MCN for Neonatology

West of Scotland Neonatal Guideline

Hypoglycaemia: Screening for, and management of, hypoglycaemia in the full term infant (≥ 37 weeks) in the first 48 hours of life

If infant ≤36+6 weeks, follow 'Hypoglycaemia: Screening for, and management of, hypoglycaemia in the neonatal period') guideline on FirstPort follow this link Hypoglycaemia Preterm Babies

Contents

This document and complementary flow charts aim to assist clinical staff in differentiating between these healthy, well grown, term infants who are undergoing normal postnatal metabolic adaptation during the first 48 hours of life and infants who may have impaired metabolic adaptation, who are potentially at risk of neurological damage when their blood glucose levels fall and who require prompt and appropriate intervention.

This guideline is applicable to all Midwifery, Nursing and Medical staff caring for the newborn in The West of Scotland neonatal MCN and is cognisant of recent recommendations contained within the BAPM Framework for Practice, "Identification and management of neonatal hypoglycaemia in the full term infant, October 2017"[1]. Staff should be familiar with guidelines for the management of persistent or refractory hypoglycaemia which are separate to this document. All the advice regarding feeding and fluids within this document assume that there are no other medical issues. Where this is not the case individualised care plans will be required.

The importance of parents as partners in care is reinforced throughout this guidance which includes a parent information leaflet which explains why their baby is receiving extra monitoring for blood glucose levels and how to raise concerns about their baby's feeding pattern or well being. (Appendix B)

Introduction

The definition of neonatal hypoglycaemia remains controversial[1] [2] as the neonate has the unique ability to utilise alternative fuels such as ketone bodies and lactate to sustain brain metabolism within the first days of life[3]. A recent consensus defined neonatal hypoglycaemia as a plasma glucose concentration of 2.5mmol/l or less. This consensus included a series of "operational thresholds" designed to guide health professionals in the treatment and prevention of neonatal hypoglycaemia. The BAPM framework concludes in the absence of new evidence, these operational thresholds for intervention should remain: These thresholds are:

1. A value of < 1.0mmol/l at any time
2. Baby with abnormal clinical signs: single value of < 2.5mmol/l
3. Baby at risk of impaired metabolic adaptation but **without** abnormal clinical signs:<2.0mmol/l and remaining <2.0mmol/l at next measurement

It is important to note that these thresholds are raised to 3.0mmol/L in infants with suspected hyperinsulinism[4] in the first 48hours and to 2.5mmol/L in infants with moderate to severe hypoxic ischaemic encephalopathy[5]. A plasma glucose concentration of 2.5mmol/l or less measured within the 48 hours of life can however be appropriate and physiological in well-grown, healthy breastfed babies[6]. These babies are not at risk of clinically significant hypoglycaemia and should not routinely have their capillary or blood glucose concentrations monitored.

The normal breastfed baby may feed very infrequently or be reluctant to feed in the first 48 hours and small volumes of hand expressed colostrum are usually sufficient[7]. The importance of early expressing in the hours immediately after birth needs to be highlighted to staff and mothers. Supplementary feeds in these babies are unnecessary and can potentially undermine the confidence of the breastfeeding mother and may interfere with the normal metabolic adaptive responses that occur in the first few postnatal days[8].

Paediatric review and initiation of blood glucose measurements should only be necessary in such babies if they are unduly sleepy or hypotonic **or** if there are other signs of clinical illness. Abnormal feeding behaviour as described below should prompt full clinical assessment and consideration of blood glucose measurement

3 groups of babies merit medical attention

1. Babies with risk factors for hypoglycaemia
2. Babies with symptoms or signs of hypoglycaemia
3. Babies with persistent or refractory hypoglycaemia **RefractoryHypoglycaemia_Neonates**

Signs and Symptoms of Hypoglycaemia in the Neonate

Hypoglycaemia may present in a number of ways within the first 48 hours of life. These include:

- Hypotonia
- Lethargy (excessive sleepiness with or without abnormal tone)
- Poor feeding
- Hypothermia
- Apnoea
- Irritability
- Pallor
- Tachypnoea
- Tachycardia or bradycardia
- Seizures
- Abnormal feeding behaviour (not waking for feeds, not sucking effectively, appearing unsettled and demanding very frequent feeds especially after a period of feeding well)

Measuring Blood Glucose

A baby at significant risk of hypoglycaemia, or who has symptoms which may be secondary to hypoglycaemia, should be screened with regular monitoring of the capillary glucose concentrations.

Handheld glucometers tend to be less accurate in the lower range, especially < 2.6 mmol/l[9]and therefore low values require confirmation using blood gas analysis as this is considered the gold standard for measuring blood glucose.

