



Topic Expert Group: Medical care and clinical practice

Prevention of vitamin K deficiency bleeding (VKDB) at birth

Koletzko B, Buonocore G, Zimmermann L, Hellström-Westas L, Fewtrell M, Perrone S, Verkade H

Target group

Newborn infants and parents

User group

Healthcare professionals, neonatal units, hospitals, and health services

Statement of standard

Prophylactic supplementation with vitamin K for all infants is given to prevent vitamin K deficiency bleeding (VKDB).

Rationale

Vitamin K deficiency bleeding (VKDB) in infants is prevented by vitamin K supplementation. Healthy newborn infants have low hepatic stores of vitamin K (1) and are at risk of developing serious bleeding, including intracranial hemorrhage, due to low hepatic synthesis of vitamin K–dependent clotting factors. (2,3) Preterm infants appear to be at even higher risk. (4) Postnatal supplementation of vitamin K can markedly reduce the incidence of VKDB, associated morbidity, including devastating brain injury, neurodevelopmental impairment and mortality. (5–7)

Healthy infants should either receive 1 mg of vitamin K intramuscular at birth, or three doses of 2 mg vitamin K orally at birth, at four to six days and at four to six weeks; or 2 mg vitamin K orally at birth followed by weekly doses of 1 mg orally for three months for breastfed infants. (3) Intramuscular application has the best preventive efficiency. (3) The administration of low daily oral doses (e.g. 25-150 µg/d) is less effective than either of the earlier mentioned alternatives and is thus not recommended. (8) Vitamin K should be administered parenterally to newborn infants who are unwell, those who have cholestasis or impaired intestinal absorption, or who are unable to take oral vitamin K, those whose mothers have taken medications that interfere with vitamin K metabolism, and to preterm infants. (9)

Preterm infants may require reduced doses of vitamin K prophylaxis such as 0.5 mg intramuscular for infants >1000 g or 0.2 mg intramuscular/intravenous for infants <1000 g. (8) Vitamin K supplementation protocols should be developed and implemented in all obstetric and neonatal units. (3,10)

Benefits

Short-term benefits

- Reduced risk of Vitamin K deficiency bleeding and related infant mortality and morbidity (11–13)

Long-term benefits

- Reduced long-term damage and neurodevelopmental handicap (12)
- Reduced healthcare costs arising from chronic morbidity (consensus)



Components of the standard

Component	Grading of evidence	Indicator of meeting the standard
For parents and family		
1. Parents are informed before and after birth by healthcare professionals about the importance of vitamin K supplementation and its benefits. (10)	A (High quality) B (High quality)	Patient information sheet
For healthcare professionals		
2. A unit guideline on Vitamin K supplementation in all infants is adhered to by all healthcare professionals. (3)	A (High quality) B (High quality)	Guideline
3. Training on prevention of vitamin K deficiency bleeding (VKDB) is attended by all healthcare professionals.	A (Low quality) B (High quality)	Training documentation
4. Parental refusal of vitamin K prophylaxis is clearly documented.	B (High quality)	Clinical records
For neonatal unit		
5. A unit guideline on vitamin K supplementation in all infants is available and regularly updated. (3)	A (High quality) B (High quality)	Guideline
6. Administration of vitamin K supplementation is monitored.	A (Low quality) B (High quality)	Audit report
For hospital		
7. Training on prevention of VKDB is ensured.	A (Low quality) B (High quality)	Training documentation
For health service		
8. A national guideline on vitamin K supplementation in all infants is available and regularly updated. (3)	A (High quality) B (High quality)	Guideline
9. Rate of vitamin K deficiency related haemorrhage in infants is monitored.	A (Low quality)	Audit report



Where to go – further development of care

Further development	Grading of evidence
For parents and family N/A	
For healthcare professionals N/A	
For neonatal unit N/A	
For hospital	
<ul style="list-style-type: none">Participate in and implement communication strategies to promote acceptance of universal vitamin K supplementation.	A (Low quality)
For health service	
<ul style="list-style-type: none">Develop and implement communication strategies to promote acceptance of universal vitamin K supplementation.Monitor the proportion of infants who receive vitamin K supplementation according to established standards across the population.	A (Low quality) B (High quality)

