VITAMIN K PROPHYLAXIS IN NEWBORN: CURRENT HOSPITAL PRACTICES IN A METROPOLITAN CITY

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Summary

Vitamin K deficiency may cause unexpected bleeding sometimes severe one into the brain in previously apparently healthy neonates, known as Vitamin K Deficiency Bleeding (VKDB) of newborn. Vitamin K prophylaxis in the newborn continues to be a worldwide health concern. A single intramuscular prophylactic dose (0.5 to 1 mg) of vitamin K within first 6 hrs of delivery is preferable till date in preventing VKDB. This observational study was carried out to see the current practices of vitamin K prophylaxis in newborn in different health care centers of a metropolitan area of Chittagong in Bangladesh from July 2013 to December 2013. Total 103 cases were enrolled in this study among them in 82 (79.61%) cases vitamin K prophylaxis was administered after initiation of breast feeding and in 21 (20.39%) cases it was offered before initiation of breast feeding. In 89 (86.40%) cases route of administration was oral whereas in 2 (1.94%) and 12 (11.65%) cases routes were intramuscular and intravenous respectively. In this study it is observed that most of the neonates received vitamin K prophylaxis orally, which is not the currently recommended route to prevent VKDB. So awareness should be promoted in this regard.

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Key words

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Introduction

Vitamin K (For 'koagulation' in German) a fat soluble vitamin, is necessary for the synthesis of clotting factors II, VII, IX, X [1]. Phylloquinone, called vitamin K_1, is present in a variety of dietary sources, with green leafy vegetables, liver and certain legumes and plant oils having the highest content. Vitamin K_2 is a group of compounds called menaquinones, which are produced by intestinal bacteria [1-5].

Vitamin K is a cofactor for γ-glutamyl carboxylase, an enzyme that performs post-translational carboxylation, converting glutamate residues in proteins to γ- carboxyglutamate typically located within Gla domains. These Gla-residues, which are usually involved in calcium binding, are essential for the function of most if not all known Gla-proteins. Vitamin K is essential for the function of several proteins involved in blood coagulation (Prothrombin, also known as factor II, factors VII, IX, and X, protein C, protein S, and protein Z) bone metabolism (Osteocalcin, periostin and matrix Gla protein) as well as vascular biology, cell growth, and apoptosis (Growth arrest specific gene 6 protein) [6-9]. Deficiency of vitamin K causes bleeding and in neonate it sometimes causes life threatening bleeding [10-12]. In neonate VKDB formerly known as hemorrhagic disease of newborn is classified into early, classical and late, based on the age of presentation [1].

Early VKDB, occurring on the first day of life, is rare and confined to infants born to mothers who have received medications that interfere with vitamin K metabolism. These include the anticonvulsants phenytoin, barbiturates or carbamazepine, the anti-Tubercular drug rifampicin, and the vitamin K antagonist warfarin and phenindione [12-14].

The reported incidence in infants of mothers who have received such medications without vitamin K supplementation is between 6 and 12 percent [1].

Classical VKDB occurs from one to seven days after birth and is more common in infants who are unwell at birth or who have delayed onset of feeding. Bleeding is usually from the umbilicus, gastrointestinal tract, skin punctures, and surgical sites and uncommonly in the brain. The incidence is variable, with ranging from 0.25 to 1.5 per cent in early reports of both sick and well infants to 0 to 0.44 per cent of well infants [14]. There is considerable uncertainty about the true rates of classical VKDB since full diagnostic criteria outlined above were seldom met.

Late VKDB occurs from eight days to six months after birth, with most presenting at one to three months. It is almost completely confined to fully breast-fed infants. About half of the infants have underlying liver disease or occasionally other malabsorptive states [14-15]. Serious intracranial hemorrhage may occur in about 30 to 50 per cent case of late VKDB [15]. Other sites of bleeding include skin, gastrointestinal tract, umbilicus or surgical sites. About 30 per cent of late VKDB have minor bruising or other signs of coagulopathy (Warning bleeds), preceding the serious hemorrhage. Infants at risk may have signs of predisposing cholestatic liver disease such as prolonged jaundice, pale stools, and hepatosplenomegaly [16-19]. The rate of late VKDB in infants without prophylaxis has been reported in 5 to 20 per 100,000 live births and mortality is about 30 percent [5].