Handheld glucometers should meet ISO standards (ISO15197:2013) and have CE marking as described in the BAPM Framework. If a handheld glucometer is used, low levels must be confirmed using an accurate method as cot-side monitors may be inaccurate in the lower ranges and require checking using a True Blood Glucose (TBG) to guide therapy A TBG can be obtained by sending a formal laboratory sample but significant delays can occur in obtaining a result, alternatively a TBG can also be obtained from a blood gas analyser, where available, as these are equally reliable[10]. All units must ensure they have readily accessible methods for accurate measurement of a TBG. Each unit must be aware of the characteristics of any handheld glucometer used in their hospital.

Local Arrangements for Confirming Blood Glucose <2.6mmol/L

- If blood glucose values <2.6 mmol/l are obtained on handheld glucometer, perform a blood gas glucose immediately.
- If blood gas glucose ≥2.0mmol/l follow management pathway detailed in this document.
- If blood gas glucose is <2.0 mmol/l, or the blood gas analyser is not working, a true blood glucose should also be sent to the lab. Treat hypoglycaemia immediately; do not wait on glucose result from the lab.

The Baby "at risk" of Hypoglycaemia

If normal adaptive metabolic and endocrine responses to extra-uterine life are absent or sub-optimal then babies are at increased risk of developing clinically significant hypoglycaemia.

The mainstay of management in this group is the ***prevention*** of hypoglycaemia by feeding early and regularly and keeping the baby warm.

Infants at risk of hypoglycaemia should be nursed with their mother in the postnatal ward unless there is a specific medical reason for admission to the neonatal unit.

Risk Factors for Hypoglycaemia

- **Intrauterine growth restriction** (<2nd centile for sex and gestation, Table A / refer to centile chart on Badgernet)
- **Prematurity** - **Less than 37 weeks gestation, i.e. up to and including 36+6 weeks gestation, these infants are managed differently. Please refer to (WoS guideline: Hypoglycaemia: Screening for, and management of, hypoglycaemia in the neonatal period) on FirstPort**
- **Maternal diabetes** – Including **both** insulin dependent and gestational diabetes
- **Macrosomic babies –** large body in comparison to head size, weight ≥98th centile. Please refer to centile chart on Badgernet.
- **Infants of mothers taking Beta blockers (**labetalol, propranolol or atenolol) in the 3rd trimester and/or at the time of delivery including a single dose prior to delivery

- Hypothermia - Inadvertent or therapeutic temperature ≤36.5^0 C persisting despite measures to treat
- Hypoxia – Babies who required prolonged resuscitation (> 10 minutes) or with a cord pH <7.1 and/or BE > -12
- **Severe illness**
    - Sepsis concerns including lethargy, high pitched cry
    - Confirmed rhesus haemolytic disease

Gestational Age (weeks)	Boys Weight (Kg)	Girls Weight (Kg)
37	2.1	2.0
38	2.3	2.2
39	2.5	2.45
40	2.65	2.6
41	2.8	2.75
42	2.9	2.85

Table A: Birth weight gestational age thresholds for second centile in Kg by sex (if Birthweight is less than the defined threshold by sex and gestation of birth in weeks, baby requires monitoring)

- **<u>Monitoring the Asymptomatic "at-risk" Baby</u>**

a. Identify babies at risk of clinically significant hypoglycaemia at birth and commence a hypoglycaemia/NEWS monitoring chart (on Badgernet) in labour ward. **All babies** should be risk assessed for criteria for hypoglycaemia monitoring and/or NEWS monitoring **prior** to leaving a labour ward environment. Begin care as per flowchart A.

b. Aim to prevent hypoglycaemia

- **Keep the baby warm -** dry the baby well at birth, cover the baby whilst receiving skin to skin contact, put a hat on and avoid bathing until the temperature is stable and a warm environment is assured. This is likely to be after 24 hours of age. When dressing the baby, ensure that clothing is warmed first. Utilise skin-to-skin to warm the baby whenever needed.
- **Skin to skin and the first feed –** it is vital that this baby has the opportunity to have uninterrupted skin contact immediately after the birth (including instrumental and caesarean birth). The baby should have the full "*magical hour*" episode.

  Do not assist the baby to feed too early before it is ready to attach correctly and feed effectively. Ideally the first feed should commence within the first 60 minutes. Assist the mother to recognise feeding cues (rapid eye movements under the eye lids, mouth and tongue movements, body movements and sounds, sucking on a fist).

  If the baby has not fed by 90 minutes after the birth or is reluctant to feed, follow reluctant feeder guidance, then start hand expressing and give the colostrum to the baby.

