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缅甸联邦第一特区卫生部

The Union of Myanmar, SR(1) Department of Health

Neonatal Hypoglycemia

Standard Operating Procedure (SOP)

Contents

Neonatal Hypoglycemia

In healthy term babies, a fall in blood glucose concentration is usual immediately after birth and rise spontaneously thereafter (Transient physiological hypoglycaemia). After delivery, blood lactate and ketones provide alternative fuels for brain metabolism thus minimizing the baby's glucose requirement while maternal lactation is established.

Practice Points

- *Healthy Term AGA infants who are breastfeeding on demand do not need to have their blood glucose routinely checked and need no supplementary foods or fluids*
- *Term AGA infants do not develop symptomatic hypoglycaemia as a result of simple underfeeding. lf it does, it is always pathological until proved otherwise*
- *Thermal protection, in addition to breast feeding, is necessary to prevent hypoglycaemia*
- *A glucose level <40 mg/dl (<2.2 mmol/L) at any time in any newborn requires follow up glucose measurements to document normal values*

It is recommended, in the otherwise healthy but at-risk baby, to wait until around 2-3 hours after birth to make the first blood glucose estimation.

Definitions

- *Hypoglycaemia - Blood glucose <2.6 mmol/L (<47 mg/dl)*
- *Severe hypoglycaemia*
  - *Blood glucose <1.5 mmol/L (<27 mg/dl)*
  - *Blood glucose <2.6 mmol/L (<47 mg/dl) despite >10 mg/kg/min of glucose infusion*
- *Persistent or recurrent hypoglycaemia*
  - *Any three blood glucose <2.6 mmol/L(<47 mg/dl)*
  - *Hypoglycemia (blood glucose <2.6 mmol/L) persisting/ recurring after 72hours*

Confirm any Glucometer Blood Glucose Level (BGL) <2.2 mmol/L (40 mg/dl) by blood gas machine or laboratory analysis.

How ever do not wait for this confirmation before starting appropriate treatment

Diagnosis

- *Asymptomatic hypoglycaemia: When the blood glucose level is below 2.6mmol/L in the absence of clinical signs*
- *Symptomatic hypoglycaemia: According to Whipple's Triad*

- *Presence of signs attributable to hypoglycaemia (non-specific; poor sucking, apathy, lethargy, hypotonia, temperature instability, irritability jitteriness, tremors, apnoea, cyanosis, vomiting, weak or high pitched cryand seizures, etc.)*
- *Low blood glucose documented by rapid bedside measurement device (Glucometer)*
- *Resolution of clinical signs within minutes to hours once the blood glucose level is normalized*

High Risk infants Who Need Screening for Hypoglycaemia

- *IUGR*
- *Low birth weight <2.5 kg*
- *Preterm <37 weeks*
- *SGA (<10t centile for weight) or LGA (>90* centile for weight)*
- *Infant of diabetic mother*
- *Sick newborn (e.g. asphyxia-5minute Apgar <7, sepsis, polycythemia,*
- *hypothermia etc)*
- *Newborns with symptoms suggestive of hypoglycaemia*

Infant Who May Need Screening

- *Infant with mother on terbutaline, beta-blockers, or oral hypoglycemic agents*
- *Infant with isolated hepatomegaly (rule out glycogen storage disease), microcephaly, anterior midline defect, gigantism*
- *Infants with macroglossia or hemihypertrophy (rule out Beckwith-Wiedemann Syndrome*
- *Infants with suspected inborn errors of metabolism*

Enteral Feeding of Infants at Risk for Hypoglycaemia (Asymptomatics with Risk Factors)

- *Commence feeding as soon as infant is ready, preferably within 1 hr of birth. Direct breastfeeding is the best option for a trial of an oral feed*
- *If the baby is unable to suck, expressed breast milk may be used*
- *Frequent feeds at least 3 hourly or at least 8 feeds in 24 hours*
- *Skin to skin contact to prevent hypothermia and encourage frequent breastfeeds Supplementation with infant formula is only recommended when blood glucose level (BGL)is below acceptable threshold and BF/ EBM is not successful, or has been insufficient to increase BGL to acceptable level*
- *EBM/Formula feeding may be given at 5-10 ml/kg/feed at least 3 hourly according to the tolerance (May be additional to BF).*

