

HYPOGLYCAEMIA OF THE NEWBORN ON BIRTHING SUITE AND POSTNATAL WARD

INTRODUCTION

Healthy term infants are able to mobilise energy stores through a process known as counter regulation and are unlikely to suffer any ill effects if fed on demand in the first 24-48 hours. Some babies however are less able to mount this response and these babies are at greater risk of hypoglycaemia.

Regular assessment of all babies should occur, including assessment of feeding, regardless of risk factors. All assessments should be documented on the neonatal observation chart (C280106). This Guideline is intended for use in conjunction with the [Neonatal Clinical Resource \(Ref.237435\)](#).

Dextrose Gel has been shown to be better than feeding alone to reverse neonatal hypoglycaemia in babies from 35 weeks and under 48 hours old. This in turn reduces maternal infant separation by reduced admission to Neonatal Unit and encourages the establishment of breastfeeding.^{5,6}

BACKGROUND

Healthy term infants do not require routine monitoring of blood glucose but at risk babies need to be identified and monitored accordingly.

30% of New Zealand babies are born at risk¹ of these at-risk babies, 50% will develop low blood glucose.²

Neonatal hypoglycaemia is associated with brain injury and neurodevelopmental delay and death.^{3,4}

DEFINITIONS

- Pre-feed – If a baby has commenced a breastfeed, a measurement can be considered 'pre-feed' if it is taken within 15 minutes of the start of the feed.
- Data suggests that there may be sequelae from blood glucose < 2.6 mmol/L⁷, however, there is no clear consensus as to what threshold to use in treatment of hypoglycaemia. In a recent survey of all units in the Australia, New Zealand Neonatal Network < 2.6 mmol/L was used in all units and is the cut off used in a New Zealand collaboration of clinical practice guidelines on treatment of neonatal hypoglycaemia with oral dextrose gel.^{6,8}

If any baby shows symptoms that could be due to hypoglycaemia, a blood glucose should be measured immediately.

INFANTS AT RISK OF HYPOGLYCAEMIA

- Preterm < 37 weeks
- Small for gestational age < 9th percentile (on UK-WHO growth chart Ref.6505)
- Large for gestational age baby > 98th percentile (on UK-WHO growth chart Ref.6505)
- Baby of mother with diabetes
- Hypothermic baby
- Severe intrapartum foetal distress or lactate > 5.8 mmol/L
- Asymmetric growth in conjunction with either intrapartum fetal distress and/or meconium exposure.
- Unwell baby
- Sepsis

SIGNS AND SYMPTOMS

Hypoglycaemia may be asymptomatic or symptomatic and both may result in adverse outcomes such as neurological impairment. Hypoglycaemia needs to be suspected and/or prevented and actively investigated and treated in any unwell baby.

General signs of hypoglycaemia may include:

- poor feeding
- sleepiness
- irritability

These babies require regular feeds, preferably breastmilk including expressed breastmilk (EBM) where available and monitoring of temperature regulation, including skin to skin contact.

Further symptoms which warrant close observation and calculation of a Newborn Early Warning Score (NEWS) on the neonatal observation chart (C280106) include:

- jitteriness
- tachypnoea
- hypothermia (not a sign of hypoglycaemia but associated)

Call the neonatal team for an **urgent review** and admission to the neonatal intensive care unit (NICU) if baby presents with:

- blood glucose < 2.0 mmol/l
- altered level of consciousness
- cyanosis
- seizures
- apnoea
- abnormal tone

MANAGEMENT

Care is to be provided on the postnatal ward unless the baby is symptomatic (see flow chart below) in which case refer and transfer to the neonatal unit. This management plan refers to all babies from 35 week's gestation and under 48 hours of age on the postnatal ward and birthing suite.

Infants at risk of hypoglycaemia should be fed as soon as possible, preferably within the first hour. The first blood glucose is best checked pre-feed 3-4 hours after birth (this is to avoid the natural nadir in blood glucose prior to 3 hours of age). Combine with the repeat lactate measurement if this also needs to be repeated. If there are concerns about the adequacy of any feed or concerns about milk transfer (ie. swallows) then discuss with parents the option of either EBM, harvested colostrum, unpasteurised donor breastmilk or infant formula. If formula is indicated, give 5-10 mLs/kg per feed and then re-assess response.

