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Clinical Guideline for the Management of Neonatal Hypoglycaemia

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This clinical guideline is intended for Estonian physicians, midwives and nurses involved in the monitoring and treatment of newborn infants. It consists of a main section and three appendices:

- Appendix 1. Algorithm: Neonatal hypoglycaemia. Recommendations for screening and treatment
- Appendix 2. Instructions for administering glucose gel
- Appendix 3. Patient information leaflet

The main section addresses the definition, significance, pathogenesis and risk factors of hypoglycaemia, as well as prevention and treatment.

The first version of the hypoglycaemia guideline was prepared by the Estonian Society of Perinatology in 2002. The approach was subsequently updated in the 2008, 2011 and 2019 editions of the Tartu University Hospital Children's Clinic Handbook for the On-call Physician.[1] This guideline primarily covers the management of hypoglycaemia in late-preterm infants (born after 34+0 weeks of gestation) and term newborns. Persistent hypoglycaemia is not covered.

The aims of the guideline are to:

- update and standardise the definition and management of neonatal hypoglycaemia throughout Estonia;
- introduce a new treatment method - administration of oral glucose gel;
- prevent harm caused by hypoglycaemia, particularly brain injury, and recognise an underlying disease causing severe hypoglycaemia;
- avoid overtreatment of physiologically low, transient glucose concentrations.

Definition and significance

Hypoglycaemia is the most common metabolic problem in newborn infants, but there is no universal safe glucose concentration threshold accepted by all studies.[10] Recent national guidelines most often use a plasma glucose concentration of <2.6 mmol/L as the treatment threshold, based on the 1988 publication by Lucas et al.[13]

Transient hypoglycaemia after birth is part of metabolic adaptation.[3] It is important to distinguish this from a pathological disorder resulting in persistent or recurrent hypoglycaemia, which may lead to neurological problems.[2]

The effect of mild, transient, asymptomatic hypoglycaemia on brain development remains unclear, but a correlation between severe, persistent hypoglycaemia and brain injury has been demonstrated.[3,12]

Shah's 2019 systematic review and meta-analysis found neonatal hypoglycaemia to be associated with specific cognitive impairments in early childhood (2-5 years), including an increased risk of visual-motor impairment (visual-perceptual coordination and fine motor skills) and impaired executive function (problem-solving, planning, attention control and goal-directed behaviour); and with difficulties in literacy and numeracy and general cognitive impairment in later childhood (6-11 years).[10]

In a prospective study published in 2022, neonatal hypoglycaemia among children screened and treated because of hypoglycaemia risk was not statistically significantly associated with poorer educational achievement at 9-10 years compared with controls.[14]

Following review of the literature, our working group reached consensus on the following reference values during the neonatal transitional period:

- first day of life: 2.6-5.5 mmol/L;
- age 24-48 hours: 2.8-5.5 mmol/L;
- age >48 hours: 3.3-5.5 mmol/L.

Glucose metabolism at birth

Glucose is the most important energy source for both the fetus and the newborn. Fetal blood glucose depends on the supply of glucose across the placenta and is usually at least 3 mmol/L.[12] Glucose is also used to build fetal glycogen stores in the muscles and liver, particularly during the third trimester. The newborn brain uses approximately 50% of total-body glucose consumption.[15] In addition to glucose, the newborn brain can use ketone bodies and lactate. Initially, however, ketone concentrations are low, so lactate may be the most important fuel for the brain during the first two days of life.[16]

During metabolic adaptation at birth, the newborn begins producing glucose until feeding starts. The infant must adapt to bolus feeding after the continuous nutrient supply through the umbilical cord ends. The stress of birth and the fall in glucose concentration facilitate this adaptation.[12] During labour, endogenous glucagon and catecholamine concentrations rise three- to fivefold and initiate glycogen breakdown (glycogenolysis).[11] Glycogen stores are depleted during the first 8-12 hours of life. Thereafter, the newborn must produce glucose through gluconeogenesis from lactate, glycerol and amino acids.[2] Secretion of growth hormone and cortisol promotes gluconeogenesis. Insulin also regulates glucose homeostasis, and its concentration falls after birth.[11] Once feeding begins, maintenance of plasma glucose no longer depends solely on gluconeogenesis. If the first feed is delayed for 3-6 hours, approximately 10% of healthy newborns cannot maintain a blood glucose concentration above 1.7 mmol/L.[2]

