

IVF Management of Neonatal Hypoglycemia – WPH Transition Care Nursery

- This guide is for use only once the decision to start IVF for neonatal hypoglycemia has been made.
- Refer to Attachment A for guidance on initial IVF rate and weaning amounts.

- Feed ad lib, at least q3-4hrs.
- Recheck blood glucose 1 hr after any IV glucose bolus (gel or IV push) or increase in IV rate.
- After initiation of IVF, check the 2 initial f/u blood sugars by EPOC. If normal, then subsequent checks can be POCT. If any POCT is <45 then confirm result with EPOC.
- Once stabilized on IVF, pre-prandial blood sugar should be checked q3-4 hrs.

Blood sugar >60

Wean GIR by ~0.5 – 1

Blood sugar 45 – 60

Maintain current GIR

Blood sugar <45

- Contact physician
- Consider additional glucose bolus (2mL/kg of D10W) and/or increase GIR (~0.5 – 1) if <35 or <45 x 2

Consider D/Cing IVF when *all the following criteria* are met:

- $GIR \leq 3$, and
- 2 blood sugars ≥ 60 (may include glucose measurements during last steps of wean)
- Asymptomatic
- Feeding adequately

Stop testing when *all the following criteria* are met:

- IVF glucose discontinued, and
- 1 additional blood sugar >45 after IVF D/Ced
- Asymptomatic

Symptoms of Hypoglycemia

- | | | |
|--------------------|---------------------------|------------|
| • Jitteriness | • Tachypnea/Resp distress | • Cyanosis |
| • Irritability | • Lethargy/stupor | • Apnea |
| • High-pitched cry | • Poor feeding | • Seizure |

Notes

- This algorithm is a care guide but does not replace clinical judgement and individualized management.
- Symptoms should resolve with glucose homeostasis. If symptoms do not resolve consider alternative dx.
- If hypoglycemia or symptoms persist despite escalation of therapy consider neonatology consultation.

Attachment A

- Glucose infusion rate (GIR) standardizes dosing of intravenous glucose therapy and emphasizes the fact that glucose is the treatment being delivered, rather than IV fluids.
- $$\text{GIR (mg/kg/min)} = \frac{\text{infusion rate (ml/hr)} \times \text{dextrose concentration (g/dL)} \times 1000 \text{ (mg/gm)}}{\text{Weight (kg)} \times 60 \text{ (min/hr)} \times 100 \text{ (ml/dL)}}$$
- $$\text{Infusion rate (ml/hr)} = \frac{\text{GIR (mg/kg/min)} \times \text{weight (kg)} \times 60 \text{ (min/hr)} \times 100 \text{ (ml/dL)}}{\text{Dextrose concentration (g/dL)} \times 1000 \text{ (mg/gm)}}$$
- The tables below show that there is considerable variation in IVF rates for babies of different weights to deliver the same GIR.
- These tables may be used to provide guidance for weaning babies of different weights.
- We typically start IV glucose therapy with D10W. If daily IVF amount is > 100ml/kg/day consider using D12.5W to avoid fluid overload.
- For babies with hypoglycemia not related to IDM (e.g., IUGR/SGA) an initial GIR of ~6 mg/kg/min is recommended to maintain adequate blood glucose level.
- For IDM a higher initial GIR may be necessary (GIR ~7-8 mg/kg/min).

2kg baby

Glucose infusion rate (mg/kg/min)	Dextrose concentration	Hourly infusion rate (ml/hr)	Daily infusion rate (ml/kg/day)
1.7	D10	2	24
2.5	D10	3	36
3.3	D10	4	48
4.2	D10	5	60
5	D10	6	72
5.8	D10	7	84
6.7	D10	8	96
7.5	D10	9	108
8.3	D10	10	120
2.1	D12.5	2	24
3.1	D12.5	3	36
4.2	D12.5	4	48
5.2	D12.5	5	60
6.3	D12.5	6	72
7.3	D12.5	7	84
8.3	D12.5	8	96

9.4	D12.5	9	108
10.4	D12.5	10	120

2.5kg baby

Glucose infusion rate (mg/kg/min)	Dextrose concentration	Hourly infusion rate (ml/hr)	Daily infusion rate (ml/kg/day)
2	D10	3	29
2.7	D10	4	38
3.3	D10	5	48
4	D10	6	58
4.7	D10	7	67
5.3	D10	8	77
6	D10	9	86
6.7	D10	10	96
7.3	D10	11	106
8	D10	12	115
2.5	D12.5	3	29
3.3	D12.5	4	38
4.2	D12.5	5	48
5	D12.5	6	58
5.8	D12.5	7	67
6.7	D12.5	8	77
7.5	D12.5	9	86
8.3	D12.5	10	96
9.2	D12.5	11	106
10	D12.5	12	115

3kg baby

Glucose infusion rate (mg/kg/min)	Dextrose concentration	Hourly infusion rate (ml/hr)	Daily infusion rate (ml/kg/day)
2.2	D10	4	24
2.8	D10	5	40
3.3	D10	6	48
3.9	D10	7	56
4.4	D10	8	64
5	D10	9	72
5.6	D10	10	80
6.1	D10	11	88
6.7	D10	12	96
7.2	D10	13	104
7.8	D10	14	112
2.8	D12.5	4	32
3.5	D12.5	5	40
4.2	D12.5	6	48
4.9	D12.5	7	56
5.6	D12.5	8	64
6.3	D12.5	9	72