  For women who wish to formula feed give at least 10-15ml/kg 3 hourly.
- **Blood glucose monitoring and clinical surveillance –** The first blood glucose should be taken **prior to the second feed** usually at around 2-4 hours old[11] [12]. Check the baby's temperature, tone and respiratory rate at least 3 hourly to coincide with blood glucose measurements. Ensure that the baby is alert and normally responsive for their age and gestation. If the baby is unwell or has clinical signs of hypoglycaemia check a blood glucose immediately and alert the neonatal team urgently.

- **Encourage effective feeding –** Following the second feed, continue to offer lots of feeding opportunities, at least 3hourly until blood glucose measurements have been > 2.0mmol on three consecutive occasions. Reinforce feeding cues; teach hand expressing and biological nurturing techniques to the mother early on, as these will be essential for the "at risk" baby who needs to feed more often than those who are not at risk. Continue feeding support until mother and midwife are satisfied that effective feeding is established.

c. Screen capillary blood samples for hypoglycaemia immediately prior to each feed (3 hourly) using a handheld glucometer. Aim to maintain a pre-feed blood glucose of ≥2.0 mmol/l. If blood glucose values <2.0 mmol/l are obtained follow the management pathways as per flowcharts B and C dependent on the additional presence of clinical signs of hypoglycaemia.

d. Discontinue monitoring when blood glucose concentrations have been > 2.0mmol/l on three consecutive occasions at least 3 hours apart. Observe feeding for a further 24 hours.

e. After discontinuing regular glucose monitoring, continue feeding input

- If the baby is alert and keen to waken and feed, then promote responsive feeding.
- If the baby is still a bit sleepy or developing significant jaundice, continue to waken and proactively offer feeds.

f. Do not transfer babies with risk factors for impaired metabolic adaptation and hypoglycaemia to community care for at least 24 hours until you are satisfied that the baby is maintaining blood glucose levels and feeding well.

Managing the "at risk "Baby - Based on Blood Glucose Results With or Without Clinical Signs of Hypoglycaemia

Flowchart A/green zone – Blood Glucose >2.0mmol/l (Link)

- **If 3 consecutive** values, at 3hly intervals, fall in this zone, monitoring may cease provided there are no clinical signs of hypoglycaemia.
- Observe feeding for further 24 hours after monitoring ceased.
- If breastfeeding, ensure at least 1 recorded breastfeeding assessment utilising local/BFI tool prior to transfer home.

Amber Zone/Flowchart B - Pre-Feed Blood Glucose 1.0-1.9mmol/l and NO abnormal clinical sign (Link)

- Inform neonatal team.
- Administer a dose of 40% buccal dextrose 200mg/kg (see table below for dose dependent on weight and directions for administration) this must be given in conjunction with making and documenting a detailed feeding plan.
  - Check blood glucose 30-60 minutes after administration of buccal gel
  - If glucose remains 1.0-1.9mmol/l on post gel blood glucose check administer second dose of buccal gel
- All doses of buccal gel MUST be administered in conjunction with a careful review of feeding including a clear feeding plan which ensures adequate volumes are being administered.
- If breast feeding, support breast feeding
  - Encourage skin to skin
  - Offer breast feed and if not feeding effectively, teach mother to hand express and use breast pump
  - Give colostrum obtained
  - Continue to encourage hand expressing at least 8-10 X/24 hrs and support feeding on the breast until the infant is feeding effectively.
- If formula fed **ensure adequate feed** volumes are being given (at least 10ml/kg) in 3 hourly volumes
- Check blood glucose before next feed, no later than 3 hours after feed irrespective of the blood glucose result 30-60 minutes obtained post gel as theoretically a delayed drop in blood glucose may occur.
- If two consecutive measurements are recorded<2.0mmol/l manage as per red zone/Flowchart C
- If baby is not feeding adequately consider admission to SCBU/TC for NG feeding.