During the first hours of life, appropriate-for-gestational-age term infants have low blood glucose values during the transitional period; this is termed transient neonatal hypoglycaemia. By 72 hours, fasting glucose reaches the reference range for older children and adults, 3.5-5.5 mmol/L.[12] Despite well-regulated metabolic adaptation, newborns are at greater risk of hypoglycaemia than older children or adults, and any mechanism that disrupts the sequence of physiological changes increases the possibility of severe or persistent hypoglycaemia.[10]

Pathogenesis, risk factors and newborns at risk

Hypoglycaemia results when glucose production and supply are low relative to glucose utilisation. In newborns, this is due to limited energy stores or impaired glucose production through glycogenolysis or gluconeogenesis.[2]

Maternal and neonatal risk factors include:[18,19]

- high blood insulin concentration;
- impaired glucose production and utilisation;
- limited body stores (glycogen and fat);
- low concentrations of regulatory hormones (growth hormone, cortisol and adrenergic hormones);
- congenital malformations;
- unclear or combined causes.

Two or more risk factors confer a greater risk of severe hypoglycaemia.[5,19]

Newborns at risk of hypoglycaemia include:[4,9,11,16,17,20-23,27,29,38]

- infants of mothers with diabetes, regardless of type or treatment, or taking antidepressants (serotonin reuptake inhibitors) or beta-blockers (labetalol);
- birth weight <2,500 g or >4,500 g;
- infants with abnormal growth (birth weight below the 10th or above the 90th percentile on the Fenton growth chart);
- preterm (<37 weeks) or post-term (>42 weeks) infants;
- infants exposed to perinatal stress: maternal pre-eclampsia/eclampsia or hypertension; birth asphyxia; caesarean birth for fetal distress; meconium aspiration syndrome; Rhesus incompatibility; polycythaemia; sepsis; or hypothermia (<36.5 °C);
- infants requiring intensive care;
- infants with a family history of genetic hypoglycaemia;
- infants with congenital syndromes associated with hypoglycaemia.

Newborns without risk factors do not require routine hypoglycaemia monitoring.

Symptoms

Infants with low blood glucose are often asymptomatic, and hypoglycaemia is detected during screening of high-risk newborns.

Symptoms are non-specific and reflect the nervous system response to glucose deprivation. Neurogenic (autonomic) symptoms result from the sympathetic nervous system response and include irritability, tremor, sweating, tachypnoea and pallor. Neuroglycopenic symptoms are caused by cerebral dysfunction due to energy deficiency and may include poor feeding or weak suck, a weak or high-pitched cry, altered consciousness (drowsiness or coma), seizures and/or hypotonia. Other non-specific symptoms include apnoea, bradycardia, cyanosis and hypothermia.[2,12]

Prevention

Recommendations for preventing neonatal hypoglycaemia:[4,6,11,24,29]

- After birth, provide all newborns with early and continuous skin-to-skin contact with the mother and/or other parent. This supports successful initiation of breastfeeding and parent-infant bonding and stabilises the newborn's body temperature.
- Initiate breastfeeding in the delivery room within the first hour of life.
- Feed newborns at risk regularly every 2-3 hours from the first day of life.
- If early breastfeeding is not possible because of the mother's condition, avoid bottle-feeding and prefer alternative methods such as cup feeding, oro-/nasogastric tube feeding or finger-syringe feeding.
- Teach mothers separated from their newborns correct and regular breast stimulation. Begin one hour after birth and continue at least eight times per day.
- During breastfeeding, assess the infant's condition and feeding technique; involve lactation consultants when required.

- Encourage all mothers to initiate breastfeeding or, alternatively, expression of breast milk as early as possible.

Screening

Screening protocols differ between countries and between hospitals within countries. They mainly follow one of two approaches: the Pediatric Endocrine Society (PES) or the American Academy of Pediatrics (AAP).[8,9] Most European protocols (Sweden 2019, Switzerland 2020, Turkey 2018, Denmark 2010, United Kingdom 2017 and 2021) and protocols elsewhere (Canada 2019, New Zealand 2019) are based, with minor differences, on the AAP guidance,[8] whereas some Finnish hospitals used PES guidance in 2019.[9]

The purpose of screening is to identify low blood glucose in newborns at risk and intervene rapidly to ensure normoglycaemia.[18]

