PARENTERAL NUTRITION DOSING GUIDELINES FOR NEONATAL AND PEDIATRIC PATIENTS IN THE CARDIAC INTENSIVE CARE UNIT

INDICATION: Consider initiation of Parenteral Nutrition (PN) if enteral nutrition is contraindicated for

- CHOP Clinical Pathway: Nutrition for Neonates Undergoing Surgery for Congenital Heart Disease
- ≥ 3 days in infants or if moderate-severe malnutrition present
- ≥ 4-5 days in children/adolescents
- Delay PN initiation for 72 hours after suspected severe neurological injury

ACCESS: Verify vascular access prior to ordering. These are initial starting recommendations for central PN.

- The use of PN through a PIV or midline catheter is strongly discouraged.

VOLUME: Use 60 mL/kg for postop cardiac neonates. Otherwise, use 80% maintenance fluid volume or adjust for TFL.

PN ORDER: Select appropriate weight-based continuous template within the order set.

INITIATION DOSING OF PN MACRONUTRIENTS, ELECTROLYTES, MINERALS

	< 5 kg		5 to < 20 kg	20 to < 40 kg	≥ 40 kg
	0-2 days old	**≥ 3 days old**			
Dextrose %	10-15%	10-15%	10-15%	10-12.5%	10-12.5%
Protein (g/kg)	2	2	1.5-2	1	0.8-1
NaPhos or KPhos (hold if Phos is elevated)	0.5-1 mmol/kg	0.5-1.5 mmol/kg	0.5-1 mmol/kg	0.5-1 mmol/kg	9-21 mmol/DAY
Sodium Chloride	0-1 mEq/kg	1-2 mEq/kg	2-3 mEq/kg	2-3 mEq/kg	50-90 mEq/DAY
NaAcet and/or KAcet (PRN – acid-base balance)	1-2 mEq/kg	1-2 mEq/kg	1-2 mEq/kg	1-2 mEq/kg	10-20 mEq/DAY
Potassium Chloride	1-2 mEq/kg	1-2 mEq/kg	1-2 mEq/kg	1-2 mEq/kg	40-60 mEq/DAY
Calcium Gluconate	1-2 mEq/kg	1-2 mEq/kg	0.5-1 mEq/kg	10 mEq/DAY	10-20 mEq/DAY
Magnesium Sulfate	0.3-0.5 mEq/kg	0.3-0.5 mEq/kg	0.3-0.5 mEq/kg	0.3-0.5 mEq/kg	10-20 mEq/DAY
Heparin	1 unit/mL	1 unit/mL	1 unit/mL	1 unit/mL	1 unit/mL
Multivitamin (MVI)[a]	<3 kg – 3.3 mL ≥3 kg – none	3.3 mL	Pediatric half dose	Adult half dose	Adult half dose
Trace Minerals (zinc, copper, selenium)	Standard auto selected	Standard auto selected	Standard auto selected	Standard auto selected	Standard auto selected
Other Additives as indicated (famotidine, vitamin K 1-2 mg/day)					
INTRALipid Fat Emulsion 20% (g/kg)[b]	2	2	1	1	0.5

[a] Initial MVI Dosing recommendations reflect current conservation guidelines for managing the intravenous MVI shortage and may not provide goal dose for weight/age. Dietitian to provide additional guidance as necessary.
[b] Verify no mitochondrial lipid metabolism disorder and screen for allergens (eggs, soy, peas and peanuts) prior to starting intravenous lipid emulsion.

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DOSING FOR INITIATION AND ADVANCEMENT OF PN MACRONUTRIENTS

	Macronutrient	Initiation	Daily Advance	Goal
<5 kg	Dextrose %	10-15% (GIR 5-8)	2.5-5% (GIR 1-3)	20-25% (GIR 10-14)
	Protein (g/kg)	2	1	3-4
	Lipids (g/kg)	2	1	3
5 to < 20 kg	Dextrose %	10-15% (GIR 3-6)	2.5-5% (GIR 1-2)	18-20% (GIR 8-10)
	Protein (g/kg)	1.5-2	1	2-3
	Lipids (g/kg)	1	1	2-3
20 to < 40 kg	Dextrose %	10-12.5% (GIR 2-4)	2.5-5% (GIR 1-2)	15-20% (GIR 5-6)
	Protein (g/kg)	1	1	1-2
	Lipids (g/kg)	1	0.5-1	1.5-2
≥ 40 kg	Dextrose %	10-12.5% (GIR 2-3)	2.5-5% (GIR 1-2)	15-20% (GIR 4-6)
	Protein (g/kg)	0.8-2	n/a	0.8-2 (Max 150 g/day)
	Lipids (g/kg)	0.5	0.5	0.5-1
Glucose Infusion Rate (GIR) (mg/kg/min) = [(Total Volume mL x Dextrose %) / dosing weight (kg)] / 1.44				

PN ELECTROLYTE DAILY DOSING REFERENCE RANGES

	< 5 kg	5 to < 20 kg	20 to < 40 kg	≥ 40 kg
Sodium	2-5 mEq/kg	2-6 mEq/kg	2-3 mEq/kg	80-150 mEq/DAY
Potassium	2-4 mEq/kg	2-3 mEq/kg	1.5-2.5 mEq/kg	40-60 mEq/DAY
Chloride	2-5 mEq/kg	2-5 mEq/kg	2-3 mEq/kg	80-150 mEq/DAY
Acetate	As needed to maintain acid-base balance			
Phosphorus[a]	1-2 mmol/kg	0.5-2 mmol/kg	0.5-2 mmol/kg	10-40 mmol/DAY
Calcium[a]	1-4 mEq/kg	0.5-2 mEq/kg	10-25 mEq/DAY	10-20 mEq/DAY
Magnesium	0.3-0.5 mEq/kg	0.3-0.5 mEq/kg	0.3-0.5 mEq/kg	10-30 mEq/DAY

[a] Adjust Calcium/Phosphorus provisions based on PN solubility curve.
Adjust daily electrolyte provisions PRN by 0.5-1 mEq/kg or 5-10 mEq/DAY based on resulted high or low lab values.
Patient dosing may fall outside these reference ranges; consider serum levels, urine output, and medications.

LABORATORY MONITORING

	Lab	Frequency
Initiation	TPN Panel[a] (BMP, Mg, Phos, Hepatic Function, Triglycerides, Pre-albumin)	In AM following initiation
Maintenance (once stable on PN)	TPN Panel[a]	Minimum weekly
	BMP, Mg, Phos	Daily until stable

[a] If Triglyceride level ≥ 200 mg/dL (infant) or ≥ 400 mg/dL (child/adolescent), reduce lipid dose by 50%. Recheck level in 24 hours.

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