Red Zone/Flowchart C Pre-Feed Glucose <1.0mmol/l OR Clinical Signs Consistent with Hypoglycaemia at a higher blood glucose concentration (Link)

- Inform neonatal team urgently and admit immediately to SCBU, not TCU.
- Management will include appropriate investigations** at time of hypoglycaemia for persistent hypoglycaemia as described below
- Continue to establish breastfeeding unless the baby is too unwell to feed. Consider administration of a dose of buccal dextrose gel, following discussion with the neonatal team, whilst awaiting review.
- **GUIDANCE FOR NEONATAL STAFF:**
- Obtain IV access
  - Give 2.5ml/kg 10% glucose bolus IV
  - If unable to obtain IV access immediately give either
    - 40% dextrose gel 200mg/kg
      OR
    - Glucagon 200micrograms/kg IM dependent on unit preference and availability
  - Followed by IV glucose as above when IV access available
  - Start infusion of IV 10% glucose at 90ml/kg/day
- Recheck blood glucose 30 minutes after above
  - Blood glucose <1.0mmol/l or abnormal clinical signs
    - Further 2.5ml/kg 10% glucose bolus
    - Increase glucose delivery rate as per flowchart (link)
    - Consider temporary cessation of enteral feeds
    - Recheck blood glucose after 30 minutes
  - Blood glucose 1.0-2.5mmol/l and no abnormal clinical signs
    - Increase glucose delivery rate as per flowchart
    - Continue feeding if no contraindication
    - Recheck blood glucose after 30 minutes
  - Blood glucose >2.5mmol/l
    - Slowly wean IV infusion
    - Monitor blood glucose every 3 hours while establishing full enteral feeds
    - Maintain blood glucose above 2.5mmol/l or 3.0mmol/l if hyperinsulinism suspected/confirmed.
    - Continue to monitor blood glucose pre-feeds (3hourly) for at least 24 hours after full enteral feeds established.

****NEONATAL GUIDANCE: Investigations for persistent Hypoglycaemia**

Transient hypoglycaemia defined as ONE measurement of 1.0 to 1.9mmol/l within the first 48 hours of life in an infant with no abnormal signs who is feeding effectively DOES NOT require such investigations.

A new born with persistent (3 or more) episodes of blood glucose < 2.0 mmol/l within the first 48 hours of life or < 1.0 mmol/l at any time should undergo consideration of investigations for persistent hypoglycaemia RefractoryHypoglycaemia_Neonates
These investigations must be taken during the period of hypoglycaemia.

In addition to metabolic investigations in infants with persistent hypoglycaemia consider screening and treating for sepsis.

In most babies, hypoglycaemia is transient, lasting only a few days, and may be managed with moderate increases in glucose intake. It is very important to identify those infants with refractory hypoglycaemia (hypoglycaemia persisting despite a glucose intake of > 10mg/kg/min of glucose) or persistent hypoglycaemia (hypoglycaemia persisting for more than 2-3 days), as the aetiology is likely to be different. Infants with refractory hypoglycaemia are uncommon, and should be discussed with the attending Consultant. Refractory hypoglycaemia carries a very significant risk of long-term neurological problems and metabolic disease will need to be excluded.

Calculating Glucose Delivery Rate

$$\text{Glucose intake (mg/kg/min)} = \frac{\text{\% Dextrose x Volume (ml/kg/day)}}{144}$$

For babies who are on a combination of different fluids +/- milk there is a handy online calculator at http://nicutools.org/

Name: DOB: CHI: Address: Postcode: (Or affix patient Label)	Gestation: Birthweight: Chart Commenced:	Time of Birth: Time of First feed:

Indication for hypoglycaemia monitoring	**Tick If Present**	**Give detail of each indication**			
Intrauterine growth restriction <2nd centile for sex and gestation If Birthweight is less than the defined threshold by sex and gestation of birth in weeks baby requires monitoring		Please tick	Gestational age	Boys weight	Girls weight
			37	2.1 kg	2.0 kg
			38	2.3 kg	2.2 kg
			39	2.5 kg	2.45 kg
			40	2.65kg	2.6 kg
			41	2.8 kg	2.75 kg
			42	2.9 kg	2.85 kg
Maternal Diabetes		IDDM / Gestational			
Macrosomia - See definition in guideline		Weight - (g)			
Preterm infants (<37/40) *Please use hypoglycaemia in the premature infant guideline		Gestation - (Weeks) (days)			
Birth Asphyxia – prolonged resus or cord pH <7.0		Cord H^+ Cooled - (Y/N)			
Hypothermia (persistent) - ≤ 36.5 ^{0} C		Temp - (^{o}C)			
Maternal beta blocker in the 3rd trimester (e.g. labetalol, atenolol, propranolol)		Drug(s) - Dose – No of Doses -			
Severe illness. e.g. Sepsis, Rhesus disease, Symptomatic Polycythaemia (Should be managed in NNU)		Details -			

Feeding Preference: Breast / Formula

Age -Hrs	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Age - mins																								
Date																								
Time																								
Blood Glucose																								
Breast Feed																								
EBM (mls)																								
Formula																								
Glucose gel given?																								
4.0 -																								
3.5 -																								
3.0 -																								
2.5 -																								
2.0 -																								
1.5 -																								
1.0 -																								
0.5 -																								
0.0 -																								
Sign/ Initial																								

