



## CLINICAL PROFILE AND FOLLOW UP OF BLEEDING NEONATE

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### ARTICLE INFO

#### Article History:

Received 10<sup>th</sup>, September, 2015

Received in revised form 27<sup>th</sup>, September, 2015

Accepted 15<sup>th</sup>, October, 2015

Published online 28<sup>th</sup>, October, 2015

#### Key words:

Hemorrhage; Neonates; Vitamin K Deficiency (VKDB); Disseminated Intravascular Coagulation (DIC); Intracranial Hemorrhage.

### ABSTRACT

**Background and Objective:** Neonatal hemorrhage either localized or generalized has significant morbidity and mortality. The identification of the cause of bleeding is of paramount importance for the appropriate management and for prognostication. The paucity of Indian studies on bleeding in newborns prompted us to do this study looking at aetiological factors, clinical features and the outcome.

**Methods:** This prospective study was done in NICU and Referral newborn, Department of pediatrics, RMMC&H, Chidambaram, between October 2014 and September 2015. A detailed history, family history, perinatal problems and thorough clinical assessment, relevant investigation were done when required, for all the 50 neonates who had bleeding. Investigations were done when required, for all the 50 neonates who had bleeding i.e., Survival or death and developmental assessment at 6 months of age in the survivors was done.

**Results:** The incidence of bleeding in neonates was 5.2% preterm babies (68%) and outborn babies (84%) had statistically significant risk of bleeding. 88% of neonates had bleeding, 88% of neonates had bleeding in the first week of life. DIC constituted 88% of neonates had bleeding in the first week of life, DIC constituted the major cause for bleeding (66%) and VKDB constituted 18%. Nearly 2/3<sup>rd</sup> cases of VKDB were classic VKDB. 8.2% of NICU and referral newborn unit deaths were in the neonates with bleeding. Bleeding constituted a significant risk factor for mortality in NICU. Out of 36 survivors, 28 cases were normal in neurodevelopment and physical outcome, 5 cases were lost for followup and development delay was noted in 2 cases.

**Interpretation and conclusion:** Preterm, IUGR, outborn babies, sick neonates have higher incidence of bleeding. Bleeding is more common in the first week of life. Late VKDB has bad prognosis. Vitamin K prophylaxis has an important role in the prevention of VKDB.

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## INTRODUCTION

The human hemostatic system is dynamic and is profoundly influenced by age.<sup>1,2</sup> Although considered immature in the newborn, it is a physiological system which results in few problems for the healthy term neonate, but may contribute to morbidity in the sick and preterm infants when additional acquired abnormalities may be present.<sup>3</sup> The newborn's hemostatic system matures during the early weeks and months of life with most hemostatic parameters reaching adult values by six months of age.<sup>4</sup> Newborn infants are susceptible to hemorrhage because of the physiological deficiencies

(qualitative and quantitative) of the coagulation factors, antenatal influences such as maternal diseases or drugs, immaturity of blood vessels, vulnerability to asphyxia, birth trauma and septicaemia.

Hemorrhage both localized and generalized is a significant cause of morbidity and mortality in the neonatal period.<sup>5</sup> Significant hemorrhagic complication accounts to about 1-2% of all NICU admissions.<sup>6,7</sup> and accounts to 40% of deaths associated with hemorrhage.<sup>8</sup> The majority of bleeding problems in the neonatal period are acquired. Though few inherited coagulation may present at this time especially following iatrogenic challenges.<sup>9</sup> It is vital to

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identify the cause of bleeding since the treatment and prognosis completely depends on it.<sup>9,10</sup>

As there is paucity of studies regarding bleeding neonates in Indian literature, this study is undertaken to know the clinical presentation and identify the aetiology by using available, relevant investigations, the immediate outcome and a short term follow up of the survivors.

## METHODOLOGY

This is a prospective study which included neonates with bleeding manifestation admitted in the Neonatal intensive care unit (NICU) and referral new born, Department of Pediatrics, Rajah Muthaiah Medical College and Hospital chidambaram. during the period of October 2014 to September 2015.

### Sample size

The 50 neonates irrespective of their comorbidities, admitted with manifestation of bleeding or those who developed bleeding during their NICU stay were included in the study. Neonates admitted in the Neonatal Intensive Care Unit with hemorrhagic manifestations of skin, mucous membrane and deep seated sites were included in the study. A detailed history with focus on the day of onset of bleeding, site and severity of bleeding, perinatal history including of bleeding perinatal history including vit K administration was taken. History of consanguineous marriage, family history of bleeding disorder either in the siblings in the relatives was taken. Thorough clinical assessment and relevant investigation were done.

### Inclusion criteria

Neonates admitted in the Neonatal Intensive Care Unit with haemorrhagic manifestation of skin, mucous membrane, gastrointestinal tract, prolonged bleeding from umbilicus, puncture sites, deep seated sites like intraventricular hemorrhage, pulmonary haemorrhage, subgaleal haematoma and also the clinically suspected cases which were then confirmed by the usual investigative procedure were also included in the study.

