

# **Risk Factors for Neonatal Hypoglycemia**

**Dr Vrushali Mathesul**

**DM Neonatology**

**Consultant Neonatology, Aditya Birla Hospital, Pune**

## **Why to define high risk categories?**

- Neonatal hypoglycaemia is the most common metabolic problem in newborn infants. And one of the most preventable cause of brain injury.
- A recent systematic review found that neonatal hypoglycaemia is associated with a two- to threefold increased risk of specific cognitive deficits in early childhood (2–5 years), including visual-motor impairment and executive dysfunction, and general cognitive impairment and literacy and numeracy problems in later childhood (6–11 years). [1]

## **Why the newborns are very susceptible to hypoglycemia induced brain injury.**

- Glucose provides metabolic fuel for the developing fetus.
- While in utero, the fetus receives a steady supply of glucose from its mother via facilitated diffusion across the placenta and produces its own insulin to permit euglycemia.
- Postnatally, the constant supply of glucose ceases and neonatal concentrations of insulin must be regulated. Lower blood glucose values are commonly seen in the healthy neonatal population in the first 24 to 48 postnatal hours
- The brain primarily uses glucose to meet its metabolic demands. The healthy newborn requires a higher glucose infusion rate (the rate at which glucose is made available to the body) that is up to 2 to 3 times more per kilogram of weight than that seen in adults because of the proportionally larger brain-to-body mass ratio of infants.
- Accordingly, newborns need to maintain regular and more frequent feedings by the first few days after birth. Any inability to procure, take in, and metabolize feedings at a rate

that supports the production and maintenance of standard blood glucose concentrations may lead to hypoglycemia that is severe and persistent in the newborn.

- Severe and prolonged hypoglycemia in the neonatal population may be associated with seizure activity and abnormal neurologic outcomes, although it is unclear at what specific values of blood glucose these metabolic aberrations occur and after how long a duration of hypoglycemia. Despite the lack of clear evidence, the concern for severe neurologic sequelae has led to empirical screening recommendations to maximize detection and treatment of neonates with hypoglycemia.
- Approximately 30% of all neonates are considered at risk of neonatal hypoglycemia, of whom approximately 50% develop hypoglycaemia [2].

### **Who should be screened?**

- Blood glucose concentration should be measured in infants at risk for hypoglycemia and in infants who exhibit signs or symptoms consistent with hypoglycemia.
- Blood glucose concentrations should not be measured in healthy asymptomatic term infants born after an uncomplicated pregnancy and delivery

**Table. 1 Neonates at increased risk of hypoglycemia and require glucose screening [3,4]:**

▪ Prematurity (gestational age <37 weeks)
▪ Large for gestational age
▪ Fetal growth restriction
▪ Neonates who have experienced perinatal stress like birth asphyxia/ischemia, maternal pre eclampsia or eclampsia or hypertension, meconium aspiration syndrome, erathroblastosis fetalis, polycythemia
▪ Postmaturity (gestational age >42 weeks)
▪ Admission to a neonatal intensive care unit
▪ Maternal diabetes
▪ Maternal use of beta adrenergic agents
▪ Maternal use of oral hypoglycemic agents
▪ Family history of a genetic form of hypoglycemia
▪ Congenital syndromes associated with hypoglycemia (eg, Beckwith-Wiedemann and Kabuki syndromes, midline defects)

**Neonates in whom to exclude persistent hypoglycemia before discharge:**

- Severe hypoglycemia (e.g. episodes of symptomatic hypoglycemia or need for intravenous dextrose to treat hypoglycemia).
- Inability to consistently maintain preprandial plasma glucose concentration >50 mg/dL up to 48 h of age and >60 mg/dL after 48 h of age.
- Family history of genetic form of hypoglycemia.

## References-

1. Rajesh Shah, Jane Harding, Julie Brown, Christopher McKinlay. Neonatal Glycaemia and Neurodevelopmental Outcomes: A Systematic Review and Meta-Analysis. *Neonatology* 2019;115:116–126.
2. Harris DL, Weston PJ, Harding JE. Incidence of neonatal hypoglycemia in babies identified as at risk. *J Pediatr*. 2012 Nov; 161(5): 787–91.
3. Alecia Thompson-Branch and Thomas Havranek. Neonatal Hypoglycemia *Pediatrics in Review* 2017;38;147
4. Thornton PS, Stanley CA, DeLeon DD, Harris D, Haymond MW, Hussain K, et al. Recommendations from the Pediatric Endocrine Society for Evaluation and Management of Persistent Hypoglycemia in neonates, infants, and children. *J Pediatr* 2015;167:238e45.