

# HEMORRHAGIC DISEASE OF THE NEWBORN: CLINICAL PRESENTATION AND RESPONSE TO TREATMENT WITH VITAMIN K

Faridullah Shah<sup>1</sup>, Muhammad Aqeel Khan<sup>1</sup>, Jehanzeb Khan<sup>1</sup>, Arshia Munir<sup>2</sup>, Rahida Karim<sup>1</sup>

<sup>1</sup>Department of Paediatrics, Hayatabad Medical Complex and <sup>2</sup>Department of Pharmacology, Khyber Medical College, Peshawar, Pakistan

## ABSTRACT

**Background:** Hemorrhagic disease of the newborn is a coagulation disturbance in newborns due to vitamin K deficiency. In our region most babies are delivered at home or in private clinics where vitamin K is not given in routine, leading to hemorrhagic disease of the newborn. The current study was conducted to determine the clinical presentation of hemorrhagic disease of the newborn and to assess the response to injection vitamin K.

**Material & Methods:** This descriptive study was conducted at Neonatal Unit, Department of Child Health, Hayatabad Medical Complex, Peshawar, from January to December 2011. All neonates who presented with bleeding were admitted in the Neonatal Unit of Hayatabad Medical Complex, Peshawar. After sending blood for investigations, 2mg Vitamin K was injected intravenously. In babies with continuous bleeding, fresh frozen plasma was also given. PT and APTT were repeated after 6 to 12 hours and after one week.

**Results:** Forty two cases were included in the study. 76.2% were born at home and did not receive vitamin K at birth. 57% were low birth weight. 88% were breastfed. Gastrointestinal tract, skin and nasal mucosa were the common sites of bleeding. PT and APTT were prolonged in all the cases. Their values improved after 6 hours and normalized in one week.

**Conclusion:** Vitamin K deficiency causing hemorrhagic disease of the newborn is a common problem in neonates. It shows a dramatic response to vitamin K injection. It is more common in male, preterm and low birth weight babies.

**KEY WORDS:** Hemorrhagic disease of newborn, Neonates, Vitamin K.

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## INTRODUCTION

Hemorrhagic disease of the newborn (HDN) is a coagulation disturbance in newborns due to Vitamin K deficiency. As a consequence of vitamin K deficiency there is an impaired production of coagulation factors II, VII, IX, X by the liver.<sup>1</sup> Newborns are relatively vitamin K deficient for a variety of reasons. They have low vitamin K stores at birth, Vitamin K passes the placenta poorly, the levels of vitamin K in breast milk are low and the gut flora has not yet been developed (Vitamin K is normally produced by bacteria in the intestines). HDN causes an increased risk of bleeding. The common sites of

bleeding are the gastrointestinal tract, Mucous membranes, umbilicus, veni-punctures and circumcision.<sup>2</sup> A number of review articles provide useful overviews of vitamin K and its importance to human beings. Bleeding disorders in newly born infants were first described over 100 years ago when Townsend reported 50 cases in 1894.<sup>3</sup> Vitamin K, however, was only discussed about 40 years later, by Dam, in a study of bleeding disorder in chickens.<sup>3</sup>

In Pakistan, most babies are delivered at home or in private clinics or maternity homes, where vitamin K is not given prophylactically. Therefore, they are more prone to hemorrhagic disease of the newborn.<sup>4</sup> Vitamin K dependent factors are lower in preterm and breast-fed infants.<sup>5</sup> The incidence of the hemorrhagic disease of the newborn is from 0.1 to 1% in western countries.<sup>5</sup> In a previous study done in the National Institute of Child Health (NICH), Karachi, it was found to be 0.4% in normal birth weight and 1.5% in low birth weight infants.<sup>6,7</sup>

### Corresponding Author:

Dr Faridullah Shah  
Assistant Professor  
Department of Paediatrics, Hayatabad Medical  
Complex, Post Graduate Medical Institute  
Peshawar, Pakistan  
e-mail: dr.faridkth@yahoo.com

The current study was conducted in to determine the clinical presentation of hemorrhagic disease of the newborn and its response to vitamin K.

**MATERIAL AND METHODS**

It was a descriptive study. A total number of 42 neonates were included. The study was conducted in the Neonatal Unit of Hayatabad Medical Complex, Peshawar from January to December 2011. All neonates with bleeding were eligible for inclusion. Babies with prolonged Prothrombin Time (PT) and Activated Partial Thromboplastin Time (APTT) were retained in the study. This was done because factor assay for vitamin K dependent factors could not be done due to financial constrains. Apt test, fibrinogen level, correction studies for PT and APTT and factor assays could not be done in our study cases as they were not available currently. PIVKA (Protein Induced by Vitamin K Absence) has been found to be the most sensitive marker for vitamin K deficiency.<sup>2,8</sup> This was not currently available in local setting. PT, APTT, platelet count and peripheral blood smear were done in all babies presenting with bleeding. In standard references<sup>8,9</sup>, the normal values of PT in preterm neonates are given as 14-22 seconds and APTT as 35-55 seconds. In term neonates, prothrombin values are reported as 13-20 seconds and APTT as 30-45 seconds. These figures were followed for normal values.

All neonates with thrombocytopenia, septicemia, DIC, birth asphyxia and birth trauma like cephalohematoma and subaponeurotic hemorrhage were excluded. Neonates with hemorrhagic disease of the newborn were admitted to the neonatal unit. After sending investigations, 2mg Vitamin K was given to full term and 1mg to preterm.<sup>3,10</sup> If bleeding continued, they were given fresh frozen plasma. PT and APTT were repeated after 6 to 12 hours. If they did not normalize, they were repeated

again after 1 week. Data was collected on a proforma and was analyzed on SPSS 10.0.