Signs and Symptoms of Hypoglycaemia in the Neonate

Hypoglycaemia may present in a number of ways within the first 48 hours of life. These include;

- Hypotonia
- Lethargy (excessive sleepiness with or without abnormal tone)
- Poor feeding
- Hypothermia
- Apnoea
- Irritability
- Pallor
- Tachypnoea
- Tachycardia or bradycardia
- Seizures
- Abnormal feeding behaviour (not waking for feeds, not sucking effectively, appearing unsettled and demanding very frequent feeds especially after a period of feeding well)

This list is not exhaustive. Medical review should be obtained for any generally unwell infant.

Managing the "at risk "Baby - Based on Blood Glucose Results With or Without Clinical Signs of Hypoglycaemia

Flowchart A/green zone – Blood Glucose >2.0mmol/l

- **If 3 consecutive** values, at 3hourly intervals, fall in this zone, monitoring may cease provided there are no clinical signs of hypoglycaemia.
- Observe feeding for further 24 hours after monitoring ceased.
- If breastfeeding, ensure at least 1 recorded breast feeding assessment utilising local/BFI tool prior to transfer home.

Amber Zone/Flowchart B - Pre-Feed Blood Glucose 1.0-1.9mmol and NO abnormal clinical sign

- Inform neonatal team
- Administer a dose of 40% buccal dextrose 200mg/kg (see table for dose dependent on weight and directions for administration) this must be given in conjunction with making and documenting a detailed feeding plan.
  - Check blood glucose 30 minutes after administration of buccal gel
  - If glucose remains 1.0-1.9mmol on post gel blood glucose check administer second dose of buccal gel
- All doses of buccal gel MUST be administered in conjunction with a careful review of feeding including a clear feeding plan which ensures adequate volumes are being administered:
- If breast feeding support breast feeding
  - Encourage skin to skin
  - Offer breast feed and if not feeding effectively teach mother to hand express and use breast pump
  - Give colostrum obtained
  - Continue to encourage hand expressing at least 8-10 X/24 hrs and support feeding on the breast until the infant is feeding effectively.
- If formula fed **ensure adequate feed** volumes are being given (at least 10ml/kg) in 3 hourly volumes
- Check blood glucose before next feed, no later than 3 hours after feed irrespective of the blood glucose result 30-60 minutes obtained post gel as theoretically a delayed drop in blood glucose may occur.
- If two consecutive measurements are recorded <2.0mmol/l manage as per red zone/Flowchart C

Red Zone/Flowchart C Pre-Feed Glucose <1.0mmol/l OR Clinical Signs Consistent with Hypoglycaemia at a higher blood glucose concentration

- Inform neonatal team and admit immediately to SCBU, not TC
- If unable to obtain IV access immediately give 40% dextrose gel 200mg/kg

Flow Chart A - Management of term infant at risk of hypoglycaemia

- Dry and place baby skin to skin in a warm, draught free room
- Put hat on baby and cover with a warm blanket
- Encourage and support early breast feeding
- For women who choose to formula feed give at least 10-15ml/kg within the first hour after birth
- Provide verbal information/leaflet to parents

→ Not fed within 90 minutes of birth?
Reluctant feeder?
Refer to the reluctant feeder flowchart (feeding in the first 48hours) Appendix A

- Check pre-feed blood glucose prior to second feed (2-4 hours after birth)

Is the blood glucose ≥ 2mmol/l?
Is the baby asymptomatic?

→ **NO**

→ **SEE FLOWCHART B**

- Encourage frequent feeding and ensure no longer than 3 hours between feeds
- Assess the need for helping the mother with feeding
- For women who choose to formula feed, give at least 10-15ml/kg/feed 3 hourly over the first 24 hours after birth
- Check blood glucose level prior to next feed (no longer than 3 hours after last feed)

Is the blood glucose ≥ 2mmol/l?
Is the baby asymptomatic?

