

Hypoglycemia in neonates without risk factors

Nicolas Georges, Chaaban Riham, Menassa Juliana, Khalife Marie- Claude, Maalouf Issam, Salameh Yara

Pediatric Department, Centre Hospitalier Universitaire Notre Dame de Secours, Jbeil, Lebanon, Holy Spirit University of Kaslik, Faculty of medicine and medical sciences, Universitaire Lebanon.

Introduction:

Hypoglycemia is the most frequent treatable metabolic disease in neonatal period associated with adverse neurological outcome and brain injury if treatment was not provided. AAP and PES recommended screening for hypoglycemia only in newborns with risk factors but many others neonates may present episodes of asymptomatic hypoglycemia without any known risk factor.

AAP 2011 guidelines

AAP and PES 2017 guidelines

Screening and Management of Postnatal Glucose Homeostasis in Late Preterm and Term SGA, IDM/LGA Infants (ELP) Infants 34-37 weeks and SGA (Gest 0-24 hrs); IDM and LGA (34-44 weeks Gest 0-12 hrs)

Symptomatic and <40 mg/dL → IV glucose

ASYMPTOMATIC

Birth to 4 hours of age
INITIAL FEED WITHIN 1 hour
Screen glucose 30 minutes after 1st feed
Initial screen <25 mg/dL
Screen <35 mg/dL
Feed and check in 1 hour

4 to 24 hours of age
Continue feeds q 2-3 hours
Screen glucose prior to each feed
Screen <35 mg/dL
Feed and check in 1 hour

<25 mg/dL → IV glucose*
25-40 mg/dL → "Refeed IV glucose" as needed
<35 mg/dL → IV glucose*
35-45 mg/dL → "Refeed IV glucose" as needed

Target glucose screen ≥45 mg/dL prior to routine feeds
*Glucose dose = 200 mg/kg (dextrose 10% at 2 mL/kg) and/or IV infusion at 5-8 mg/kg per min (80-100 mL/kg per d). Achieve plasma glucose level of 40-50 mg/dL.

Symptoms of hypoglycemia include: Irritability, tremors, jitteriness, exaggerated Moro reflex, high-pitched cry, seizures, lethargy, floppiness, cyanosis, apnea, poor feeding.

Timeline

0-4 hours | 4-24 hours | 24-48 hours | >48 hours

AAP
AAP: asymptomatic screened neonate- In first 4 hours, maintain blood glucose >40mg/dL prior to feeding. Between 4-24 hours, maintain blood glucose >45 mg/dL. If symptomatic- treat if blood glucose is <40mg/dL.

PES
PES (first 48 hours): Maintain blood glucose >50mg/dL. Infants who are unable to maintain a blood glucose level >50 mg/dL in the first 48 hours of life may be at risk for a disorder causing hypoglycemia syndrome are recommended by the PES to have a fast challenge of 6-8 hours with maintenance of blood glucose >70mg/dL.

Mother's BMI-Hypoglycemia AAP

Variables	BG < 40mg/dl	BG > 40mg/dl	P value
BMI(60mn)	30.04±4.80	29.19± 4.34	0.255
BMI (90mn)	28.33 ± 1.005	29.19 ± 4.42	0.274

Mother's BMI-Hypoglycemia PES

Variables	BG <50mg/dl	BG >50 mg/dl	P value
BMI (60 mn)	29.96 ± 96	28.83 ± 4.36	0.047
BMI (90mn)	29.49 ± 4.37	29.12±4.41	0.595

Gestational age-Hypoglycemia AAP

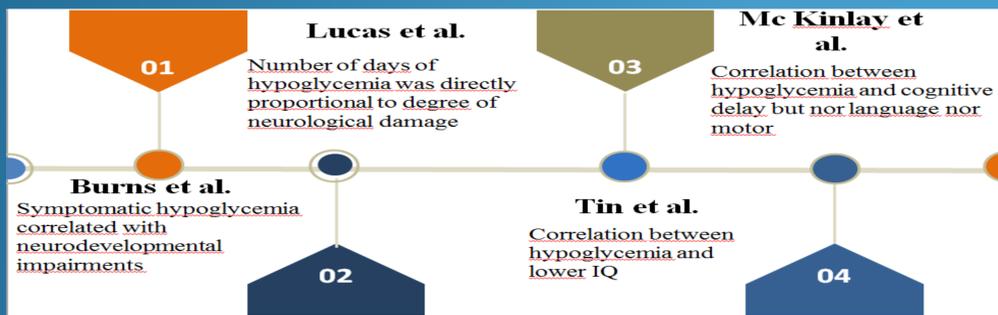
Variables	BG <40 mg/dl	BG > 40mg/dl	P value
GA(60 mn)	37.56 ± 0.74	38.21 ± 0.99	0.001
GA (90mn)	37.67 ± 0.99	38.14 ± 0.987	0.414

Gestational age-Hypoglycemia PES

Variables	GB < 50mg/dl	BG >50 mg/dl	P value
GA (60 mn)	37.76 ± 0.846	38.3 ± 1.002	0.001
GA (90 mn)	37.65 ± 0.75	38.23 ± 1.001	0.001

Definition: numerical AAP glycemia < 40 mg/dl (first 4h) & PES glycemia < 50 mg/dl (first 48hr)

Neonatal hypoglycemia & neurodevelopmental outcomes



Risk factors of hypoglycemia: prematurity, large for gestational age, small for gestational age, infant of diabetic mother

Objectives:

To assess the incidence of hypoglycemia in healthy full term neonates without any risk factors in our medical center and to correlate it with mother's BMI, the initiating time of feeding and the difference between breast feeding and formula. To prove the benefit of universal neonatal screening of hypoglycemia in saving many full term newborns without any risk factors.