Riskin's 2022 review recommends starting monitoring 1-2 hours after birth, or immediately when symptoms appear, and continuing before feeds for the first 12-24 hours. Screening of newborns with low values continues on the second day until feeding is established and values have normalised.[17]

Several protocols begin testing before the second breastfeed and no later than age 2-4 hours (Canada, Sweden and Finland). If the value is ≥ 2.6 mmol/L, screening continues before every second feed until 24 hours of age (Canada).[11,19,26] United Kingdom National Health Service guidance does not recommend beginning screening before four hours because of physiological hypoglycaemia.[38]

The optimal frequency and duration remain uncertain. Most protocols recommend screening until normoglycaemia is achieved in two or three consecutive measurements,[5] or until the newborn has remained normoglycaemic for 12-48 hours.[21,23] By 12 hours, screening has identified 96.5% of mild and 98% of severe cases among infants of mothers with diabetes.[20]

Under the Canadian Paediatric Society protocol, screening may be stopped after 12 hours in large-for-gestational-age infants and infants of mothers with diabetes if values remain ≥ 2.6 mmol/L. In small-for-gestational-age and preterm infants it may be stopped on the second day if feeding is established and values remain ≥ 2.6 mmol/L.[26]

Our working group recommends beginning screening before the second feed, at 1.5-4 hours of age. Frequency and duration depend on blood glucose values. Screening may be discontinued in a clinically well newborn when 2-3 consecutive measurements are within the age-specific range and there are no feeding problems. Borderline values should be rechecked the following day.

Blood glucose measurement

In routine practice, a glucose meter provides a rapid and cost-effective means of detecting hypoglycaemia. Because of the non-enzymatic measurement method, glucose meters are less accurate at low values than laboratory analysis using the glucose oxidase method (the gold standard). Whole-blood concentrations measured by a meter are approximately 10-18% lower than plasma concentrations, depending on haematocrit. Critically low meter readings should therefore be confirmed by a laboratory plasma measurement.[4]

Capillary blood in newborns may be taken from the medial or lateral plantar surface of the heel or from the great toe.[7] Local hospital instructions and practice for capillary sampling should be followed. Continuous glucose monitoring with a subcutaneous sensor, although used in research, is not yet established in routine neonatal care.[25,39]

Treatment

The aim is to achieve normoglycaemia and prevent symptomatic hypoglycaemia. Normothermia must be ensured.

Begin treatment with regular oral feeding. If very low (<1.5 mmol/L) or low (<2.6 mmol/L) values persist despite enhanced enteral feeding, use glucose gel. If combined oral treatment does not correct the blood glucose, begin intravenous glucose infusion.

Oral treatment: 40% glucose gel with feeding

Oral 40% glucose gel combined with feeding is recommended as a treatment option.[3,6,10,11,13,16,28,30] Studies indicate that applying 40% glucose gel to the buccal mucosa followed by feeding may reduce admission to a neonatal unit and separation from parents, increase the likelihood of breastfeeding at discharge, and reduce the need for intravenous infusion. Glucose gel is well tolerated, non-invasive and inexpensive. Its use has not caused adverse effects or affected outcomes at two years of age.[4,6,31-33]

Draw the required dose - 200 mg/kg, equivalent to 0.5 mL/kg - into a needleless syringe and massage it into the buccal mucosa with a finger. Glucose gel is rapidly absorbed through the oral mucosa into the circulation via the lingual and internal jugular veins; some is absorbed from the gastrointestinal tract. Feeding must follow administration. Begin with breast milk; donor breast milk or infant formula is the second choice. On the first day, the recommended feeding volume for treatment is 5-10 mL/kg (maximum 15 mL/kg) per feed every 2-3 hours.[11,19,34]

A maximum of six doses of glucose gel may be given over 48 hours to stable newborns able to feed orally.[6,10,11,13,16,28,30]

Treatment according to blood glucose value:[11,27]

