Vitamin A

Newborn use only

2022

Alert	Vitamin A is expressed as microgram retinol activity equivalents (RAE) or international units (IU) or units. **1 microgram RAE = 1 microgram retinol = 3.3 units of retinol. (1)** Penta-Vite Infant, a commonly used multi-vitamin supplement in Australia, contains 486.45 microgram RAE or 1600 units of retinol. Vitamin A for chronic lung disease is beyond the scope of this formulary.(Refer to evidence summary)
Indication	Prevention of vitamin A deficiency Cholestatic liver disease Cystic fibrosis
Action	Fat soluble vitamin required for vision, growth and bone development, immune function and maintenance of epithelial cells particularly in the retina and respiratory tract tissues.
Drug type	Fat soluble vitamin.
Trade name	Bio-Logical Vitamin A oral solution
Presentation	Bio-Logical Vitamin A oral solution (50 mL bottle): Contains Retinyl palmitate 1.37 mg per 0.1 mL (750 microgram RAE or 2500 units vitamin A/0.1 mL)
Dose	**Prophylaxis in preterm infants <1800 g birthweight:** Bio-Logical Vitamin A oral solution: 0.1 mL/kg/day (2500 units/kg/day) Range: 1320-3300 units/kg/day (400-1000 microgram/kg/day) **Supplementation for cholestatic liver disease*** Bio-Logical Vitamin A oral solution: 0.12 – 0.2 mL/day (3000 – 5000 units/day) (2) (ANMF consensus) **Supplementation for cystic fibrosis*** Bio-Logical Vitamin A oral solution: 0.06 mL/day (1500 units/day) (8-11) *Penta-Vite 0.45 mL twice daily provides 3200 units/day.
Dose adjustment	Therapeutic hypothermia – No information. ECMO – Not applicable. Renal impairment - No information. Hepatic impairment – No information.
Maximum dose	
Total cumulative dose	
Route	Oral
Preparation	No preparation is required.
Administration	Oral: Administer undiluted with a feed.
Monitoring	An 'adequate' concentration of plasma vitamin A in VLBW infants is not known. Concentrations below 0.70 µmol/L have been considered deficient in premature infants, and concentrations below 0.35 µmol/L indicate severe deficiency and depleted liver stores. (4)
Contraindications	Hypersensitivity to vitamin A or any component of the formulation, hypervitaminosis A.
Precautions	
Drug interactions	May increase effects of anticoagulant and antiplatelet agents.
Adverse reactions	Hypervitaminosis A: Irritability, lethargy, vomiting, bulging fontanelle.
Compatibility	Not applicable
Incompatibility	Not applicable
Stability	
Storage	Protect from light.
Excipients	Bio-Logical Vitamin A oral solution contains sodium benzoate. Avoid exposure of >99mg/kg/day in neonates.
Special comments	

Evidence	**Efficacy** **Preterm infants <1800 g** Recommended enteral intake in preterm infants <1800 g birthweight (ESPGHAN 2010): 400-1000 microgram/kg/day (1320-3300 units/kg/day) (4). Recommended parenteral intake (ESPGHAN 2018): Preterm neonates – 227-455 microgram/kg/day (700-1500 units/kg/day); Term neonates – 150-300 micrograms/kg/day (495-990 units/kg/day). Alternatively 2300 units (697 micrograms)/day.(5) **Chronic liver disease** Supplementation with 5000–10,000 IU/day may be needed in children with chronic liver disease.(2) The dose in neonates is unclear. It is important to monitor levels in children receiving supplementation, as hypervitaminosis A can lead to potentially fatal hepatotoxicity.(2) **Prevention of chronic lung disease and neurodevelopmental impairment**: Cochrane review by Darlow et al 2016 (3) evaluated vitamin A supplementation on the incidence of death or chronic lung disease and long-term neurodevelopmental disability in very low birth weight (VLBW) infants compared with a control (placebo or no supplementation). Eleven randomized clinical trials with over 1500 VLBW infants, defined as birth weight ≤ 1500 grams or less than 32 weeks' gestation, were analysed. All except one RCT in this review used **intramuscular** vitamin A as intervention. Doses varied among the studies. One of the dosing regimens used in RCT by Tyson et al was IM vitamin A 5,000 units/dose 3 times weekly initiated within the first 96 hours of life and continued for 4 weeks. (3,7) Meta-analysis (3) found that vitamin A was associated with a small benefit in reducing death or oxygen use at one month of age and a marginal reduction in oxygen use at 36 weeks' postmenstrual age. However, neurodevelopmental assessment in the largest trial showed no difference at 18 to 22 months corrected age. No adverse effects of vitamin A supplementation were reported, but it was noted that intramuscular injections of vitamin A were painful. ANMF consensus: Clinicians need to balance the clinical benefits against painful intramuscular injections and the decision may depend upon the local incidence of the outcomes. It is not a standard practice in Australia to administer intramuscular vitamin A for prevention of chronic lung disease. **Supplementation in cystic fibrosis** The US Cystic Fibrosis Foundation (CFF) recommends daily supplementation of 1500 IU of vitamin A, 400–500 IU of vitamin D, and 40–50 IU of vitamin E for infants with CF. These dosages increase to 5000 IU of vitamin A, 800–1000 IU of vitamin D, and 80–150 IU of vitamin E for children 1–10 years of age. (8-10) A multicenter prospective longitudinal study known as FIRST determined the prevalence of suboptimal vitamins A, D, and E status in infants supplemented with CF foundation recommended vitamin dosages. The study found normalisation of serum retinol and α-tocopherol in almost all infants by age 3 years.(11)
Practice points	Recommendations for daily supplementation of vitamin A: Recommended enteral intake in preterm infants <1800 g birthweight (ESPGHAN 2010): 400-1000 microgram/kg/day (1320-3300 units/kg/day)(4) Recommended parenteral intake (ESPGHAN 2018): Preterm neonates – 227-455 microgram/kg/day (700-1500 units/kg/day); Term neonates – 150-300 micrograms/kg/day (495-990 units/kg/day). Alternatively 2300 units (697 micrograms)/day.(5) Preterm human milk contains 50-400 units of vitamin A/dL. Term human milk contains 60-200 units/dL.(6) Evaluate vitamin A intake from other sources prior to prescribing e.g. feeds and other concomitant medications or supplements.
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