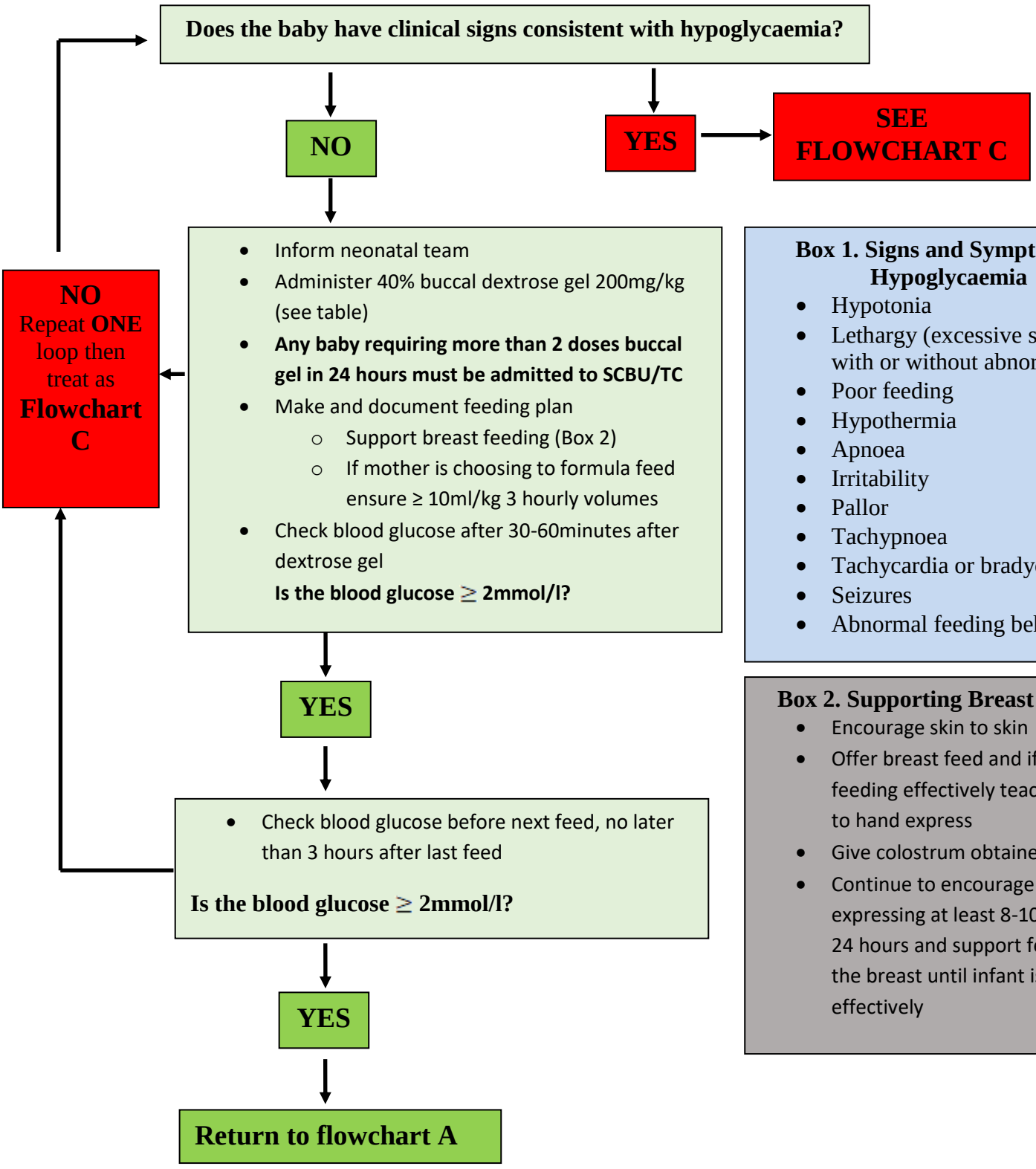
→ **NO**

- Continue to support responsive feeding
- Ensure the mother understands how to assess effective feeding and knows how to escalate concerns
- Discontinue blood glucose monitoring when 3 consecutive 3 hourly pre-feed blood glucose levels, ≥ 2mmol/l.
- Observe feeding for a further 24 hours
- Complete at least one recorded breastfeeding assessment

Signs and Symptoms of Hypoglycaemia

- Hypotonia
- Lethargy (excessive sleepiness with or without abnormal tone)
- Poor feeding
- Hypothermia
- Apnoea
- Irritability
- Pallor
- Tachypnoea
- Tachycardia or bradycardia
- Seizures
- Abnormal feeding behaviour)

Flowchart B – Pre-feed Blood Glucose 1.0-1.9mmol/l and NO Abnormal Clinical Signs