- **Symptomatic hypoglycaemia and/or <1.5 mmol/L:** notify a paediatrician. The paediatrician assesses the infant's condition and feeding and decides whether to start intravenous treatment immediately. With severe symptoms (apnoea, seizures or altered consciousness), administer an intravenous bolus of 10% glucose followed by continuous glucose infusion. Before venous access is established, massage glucose gel into the buccal mucosa. Feed enterally at the same time, using a nasogastric tube if necessary.
- **1.5-1.9 mmol/L:** massage 40% glucose gel into the buccal mucosa, followed by breastfeeding and/or 5-10 mL/kg donor milk or formula. If 1.5-1.9 mmol/L persists after two oral treatments, begin intravenous infusion. Recheck after 30-45 minutes.
- **2.0-2.5 mmol/L:** enhance feeding by increasing the volume and frequency of breastfeeding, donor milk and/or formula. If hypoglycaemia persists at the next measurement, provide oral treatment. If it persists after 2-3 feeds and a maximum of two consecutive gel doses, consider intravenous glucose. Recheck within 1-2 hours.
- **2.6-3.2 mmol/L:** consider age in hours and enhance feeding if required. If hypoglycaemia persists at the next measurement, provide oral treatment. If it persists after 2-3 feeds and a maximum of two consecutive gel doses, consider intravenous glucose. If the infant is already receiving an infusion, continue at the same rate. Recheck before the next feed.
- **≥3.3 mmol/L:** test less frequently; the infusion rate may be reduced.

Intravenous glucose infusion

Intravenous infusion is required when severe symptoms occur (apnoea, seizures or altered consciousness), when blood glucose does not rise above 2.5 mmol/L after two consecutive oral treatments with gel and enhanced feeding, or when repeated vomiting prevents increased enteral feeding.[35]

10% glucose bolus An intravenous bolus is recommended only for very low glucose or severe neuroglycopenic signs, because it causes excessive fluctuation in blood glucose and suppresses endogenous glucagon production.[23,27] Definitions of very low glucose range from <1.1 to <1.5 mmol/L.[11,37]

The bolus dose is 2 mL/kg of 10% glucose (100 mg/mL), equivalent to 200 mg/kg, administered over 5-15 minutes.[11,27,35,36] It must always be followed immediately by continuous infusion delivering 5-8 mg/kg/min.[11,27]

If severe neurological symptoms caused by hypoglycaemia, such as lethargy, coma or seizures, develop during infusion, repeat the glucose bolus (200 mg/kg) and increase the continuous infusion rate.[11] Measure glucose again 30-45 minutes after starting the infusion and after changing the rate or solution concentration.[27]

Calculating glucose delivery 10% glucose solution = 100 mg glucose/mL

Glucose (mg/kg/hour) = infusion rate (mL/hour) × glucose concentration (mg/mL) ÷ weight (kg)

Glucose (mg/kg/min) = glucose (mg/kg/hour) ÷ 60

Example: 12.5 mL/hour × 100 mg/mL ÷ 3 kg = 416 mg/kg/hour.

Glucose dose = 416 mg/kg/hour ÷ 60 min/hour = 6.94 mg/kg/min.

Infusion rate and concentration In asymptomatic patients, start glucose infusion at 5-8 mg/kg/min. An intravenous 10% glucose rate of 3 mL/kg/hour delivers 5 mg/kg/min.

The rate and concentration are limited by the fluid volume that can be administered and the glucose concentration appropriate for the venous access: up to 12.5% through a peripheral vein and 25% through a central vein. In exceptional cases, 15% or 20% glucose may be used briefly in a term infant through a peripheral cannula with strict observation of the access site. More hypertonic solutions must always be administered through a central venous catheter.[11,27]

The target during infusion is 2.8-5.5 mmol/L during the first 48 hours and 3.3-5.5 mmol/L after 48 hours.[4,9,35] If carbohydrate delivery exceeds 12 mg/kg/min or fluid delivery exceeds 160 mL/kg/day, consider other interventions.[27] If more than 12-16 mg/kg/min or intravenous treatment for longer than five days is required, investigate persistent hypoglycaemia.[36]

In an emergency when venous access cannot be obtained, intramuscular glucagon 200 micrograms/kg stabilises blood glucose in most newborns for 1-2 hours. The dose may be repeated, but subsequent doses may not be effective because glycogen stores are mobilised and are probably depleted after the first dose.[35]

Infusion rate (mL/hour) = glucose (mg/kg/min) × weight (kg) × 60 ÷ solution concentration (mg/mL)

Discontinuing infusion therapy

Once glucose has stabilised above the treatment threshold for at least 6-9 hours, gradually reduce the infusion rate.[27] Reduce glucose delivery stepwise by 0.4-1.6 mg/kg/min.[11,27] Rapid reduction may cause recurrent hypoglycaemia.[35]