6.9	D12.5	10	80
7.6	D12.5	11	88
8.3	D12.5	12	96
9	D12.5	13	104
9.7	D12.5	14	112

3.5kg baby

Glucose infusion rate (mg/kg/min)	Dextrose concentration	Hourly infusion rate (ml/hr)	Daily infusion rate (ml/kg/day)
2.4	D10	5	27
2.9	D10	6	41
3.3	D10	7	48
3.8	D10	8	55
4.3	D10	9	62
4.8	D10	10	69
5.2	D10	11	75
5.7	D10	12	82
6.2	D10	13	89
6.7	D10	14	96
7.1	D10	15	103
7.6	D10	16	110
8.1	D10	17	117
2.4	D12.5	4	27
3	D12.5	5	34
4.2	D12.5	7	48
4.8	D12.5	8	55
6	D12.5	10	69
6.5	D12.5	11	75
7.1	D12.5	12	82
8.3	D12.5	14	96
8.9	D12.5	15	103
9.5	D12.5	16	110

4kg baby

Glucose infusion rate (mg/kg/min)	Dextrose concentration	Hourly infusion rate (ml/hr)	Daily infusion rate (ml/kg/day)
2.1	D10	5	30
2.5	D10	6	36
2.9	D10	7	42
3.3	D10	8	48
3.8	D10	9	54
4.2	D10	10	60
4.6	D10	11	66
5	D10	12	72
5.4	D10	13	78
5.8	D10	14	84
6.3	D10	15	90

6.7	D10	16	96
7.1	D10	17	102
7.5	D10	18	108
7.9	D10	19	114
2.6	D12.5	5	30
3.1	D12.5	6	36
3.6	D12.5	7	42
4.2	D12.5	8	48
4.7	D12.5	9	54
5.2	D12.5	10	60
5.7	D12.5	11	66
6.3	D12.5	12	72
6.8	D12.5	13	78
7.3	D12.5	14	84
7.8	D12.5	15	90
8.3	D12.5	16	96
8.9	D12.5	17	102
9.4	D12.5	18	108

4.5kg baby

Glucose infusion rate (mg/kg/min)	Dextrose concentration	Hourly infusion rate (ml/hr)	Daily infusion rate (ml/kg/day)
2.2	D10	6	32
2.6	D10	7	37
3	D10	8	43
3.3	D10	9	48
3.7	D10	10	53
4.1	D10	11	59
4.4	D10	12	64
4.8	D10	13	69
5.2	D10	14	75
5.5	D10	15	80
5.9	D10	16	85
6.3	D10	17	91
6.7	D10	18	96
7	D10	19	101
7.4	D10	20	107
7.8	D10	21	112
8.1	D10	22	117
2.8	D12.5	6	32
3.2	D12.5	7	37
3.7	D12.5	8	43
4.2	D12.5	9	48
4.6	D12.5	10	53
5.1	D12.5	11	59
5.6	D12.5	12	64

6	D12.5	13	69
6.5	D12.5	14	75
6.9	D12.5	15	80
7.4	D12.5	16	85
7.9	D12.5	17	91
8.3	D12.5	18	96
8.8	D12.5	19	101
9.3	D12.5	20	106

5kg baby

Glucose infusion rate (mg/kg/min)	Dextrose concentration	Hourly infusion rate (ml/hr)	Daily infusion rate (ml/kg/day)
2.3	D10	7	34
2.7	D10	8	38
3	D10	9	43
3.3	D10	10	48
3.7	D10	11	53
4	D10	12	58
4.3	D10	13	62
4.7	D10	14	67
5	D10	15	72
5.3	D10	16	77
5.7	D10	17	82
6	D10	18	86
6.3	D10	19	91
6.7	D10	20	96
7	D10	21	101
7.3	D10	22	106
7.7	D10	23	110
8	D10	24	115
2.5	D12.5	6	29
2.9	D12.5	7	34
3.3	D12.5	8	38
3.8	D12.5	9	43
4.2	D12.5	10	48
4.6	D12.5	11	53
5	D12.5	12	58
5.4	D12.5	13	62
5.8	D12.5	14	67
6.3	D12.5	15	72
6.7	D12.5	16	77
7.1	D12.5	17	82
7.5	D12.5	18	86
7.9	D12.5	19	91
8.3	D12.5	20	96
8.8	D12.5	21	101

9.2	D12.5	22	106
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References

Thompson-Branch, A, et al. Pediatrics in Review. 2017, 38 (4) 147-157.

AAP Committee on Fetus and Newborn. Pediatrics. 2011; 127 (3): 575-579.

Pediatric Endocrine Society. Journal of Pediatrics. 2015; 167 (2): 238-245.

McKinlay, CJ, et al. New England Journal of Medicine. 2015; 373 (16): 1507-1518.

Thornton, PS, et al. Contemporary Pediatrics. June 1, 2016.

Canadian Paediatric Society. Paediatric Child Health. 2019; 24(8): 536-544.

Gomella, TL. (2020) Neonatology, 8th ed. McGraw Hill.