

TPN Case Study:

Sophia is a 10 month old female, with a history of hypoxic ischemic encephalopathy at birth who is GJ tube dependent, she was admitted to the hospital due to a bowel perforation from her J-tube. She was previously growing appropriately on GJ feeds of 20 cal/oz Enfamil NeuroPro Infant at 58 mL/hr x 18 hours, she will require 3-4 weeks of PN to allow healing of the perforation site after surgical repair prior to placing a new GJ and resuming enteral feeds.

- Height: 69 cm (10-25%tile, z-score -1.01)
- Weight: 8.6 kg (50-75th%ile, z-score 0.11)
- Weight for Length: 80%tile (z-score 0.84)
- IBW 8.0 kg (108% IBW)

Start by calculating calorie and fluid needs

Calorie Needs: Growing well on 696 kcal from EN (58 ml/hr x 18 hours = 1044 mL x 0.67 (20 cal/oz formula x 30 mL/oz) = 696 kcal). Reduce by 10% to get PN needs.

Calorie goal= _____

PN calorie needs are 696 kcal x 90% = **625 kcal**

Fluid needs = _____

Maintenance fluid need = 860 mL (100 mL/kg)

PN rate is $860 \div 24 =$ **36 mL/hr x 24 hours – lipid volume**

Calorie Distribution (30% from fat, 15% from protein, remaining amount from dextrose)

Fat (30%):

- 30% calories from fat (goal 25-40%) = 188 kcal from fat $\div$ 10 kcal/gram = 18.8 g lipid = **2.2 g/kg lipid**
- 2.2 g/kg lipid x 8.6 kg = 18.9 g lipid x 5 mL/gram = 95 mL lipid
- 95 mL lipid $\div$ 24 hours = **3.9 mL/hour x 24 hours of lipids**

Total fluids (36 mL/hr) – lipid rate (3.9 mL/hr) = 32 mL/hr x 24 hours (768 mL) left for PN volume

Which Lipid will you choose?

Intralipid (since you anticipate need for <1 month)

Protein (15%):

15% calories from Protein (goal 10-15%)= 94 calories from protein ÷ 4 kcal/gram = 23 grams protein = **2.7 grams/kg protein**

Dextrose:

- 625 kcal goal – 188 kcal from fat – 93 kcal from protein = 344 kcal needed from Dextrose
- 344 kcal ÷ 3.4 kcal/gram = 101 grams Dextrose
- 101 g Dextrose ÷ 768 mL PN = 0.13 x 100 = **13% Dextrose**

Calculate GIR:

GIR= 32 mL/hr x 24 hours x 0.13 (13%) Dextrose x 1000 ÷ 8.6 kg ÷ 1440 minutes (in 24 hours) = **8.1 mg/kg/min**

What is your TPN order?

Initial PN order

~ 34 mL/hr x 24 hours (816 mL) D10%, 1.5 g/kg AA

~ 1.0 g/kg Intralipid @ 1.8 mL/hr x 24 hours

- Should not start dextrose >10%, amino acids >2.0 g/kg or lipids >2.0 g/kg

Goal PN order

~ 32 mL/hr x 24 hours, D17%, 2.7 g/kg AA

~ 2.2 g/kg Lipids @ 3.9 mL/hr x 24 hours