Summary

Hypoglycaemia is the most common metabolic problem in newborns. Persistent or recurrent hypoglycaemia can cause neurological injury, making timely diagnosis and treatment important. It results from glucose production and supply being low relative to utilisation. Risk groups include infants of mothers with diabetes, infants with growth abnormalities, and preterm and post-term infants. Certain maternal medicines and genetic or familial syndromes may also contribute. The primary preventive measures are avoiding hypothermia and initiating early, frequent breastfeeding. Hypoglycaemia is often asymptomatic or presents with non-specific symptoms, so at-risk infants must be screened during the first days of life. Enhanced feeding is the first treatment when screening shows a value below the age-specific range. Oral 40% glucose gel, newly included in this guideline, may reduce the need for infusion when combined with feeding. If the desired rise is not achieved orally, intravenous glucose is the next treatment. Screening and treatment can stop once the infant feeds well and glucose remains within the age-specific range.

Recommendations of the Neonatal Hypoglycaemia Guideline

1. Reference values during the neonatal transitional period are 2.6-5.5 mmol/L on the first day, 2.8-5.5 mmol/L at 24-48 hours, and 3.3-5.5 mmol/L after 48 hours.
2. At-risk newborns include infants of mothers with diabetes or specified medicines; birth weight <2,500 g or >4,500 g; birth weight below the 10th or above the 90th Fenton percentile; preterm or post-term infants; infants exposed to perinatal stress; infants requiring intensive care; those with a family history of genetic hypoglycaemia; and those with congenital syndromes associated with hypoglycaemia.
3. Healthy newborns without risk factors are not screened.
4. Symptoms may include irritability, tremor, sweating, tachypnoea, apnoea, pallor, cyanosis, hypothermia, bradycardia, circulatory collapse, poor feeding, weak or high-pitched cry, altered consciousness, seizures and hypotonia.
5. Prevention requires early skin-to-skin contact, normothermia and breastfeeding within the first hour, continued every 2-3 hours.
6. Begin screening at 1.5-4 hours. Frequency and duration depend on glucose values.
7. Measure blood glucose with a glucose meter using blood from a warm heel or great toe.
8. Stop screening when a clinically well newborn has age-appropriate values in 2-3 measurements and no feeding problems. Recheck borderline values the next day.
9. Oral treatment is 40% glucose gel (0.5 mL/kg) with feeding. A maximum of six doses may be given over 48 hours to a stable newborn. On the first day, give 5-10 mL/kg per feed every 2-3 hours. If oral treatment fails, intravenous glucose is required.
10. Take account of age and glucose value and treat according to the algorithm.

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Appendix 1. Algorithm: Neonatal Hypoglycaemia

Age-specific reference values: <24 h ≥ 2.6 mmol/L; 24-48 h ≥ 2.8 mmol/L; >48 h ≥ 3.3 mmol/L.

Newborns at risk of hypoglycaemia

- maternal illness: diabetes (regardless of type and treatment), and maternal medicines: antidepressants (serotonin reuptake inhibitors) and beta-blockers (labetalol);
- birth weight <2,500 g or >4,500 g;
- abnormal fetal growth (birth weight below the 10th percentile or above the 90th percentile on the Fenton growth chart);
- preterm newborns (<37 weeks of gestation) or post-term newborns (>42 weeks of gestation);
- perinatal stress: maternal pre-eclampsia/eclampsia or hypertension; birth asphyxia; caesarean birth due to fetal distress; meconium aspiration syndrome; Rhesus incompatibility; polycythaemia; sepsis; hypothermia (<36.5 °C);
- newborns requiring intensive care;
- family history of genetic hypoglycaemia;
- congenital syndromes associated with hypoglycaemia.

Symptoms of hypoglycaemia

- poor feeding or weak suck;
- irritability;
- hypotonia;
- tremor or seizures;
- altered consciousness;
- weak or high-pitched cry;
- sweating;
- tachypnoea or apnoea;
- pallor or cyanosis;
- hypothermia;
- bradycardia or circulatory collapse.

Prevention: first breastfeed in the delivery room during the first hour; safe skin-to-skin contact; maintain 36.5-37.5 °C; continue feeding every 2-3 hours.

Begin screening at 1.5-4 hours. Measure blood glucose with a glucose meter.