Prior to any administration of infant formula, ensure mothers have had lactation support including LMC/Midwife or lactation consultant and are regularly expressing. Ideally all babies should be skin to skin with their mother whilst feeding by any method.

The Accu-chek monitor is used for blood glucose measurement and is more accurate than previous devices at low levels. If there is any concern regarding the result use the blood gas analyser as it is a more reliable measure. The Maternity Clinical Coordinators are able to process blood samples through the blood gas analyser to confirm hypoglycaemia prior to giving intravenous glucose. Do not delay treatment.

THE FOLLOWING MANAGEMENT PLAN IS OUTLINED IN THE FLOWCHART IN [APPENDIX 1](#):

- Infants at risk require feeds at least 3 hourly
- If blood glucose is 2.6 mmol/L or above the baby just requires blood glucose monitoring before the 3 hourly feeds until a total of 3 consecutive pre-feed measurements are 2.6 mmol/L or above.

Treatment with Dextrose Gel 40%

- If blood glucose is between 2.0 mmol/L and 2.6 mmol/L on **first** testing:
 - Contact neonatal team to prescribe 0.5 ml/kg (200 mg/kg) of 40% dextrose gel via buccal mucosal route (verbal order is appropriate)
eg. dose for a 3 kg baby is 0.5 mL x 3 = 1.5 mL gel
 - Using non-sterile latex-free gloves, dry the baby's inner cheek (buccal mucosa) with sterile gauze and then administer small amounts of the dextrose gel with an oral syringe (orange plunger)
 - Massage the dextrose gel into the buccal mucosa, preferably in the parent's presence to reduce separation. Parents may also apply the gel under staff supervision
 - Ensure baby is fed, ideally breastmilk
 - Recheck blood glucose 30 minutes after dextrose gel administration
- If blood glucose is between 2.0 mmol/L and 2.6 mmol/L on **subsequent** testing:
 - Contact neonatal team to review
 - Administer dextrose gel as per prescription and directions above
 - Ensure baby is fed, ideally breastmilk
 - Recheck blood glucose 30 minutes after dextrose gel administration

CONTACT NEONATAL TEAM TO REVIEW

Contact neonatal team to review:

- If blood glucose is below 2.0 mmol/L at any stage
- If the blood glucose is < 2.6 mmol/L any time after the second feed
- If more than 4 doses of dextrose gel are required in 48 hours
- If post-feed blood glucose is 2.0-2.5 mmol/L
- If the clinical picture is of significant concern regardless of blood glucose

The desired outcome from this treatment is that the blood glucose is restored quickly to the normal range without disruption to the establishment of breast feeding and maternal-infant bonding.

Hypoglycaemia usually resolves in the first 24-48 hours depending on the cause.

Request neonatal daily review for babies who develop hypoglycaemia (2.0-2.5 mmol/L) even if the post feed blood glucose improves according to the feeding protocol.

See Neonatal Drug profile for further details in [Appendix 2](#).

DISCONTINUATION OF BLOOD GLUCOSE

- If any recording of blood glucose less than 2.6 mmol/L has occurred, the baby should be fed at least every 3 hours with pre-feed blood glucose monitoring until a total of 3 consecutive measurements are 2.6 mmol/L or above without top-ups or dextrose gel.
- If a baby has always had BSLs of 2.6 mmol/L or more and the feeding regime changes, ie. from breastfeeds with top-ups to fully breastfeeding a pre-feed blood glucose measurement is recommended 6-8 hours after the last top-up.

APPENDIX 1 INFANTS AT RISK OF HYPOGLYCAEMIA

NOTE: Oral dextrose gel is used to treat neonatal hypoglycaemia ≥ 35 weeks and < 48 hours after birth

FEED IN FIRST HOUR THEN AT LEAST 3 HOURLY, KEEP WARM INCLUDING SKIN TO SKIN

Blood glucose pre-feed 3-4 hours after birth

Blood glucose ≥ 2.6 mmol/L

- Breastfeed at least 3 hourly
- Blood glucose 3 hourly before feeds until a total of 3 consecutive measurements are 2.6 mmol/L or above