When to Check BGL For Screening and Continued Surveillance

- *At around 2- 3 hours of age if baby was not interested in feeding right afterbirth*
- *At least 30-60 minutes after conclusion of 1st feeding (Post feed monitoring) and/or before the 2m feed (Prefeed monitoring)*
- *For subsequent checks, just before each subsequent feeds until the 2-3 consecutive readings are >2.6 mmol/L (>47 mg/dl) (Prefeed monitorings)*
- *When clinical signs of hypoglycaemia are suspected*
- *Recommence glucose monitoring if any change in feeding or clinical condition*

Parenteral Therapy

Indications

- *Symptomatic hypoglycaemia*
- *BGL <1.5 mmol/L (<27 mg/dl)*
- *BGLs persistently less than 2.0 mmol/L (36 mg/dl)*
- *Oral feeding does not maintain BGL >2.6 mmol/L (>47 mg/dl)*
- *Inability to tolerate oral feeding as treatment for hypoglycaemia*

If the baby is on IV fluids, ensure that the glucose intake is adequate.

- *Term/ AGA-10 % DW 60-90 ml/kg/day*
- *SGA/IUGR-10% DW 80-100 ml/kg/day*

Increase the rate as needed to maintain a normal BGL

BGL should be checked at 30-60 minutes intervals initially until stable, and then 4-6 hourly as indicated.

Useful formula for calculating infusion rate

(a) *Infusion rate (mg/kg/min) = % of dextrose being infused x rate (ml/hr) / body weight (in kg) x 6*

(b) *Infusion rate (mg/kg/min) = IV rate (ml/kg/day) x % of dextrose / 144*

(c) *Infusion fluid volume of 10%DW*

Table 1.6 Fluid Therapy in Neonate

Day	Fluid (ml/kg/day)	Glucose (mg/kg/min)
D1	60	4
D2	90	6
D3	120	8
D4	150	10

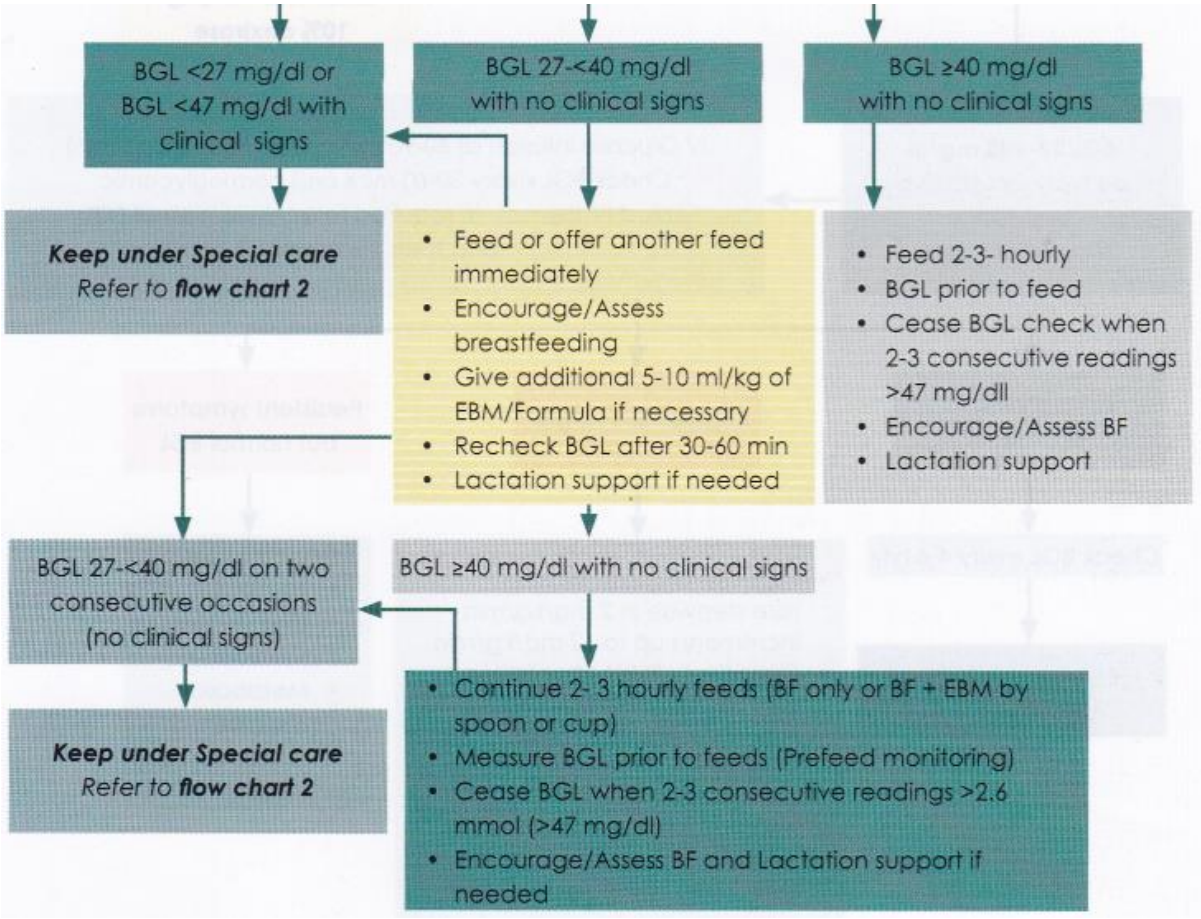
Note: The maximum concentration of IV dextrose that can be administered peripherally is 12.5%