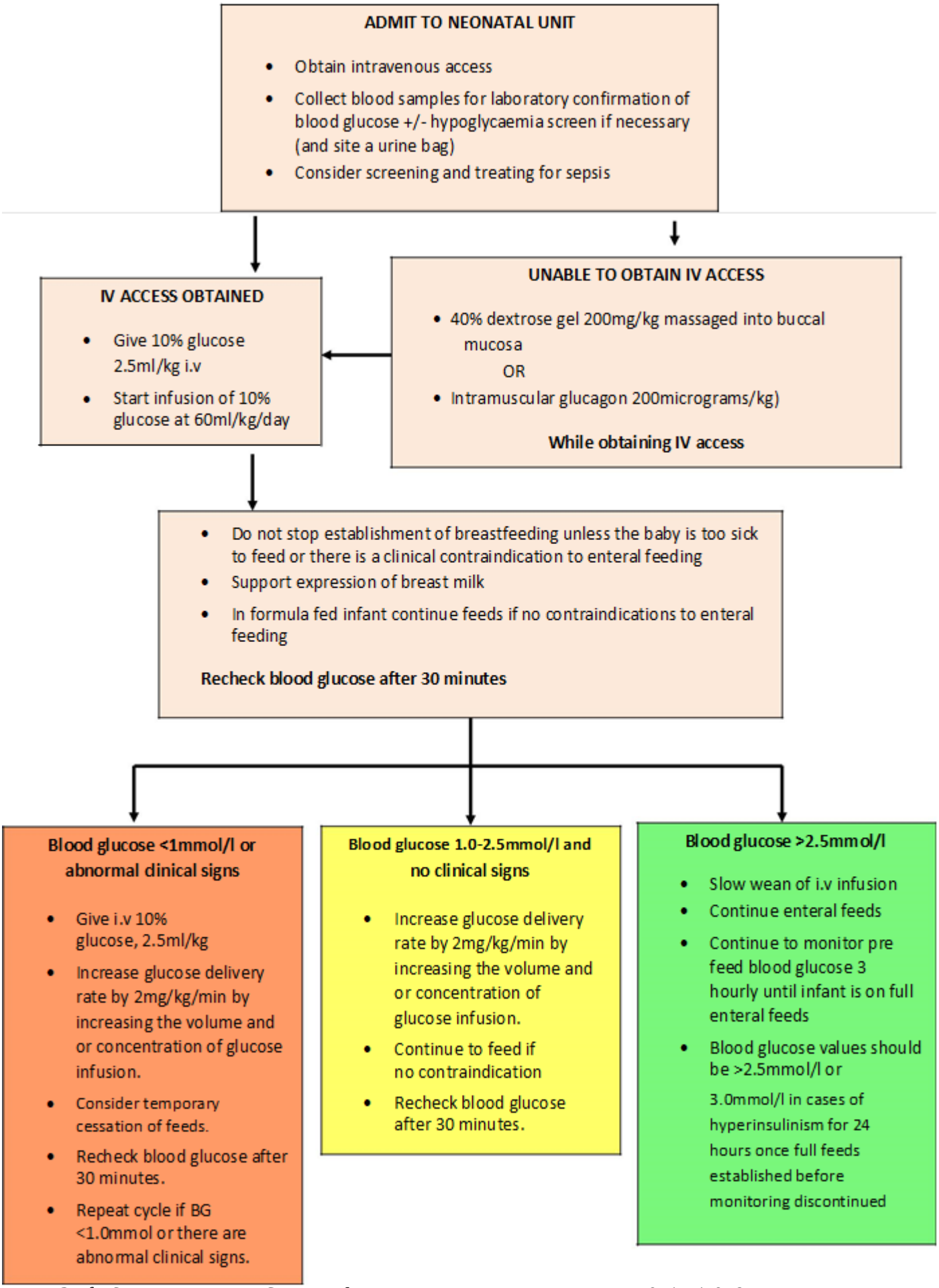
Box 1. Signs and Symptoms of Hypoglycaemia

- Hypotonia
- Lethargy (excessive sleepiness with or without abnormal tone)
- Poor feeding
- Hypothermia
- Apnoea
- Irritability
- Pallor
- Tachypnoea
- Tachycardia or bradycardia
- Seizures
- Abnormal feeding behaviour

Box 2. Supporting Breast Feeding

- Encourage skin to skin
- Offer breast feed and if not feeding effectively teach mother to hand express
- Give colostrum obtained
- Continue to encourage hand expressing at least 8-10 times in 24 hours and support feeding on the breast until infant is feeding effectively

Flowchart C- Blood Glucose <1.0mmol/l and/or Clinical Signs with Hypoglycaemia



Dose Summary of Glucose 40% Oral Gel for Newborns

Neonatal

BRAND Glucoboost®

FORM 40% Oral Gel

INDICATION As per Hypoglycaemia Protocol

Infants ≥ 37 weeks' gestational age and younger than 48 hours after birth with hypoglycaemia, but no abnormal clinical signs

