SUPPORTING PREMATURE INFANT NUTRITION WORKSHOP

Jae H Kim MD PhD
Lisa Stellwagen MD
Division of Neonatology
UC San Diego, Medical Center

Workshop: Planning the nutritional discharge
Jae H. Kim, MD, PhD
Neonatologist and Pediatric Gastroenterologist
University of California, San Diego

Transitioning from NICU to home

LEVEL OF CARE

- Level 3 Care: Neonatologist, RT, OT, RD, LC
- Level 2 Care: Neonatologist, RT, OT, RD, LC
- DISCHARGE
- Home: Pediatrician

Nutrition discharge of the preterm infant
Nutritional management
- Anthropomorphic growth
- Body composition
- Bone status
- Iron status
- Vitamin status
- Neurodevelopmental outcomes

MOISES: CREATE A NUTRITIONAL DISCHARGE

Elisa is almost ready to take Moises home. He was a 900 gm 27 weeker and is now 4 months old. He is breastfeeding 3-4 times each day and she has a great milk supply. She takes him to a community clinic and doesn’t know which doctor will see him. We fax him the DC summary (but no growth chart). His pediatrician feels fortification is not needed because the baby is BF well, and stops the vits and iron because the last Hgb was 10.5. He tells Elisa to bring Moises in for his 6 month check up and shots. At 5½ months he presents to the ER with refusal to use his right arm, and is found to have rickets and a fracture.

What happens with a poor discharge plan...

http://static.px.pn/write/a.jpg/S3ESC/t/w0qq8h?en=RO/1
What do you do?
- Do you have an organized discharge?
- Is discharge nutrition plan communicated to PCP?
- Do you send growth chart?
- Do parents (and PCP) understand need for fortification?
- Vit-Fe-supplements easy for parents and safe for baby?
- Do you have a post-discharge clinic for your NICU?

How can we improve discharge planning?
- Better preparation at discharge
- Help mother with breastfeeding plan/milk production at home
- Improve education/communication with PCP
- Send growth chart and nutrition plan to PCP
- Provide clear fortification recommendation
- Work out simple strategies to fortify human milk fed infants at discharge
- Improve follow up in the community

Postdischarge Nutrition
- Formula
  - Standard term formula (20 kcal/oz)
  - Increased calorie term formula (22-24 kcal/oz)
  - Postdischarge formula (22 kcal/oz)
- Human milk
  - Human milk alone
  - Fortified human milk with postdischarge powder
  - Supplemental bottles of postdischarge formula
  - Liquid fortifier

Postdischarge formulas
- Rationale
- Content
  - MORE
    - Energy (22 vs 20 kcal/oz)
    - Protein (1.9 vs 1.4 g/dL)
    - Ca, P, Fe
    - Zn
    - Trace
    - Vitamins

Postdischarge Formulas
- O’Connor, 2003 – PDF fed infants were heavier, longer and had larger head circumferences than HM fed infants
- DeCurtis, 2002 - no differences in weight, length, head circumference and weight gain composition
- Carver, 2001- infants fed PDF were heavier at 2 months corrected - greatest effect seen in males <1250 g birthweight- infants in PDF group consumed less formula

Postdischarge nutrient fortification of human milk for premature infants
- Toronto Sick Kids study of fortification for human milk
- 39 premature infants (<1800 gms) studied for 12 weeks after NICU discharge
- 50% given non-fortified breastmilk
- 50% given fortified breastmilk (with HMF) for half of each baby’s feedings
- At 12 weeks post discharge:
  - Fortified infants were longer than controls
  - Fortified infants born at < 1250 g had larger head circumference than controls
  - Mean protein, zinc, calcium, phos, Vits A&D intakes higher in fortified group

O’Connor DL et al. Pediatrics 2008;121:766-76
How do we assess anthropomorphic growth?
- Weight
  - scale
- Length
  - proper length boards
  - knemometer
- Head circumference
  - tape

How do we measure body composition?
- No BMI, suggestion of weight for length
- Skinfold thickness
  - no neonatal calipers, some normative data
- DEXA
  - limited availability, inconvenient, machine variability
- Air displacement plethysmography
  - expensive, accurate, easy to use, no standards less than 1500 grams

How do we assess bone mineral density?
- Biochemical markers
  - Ca, P, urinary phosphate, alkaline phosphatase correlate poorly with bone density
- Radiographs
  - reliable but not sensitive
- DEXA scan
  - limited availability, inconvenient, machine variability

How do we assess iron status?
- Hematocrit
  - 70% of iron stores are in red blood cells
- Ferritin
  - positive predictive value of low iron stores is good
  - may be normal or high due to being an acute phase reactant

How do we assess vitamin status?
- Vitamin D
  - Healthy bones
  - Immune system
  - Cancer risk
  - Cardiovascular risk
  - All cause death
- 25-OH vit D is the best test for assessing vitamin D status
  - Target range > 32 ug/L (80 nmol/L)
  - Important to identify an accurate lab as inaccuracies exist with different methods

Vitamin D

Implementation of standardized post-discharge nutrition

- Medical team makes discharge nutrition and feeding plan (MD, RN, LC, RD)
- Feeding team members attend discharge planning rounds
- Fortification method chosen
- Supplement until 12 months if BW <1250 gms
- Supplement until 6 months if BW 1250-1800 gms
- Provider education about premature nutritional needs
- Recommends viits/lab testing/growth targets/wt checks
- Referral to premature infant nutrition clinic if appropriate
- Discharge handouts about breastfeeding progression