

Main target of dietary management in CKD 1-3

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Rationale for dietary intervention at CKD 1-3

- Serum concentrations of PTH are increased early
- Serum phosphorus are within the normal range or mildly increased
- CKD Stages 2 and 3, hyperphosphatemia is rarely present and raised PTH can be attributed, in part, to the reduction in serum concentrations of 1,25(OH)₂D

Portale et al. Effect of dietary phosphorus on circulating concentrations of 1,25-dihydroxyvitamin D and immunoreactive parathyroid hormone in children with moderate renal insufficiency. (J Clin Invest 73:1580-1589,1984)

Continued

- 8 children with CKD stage 3 (GFR 45ml/min/1.73m²)
- 6-17 years
- 5-day restriction and supplementation of dietary phosphorus

When dietary PO₄ is restricted (0.35g/d), plasma concentration of 1,25-(OH)₂D increased by 60% to a mean value not different from that of normal controls

Serum concentrations of PTH decreased by 25%

Maintain normal electrolyte blood levels

PHOSPHATE

Phosphate restriction- may to be beneficial when $GFR < 75 \text{ ml/min/1.73m}^2$ (Stage 2-5)



- Guidelines for intake
 - <400mg/day in infants
 - <600mg/d <20kg
 - <800mg/d >20kg
 - <1000mg/d >40kg

Table 23. Recommended Maximum Oral and/or Enteral Phosphorus Intake for Children With CKD

Age	DRI (mg/d)	Recommended Phosphorus Intake (mg/d)	
		High PTH and Normal Phosphorus*	High PTH and High Phosphorus†
0-6 mo	100	≤100	≤80
7-12 mo	275	≤275	≤220
1-3 y	460	≤460	≤370
4-8 y	500	≤500	≤400
9-18 y	1,250	≤1,250	≤1,000

Growing skeletons

- Infancy is a period of rapid accretion of bone mineral
- Increased requirements of calcium and phosphorus
- Serum phosphorus intakes below the target range for age should be avoided

Calcium

Assess Calcium: intake from diet and PO4 binders

Aim to meet UK RNI:

- 0-1 Year: 525mg
- 1-3 years: 350mg
- 4-6 years: 450mg
- 7-10 years: 550mg
- Males: 11-18 years: 1000mg
- Females: 11-18 years: 800mg

KDOQI

- Intake 100% OF DRI
- Safe upper limit for older than 1 year: is 2,500mg

- Four patients with Stages 1 and 2 of CKD
- Conducted in a metabolic ward before and after 8 weeks of dietary phosphate restrictions
- Reduction in blood PTH levels to normal without significant changes in the serum levels of phosphorus,
- Significant increase in blood levels of 1,25(OH)₂D₃ and intestinal absorption of calcium
- Dietary phosphate restriction was associated with marked improvement in bone resorption

Phosphate restriction

not to be imposed without dietetic support

Clinical practice guidelines for nutrition in chronic renal failure. KDOQI, 2000

- In patients with CKD, compliance with dietary phosphate restriction is difficult and requires dietetic support (35-91%)
- Care must be taken to reduce phosphate intake while maintaining adequate protein and calcium intake (especially infants and teenagers)
- Ensure good intake of HBV protein that has relatively moderate PO₄