DOSE RANGE

AGE	DOSE	FREQUENCY	ROUTE
Infants ≥ 37 weeks' gestational age and younger than 48 hours after birth	200mg/kg (equivalent to 0.4ml/kg) (See table below)	Up to two doses given 30 minutes apart per episode of hypoglycaemia MAX of SIX doses in 48 hours	Buccal (see below for administration info)

Weight	Dose	Volume to be administered
2kg	400mg	0.8ml
2.25kg	450mg	0.9ml
2.5kg	500mg	1.0ml
2.75kg	550mg	1.1ml
3kg	600mg	1.2ml
3.25kg	650mg	1.3ml
3.5kg	700mg	1.4ml
3.75kg	750mg	1.5ml
4kg	800mg	1.6ml
4.25kg	850mg	1.7ml
4.5kg	900mg	1.8ml
4.75kg	950mg	1.9ml
5kg	1000mg	2ml

METHOD OF ADMINISTRATION

- Draw up correct volume of 40% dextrose gel using a 2.5 or 5ml oral / enteral syringe
- Dry oral mucosa with gauze, gently squirt gel with syringe (no needle) onto the inner cheek and massage outer cheek, using latex-free gloves, to promote gel absorption.
- Offer a feed preferably breast milk, immediately after administering dextrose gel
- Repeat blood sugar measurement as requested
- Repeat oral dextrose gel if baby remains hypoglycaemic according to flow chart

Patient Addressograph

University Hospital Wishaw

Weight .....kg Parent information leaflet given: ☐

Record of Glucose 40% Administration for Neonatal Hypoglycaemia Protocol

Date	Time	Blood Glucose	Dose of Glucose Administered (mg)	Volume of Glucose Administered (ml)	Given By	Checked By

Up to 6 doses can be given over a 48-hour period. Neonatal Staff must review all babies receiving a dose of buccal dextrose gel to ensure that they remain asymptomatic with no concerning clinical signs, review (Temp, RR, HR). If >2 doses of buccal gel required within a 24 hour period requires SCBU/TC admission.

Authors
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Date: August 2019 with a review date of August 2022

References

[1]Identification and Management of neonatal Hypoglycaemia in the full term infant. British Association of Perinatal medicine, a framework for practice, revised version October 2017

[1] Cornblath M, Hawdon JM, Williams AF, Aynsley-Green A, Ward-Platt MP, Schwartz R et al. (2000) Controversies regarding the definition of neonatal hypoglycaemia: suggested operational thresholds. Paediatrics 105:1141-45

[2] Aynsley-Green A, Hawdon JM. Hypoglycaemia in the neonate: current controversies. (1997) Acta Paediatric.Jpn. 39.Suppl 1:S12-S16

[3] Hawdon JM, Ward-Platt MP, Aynsley-Green A. Patterns of metabolic adaptation for preterm and term infants in the first neonatal week. (1992) Arch.Dis.Chil 67:357-65

[4] Rozenkova K, Guemes M, Shah P, Hussain K. The Diagnosis and Management of Hyperinsulinaemic Hypoglycaemia. *Journal of clinical research in pediatric endocrinology.* 2015;7(2):86-97.

[5] Boardman JP, Hawdon JM. Hypoglycaemia and hypoxic-ischaemic encephalopathy. *Developmental medicine and child neurology.* 2015;57 Suppl 3:29-33.

[6] Williams A.F (1997) Review of Hypoglycaemia of the newborn. WHO, Geneva

[7] de Rooy L, Hawdon J. (2002) Nutritional factors that affect the postnatal metabolic adaptation of full-term small- and large-for-gestational-age infants. Pediatrics, Mar;109 (3): E42

[8] Heck LJ, Erenberg A. *S*Srinivasan J, Pildes RS, Cattamanchi J,Voora S, Lillen LD. (1986) *Plasma glucose values in normal neonates:a new look* J Pediatr 109: 114-7

[9] Beardsall K. Measurement of glucose levels in the newborn. *Early HumDev.* 2010;86(5):263-267

[10] Dahlberg M, Whitelaw A. Evaluation of HemoCue Blood Glucose Analyzer for the instant diagnosis of hypoglycaemia in newborns. (1997) Scand J Clin Lab Invest Dec; 57(8):719-24 1

[11] Aynsley-Green A, Soltesz G. (1986) Disorder of blood glucose homeostasis in the neonate. In: Roberton NRC, ed.Textbook of neonatology. Edinburgh: Churchill Livingstone,.

[12] Hetenyi G, Cowan JS. Glucoregulation in the newborn. (1980) Can J Physiol Pharmacol; 58:879-88.

<u>This document has been modified by the Hypoglycaemia Working Group, Wishaw, for local implementation</u>