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The effectiveness of vitamin k in decreasing risk of bleeding in breast fed infants

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Abstract
Vitamin-K is one of fat-soluble Vitamin that synthesis in the intestine by intestinal bacteria. The plant Form of Vitamin-K is phylloquinone or vit-k_1 another Form is menaquinone or vit-k_2, one of a series of compounds with unsaturated side chains synthesized by intestinal bacteria. Of Vit-K can results in deficiency and Vit-K is necessary for clinically significant bleeding. To evaluate the role of using Vit-K T-M injection or orally in reducing episode of bleeding in breast Fed infants.

Keywords: Vitamin, phylloquinone, synthesized, bacteria, injection

Introduction
Vitamin-K is one of fat-soluble Vitamin that synthesis in the intestine by intestinal bacteria. The plant Form of Vitamin-K is phylloquinone or vit-k_1 another Form is menaquinone or vit-k_2, one of a series of compounds with unsaturated side chains synthesized by intestinal bacteria. of Vit-K can results in deficiency and Vit-K is necessary for clinically significant bleeding. Vit-K deficiency typically affects infants who experience atrasient deficiency related to inadequate intake, or patient of any age who have decreased Vit-K absorption. Mild Vit-K deficiency can affect long term bone and vascular health.

Aim of study
To evaluate the role of using Vit-K T-M injection or orally in reducing episode of bleeding in breast Fed infants.

Pathogenesis
Vit-K is group of compounds that have common naphthoquinone ring structure. Phylloquinone called Vit-K, is present in variety of dietary sources, with green leafy vegetables, liver, certain legumes and plants oils having the highest content. Vit-K_2 is group of compound called menaquinon which produced by intestinal bacteria. Because Vit-K is Fat soluble, Vit-K requires the presence of bile salts for its absorption. There are 3 forms of Vit-K deficiency bleeding (VKDB) of the newborn. Early VKDB was formerly called classic hemorrhagic disease of newborn and occurs at 1-14 days of age. Early VKDB is secondary to low stores of Vit-K at birth days, poor transfer of Vit-K across the placenta and inadequate intake during the 1st few days of life. In addition there's no synthesis of intestinal Vit-K because the newborn gut is sterile. This type occurs mostly in breast fed infants due to low Vit-K content in breast milk. Late VKDB most commonly occur at 2-12 weeks of age, but the cases can occur up to 6 months after birth. All cases are in breast fed infants due to low Vit-K content in breast milk. Other factors are occult malabsorption of Vit-K cystic Fibrosis, Cholestasis, Liver disease, biliary atresia. Without Vit-K prophylaxis the incidence is (4 - 10 / 100, 000) newborn. 3rd forms occur at birth or shortly thereafter. It is secondary to maternal intake of medication (warfarin, phenobarbital, and phenytoin) that cross the placenta.

Clinical Manifestation
In early VKDB the most common site of bleeding are the gastrointestinal tract, mucosa, cutaneous tissue, the umbilical stump, post-circumcision. Intracranial bleeding is less common. The most common site of bleeding in late VLDB is intracranial, although cutaneous and GI bleeding may be the initial manifestation. Intracranial bleeding can cause convulsion, permanent neurologic squeal or death, or jaundice or failure to thrive. Older children with Vit-K deficiency can present with bruising, mucocutanious bleeding.

Laboratory findings
Patients with Vit-K deficiency presented with prolonged prothrombin time (P.T), but put in your mind that the prolonged (P.T) may be normaly finding in newborn, partial thromboplastin time (P.T.T) is usually prolonged. Factor has the shortest half-life of coagulation factors and is the first to be affected. Platelet count and fibrinogen level are normal. In mild Vit-K deficiency there is elevated of under carboxylate forms of the proteins. Determination of Vit-K level is less useful because it affected by recent dietary intake.

Diagnosis and differential diagnosis
The diagnosis is established by the presence of prolonged P.T that correct rapidly after administration of Vit-K, which stops the active bleeding. Other causes of prolonged P.T include:

1. Disseminated intravascular coagulation (DIC).
2. Liver failure.
3. Rare hereditary deficiency of clotting factors.

DIC is secondary to sepsis, it is associated with thrombocytopenia, low Fibrinogen, elevated D-Dimers. Coumarin derivatives inhibit the reaction of Vit-K by preventing its recycling to an active form after it functions as a factor for ϒ-glutamyl. Bleeding can occur with overdose of the commonly used anticoagulant warfarin or with ingestion of rodent poison, which contain Coumarin derivative. High dose of salicylate also inhibit Vit-K regeneration, potentially leading to prolonged P-T and clinical bleeding.

Treatment

Infant with Vit-K dependent bleeding should receive (1 mg) of parenteral Vit-K. The P-T should decrease within (6 hr.) and normalize within (24 hr.).For rapid correction in adolescents, the parenteral dose (2.5 – 10 mg).

