Assess for risk factors
- o Assess age of baby/ nature of delivery; feeding history
- o Maternal feeding preference?

o EXAMINATION

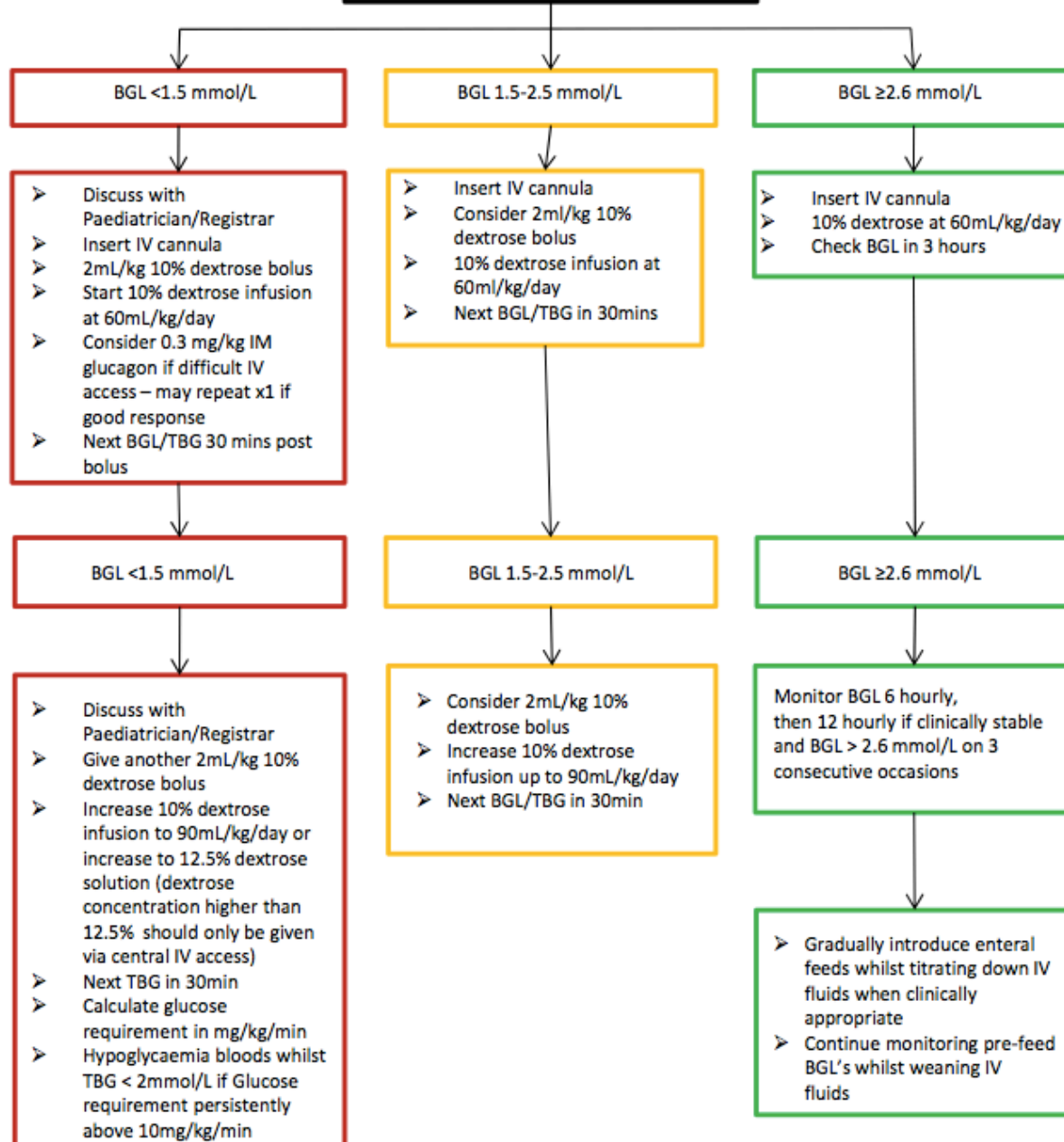
- o A,B,C – CHECK TBG
- o Symptomatic (? Admission to SCN)

o GUIDELINE: *(insert link)*

Symptomatic/ TBG <1.5

- o Admit to SCN
- o Have you identified all the risk factors for hypoglycaemia/ established the cause/s
- o Iv access – give dextrose gel if delay in insertion
- o TBG remains low – bolus and infusion of 10% dextrose
- o *The infusion MUST commence after the bolus to avoid secondary hypoglycaemia as a result of an insulin surge in response to the bolus.*

INFANT NIL ORALLY
First BGL within 30min of birth or
earlier if medically indicated



Increasing glucose delivery

- o Increase volume and rate of 10%
- o Increase concentration to 12.5% (any greater you need a central line)
- o Consider glucagon im or hydrocortisone iv
- o Glucose calculator
- o Senior involvement/ PIPER

Persisting or recurring hypoglycaemia

Prompt recognition is essential!!

There is a substantial risk of developing developmental delay, cerebral palsy and epilepsy.

Other conditions causing neonatal hypoglycaemia

- Hormone deficiencies
 - Congenital adrenal hyperplasia
 - Pituitary/ midline defects
- Hyperinsulinism syndromes
 - Prev called nesidioblastosis
 - Beckwith Weidemann syndrome
- Inborn errors of metabolism
 - Defects in carbohydrate, amino acid, fatty acid metabolism

Summary

- Significant risks from neonatal hypoglycaemia (<2.6mmol/l)
- Be aware of symptoms and signs of hypoglycaemia
- Identify infants at risk and monitor
- Treat early – gel/ milk/ iv dextrose