In 2003 the American Academy of Pediatrics recommended that vitamin K_1 should be given to all neonates as a single, intramuscular dose of 0.5 to 1 mg, and this recommendation was reaffirmed in 2009. A similar recommendation was issued and reaffirmed in 2009 by the Canadian Pediatric Society and the Committee on Child and Adolescent Health, College of Family Physicians of Canada. Accordingly, it is recommended that vitamin K_1 should be given as a single intramuscular dose of 0.5 mg (For babies weighing 1,500 g or less at birth) or 1.0 mg (for babies weighing more than 1,500 g at birth) to all neonates within the first 6 hours after birth following initial stabilization of the baby and an appropriate opportunity for maternal (Family) baby interaction [1,15].

Materials and methods

This observational study was carried out to see vitamin K prophylaxis pattern in neonate in contrast to recent standard recommendation, from July 2013 to December 2013. Cases were selected from different Health facilities of Chittagong Metropolitan Areas including Medical Colleges both Government and Non government, Clinics, maternity hospitals. Healthy term (>37 completed weeks) & preterm (< 37 weeks) babies, birth weight >1800gm were included, whereas those with preterm sick, less than 1800gm weighted babies were excluded in our study. Before delivery of these babies, Inj K-One (Konankion MM 2mg) were supplied, safety was provided after checking the expired date. Methods of administration, route, timing in relation to delivery, prelacteal feed, colostrums, as well as dosing pattern, frequency were observed by a medical officer. Then data were recorded in a preformed questionnaire on a case record form. Any complications like salivation, feeding problems, vomiting, were also observed.

The data were analyzed afterwards in percentage.

Results

Among 103 cases 58 (56.31%) were male and 45 (43.69) were female baby (Fig 1). Ninety two (89.32%) babies were delivered in hospital and 11 (10.68%) babies were delivered at clinic (Fig 2). Cesarean section was the mode of delivery for 86 (83.45%) of the enrolled newborn (Fig 3). The average age of the baby was 3.19 hours. The average gestational age was 36.87 weeks and average birth weight of the babies was 2852.43 gm. Oral route of administration was preferred in 89 (86.41%) neonates and 12 (11.65%) neonates received IV and 2 (1.95%) cases received in IM route (Fig 4). One hundred (97.09%) babies have no complication after vitamin K ingestion, 2 (1.94%) babies developed rash and 1(0.97%) baby developed urticaria after ingestion of vitamin K (Fig 5). All babies received vitamin K prophylaxis within hours of birth. Eighty two (79.61%) babies started vitamin K ingestion after initiation of breast feeding and in 21 (20.39%) cases the prophylaxis was given before initiation of breast feeding. About 5% of the babies fall in complicacy those who inject vitamin K before breastfeeding and only 2% babies showed complexity those who inject vitamin K after breastfeeding.

