NICU Basics – Fluids, Electrolytes and Nutrition

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Basic Principles

- Decide total fluid goal appropriate for age/ weight of patient
- Remember baby's electrolytes in first few hours reflect mother's (i.e. generally not useful to check before 12 hrs of life)
- Usually D5-10W + 250mg elemental Ca/500cc as initial fluid (i.e. no electrolytes)
- Alternatively, older babies should have electrolytes in their fluids (i.e. D10W not appropriate)

Initiating IVF

%D	<1000 D5-7.5	1000-1500g D7.5-10	1500-2500g D10	>2500g D10
Day 0 cc/kg/d	90-100	80-100	60-80	60-80
Day 1 cc/kg/d	100-120	110-130	90-110	80-100
Day 2 cc/kg/d	120-140	120-140	110-140	100-120

Assessing adequacy of TF

- Special considerations
  - Fluid restriction in CHF/ PDA, Cerebral edema/ SIADH/ meningitis, renal disease
  - Increased requirements in hyperbilirubinemia on phototherapy (usually extra 20cc/kg/d), respiratory distress/ tachypnea – i.e. increased insensible losses
- Signs of inadequate fluid balance
  - Rising BUN or Na
  - Tachycardia
  - Decreased UOP (less reliable in new preemies)

Adding Electrolytes

- Starting Na: usually 2-3 mEq/Kg/day and adjust accordingly
  - In ELBW- start when serum Na<135 – usually after 3-4 days of life. Follow istat Na q6 hrs initially to evaluate fluid status. Remember if it is low in the first 1-2 days, likely sign the baby has received too much TF rather than needing Na added. Similarly, if Na rising then baby needs more TF.
- Starting K: 1-2 meq/Kg/day usually on Day 1-2
- Phosphorus (and Acetate) can only be started once K/Na can be added for ion balance

Glucose Infusion Rate (GIR)

- GIR= $\frac{\%D \times rate}{wt \times 6}$
- Start at 4-6 mg/kg/min, advance by 2 every day to max 10-12 as needed for caloric goal
- Insulin may be needed.

Nutritional Goals

- Parentally= 100 kcal/kg/day
- Enterally = 120 kcal/kg/day
- May need more or less- adjust by weight gain/ growth

Protein

- Start goal protein on day 1 of TPN: 3-3.5 g/kg/day (2.2 -2.5g/kg/day in term)
- Once starting enteral feeds remember to decrease in TPN so total protein no more than 4g/kg/d
- Reduce protein in renal failure, elevated BUN

Intralipids

- start at 1-2g/kg/d advance by 0.5 to 1 each day to goal 3 g/kg/d
- Hold if TG >200, until TG <150
- Hold at times in suspected fungal sepsis
- If on hold for extended period of time, consider at least 1gm/kg/week to prevent essential fatty acid deficiency

Other TPN additives – should be reported on rounds if added

- Cysteine (in all CNMC TPNs)- to maximize Ca/ Phos delivery (remember ideal in preemie 1.5/6:1, term 1.3/1)
- Zantac 2mg/kg/day- hold in small preemies, thrombocytopenia. Consider if on steroids.
- Zinc/Chromium/Selenium- when trace elements on hold for cholestasis/ direct hyperbilirubinemia
- Acetate- for metabolic acidosis
- NH4Cl- for metabolic alkalosis
- L-carnitine- for proven/ suspected carnitine deficiency (babies with recurrent lipid intolerance)
- Albumin- not routinely used & no longer added to TPN (should be infused separately over 4 hrs if given)

Fluids and Electrolytes Enteral feeds

- Preemie formula – Premature Enfamil (PE24)/ Special Care (SC24) has increased caloric density (24 kcal/oz), but also more nutrients protein, Ca, Phos etc.
- Transitional formula – Enfacare/ Neosure 22 kcal/oz is discharge formula, still with more Ca and Phos (usually will stay on for first 6-12months of life)
- Fortifying BM- use human milk fortifier (HMF) ONLY in preemies. Once term, use Enfamil powder.

FEN – Monitoring

- Initially BMP, Mg, Phos q day
- Once stable TPN labs weekly to bi-weekly: BMP, Mg, Phos, LFTs, TG, (also with drug levels, CBC, retic)
- Plot growth parameters weekly