



# Nutrition Support of a 30-week Preterm Infant with Severe Intrauterine Growth Restriction in the Neonatal Intensive Care Unit



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## Introduction

Intrauterine growth restriction (IUGR) is poor growth of a baby while developing in utero, with maternal, fetal, or placental etiology. Depending on when it occurs, a baby may be symmetrically small, or have a normal head with smaller body<sup>1</sup>.

### Short Term Increased risk of<sup>2</sup>:

- Stillbirth & perinatal mortality
- Hypoglycemia
- Respiratory distress syndrome
- Depleted fat/glycogen stores
- Infection/sepsis
- Necrotizing Enterocolitis (NEC)



### Long Term Increased risk of<sup>2</sup>:

- Type 2 diabetes
- Hypertension, cardiovascular disease
- Cognitive disabilities
- Behavioral issues
- Short stature

## Parenteral Nutrition in the NICU

PN usually initiated in preterm infants at birth to maximize caloric and protein intake because immature GI tract and critical illness often delays enteral or oral feedings<sup>5</sup>.

### Estimated Needs (parenteral, ELBW, preterm)

- 90-110 kcal/kg/day
- 3.5-4 g/kg/day protein
- 3 g/kg/day lipids
- Dextrose Infusion Rate (DIR) goal: 10-12 mg/kg/min

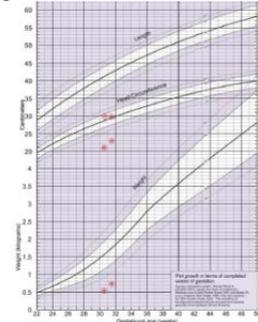
### Considerations

- Total fluids (including meds)
- Central vs Peripheral access
- Electrolyte trends
- Calcium and phosphorus solubility
- Trace element shortages (copper, molybdenum, chromium)

## Case Description & Anthropometrics

Patient was delivered early at 30 weeks 4 days gestational age through emergent C-section for breech position, fetal distress and severe IUGR to 37 yo Spanish-speaking mother with multiple complications including pregnancy induced hypertension. Upon birth, patient was intubated for respiratory distress and possible sepsis.

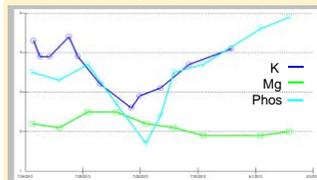
Birth: 30<sup>4</sup>  
 Weight: 0.541 kg • Symmetric IUGR  
 Length: 30 cm • Very preterm (<32 wks)  
 Head Circ: 21 cm • SGA (Wt <10<sup>th</sup> %ile)  
 • ELBW (<1000 g)



**PES statement:** Underweight r/t SGA/IUGR AEB birth weight <<3%ile

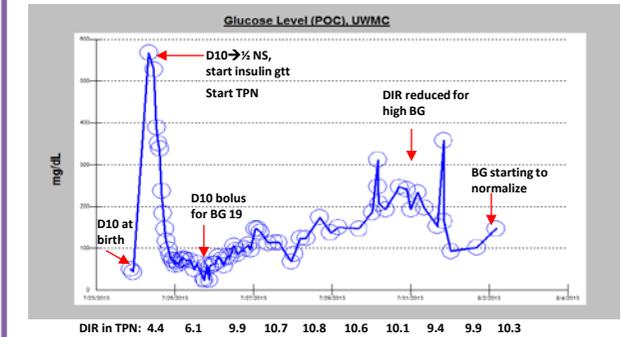
Day	Medical Issue	Nutrition Status and Intervention
0-1	Intubated, high BG	NPO, start TPN with low DIR
2-4	Edema, low BG	NPO, Increase dextrose load in TPN
5-6	Ascites, high Na	NPO, Increased fluids, at goal TPN, refeeding?
7-8	Color, belly worse	NPO, Restrict fluids, reduce dextrose in TPN
9-12	Belly stable, still intubated	Start trophic feeds of donor breast milk, continue TPN support
13-15	Low BP, dopamine, cholestasis	Back to NPO, Start carnitine, some trace minerals in TPN

## Refeeding Syndrome?



Placental insufficiency leads to a state of chronic malnourishment, some IUGR neonates may experience period of "refeeding" syndrome following initiation of nutrition support at birth. 2-3 days after initiation of parenteral dextrose infusion, labs showed hypophosphatemia and hypokalemia

## Hypoglycemia and Hyperglycemia



**Hypoglycemia** can result after birth due to:<sup>3</sup>

- Inadequate glycogen/fat stores
- Diminished liver gluconeogenesis
- Decreased counter-regulatory hormone response
- Hyperinsulinism/increased insulin sensitivity

**Hyperglycemia** is common in extremely low birth weight (ELBW)<sup>4</sup>

- Inappropriate insulin response in response to glucose infusion
- Sepsis/stress response
- Neonatal diabetes (rare)

## Discussion

The nutritional management of critically-ill preterm infants is complicated by frequent changes in fluid status, electrolyte and glycemic imbalances, delayed enteral feeding and the need for increased nutrients to fuel catch-up growth. The implications of IUGR requires additional considerations and daily monitoring and adjustment in parenteral nutrition is necessary.

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### References:

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