Getting started

Initial steps
For parents and family
<ul style="list-style-type: none">Parents are verbally informed by healthcare professionals before and after birth about the importance of vitamin K supplementation and its benefits.
For healthcare professionals
<ul style="list-style-type: none">Attend training on prevention of vitamin K deficiency bleeding (VKDB).
For neonatal unit
<ul style="list-style-type: none">Develop a unit guideline on vitamin K supplementation in all infants.Develop information material on the importance of vitamin K supplementation and its benefits for parents.
For hospital
<ul style="list-style-type: none">Support healthcare professionals to participate in training on prevention of VKDB.
For health service
<ul style="list-style-type: none">Develop and implement a national guideline for vitamin K supplementation in all infants.Raise awareness of the importance of vitamin k supplementation to effectively address common concerns and disinformation.



Source

1. Shearer MJ. Vitamin K metabolism and nutriture. *Blood Rev.* 1992 Jun 1;6(2):92–104.
2. Shirahata A, Nakamura T, Ariyoshi N. Vitamin K1 and K2 Contents in Blood, Stool, and Liver Tissues of Neonates and Young Infants. In: *Perinatal Thrombosis and Hemostasis* [Internet]. Springer, Tokyo; 1991 [cited 2017 Nov 22]. p. 213–23. Available from: https://link.springer.com/chapter/10.1007/978-4-431-65871-9_24
3. Mihatsch WA, Braegger C, Bronsky J, Campoy C, Domellöf M, Fewtrell M, et al. Prevention of Vitamin K Deficiency Bleeding in Newborn Infants: A Position Paper by the ESPGHAN Committee on Nutrition. *J Pediatr Gastroenterol Nutr.* 2016 Jul;63(1):123–129.
4. Clarke P. Vitamin K prophylaxis for preterm infants. *Early Hum Dev.* 2010 Jul;86 Suppl 1:17–20.
5. Lane PA, Hathaway WE. Vitamin K in infancy. *J Pediatr.* 1985 Mar 1;106(3):351–9.
6. Sutor AH, Von Kries R, Cornelissen EM, McNinch AW, Andrew M. Vitamin K deficiency bleeding (VKDB) in infancy. *Thromb Haemost-Stuttg.* 1999;81:456–461.
7. Shearer MJ. Vitamin K deficiency bleeding (VKDB) in early infancy. *Blood Rev.* 2009 Mar 1;23(2):49–59.
8. Witt M, Kvist N, Jørgensen MH, Hulscher JBF, Verkade HJ, also, et al. Prophylactic Dosing of Vitamin K to Prevent Bleeding. *Pediatrics.* 2016 May 1;137(5):e20154222.
9. Clarke P, Mitchell SJ, Shearer MJ. Total and Differential Phylloquinone (Vitamin K1) Intakes of Preterm Infants from All Sources during the Neonatal Period. *Nutrients.* 2015 Sep 25;7(10):8308–20.
10. Hamrick HJ, Gable EK, Freeman EH, Dunn LL, Zimmerman SP, Rusin MM, et al. Reasons for Refusal of Newborn Vitamin K Prophylaxis: Implications for Management and Education. *Hosp Pediatr.* 2016 Jan;6(1):15–21.
11. Unal E, Ozsoylu S, Bayram A, Ozdemir MA, Yilmaz E, Canpolat M, et al. Intracranial hemorrhage in infants as a serious, and preventable consequence of late form of vitamin K deficiency: a selfie picture of Turkey, strategies for tomorrow. *Childs Nerv Syst.* 2014 Aug 1;30(8):1375–82.
12. Cekinmez M, Cemil T, Cekinmez EK, Altinörs N. Intracranial hemorrhages due to late-type vitamin K deficiency bleeding. *Childs Nerv Syst ChNS Off J Int Soc Pediatr Neurosurg.* 2008 Jul;24(7):821–5.
13. Koletzko B, Uauy R. *Nutritional Care of Preterm Infants.* Freiburg im Breisgau: Karger, S; 2014.

First edition, November 2018

Lifecycle

5 years/next revision: 2023

Recommended citation

EFCNI, Koletzko B, Buonocore G et al., European Standards of Care for Newborn Health: Prevention of vitamin K deficiency bleeding (VKDB) at birth. 2018.