An umbilical catheter may be used under strict aseptic condition, if there is difficulty in inserting an IV cannula.

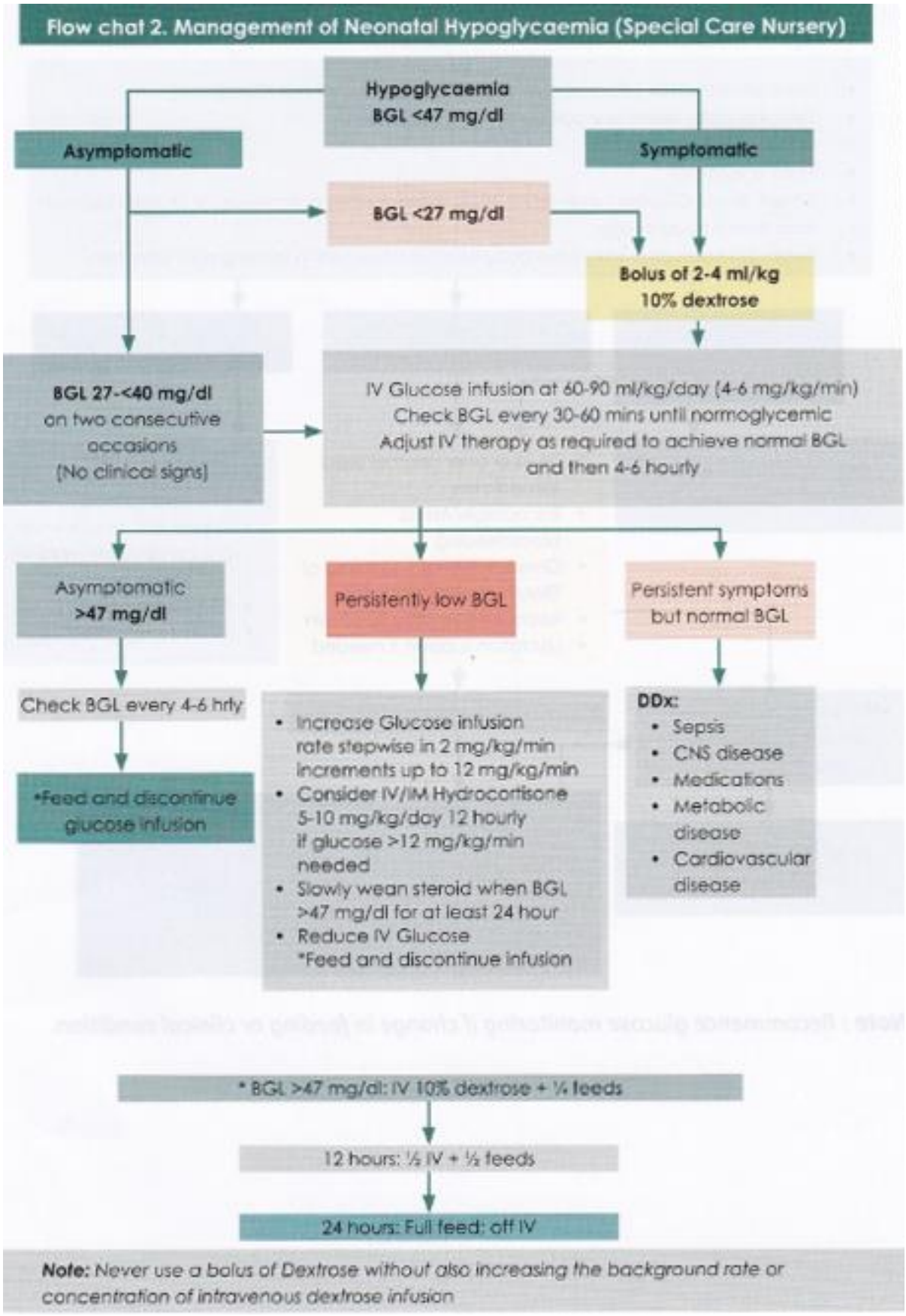
Consider to give IV or IM Hydrocortisone 5-10 mg/kg/day in 2 divided doses or Prednisolone 2 mg/kg/day orally daily if the infant remains hypoglycaemic despite receiving glucose infusion of 12 mg/kg/min.

