Daily phosphate intake in preterm infants – reality versus ESPGHAN recommendations

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Introduction

- Babies born under 32 weeks gestation or weighing < 1500g are at higher risk of metabolic bone disease (MBD) of prematurity since maximal bone mineralisation occurs during third trimester in pregnancy
- ESPGHAN recommends daily intake of 120-140mg/kg (3-3.5mmol/kg) of calcium and 60-90mg/kg (1.2-2.9mmol/kg) of phosphate
- Our early feeding guideline with routine supplementation of prophylactic breast milk fortifier (BMF) for medium and high risk babies was introduced in 2015
- We aimed to review daily phosphate and calcium intake with this new guideline

Methods

- All neonates born in 2015 with birthweight < 1500g were reviewed using electronic medical records
- Data on total daily calcium and phosphate intake through parenteral nutrition, including BMF and additional NaH₂PO₄ supplementation was collected together with bone profile results
- Excluded: neonates who died, or were transferred elsewhere for on-going care within 7 days or while on parenteral nutrition

Results

- 90 infants reviewed
- Table 1 summarises the clinical and nutritional data

N=90	Median (IQ range)
Gestational age in weeks	27+5 (26+3-29+6)
Birthweight, grams	952.5 (800-1208.75)
Days of parenteral nutrition	7.5 (6-11.75)
Days of additional NaH ₂ PO ₄ supplementation	35 (23.5-56.25)
Lowest serum total calcium, mmol/L	1.92 (1.71-2.07)
Lowest serum phosphate, mmol/L	1.49 (1.24-1.79)
Highest alkaline phosphatase, mmol/L	489 (391.75-660.75)

Table 1. Clinical and nutritional data of the whole cohort of 90 neonates

- 100% received mother's breast milk, 78% received supplemental donor breast milk, and 47.8% received formula feeds
- 89% received parenteral nutrition and 88% received additional NaH₂PO₄
- MBD was diagnosed biochemically in 5% (ALP >900)
- Only 13% required NaH₂PO₄ at discharge and two (2%) required treatment with cholecalciferol

- Subset analysis of 19 infants with complete medical records up to 34 weeks post menstrual age showed median daily phosphate intake of 64.3mk/kg (Table 2)

N=19	Daily phosphate intake (average mg/kg/day)	Daily calcium intake (average mg/kg/day)
Parenteral nutrition	22.4	25.3
Expressed breastmilk	17.6	30.6
Nutriprem 1	38.5	51.6
Nutriprem 2	26.4	48.9
BMF	27.6	46.1

Table 2. Detailed analysis of daily calcium and phosphate intake in a subset of 19 neonates

Conclusions

- We had good compliance with local feeding guideline with lower incidence of MBD
- Detailed analysis of daily phosphate intake shows that it is only possible to achieve adequate intake through enteral route with additional NaH₂PO₄ supplementation
- Subsequently, new guideline on routine phosphate supplementation for high risk infants was introduced (Figure 1) for close monitoring for MBD and to consistently meet ESPGHAN recommendations

Management of Metabolic bone disease
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Figure 1. Prophylactic Phosphate Supplementation for at risk infants