### Exclusion criteria

In case of hametemesis in the newborn, the Apt – Downey test was performed to differentiate between maternal and fetal blood in gastric aspirate and if the test was positive (positive test indicates swallowed maternal blood), those neonates were excluded from the study.

Vaginal bleeding may occur in female neonates at 3 to 7 days of life and it is due to maternal hormone effect and they were excluded from the study

**Table 1** Post natal age of onset of bleeding

	No. of patients	Percentage
<24 hrs	6	12.0
2-7 days	38	76.0
>7 days	6	12.0
Total	50	100.0

**Table 2** Bleeding neonate and Gestational Age in Weeks

	No. of patients	Percentage
28-32 weeks	9	18.0
33-37 weeks	25	50.0
>37 weeks	16	32.0
Total	50	100.0

**Table 3** Bleeding neonates and birth weight

	No. of patients	Percentage
<1.499 kg	10	20.0
1.5-2.499 kg	21	42.0
>2.5 kg	19	38.0
Total	50	100.0

**Table 4** Diagnosis

	No. of patients	Percentage
Septicemia with DIC	24	48.0
BA with DIC	9	18.0
BA, VKDB	9	18.0
VKDB	13	26.0
Birth injuries	3	6.0
CD	1	2.0

**Table 5** Immediate outcome

Immediate outcome	No. of patients	Percentage
Death	14	28.0
Survival	36	72.0
Total	50	100.0

**Table 6** Follow up (3 months)

	No. of patients	Percentage
Normal	28	56.0
Death	14	28.0
Developmental Delay	2	4.0
Coagulation Disorder	1	2.0
Lost for followup	5	10.0
Total	50	100.0

**Table 7** Place of delivery

	No. of patients	Percentage
Out born	42	84.0
In born	8	16.0
Total	50	100.0

**Table 7** Site of bleeding

Site	No. of patients	Percentage
GIT	37	74
IC	13	26
Skin	9	18
Pulmonary	5	10
Umbilicus	1	2
SG	1	2

## DISCUSSION

The present study was conducted in Referral new born and NICU, Department of Pediatrics, Rajah Muthaiah Medical College and Hospital, Chidambaram during a period of 1 year from October 2014 to September 2015. The newborns with haemorrhagic manifestations were included and investigated and the survivors were followed up for a short term period of 3 months to know the developmental outcome (physical and a short term period of 3 months to know the developmental outcome (physical and neurological).

### ***Incidence of neonatal bleeding***

In the present study out of the 960 neonates admitted in NICU and Referral new born in 1 year, 50 neonates had bleeding manifestation irrespective of comorbidity. The overall incidence of bleeding neonates in the present study was 5.2%. In a study conducted in an American hospital, the incidence was 1% which is much less compared to our study. Several factors contribute to the variation, like geography, cultural practices, good obstetric practices, artificial feeding which is known to prevent VKDB, better quality of neonatal care, low incidence of sepsis, could have been responsible for the lower incidence noted in advanced countries.

### ***Bleeding neonate and birth weight***

In our study 31 babies were low birth weight (62%) The incidence of bleeding in very low birth weight babies and low birth weight babies is high when compared to babies with normal weight. This is similar to the finding by Perlman that preterm and VLBW babies and IUGR neonates are highly susceptible to coagulation abnormality and the degree of IUGR correlated with the abnormal coagulation finding<sup>74</sup>. In addition to having several adverse effects of IUGR, bleeding is one of the morbidities.

### ***Bleeding neonate in relation to gestational age***

In our study pre term babies (68%) were affected more than term babies (32%). When the hospital admission was considered, the incidence of bleeding was high among preterm neonates (11.5%) when compared to the term infants (2.7%). This is similar to the findings of Hathaway that sick preterms do bleed excessively owing to many pathological conditions that may complicate easily.<sup>1</sup> Preterm babies are highly vulnerable to haemostatic disorders; when compared to term neonates, due to immaturity of the haemopoietic system and capillaries and they are susceptible to certain other morbidities which predispose to derangement in hemostatic system like hypoxia, hypothermia, infections.<sup>2,75</sup>

### ***Place of delivery and bleeding***

In our study 8 (16. %) of the neonates were inborn, remaining 42(84%) were outborn. As this is a referral center, many newborns from surrounding peripheral hospitals get admitted. Outborn babies were more susceptible to bleeding problem than inborns. This reflects the quality of obstetric care and perinatal care in peripheral centers inborns. This reflects the quality of obstetric care and perinatal care in peripheral centers.

### ***Postnatal day of onset of bleeding***

In this study 38(76%) out of 50 cases had bleeding manifestation between second and seventh day of life. 12.% had bleeding manifestation after 7 days and 12.% on first day of life.