Flow chart 1. Management of Infants at risk for Hypoglycaemia

- Feed infants within l hour of age, feed 3-4 hourly (Breast milk/Colostrum)
- Keeping baby warm; encourage skin to skin contact
- Observation of wellbeing
- Feed effectively Check Blood Glucose Level IBGL) 30-60 minutes after completion of 1st feed but not later than 4 hours of age
- Within 2-3 hours after birth if the baby was not interested in feeding right after birth



Note: Recommence glucose monitoring if change in feeding or clinical condition.


Flow chat 2. Management of Neonatal Hypoglycaemia (Special Care Nursery)
Hypoglycaemia
BGL <47 mg/dl
Asymptomatic
Symptomatic
BGL <27 mg/dl
Bolus of 2-4 ml/kg
10% dextrose
BGL 27-<40 mg/dl
on two consecutive
occasions
(No clinical signs)
IV Glucose infusion at 60-90 ml/kg/day (4-6 mg/kg/min)
Check BGL every 30-60 mins until normoglycemic
Adjust IV therapy as required to achieve normal BGL
and then 4-6 hourly
Asymptomatic
>47 mg/dl
Persistently low BGL
Persistent symptoms
but normal BGL
Check BGL every 4-6 hrly
*Feed and discontinue
glucose infusion
Increase Glucose infusion rate stepwise in 2 mg/kg/min increments up to 12 mg/kg/min
Consider IV/IM Hydrocortisone 5-10 mg/kg/day 12 hourly if glucose >12 mg/kg/min needed
Slowly wean steroid when BGL >47 mg/dl for at least 24 hour
Reduce IV Glucose
*Feed and discontinue infusion
DDx:
Sepsis
CNS disease
Medications
Metabolic disease
Cardiovascular disease
* BGL >47 mg/dl: IV 10% dextrose + ¼ feeds
12 hours: ½ IV + ½ feeds
24 hours: Full feed: off IV
Note: Never use a bolus of Dextrose without also increasing the background rate or concentration of intravenous dextrose infusion