

Vitamin K and the Newborn

What is Vitamin K?

Vitamin K is a fat-soluble vitamin that is essential to help blood clot. There are 2 types: **phylloquinone** (Vit K₁) is acquired through diet, particularly leafy green vegetables and; **menaquinone**, (Vit K₂) which is synthesized by bacteria in the human intestinal tract. It is necessary for the formation of blood clotting factors.

Why do we give newborns Vitamin K?

Normal newborn babies in their first few days of life have lower levels of Vitamin K – the reason for this is currently not well understood. If any bleeding occurs, a newborn's blood will take longer to clot than an adult's. The concern with this is that some babies will encounter a temporary abnormality of the blood coagulation system called vitamin K-deficiency bleeding (VKDB).

Do all babies need Vitamin K?

The Canadian Pediatric Society recommends that all newborns receive an injection of Vitamin K in the first 6 hours of life. Vitamin K administration has reduced the incidence of VKDB to approximately 1 in 1 million.

There are some conditions where babies are at higher risk for VKDB and have a greater need for Vitamin K. These are related to: preterm delivery, low birth weight, forceps or vacuum delivery, caesarean section, undetected liver disease, extremely fast or prolonged birth, mother's use of certain medications.

What is VKBD?

VKDB is characterized by generalized ecchymoses (bruising), cephalohematoma, and spontaneous bleeding from the umbilicus or nose, needle prick sites or following circumcision. Sometimes the bleeding is internal, e.g. intracranial, intra-thoracic, abdominal and gastrointestinal bleeding, or the urogenital tract. This is of special concern as symptoms of internal bleeding may not always be evident until major damage has occurred.

Early VKDB typically occurs within 24 hours of birth and is associated with premature birth, birth injuries from a complicated birth or maternal use of medications (e.g. anticonvulsants, oral anticoagulants, cephalosporins and tuberculostatics). It occurs almost exclusively in breastfed babies. Breast milk contains only small amounts of vitamin K (1 – 9 mcg/L); whereas Vitamin K is added to formula (53-66 mcg/L).

Classic VKDB occurs between 24 hours and 7 days of age and is associated with late onset of feeding, inadequate milk intake and marginal Vitamin K content in breast milk. The clinical presentation is often mild, with bruises, gastrointestinal blood loss or bleeding from the umbilicus and puncture sites.

Late VKDB occurs between 2 and 12 weeks of age and is associated with exclusive breast-feeding. The clinical presentation is severe, with a mortality rate of 20% and intracranial haemorrhage occurring in 50% of cases

Supplementing the baby with Vitamin K has lowered the incidence in all aspects of this disease. As well, early and frequent breastfeeding is supported by the fact that colostrum has more Vitamin K than breast milk.

How is Vitamin K given?

Vitamin K (0.1 ml) is usually given to newborns via a single intramuscular injection into the thigh muscle using a very tiny needle. Many studies have concluded that the IM administration is the most effective method of lowering the incidence of all types of VKDB. Some studies have raised concerns regarding long term side effects but there is no definitive evidence to support this concern and the benefits outweigh any possible risks. If performed improperly, intramuscular vitamin K injections can carry a risk for damage to muscles, blood vessels, nerves and the femur, however this would be extremely rare. Intramuscular injection can be a painful experience for the infant, but for most babies it is of momentary discomfort. We usually wait until after the baby has had breastfeeding and cuddling time. Babies can be held skin to skin by a parent when the injection is given, as skin to skin contact has a known analgesic effect.

Can Vitamin K be given orally?

Vitamin K can be given orally in multiple doses over several weeks. This method does not have definitive research findings and it is generally accepted that further study is necessary before oral administration can be confirmed to offer the same protection as the IM route. However, current evidence suggests that oral Vitamin K does provide protection against classic VKDB, 2-7 days, but does not fully protect against late onset VKDB.

The concerns with oral Vitamin K are that; it is not as well absorbed as IM vitamin K and multiple doses are needed; the quality control in the PO products is unknown as there is no standard oral preparation; and there may be variable absorption as babies often spit up after oral liquids and thus may not receive the full benefit. Vitamin K is a very fatty substance so most PO Vitamin K preparations are in an oil base to enable emulsification and ingestion, however, some babies may react to certain oils. There is also a concern that follow-up doses may be missed.

There is no consensus as to the best oral dose. The oral dose regimes suggested are:

1. 2 - 4 mg Vit K PO following first feed then 2 mg at 2-4 weeks and again at 6-8 weeks. (3 doses)
2. 2 - 4 mg Vit K PO following first feed then 2 mg within first week, then 2 mg weekly while breastfeeding. (multiple doses)
3. 2 mg after first feeding, the 2 mg within first week, followed by 25 mcg daily for 13 weeks. (multiple doses)
4. 2 mg after 1st feeding, followed by 1mg weekly, OR 25 mcg daily, while breastfeeding.

Parents should be advised of the importance of the baby receiving follow-up doses and be cautioned that their infants remain at an increased risk of late VKDB (including the potential for intracranial haemorrhage) using this regimen. Parents should note that babies who are not well enough to feed soon after birth, should receive IM prophylaxis. IM Vitamin K should also be considered in any baby with failure to thrive.

References

1. Routine administration of Vitamin K to newborns.

A joint position statement with the College of Family Physicians of Canada
Principal Author D McMillian; Canadian Paediatric Society, [Fetus and Newborn Committee](#) Paediatr Child Health 1997;2 (6):429-31 Reaffirmed February 1 , 2014
Click on Fetus and Newborn Committee for the link

*Many of the studies of Vitamin K prophylaxis in newborns are over 10 years old, and the current dose of Vitamin K is now different than those referenced. This summary above is one of the best in reporting a balanced, scientific view of Vitamin K administration to newborns.

2. Vitamin K in neonates: facts and myths

Guiseppe Lippi and Massimo Franchini; Blood Transfus. Jan 2011; 9(1): 4–9.
The link below will take you to the article:
[Vitamin K in neonates: facts and myths - PubMed Central ...](#)

3. Separating Fact From Fiction in the Not-So-Normal Newborn Nursery: Vitamin K Shots.....

<http://www.sciencebasedmedicine.org>

4. Revisiting vitamin K - What have we learned in a decade?

Sara Wickham Essentially MIDIRS: July/August 2013 Vol 4 /7
The link below will take you to the article: Copy and paste in your browser
<http://www.maternity.org.nz/wp-content/uploads/2014/03/Revisiting-Vitamin-K-and-the-newborn.pdf>