

Vitamin K at Birth To Inject or Not

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Newborn infants routinely receive a vitamin K injection after birth in order to prevent (or slow) a rare problem of bleeding into the brain weeks after birth. Vitamin K promotes blood clotting. The fetus has low levels of vitamin K as well as other factors needed in clotting. The body maintains these levels very precisely.^{^1} Supplementation of vitamin K to the pregnant mother does not change the K status of the fetus, confirming the importance of its specific levels.

Toward the end of gestation (in the final weeks or days), the fetus begins developing some of the other clotting factors, developing two key factors just before term birth.^{^2} It has recently been shown that Vitamin K is involved in regulating the rate of cell division in the fetus. It's possible that abnormally high levels of vitamin K can allow cell division to get out of hand, leading to cancer.

What's the Concern?

The problem of bleeding into the brain occurs mainly from 3 to 7 weeks after birth in just over 5 out of 100,000 births (without vitamin K injections); 90% of those cases are breastfed infants, 3 because formulas are supplemented with unnaturally high levels of vitamin K. Forty percent of these infants suffer permanent brain damage or death.

The cause of this bleeding trauma is generally liver disease that has not been detected until the bleeding occurs. Several liver problems can reduce the liver's ability to make blood-clotting factors out of vitamin K; therefore extra K helps this situation. Infants exposed to drugs or alcohol through any means, are especially at risk, and those from mothers on anti-epileptic medications are at very high risk and need special attention.

Such complications reduce the effectiveness of vitamin K, and in these cases, a higher level of available K could prevent the tragic intracranial bleeding. This rare bleeding disorder has

been found to be highly preventable by a large-dose injection of vitamin K at birth.

The downside of this practice however is a possibly 80% increased risk of developing childhood leukaemia. While a few studies have refuted this suggestion, several tightly controlled studies have shown this correlation to be most likely, a more recent analysis of six different studies suggests it may be a 10 or 20% increased risk. This is still a significant number of avoidable cancers.

Apparently the cell division that continues to be quite rapid after birth continues to depend on precise amounts of vitamin K to proceed at the proper rate. Introduction of levels that are 20,000 times the newborn level, the amount usually injected, can have devastating consequences.

The Newborn's Diet

Breastfeeding raises the infant's vitamin K levels very gradually after birth so that no deregulation occurs that would encourage leukaemia development. Additionally, the clotting system of the healthy newborn is well planned, and healthy breastfed infants do not suffer bleeding complications, even without any additional supplementation.

While breastfed infants demonstrate lower blood levels of vitamin K than the "recommended" amount, they show no signs of vitamin K deficiency (leading one to wonder where the "recommended" level for infants came from). But with vitamin K injections at birth, harmful consequences of some rare disorders can be averted.

Infant formulas are supplemented with high levels of vitamin K, generally sufficient to prevent intracranial bleeding in the case of a liver disorder and in some other rare bleeding disorders. Although formula feeding is seen to increase overall childhood cancer rates by 80%, this is likely not related to the added vitamin K.

The Numbers

Extracting data from available literature reveals that there are 1.5 extra cases of leukaemia per 100,000 children due to vitamin K injections, and 1.8 more permanent injuries or deaths per 100,000 due to brain bleeding without injections. Adding the risk of infection or damage from the injections, including a local skin disease called "scleroderma" that is seen rarely with K injections, and even adding the possibility of healthy survival from leukaemia, the scales remain tipped toward breastfed infants receiving a prophylactic vitamin K supplementation. However, there are better options than the .5 or 1 milligram injections

typically given to newborns.

So what is a better solution?

The breastfed infant can be supplemented with several low oral doses of liquid vitamin K⁹ (possibly 200 micrograms per week for 5 weeks, totalling 1 milligram, even more gradual introduction may be better). Alternatively, the nursing mother can take vitamin K supplements daily or twice weekly for 10 weeks. (Supplementation of the pregnant mother does not alter fetal levels but supplementation of the nursing mother does increase breastmilk and infant levels.)

Either of these provides a much safer rate of vitamin K supplementation. Maternal supplementation of 2.5 mg per day, recommended by one author, provides a higher level of vitamin K through breastmilk than does formula,¹⁰ and may be much more than necessary.

Formula provides 10 times the recommended daily allowance," and this recommended daily allowance, is about 2 times the level in unsupplemented human milk. One milligram per day for 10 weeks for mother provides a cumulative extra 1 milligram to her infant over the important period and seems reasonable. Neither mother nor infant require supplementation if the infant is injected at birth.

The Bottom Line

There is no overwhelming reason to discontinue this routine prophylactic injection for breastfed infants. Providing information about alternatives to allow informed parents to refuse would be reasonable. These parents may then decide to provide some gradual supplementation, or, for an entirely healthy term infant, they may simply provide diligent watchfulness for any signs of jaundice (yellowing of eyes or skin) or easy bleeding.

There appears to be no harm in supplementing this vitamin in a gradual manner however. Currently, injections are provided to infants intended for formula feeding as well. Discontinuing routine injections for this group (formula fed babies) alone could reduce cases of leukaemia.

One more curious look at childhood leukaemia is the finding that when any nation has lower rates of infant deaths, their rate of childhood leukaemia increases. Vitamin K injections may be responsible for some part of this number, but other factors are surely involved, about which we can only speculate.

Notes

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