Blood glucose 2.0 to 2.5 mmol/L

TREATMENT 1

- Contact neonatal team to prescribe oral dextrose gel 0.5 mL/kg (verbal order if needed)
- Give oral dextrose as per guideline
- Ensure baby is fed, ideally breastmilk
- Top-up formula is not indicated at this stage

Blood glucose < 2.0 mmol/L

- Immediate neonatal review
- Give oral dextrose gel 0.5 mL/kg (verbal order if needed)
- Ensure baby is fed, ideally breastmilk
- Further feeding advice after neonatal review

Recheck blood glucose 30 minutes after dextrose gel administration

Blood glucose ≥ 2.6 mmol/L

- Feed at least 3 hourly – ideally breastmilk
- Blood glucose 3 hourly before feeds until a total of 3 consecutive measurements are 2.6 mmol/L without top-ups or dextrose gel

Blood glucose 2.0 to 2.5 mmol/L

TREATMENT 2

- Neonatal team to review when able
- Give oral dextrose gel 0.5 mL/kg as per guideline (verbal order if needed)
- Ensure baby is fed, ideally breastmilk. Formula may be indicated – 5-10 mLs/kg

Blood glucose < 2.0 mmol/L

- Immediate neonatal review
- Give oral dextrose gel 0.5 mL/kg (verbal order if needed)
- Ensure baby is fed, ideally breastmilk
- Further feeding advice after neonatal review

Recheck blood glucose 30 minutes after dextrose gel administration

Blood glucose ≥ 2.6 mmol/L

- Feed at least 3 hourly – ideally breastmilk
- Blood glucose 3 hourly before feeds until a total of 3 consecutive measurements are 2.6 mmol/L without top-ups or dextrose gel

Blood glucose 2.0 to 2.5 mmol/L

- Neonatal review within 30 minutes
- Ensure baby is fed, ideally breastmilk. Formula may be indicated – 5-10 mLs/kg

Blood glucose < 2.0 mmol/L

- Immediate neonatal review
- Admit to NICU

If recurrent hypoglycaemia reconsider oral dextrose gel

Neonatal review if:

- More than 4 doses of oral dextrose gel required in 48 hours
- The clinical picture is of significant concern regardless of blood glucose

PRACTICE POINTS

- If any concerns regarding the Accu-check monitor blood glucose result, use the blood gas analyser
- If the feeding regime changes (ie. from breastfeeds with top ups, to fully breastfeeding) a blood glucose measurement is recommended 6-8 hours after last top-up

This appendix is part of the Hypoglycaemia for the Newborn on Birthing Suite and Postnatal Ward Guideline (GLM0056)

APPENDIX 2 DEXTROSE 40% (GLUCOSE)

Trade name	Dextrose 40% Gel
Class	Monosaccharide, Anti-hypoglycaemic agent
Mechanism of action	Dextrose gel is absorbed via the buccal mucosa and increases blood glucose
Indications	Management of hypoglycaemia in babies: <ul style="list-style-type: none"> • for the first 48 h after birth • in conjunction with breastfeeding support and neonatal review
Contraindications	Use with caution in patients with known or family history of hypersensitivity to corn/maize products.
Supplied as	Dextrose gel 40% (100 mL) BIOMED
Dilution	Do not dilute prior to administration
Dosage	0.5 mL/kg per dose
Guardrail	N/A
Interval	As per Neonatal Hypoglycaemia protocol
Administration	Massage the measured dose to a surface of the buccal mucosa previously dried with sterile gauze.
Compatible with	Do not mix with other medications
Incompatible with	Do not mix with other medications
Interactions	N/A
Monitoring	Monitor blood glucose as per Neonatal Hypoglycaemia protocol
Stability	Discard bottle 1 month after opening
Storage	Store at room temperature, protect from light
Adverse reactions	Adverse reactions to dextrose are rare Irritation of the gastrointestinal tract causing nausea and vomiting is possible. Avoid contact of gel with eyes as stinging /irritation will occur.
Metabolism	Onset of action 5-30 minutes
Comments	Dextrose gel is primarily for well babies on the postnatal ward to avoid admission to NICU and separation from their mother which may impact on the ability to establish breastfeeding
References	<ol style="list-style-type: none"> 1. http://www.waikatodhb.health.nz/assets/directory-of-our-services/waikids/sugar-babies/study-guide.pdf 2. http://www.ncbi.nlm.nih.gov/pubmed/24075361
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