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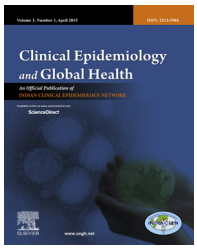

Original Article

Blood component therapy in neonates in a neonatal intensive care unit of northern India

Avneet Kaur [a], *Shashi Kant Dhir* [b,*], *Gurmeet Kaur* [c], *Manish Gupta* [a], *Meenal Batta* [d]

[a] *Post Graduate Student, Department of Pediatrics, Guru Gobind Singh Medical College, Faridkot, Punjab, India*
[b] *Assistant Professor, Department of Pediatrics, Guru Gobind Singh Medical College, Faridkot, Punjab, India*
[c] *Professor and Head, Department of Pediatrics, Guru Gobind Singh Medical College, Faridkot, Punjab, India*
[d] *Senior Resident, Department of Physiology, Guru Gobind Singh Medical College, Faridkot, Punjab, India*

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ABSTRACT

Background: Neonates, especially preterm babies admitted in neonatal intensive care units (NICU), frequently require transfusion of blood components. The use of blood components in the neonates varies across different hospitals. There is urgent need of forming global guidelines and policies for blood component transfusions in the sick neonates. Although the guidelines for Indian setup from the premier institutes exist, yet there is paucity of Indian data regarding the actual blood component usage.

Aims and objective: To know the incidence and indications of various blood components transfusion in our NICU.

Material and method: This retrospective single center observational study was done in a tertiary care NICU of a government medical college of northern India. The records of all neonates admitted in the NICU from August 2014 to July 2015 were screened for blood component usage and their indications. The data were statistically analyzed using Microsoft Excel™ software.

Results: During the study period, 815 neonates were admitted in NICU of our hospital. Out of these neonates, 280 (34.3%) neonates received at least single blood component transfusion at some point of NICU stay. More than one type of components was needed in 100 (12.2%) neonates. A total of 557 units of blood components were transfused in the babies. The mean blood component transfusion was 1.98 ± 0.21 in the babies requiring transfusion. The maximum (54.7%) component to be transfused was platelets followed by packed red blood cells (24.5%). Sepsis was the most common reason for blood component transfusion.

Conclusion: A large number of admitted neonates require blood components. Sepsis remains the foremost etiological factor for blood component transfusion.

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* *Corresponding author*. Tel.: +91 9780190130.
E-mail address: drshashikantdhir@gmail.com (S.K. Dhir).

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1. Introduction

Neonates admitted in neonatal intensive care units (NICUs) require transfusion of blood and blood components for various reasons. With the advent of newer techniques, the sick neonates stay for more time in NICUs and they are one of the most common recipients of whole blood (WB) or blood components. Gone are the days when only WB was used. From last quarter century, blood components are used almost exclusively to decrease avoidable transfusion reactions, sensitization, volume overload, and to use one unit of blood to save many lives. Various blood components include packed red blood cells (PRBC), fresh frozen plasma (FFP), and platelet concentrate (PC). Preterm babies comprise major group requiring transfusion, and 85% of extremely low birth weight babies admitted in NICUs have required blood component transfusion at some point of time.[1]

The common reasons in the neonatal intensive care unit for which various blood components are transfused include thrombocytopenia, anemia, bleeding, various surgical conditions, exchange transfusion for hyperbilirubinemia, etc. Thrombocytopenia is common in sick neonates admitted in NICU. Platelet transfusions are life saving for bleeding manifestations accompanied with thrombocytopenia. Most platelet transfusions are still given prophylactically to thrombocytopenic neonates even without bleeding.[2] Previous studies suggest that neonatal thrombocytopenia is a risk factor for hemorrhage (particularly intra-ventricular hemorrhage), mortality, and adverse neurodevelopmental outcome.[3] Thrombocytopenic neonates who receive platelets are up to ten times more likely to die than neonates who do not receive platelet transfusion. Platelet transfusions are given to all neonates with platelet counts below 30,000/dl and below 100,000/dl in other circumstances.[4] FFP is transfused in neonates with significant coagulopathy. Common coagulopathies in neonates include vitamin K deficiency and disseminated intravascular coagulation due to sepsis. Packed RBC transfusion is also common transfusion given in NICU to treat anemia depending upon the comorbid conditions as per the guidelines. Exchange transfusions using WB are done in hyperbilirubinemia and sepsis.