Glucose / clinical condition	Immediate management	Recheck
<1.5 mmol/L, or <2.6 mmol/L with seizures, apnoea or altered consciousness	Notify paediatrician; oral treatment [A]; IV 10% glucose bolus [B]; immediately start IV infusion [C]	30 min
1.5-1.9 mmol/L, asymptomatic	Oral treatment [A]; repeat if persistent; notify paediatrician and start IV infusion if not corrected	30-45 min
2.0-2.5 mmol/L, asymptomatic	Enhance feeding [D]; if persistent, give oral treatment [A] and repeat once; notify paediatrician if not corrected	1-2 h
2.6-3.2 mmol/L, asymptomatic	Enhance feeding [D]; if persistent, give oral treatment [A] and repeat once; notify paediatrician if not corrected	2-3 h

Stop screening when a clinically well infant has an age-appropriate value on 2-3 measurements and no feeding problems. Recheck borderline values the next day.

[A] Oral treatment: 40% glucose gel 0.5 mL/kg to buccal mucosa + immediate breastfeeding and/or donor breast milk/formula 5-10 mL/kg per feed. Maximum six gel doses in 48 hours.
[B] IV bolus: 2 mL/kg 10% glucose over 5-15 minutes.
[C] IV infusion: 10% glucose at 5-8 mg/kg/min; initial rate 3 mL/kg/hour = 5 mg/kg/min.
[D] Enhanced feeding: breastfeed every 2-3 hours and/or give breast milk, donor milk or formula 5-10 mL/kg per feed.

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Appendix 2. Administration of Glucose Gel

40% dextrose monohydrate gel (GlucoGel)

1. Prepare: glucose gel bottle, 2 mL syringe, clean swabs, kidney dish, clean cup and gloves.
2. Check the gel expiry date. When opening a new bottle, label it with the new expiry date. The gel is usable for 30 days after opening. **Do not touch the bottle tip with your finger.**
3. Perform hand antisepsis and pour gel into the cup.
4. Draw the required amount into the syringe. Place the syringe and swabs in the kidney dish and put on gloves.
5. Dry the patient's buccal mucosa with a swab.
6. Express the gel from the syringe onto your finger.
7. Massage the gel into the patient's buccal mucosa. A large amount may be divided between both cheeks. Administration of the full dose must not take longer than three minutes.

Weight	Dose (400 mg/mL gel; 200 mg/kg = 0.5 mL/kg)
2.0 kg	1.0 mL
2.5 kg	1.25 mL
3.0 kg	1.5 mL
3.5 kg	1.75 mL
4.0 kg	2.0 mL
4.5 kg	2.25 mL
5.0 kg	2.5 mL

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Appendix 3. Patient Information Leaflet

Hypoglycaemia in the Newborn

You have been given this leaflet because your baby has an increased risk of low blood glucose, or hypoglycaemia. Blood glucose is an essential source of energy for the whole body. If a newborn's blood glucose remains low for a prolonged period, falls repeatedly or becomes very low, it may affect growth and development of the brain.

Breastfeed your baby within the first hour of life. Feed frequently and regularly, at least every three hours. In addition to feeding, prevent hypoglycaemia by maintaining a normal body temperature: keep the baby warm and in skin-to-skin contact with a parent. Skin-to-skin contact with the mother or other parent supports successful breastfeeding.

Newborns at increased risk include those:

- with abnormal growth (birth weight too low or too high);
- born preterm (before 37 weeks) or post-term (after 42 weeks);
- whose mother had diabetes during pregnancy, regardless of type or treatment;
- whose mother takes certain medicines;
- who experienced stress during birth or require intensive care.

Your baby belongs to one of these high-risk groups. At-risk newborns need more frequent blood tests to check glucose. A few drops of blood are taken from the heel or great toe.

Testing begins before the second feed and continues until repeated measurements are normal for the baby's age.

Your baby may have hypoglycaemia if they are not feeding well, have trembling limbs, cold or sweaty skin, or rapid breathing. More commonly, hypoglycaemia occurs without symptoms.

Treatment depends on how low the blood glucose is, how well the baby feeds and whether other health problems are present.

If the level is low, glucose gel is massaged into the baby's buccal mucosa, followed by feeding.

If it is very low, the baby is unwell, or the level has not risen after feeding, treatment with intravenous glucose solution may be required. The baby will then need closer monitoring and treatment.

Hypoglycaemia usually resolves with treatment during the first days of life. In rare cases it persists longer, and the newborn may need further investigations.

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