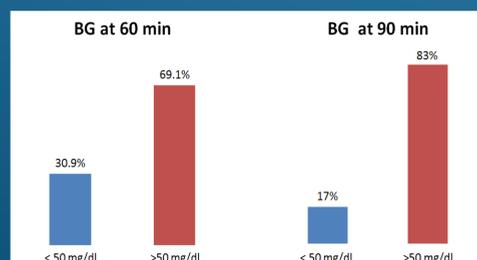
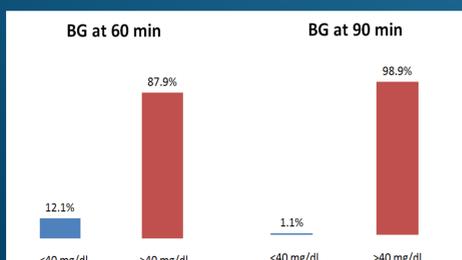
Materials and Methods: A hospital based, prospective longitudinal study involving 282 healthy full term asymptomatic neonates. Blood glucose level was measured at 60 and 90 minutes of life using reagent strips and Glucometer independent of feeding time.

Results:

Variables	Mean ± SD	Minimum	Maximum	Median
GA	38.13 ± 0.988	37	42	38
Mother's weight	78.66 ± 1.62	52	125	77
Mother's height	1.64 ± 0.057	1.5	1.8	1.64
Mother, BMI	29.18 ± 4.40	19.8	41.35	28.56
Birth weight	3201.7 ± 369.149	2500	4260	3156
BG at 60mn	55.56 ± 11.44	21	134	54
BG at 90mn	59.87 ±	30	170	58
Time 1 st feeding	102.67 ± 87.56	0	720	105

AAP BG < 40 mg/dl

PES BG < 50 mg/dl



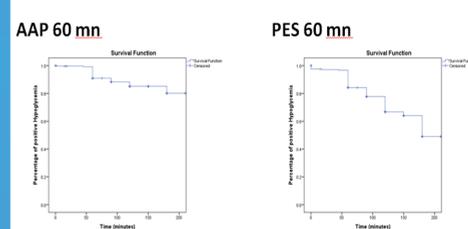
Breast feeding Hypoglycemia AAP

Variables	BG < 40 mg/dl	BG > 40 mg/dl	P value
Breastfeeding (60 min)	Yes 23.5 No 76.5	Yes 76.9 No 23.1	0.0001*
Breastfeeding (90 min)	Yes 0 No 100	Yes 71.2 No 28.8	0.025*

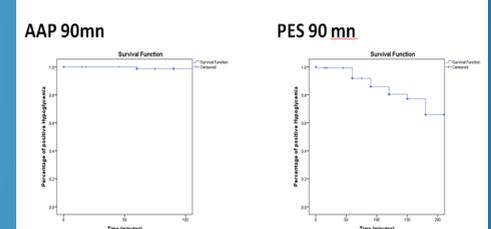
Breast feeding-Hypoglycemia PES

Variables	BG < 50 mg/dl	BG > 50 mg/dl	P value
Breastfeeding 60mn	Yes 50.6 No 49.4	Yes 79.4 No 20.6	0.0001
Breastfeeding 90mn	Yes 45.8 No 54.2	Yes 75.5 No 24.5	0.0001

Survival analysis

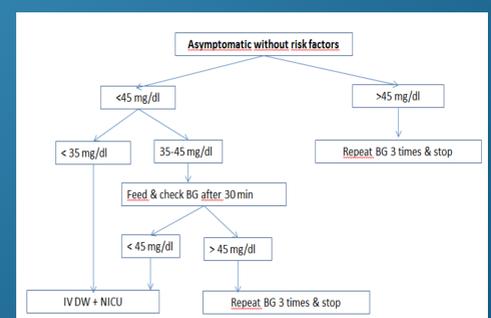
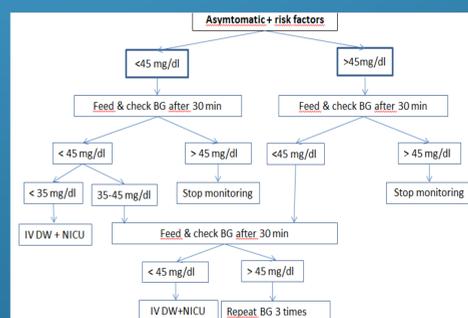
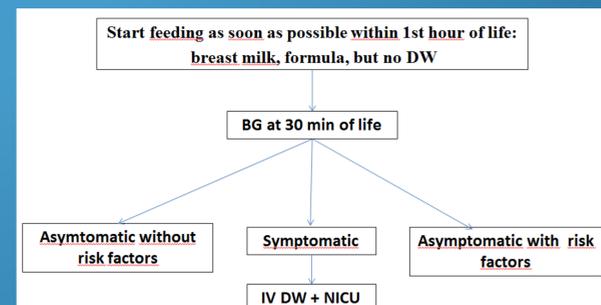


Survival analysis



Birth weight was statistically non significant because we have chosen babies without risk factors.

Algorithm:



Conclusion: Delayed initiation of feeding, gestational age below 38 weeks and bottle fed infants were significantly associated with hypoglycemia. It is preferable to do a universal glycaemic screening for all newborns to prevent transient neonatal hypoglycemia, which could have some deleterious consequences on the central nervous system and to start breastfeeding within 1 hour after delivery as soon as possible.