The use of blood components in the neonates varies across different hospitals. There is urgent need of forming global guidelines and policies for blood component transfusions in the sick neonates. Although the guidelines for Indian setup from the premier institutes exist, yet there is paucity of Indian data regarding the actual blood component usage.[5] This study was conducted to know the incidence of transfusion of various blood components in our NICU and various indications for which they are being used. Although western data are available on usage of isolated blood components, there is paucity of Indian data for the blood component usage. This study was planned to get an insight into above-mentioned issues.

2. Material and methods

This retrospective single center observational study was done in a tertiary care neonatal intensive care unit of a government medical college of northern India. The records of all neonates admitted in the NICU from August 2014 to July 2015 were screened for the blood component usage and the indications of the transfusion. All consecutive patients younger than 28 days admitted during the study period in NICU were eligible for study enrollment. The neonatal intensive care unit of our hospital caters to the neonates suffering from various critical diseases from adjacent districts and states. All the inborn, outborn, and babies admitted with surgical causes were included. The neonates, who stayed in NICU for less than twenty-four hours, received any blood component prior to admission, or who were readmitted, were excluded from the study. Our hospital has certified blood bank which provides WB and its various fractions, i.e. PRBC, FFP, PC, and platelet-rich plasma. Facility for cryoprecipitate is also available at our blood bank. The indications of transfusing various blood components being followed in our NICU are detailed in Table 1. Random donor platelets were used for the transfusion.

The details of PRBC, FFP, PC, and WB transfusions were recorded from the files. The mean value of hemoglobin, platelet count, and coagulogram indices was noted at the time of concerned blood component transfusion. The mean age of the neonates at the time of transfusion was noted. Detailed information about the components transfused, number of transfusions, and indications was noted in a predesigned validated Proforma. The data were taken till the final outcome of the baby. The data were statistically analyzed using Microsoft Excel™ software.

3. Results

During the study period, 815 neonates were admitted in NICU of our hospital. The baseline variables of the neonates included in the study are shown in Table 2. Out of enrolled neonates, 280 (34.3%) neonates received at least single blood component transfusion at some point of NICU stay. More than one type of components was needed in 100 (12.2%) neonates. The number of units of blood components transfused in the babies was 557. The mean blood component transfusion was 1.98 ± 0.21 in the babies requiring transfusion. The component-wise detail of various transfusions is being shown in Table 3. The various etiologies of need of blood component transfusion are listed in Table 4.

The incidence of thrombocytopenia (platelet count less than 1.5 Lakhs/cmm) was 42.9% in neonates. The incidence of severe (less than 0.5 Lakhs), mild (1–1.5 Lakhs/cmm), and moderate thrombocytopenia (0.5–1 Lakhs/cmm) was 49.5%, 28.5% and 22% respectively. Mean hemoglobin at the time of transfusion of packed red blood cell was 8.2 ± 1.3 g/dl. The mean platelet count for transfusing the platelets was 35,458 $\pm$ 3,962/dl. The mean prothrombin time index (PTI) was 63.8 $\pm$ 6% and partial thromboplastin time (PTT) was 55.2 ± 6.2 s in the babies requiring transfusion of FFP. The mean age of platelet transfusion was 5.2 ± 1.1 days and the overall mean age of blood component transfusion in the neonates in days was 13 ± 1.63.

In the multiple transfusions group, the random donor platelets were given more than once in 51% of the transfused

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