**RESULTS**

42 cases were included. 29 (69%) of the newborn infants were male and 13 (31%) were female. All cases were 2 to 7 days old. Out of 42 babies, 32 (76.2%) were home deliveries, whereas 10 (23.8%) were hospital deliveries. 40 (95.2%) were spontaneous vaginal deliveries and 2 (4.8%) were delivered by caesarean section in the hospital. All neonates including hospital deliveries had no record about the administration of Vitamin K and even the parents did not know about it.

Out of 42 babies, 25 (59.5%) were preterm and 17 (40.5%) were full term. Out of all, 17 (40.4%) were appropriate for gestational age, 24 (57%) were small for gestational age and one (2.6%) were large for gestational age. 37 (88%) cases were breast-fed. (Table 1)

Regarding the clinical presentation, gastrointestinal bleeding (haematemesis and bleeding per rectum) was the most common presentation (71.4%), followed by ecchymosis (52.2%), epistaxis (47.6%), bleeding from injection site (23.8%), circumcision (12%), umbilicus (19%) and ears (11.9%). Anemia (hemoglobin less than 12 gm/dl) was present in 71.4% babies. (Table 2)

Prothrombin time ranged from 20-40 seconds with mean 29 seconds. APTT value ranged from 40-60 seconds. The mean value was 55 seconds. PT was more than 22 seconds in 37 babies (88%) and APTT was more than 55 seconds in 25 babies (59.5%). Six to twelve hours after injecting vitamin K, PT became normal in 71.4% cases and APTT became normal in 69% cases. After one week, PT and APTT became normal in all babies.

**Table 1: Profile of babies with hemorrhagic disease of the newborn (n=42).**

		No. of Babies	Percentage
Sex	Male	29	69
	Female	13	31
Mode of Delivery	Spontaneous Vaginal Delivery	40	95.2
	Caesarean Section	02	4.8
Gestational Age	Small for Gestational Age	24	57
	Appropriate for Gestational Age	17	40.4
	Large for Gestational Age	01	2.6
	Full term baby	17	40.0
	Preterm baby	25	59.5

**Table 2: Clinical presentation of 42 neonates with hemorrhagic disease of the newborn.**

Clinical Manifestation	No. of cases	Percentage
Anemia	30	71.4 %
Gastro Intestinal bleeding	30	71.4%
Ecchymosis	22	52%
Epistaxis	20	47.6%
Bleeding from Injection site	10	23.8%
Bleeding from Umbilics	08	19%
Bleeding from ears	05	12%
Bleeding from Circumcision	05	12%

**DISCUSSION**

Recent national data on vitamin K prophylaxis uptake are not available. However previous data from NICH, Karachi showed the prevalence of hemorrhagic disease of the newborn in hospital born babies to be 0.4% in normal birth weight and 1.5% in low birth weight babies.<sup>4,6</sup> In that study, 50% babies presented were within 2-4 days of birth. In the West, the prevalence ranges from 0.25% to 1.7%.<sup>5,11,15</sup>

Reliable studies of the incidence in other less developed countries are also not available. It is therefore necessary to estimate it on the basis of other studies from developed countries. In New Zealand, over the period of 1998-2008, hemorrhagic disease of the newborn was largely confined to fully breast-fed infants who did not receive vitamin K prophylaxis at birth with incidence of 4-17 per 100,000 births, while the incidence of confirmed classic cases was 1.24 per 100,000 births in non breast-fed infants.<sup>8,13</sup> The nationwide studies from England and Switzerland also reported similar incidence.<sup>14,15</sup>

Tulchinsky has reported the incidence of hemorrhagic disease of the newborn in children (not received vitamin K prophylactically) as 2.5 to 17 per 1000 live births.<sup>16</sup> In Thailand, the incidence was 35 to 72 per 100,000 live births. In Israel in 1977, deaths related to HDN were 131 per 100,000 live births, declining to 31 per 100,000 in 1984 and 3 per 100,000 live births in 1988.<sup>16</sup>

In our study, 88% of the babies were breast-fed. This higher incidence in breast-fed babies is also supported by various national and international studies. In both England and Japan, breast feeding was associated with at least a doubling of the incidence.<sup>5,8</sup>

In the present study, 59.6% were preterm, 40.4% were full term. Out of these 57% were small

for gestational age, 40.4% were appropriate for gestational age and 2.6% were large for gestational age. In Pakistan, 25% babies are born with low birth weight. 69% of these are small for gestational age.<sup>7</sup> This enhances the risk for hemorrhagic disease of the newborn. In this study, 69% of the newborn infants with HDN were male. This higher incidence in male was an incidental finding.

Home deliveries constituted 76.2% of the study. This high incidence of HDN was due to lack of introduction of Vitamin K by traditional birth attendants after birth. In our study, 71.4% presented with gastrointestinal bleeding, 52.2% with ecchymosis, 47.6% with epistaxis, 23.8% with bleeding from injection site, 19% umbilicus and 12% each from ears and site of circumcision. This was similar to the findings in other studies.<sup>1,4</sup> 71.4% babies were anemic; this may be related to delayed referral to hospital.

Vitamin K administration at birth is recommended to prevent hemorrhagic disease of the newborn, but this is still not practiced commonly in developing countries.<sup>18</sup> In this study, PT and APTT improved significantly within six hours of vitamin K injection.

**CONCLUSION**

Hemorrhagic disease of the newborn is still a common problem in Pakistan, as vitamin K is not administered routinely to all live births. Vitamin K is effective in treating cases of hemorrhagic disease of the newborn.

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