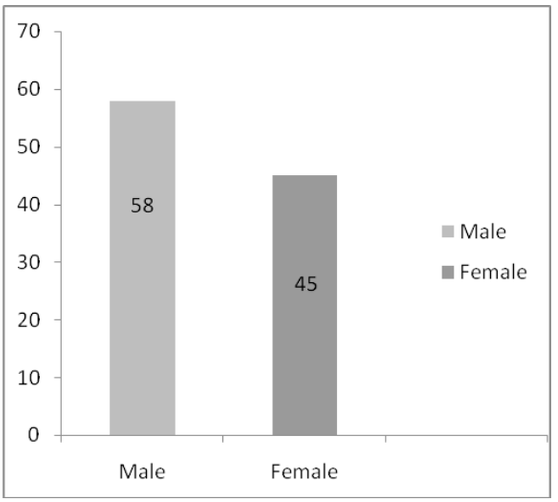

Fig 1 : 56.31% male and 43.69% female babies

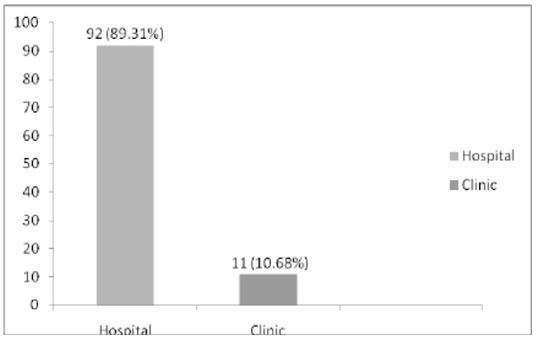

Fig 2 : 89.32% of the babies born in hospital and 10.68% in clinic

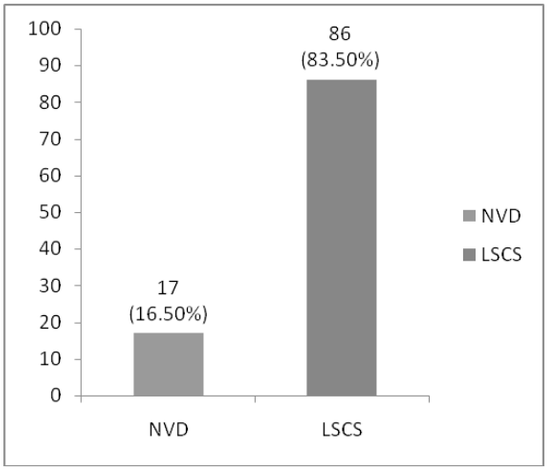

Fig 3 : 83.50% of the babies was LSCS and 16.50% was NVD

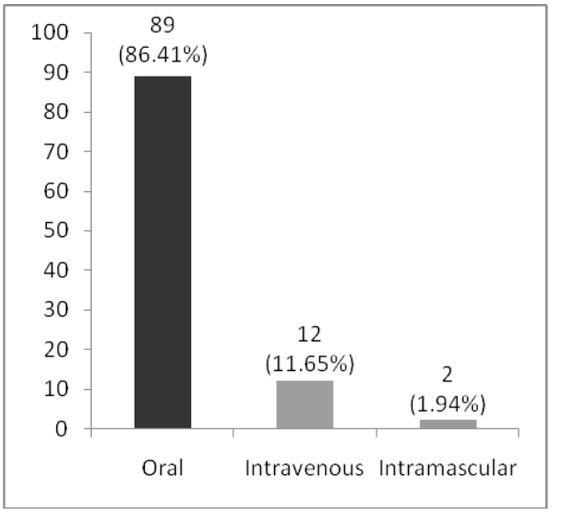

Fig 4 : Route of administration was oral 86.41%, IM 1.94% & IV 11.65%

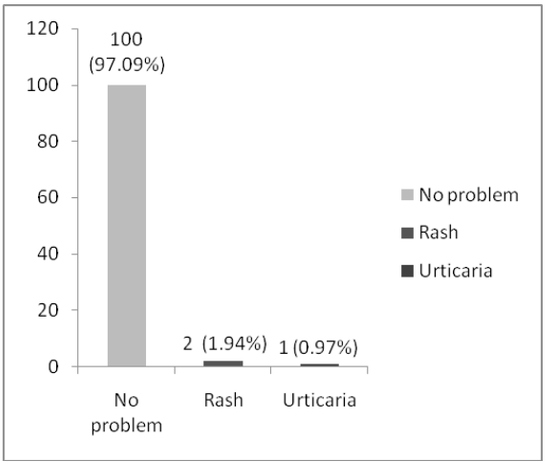

Fig 5 : Problem after Vitamin K ingestion

Discussion

In this study oral route of administration was preferred in 89 neonates (86.41%) and 12 neonate (11.65%) received IV and 2 neonate (1.94%) received IM vitamin K. This finding does not correlate well with the current recommendation of vitamin K in newborn which suggests the route should be intramuscular [1]. The average age of the baby was 3.19 hours where the minimum age was 0.33 hours or 20 minutes and maximum age was 11 hours. First quartile or 25% of the babies' age was 1 hours, median or 50% age was 3 hours and 3rd quartile or 75% age 5 hours. The time recommendation for giving the vitamin K is initial stabilization after birth which seems alright in the

present study. The average gestational age was 36.87 weeks whereas minimum and maximum age was 28 weeks, 40 weeks respectively. The average birth weight of the babies was 2852.43 gm. Oral administration of vitamin K has been shown to have efficacy similar to that of parenteral administration in the prevention of early VKDB [1,16]. However if the oral route is chosen it should be repeated at 4 days and also on day 28. In this study it was not followed up whether the subsequent doses were administered properly or not.

One hundred cases (97.09%) were given 0.5mg of vitamin K where as only 3 (2.91%) were given 1mg. Only 3 cases (2.91%) developed some minor side effects, 2 (1.94%) had rash and 1 (0.97%) baby had urticaria. All babies started vitamin K prophylaxis within hour of delivery after umbilical clamping. 82 (79.61%) babies received vitamin K ingestion after breast feeding and whereas in 21(20.39%) neonate received vitamin K prophylaxis started before initiation of breast feeding.

Conclusion

In this study we found that the route of administration of vitamin K prophylaxis to prevent VKDB predominantly oral and in some cases it started even before initiation of breast feeding which is an area of concern as because this is contrary to the current standard recommendation.

Recommendation

Further large sample sized, multi-centric study can be done to get appropriate picture of vitamin K prophylaxis pattern in newborn babies and thus to create awareness to follow the standard recommendation.

Disclosure

All the authors declared no competing interest.

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