The increased incidence of bleeding in the first week of life is due to the fact that immature haemostatic system of the neonates requires about a week for stabilization and also probably due to the vulnerability to perinatal factors, particularly sepsis.<sup>2,5</sup> Aetiology and Clinical presentation

Bleeding is considered as one of the danger signs in neonates and causes are varied.<sup>75</sup> In our study we found that the following conditions occurred in decreasing order of frequency. Septicemia with DIC (48%), birth asphyxia with DIC (18%) vit K Deficiency bleeding (26%) birth injuries (6%) coagulation defects (2 %)

### ***Mortality***

Out of 50 cases, 14 cases died. Mortality due to bleeding constituted 16.12% of the cases, which is less than the study conducted in Colorado Medical Centre in USA which quotes an incidence of 40%.<sup>5</sup> This may be due to the fact that additional number of bleeding (concealed hemorrhage) as the cause of neonatal death in NICU would have been revealed if the autopsy examination of neonates who died in NICU were undertaken. The centre being an advanced center for neonatal care would have received several sick cases, very preterm babies and detailed investigations would have picked up unsuspected cases.

### ***Mortality in relation to aetiology***

14 of 50 bleeding neonates died. Among those who died DIC was the leading cause (66%). In a study by Chuansmrit the incidence was 41.6%, but it was not correlated with gestational age.<sup>35</sup>

The incidence is also high compared with the incidence of 36.8% quoted by Steven.<sup>91</sup> The higher mortality may be due to the fact that our hospital is a referral center receiving lot of sick cases Septicaemia contributed to 71.4% of deaths in bleeding neonates in the present study. Mishra et al (61.7%)<sup>85</sup> and Tallur et al<sup>84</sup> have observed that septicaemia was responsible for death in bleeding neonates in 61.7% and 47.52% of cases respectively. In our study there were 3 cases of late VKDB and of them 2 presented with intracranial hemorrhage and 2 of them died (66.6%) and the one that survived was left with severe neurological handicap. In other studies mortality in late VKDB has varied between 14%<sup>21</sup> to 50%<sup>23</sup>. The higher mortality in our cases is because of later arrival of these cases. The initial symptoms may be non specific and the diagnosis is not considered. Many cases may be mistaken for pyogenic meningitis and there may be emphasis on antibacterial agents. Birth injuries contributed to 7.2% of deaths. The higher incidence in our study group may be due to the severity of birth injuries like subgaleal hemorrhage and also due to late arrival and poor obstetric facilities. The incidence of mechanical birth injuries reflects the quality of obstetrical services in the surrounding areas.

There were no deaths in case of classic VKDB, as it is well known that the classic VKDB is a relatively benign condition.

### **Immediate outcome**

Out of 50 neonates in our study, 14 neonates died (28.%) and 36 neonates (72%) survived.

### **Short term followup**

The NICU graduates were followed for a short term (3 months). 5 of them lost for followup, 2 had developmental delay. Coagulation defect was confirmed in 1 case viz hemophilia. 28 cases were normal in The NICU survivors with a diagnosis of septicaemia and DIC, who were followed up had normal neuro developmental and physical growth at 3 months of age. Out of 2 cases of developmental delay, as per Trivandrum Development Screening test (TDSC), initial diagnosis in one case was late VKDB. Remaining 1 birth asphyxia with DIC. Those with diagnosis of birth asphyxia, 7 survived. 2 cases had delayed development the form of delayed milestone and spasticity. This developmental delay may not be related to bleeding per se but related to the severity of birth asphyxia.

Mose of the of early and classic VKDB had normal outcome. One case classic VKDB died which had birth ashyxia as comorbidity. 1 case of late VKDB (33.3%) which survived had delayed development which is similar to the incidence quoted in other studies in which 36% and 40% of the survivors had long term neurologic handicap.<sup>21</sup>

### **SUMMARY**

1. Hemorrhage both localised and generalized constitutes an important cause of morbidity and mortality in neonate.
2. Significant number of NICU admissions will have bleeding manifestation.
3. Preterm and IUGR infants have higher incidence of bleeding due to immaturity of haemopoietic system and their susceptibility to other morbidities.
4. Outborn babies are at higher risk for developing bleeding manifestation due to poor obstetric care, lack of knowledge regarding vitamin K, late referral and bad facility of transportation of risk neonates.
5. GIT is the commonest site of bleeding and Apt test has to be done to rule out maternal blood ingestion, which is the commonest cause.
6. Perinatal risk factor like septicaemia, asphyxia are important causes for bleeding manifestations. A good perinatal care can reduce the incidence.
7. In case of perinatal asphyxia developmental outcome depends on the severity of asphyxia.

8. VKDB still constitutes an important cause of bleeding neonates even in hospital deliveries. This is due to the lack of knowledge regarding the importance of vitamin K prophylaxis, failure rate of vit K, promotion of exclusive breast feeding and avoidance of pre lacteal feeds. Early and Classic VKDB have got better outcome compared to late VKDB.
9. The outcome in late VKDB is grave with high mortality and severe morbidity in survivors. Prophylactic vitamin K should be administered to all newborns at birth, as it has got an important role in prevention of VKDB.
10. Bleeding is one of the danger signs in the neonatal period which needs prompt evaluation. Early recognition with the help of laboratory investigations and early intervention at appropriate stage contributes to the better outcome.
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