COLECALCIFEROL/CHOLECALCIFEROL (Vitamin D_3) 2016

Alert	1 microgram colecalciferol provides 40 IU of vitamin D activity.
Indication	Prevention and treatment of vitamin D deficiency Preterm infant is deficient in Vitamin D secondary to maternal Vitamin D deficiency, lower fat stores and prolonged hospitalisation that prevents cutaneous synthesis as a source of Vitamin D.
Action	Vitamin D enhances intestinal absorption of calcium and phosphorus. Adequate vitamin D status maintains plasma levels of calcium and phosphate that are necessary for normal bone mineralisation and neuromuscular function.
Drug Type	Fat soluble vitamin
Trade Name	Ostevit-D Liquid Oral drops; Ostelin Vitamin D Liquid Kids
Presentation	1000 units/0.2 mL (equivalent to 5000 units/mL) "OsteVit-D Liquid Oral drops" 200 units/0.5 mL (equivalent to 400 units/mL) "Ostelin Vitamin D Liquid Kids"
Dosage/Interval	Supplementation to meet daily requirements [1,10,11] Parenteral: 40–160 IU/day Enteral: 800–1000 IU/day (Consider vitamin D intake infant is already receiving from feeds and/or Penta-vite (400 IU per 0.45 mL) Treatment of vitamin D deficiency (Rickets) 1000 IU/day for 2–3 months (review with Ca/PO_4/ALP/25-OH Vitamin D monthly)
Route	PO
Maximum Daily Dose	1000 IU/day
Preparation/Dilution	
Administration	PO
Monitoring	25-hydroxy vitamin D, calcium and phosphate, parathyroid hormone, alkaline phosphatase
Contraindications	Hypercalcaemia, vitamin D toxicity
Precautions	Use with caution in renal impairment, renal calculi or elevated serum phosphate. Consider total daily vitamin D dose when concurrent use of Human Milk Fortifier, formula, Penta-vite or IV lipids. ESPGHAN guidelines recommend a total of 800 to 1000 units/day (not per kg).
Drug Interactions	
Adverse Reactions	Vomiting, paraesthesiae and hypercalcaemia Nephrocalcinosis (generally not seen until concentrations of 625–750 nmol/L are reached).
Compatibility	Not applicable.
Incompatibility	Not applicable.
Stability	
Storage	Store below 25°C. Protect from light. 1000u nits/0.2 mL strength: Stable until expiry date on bottle. 200 units/0.5 mL strength: Refrigerate after opening and discard 40 days after opening to reduce risk of microbial contamination. Write date of opening on packaging.
Special Comments	
Evidence summary	Recommended daily intakes European Society for Paediatric Gastroenterology Hepatology and Nutrition recommends 800–1000 IU per day.[1] However, uncertainty still exists regarding the need, dose and duration of vitamin D supplementation in preterm and low birth weight infants. Oral feeding at 160 to 180 mL/kg with human breast milk (2 IU/100 mL) provides vitamin D_3 at 3 to 4 IU/kg, human breast milk plus added breast milk fortifier (202 IU/100 mL) provides 323 to 364 IU/kg, preterm formula (120 IU/100 mL) provides vitamin D_3 at 192 to 216 IU/kg, nutrient-enriched post-discharge formula (68 IU/ 100 mL) provides vitamin D_3 at 109 to 122 IU/kg and standard infant formula (48 IU/100 mL) at 77 to 86 IU/kg.[4,5] Vitamin D deficiency Vitamin D deficiency has re-emerged as a significant problem because of improved survival rates of low birth weight and preterm infants and the increasing prevalence of vitamin D deficiency in

pregnant women.[1] Preterm infants are at increased risk of metabolic bone disease of prematurity. Preterm infants with lower 25-OH vitamin D are also at higher risk of acute respiratory morbidity and chronic lung disease.

There is no consensus with regards to concentration of 25-OHD to define vitamin D insufficiency in infants and children. Vitamin D deficiency is generally defined by clinical features (rickets, osteopenia or bone fractures), serum vitamin D concentrations (< 20 ng/mL or < 50 nmol/L) or a combination of both. A randomised, double-blind, controlled trial showed that at birth 67% of infants had 25-hydroxy vitamin D < 20 ng/mL suggesting biochemical vitamin D deficiency.[2]

High (> 900 IU/L) ALP activity combined with a phosphate < 1.8 mmol/L can indicate metabolic bone disease.[9]

Efficacy

In a randomised, double-blind, controlled trial, infants given 400 IU/day (200 IU/day supplement + 200 IU in parental and enteral nutrition) did not significantly increase their serum 25-OH vitamin D concentrations at Day 14 of age although most infants had adequate concentrations by 28 days. Use of 800–1000 IU/day, however, led to adequate concentrations at Day 14 but higher than desired at Day 28. There were no differences in days alive and off respiratory support or other respiratory outcomes among groups.[2] Another randomised, double-blind, controlled trial[3] also showed that 1000 IU/day of vitamin D had significantly higher mean vitamin D concentrations as compared with the arm that received 400 IU at term. (47.47 ± 14.42 vs 17.48 ± 9.27 ng/mL, p < 0.001). Comparison of mean vitamin D concentrations within each arm of the trial showed a drop from baseline to 6 weeks in those supplemented with 400 IU (24.76 ± 33.4 vs 17.48 ± 9.27, p = 0.15), but in the 1000 IU group it rose significantly (23.12 ± 15.24 vs 47.47 ± 14.42, p = 0.001).

In terms of treating moderate and severe vitamin D deficiency, it has been suggested to treat with Vitamin D_3 800—1000 IU/day for about 1–3 months with monitoring of biochemical indices (calcium/phosphate/alkaline phosphatase/25-OH vitamin D) monthly.[5,6,7]

High-dose, intermittent vitamin D therapy (50,000 IU/dose) has also been suggested in children to facilitate adherence, although there is insufficient evidence to support the use of high-dose therapy in infants younger than 3 months. It is also important to recognise that simultaneous calcium supplementation is necessary because of the risk of hypocalcaemia.[8]

Safety

Two randomised, controlled trials[2,3] that used up 1000 IU/day showed excess concentrations of vitamin D in the patients who received 1000 IU/day but no clinical evidence of toxicity was noted.

References

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