In addition to vitamin K, patient with severs life threatening bleeding should receive an infusion of fresh frozen plasma. Patient with malabsorption required chronic administration of high doses of oral Vit-K (2.5 mg twice / wk. to 5 mg / day

Material and methods

This is prospective study carried out in tow pediatrics private clinics, in Baghdad by (Dr. Ali Alwan Kuraibut and Dr. Senan Eraby Al-hamadani) Pediatricions in Al-Yarmouk Teaching Hospital.

The study done from January 2017 to January 2018 to evaluate the effectiveness of Vit-K in controlling the bleeding episodes in newborn. In this study 450 newborns was followed for development of any type of bleeding. The 450 newborns divided into 3 groups:

1. Group A. 150 newborns who received Vit-K prophylaxis during first 3
2. Days of life. This group subdivided to 100 newborns as full term and 50
3. Newborns as preterm baby.
4. Group B. 150 newborns without receiving Vit-K prophylaxis during first 3
5. Days of life. This group subdivided to 100 newborns as full term and 50
6. Newborns as preterm baby.
7. 3- Group C. who who are not received Vit-K prophylaxis during first 3 days of life. This group subdivided to 100 newborns as full term and 50

Newborns as preterm baby.
Group A are pure breast fed baby.
Group B are pure breast fed baby.
Group C are bottle fed baby.

The questionnaire formula including maternal receiving of anticonvulsants therapy or not, salicylate, anticoagulants like warfarin, or ingestion of rodent poison, family history of coagulopathy, site of bleeding, time of bleeding episods.

Results

We divide the 450 newborns according to the age into 3 groups:
Group A: 0 – 7 days
Group B: 7 – 14 days
Group C: 14 – 30 days

We found that: The major group was (0 – 7) days (240 newborns) and (7 – 14) days (120 newborns) and (14 – 30) days (90 newborns)

Table 1: Patients Group

Age (day)	No. of newborns	Percent %
0 - 7	240	53.3
7 - 14	120	26.6
14 – 30	90	20
Total	450	100

In group A who is pure breastfed baby and receiving Vit-k prophylaxis

One preterm baby (1(0.66%)) developed bleeding within first week of life.

In contrast, group B those newborn who pure breast fed baby and not received Vit-K prophylaxis, 4 of them developed bleeding episodes, one full term bleed from suture line after circumcision which controlled by packing and Vit-K parenteral. In other 3 newborn was preterm (3(2%)) developed bleeding from mucous membrane and umbilical stump during first week of life. One of them admitted to hospital in preterm intensive care unit due to heavy bleeding from mucous membrane and umbilical stump because the baby extreamly low birth weight and a complicated with sepsis. In group C those newborns who are bottle fed bay and not reserved Vit-K prophylaxis, one of them (1(0.66%)) preterm baby developed bleeding from umbilical stump during 0 – 7 days of life.

Table 2: Bleeding Distribution in Groups

Group of newborns	No. of newborn	Newborn with bleed	Percent %
A	150	1	0.66
B	150	4 3- preterm 1- full-term	2.6 2 0.66
C	150	1	0.66

The total number of newborns who developed bleeding disorder was (6 (1.33 %)

Table 3: Site of Bleeding Distribution

Total No.	site of bleeding	no. of newborn	Present %
450	Umbilical stump	5	1.1
	Post circumcision	1	0.22
	Mucous membrane	3	0.66

Table 4: Time of bleeding disorder distribution

Age Group (Day)	No. of newborns	Newborns with bleeding	Percent %
0 - 7	240	5	2.08
7 - 14	120	1	0.8
14 – 30	90	0	0.0

During questionnaire formula there is no maternal history of anticonvulsant or salicylate, anticoagulant like warfarin or rodent poison, and no family history of coagulopathy.

Discussion

Bleeding disorder during neonatal period is one of the commonest problems that deal with it in preterm intensive care unit. From the results of study we found that the newborn who not received Vit-K prophylaxis during first week of life under high risk of bleeding tendency and its complications which can prevented or reduced by so easy and available single parenteral or oral Vit-K soon after birth for all newborn baby whatever the gestational age. However a single intramuscular injection of Vit-K (1 mg), the current practice in the U.S.A, is almost universally effective, except in children with severe malabsorption.

Conclusion

From the results of study we found that

1. Highest percentage of bleeding during first week of life.
2. Breast fed baby developed bleeding disorder more Earlier than the bottle fed baby.

3. The highest risk of bleeding disorder in the neonatal group who not received Vit-K prophylaxis.
4. The commonest site of bleeding from the umbilical stump.
5. Vit-K prophylaxis immediately after birth can prevent and reduced bleeding episodes in the neonatal period.
6. Preterm baby developed bleeding more and earlier than full term baby due to low body Vit-K stores and prematurity of the liver.

Recommendations

From the collected data of study we advise to give intramuscular injection of Vit-K (1 mg) for all newborn baby as soon as possible after birth. This practical work can reduced the risk of neonatal hemorrhage and reduced its complications such as intracranial hemorrhage.

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