"Outcomes And Progression: A Study on Neonatal Thrombocytopenia Including Immediate and Short-Term Follow-Up Observations"

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Abstract: Neonatal thrombocytopenia is a common hematological abnormality in the neonatal intensive care unit (NICU). A study was conducted to estimate the frequency, etiological characteristics and predisposing factors of thrombocytopenia in the NICU. In the study, it was determined that the prevalence of thrombocytopenia was 39% and the prevalence of severe thrombocytopenia was 11%. The most common cause is sepsis, and maternal peripartum bleeding is associated with neonatal thrombocytopenia. Neonatal factors associated with thrombocytopenia include age at presentation, sepsis, DIC, NEC, candiduria, and assisted breathing. Gestational age, IUGR, and perinatal asphyxia were not associated with neonatal thrombocytopenia. Transfusion was not associated with thrombocytopenia, probably due to the use of fresh blood. Signs and symptoms associated with thrombocytopenia include bleeding, purpura, and delayed capillary refill. Neonatal thrombocytopenia requires a longer hospital stay and the need for supplemental oxygen and intravenous fluids. Severe thrombocytopenic newborns have a higher mortality rate than non-thrombocytopenic newborns. Low platelet count is a risk factor for adverse outcomes, and whole blood transfusion has been shown to be an effective alternative to platelet transfusion in the treatment of severe neonatal thrombocytopenia.

Introduction

A platelet count below 150,000/µL indicates thrombocytopenia, regardless of the person's age. Except for phlebotomy-related anemia, thrombocytopenia is the most common hematological abnormality seen in the NICU (Neonatal Intensive Care Unit) 2 . One quarter of all babies born in the NICU have thrombocytopenia, and 20% of these babies are very sick, with levels below 50,000/µL. However, only 1-2% of healthy babies have thrombocytopenia3. The prevalence of thrombocytopenia among babies admitted to the NICU is 22-35%, and the prevalence of thrombocytopenia is higher in ELBW and premature babies4.
In the past decade, numerous clinical research articles have been published and discussed regarding its etiology and pathogenesis. Source: Neonatal thrombocytopenia in NICU1-3. The impact of thrombocytopenia on fertility is an issue that has not been adequately investigated in the past. There is no material yet available that measures the neonatal thrombocytopenia rate seen in newborns.
A detailed study of the reviewed medical literature revealed very few subjects from India 5. One article is a study examining the relationship between pregnancy due to maternal hypertension and neonatal thrombocytopenia and other articles are information and knowledge 6. A conducted in India The scarcity of studies and the increase in this situation in our NICU led us to conduct a study to evaluate the frequency, clinical spectrum, etiological features and consequences of neonatal thrombocytopenia in our NICU.

Goals

1. Our study aims to define the etiology, examine the clinical course, immediate outcomes and include a short-term study of infants with thrombocytopenia (<150,000/µl) at Narayana Medical College and Nellore NICU Hospital.
2. Factors that predispose to neonatal thrombocytopenia.
3. To evaluate the role of neonatal thrombocytopenia as a prognostic indicator at NICU completion.

Objective determination of the effectiveness of the procedures used in the treatment of babies with thrombocytopenia in our NICU.

METHODOLOGY

This study aims to understand the frequency, etiological features, clinical course, immediate consequences of newborns admitted to the NICU with thrombocytopenia, and to conduct a short-term follow-up of 6 months after learning about its benefits. Predisposing factors for thrombocytopenia, the effectiveness of neonatal thrombocytopenia treatment regimens, and the role of neonatal thrombocytopenia as a prognostic indicator for NICU graduation were also evaluated. The effectiveness of the protocol used for the treatment of thrombocytopenic newborns in our NICU was also evaluated.

Source:

In December, 179 consecutive babies were admitted to the NICU at Narayana Medical College and Pediatric Hospital, Nellore. From 2014 to May 2015, thrombocytopenia screening was performed regardless of the following diseases. Except for 8 patients who were lost to follow-up, all newborns were followed up 6 months after discharge. Study design and inclusion:

This is a one-year observational study of infants in the NICU.
Inclusion criteria:
Newborns who were continuously admitted to the NICU from December 2014 to May 2015 were included in this study

Exclusion criteria were excluded
1) Whole blood in "Data Collection Method" Other tests that need to be done for babies that cannot be counted.
2) Newborns whose parents or guardians have not completed blood counts and other necessary examinations. Do not agree to participate in the research.

Data Collection Methods:

During registration, parents and/or guardians were informed about the study and their verbal consent was obtained. A detailed medical history, including maternal and paternal history, was obtained on a case-by-case basis, focusing on the history and type of diabetes in the child or mother. Data on various diseases associated with neonatal thrombocytopenia examined in previous studies have been recorded.
Ask the mother about her history of gestational hypertension, gestational diabetes, and premature rupture of membranes. These diagnoses are based on diagnostic criteria. The mother's history of taking medications that may cause neonatal thrombocytopenia was also noted (see Appendix). The gestational age of all newborns was determined according to the New Ballard scoring system.
Growth assessment at birth or access to Colorado Intrauterine Growth Restriction. All babies are examined, purpura/punctate rash, mucosal bleeding, etc. A detailed physical examination was performed. All babies underwent gastric lavage on admission to see if there were any changes in the blood. Maternal blood is distinguished from newborn blood using the Apt-Downey test. Also look for other areas of bleeding.

Appropriate blood tests are performed on all newborns; these…
1. Complete blood count (including hemoglobin estimate and hematocrit)
2. Peripheral smear test
3. Blood culture

Sepsis test (no neutrophil count, total white blood count, ESR line, C-reactive protein)
After collecting whole blood, collect blood into sterile EDTA of venipuncture tubes< br>
Aseptic measures are taken quickly in the NMCH laboratory, with short collection and evaluation time usually 10 to 15 minutes.
CBC was obtained with an automatic hematology analyzer (ABX MICOROX OT-ABX HEMATOLOGIE MONPELLIER CEDEX 04). Peripheral blood smear studies, blood samples were taken and blood cultures were performed.
All patients underwent sepsis examination, including neutrophil count, total leukocyte count, micro-ESR, C-reactive protein. If both of the above are positive, it is labeled as neonatal sepsis. Quantitative detection of CRP by latex turbidimetry using SPINREACT CRP-TURBILATEX. Values above 6 mg/dL are considered abnormal. The next step is to group children according to their platelet count at admission. As shown in the comments below
Prothrombin time (PT), activated thromboplastin time (aPTT) and detection of fibrin degradation products of all patients in group IIb (STHR) were examined as follows

Collect into 1.8 ml bottle Venous blood contains 0.2 ml 3.8. % sodium citrate, blood citrate ratio 9:1. In this study, PT and aPTT were obtained with the automatic coagulation analyzer ERBA COAG UNO using Dade actin cephalosporin for aPTT, Thromborel S is brain thromboplastin reagent sold by Dade Behring, and the ISI value of PT is 1.15. (Normal PT: 14-22 seconds, Normal aPTT: 30-55 seconds)
Qualitative and semi-quantitative latex slide testing using TULIP XL FDP to detect cross-linked fibrin degradation products. Positive results show up as agglutination and indicate D-dimer is above 200ng/ml. The absence of blood vessels indicates that the result is not good.

In all cases, platelet count was repeated 24 hours after treatment. Other tests for candida, such as urine tests, chest X-ray, neuroultrasound, and brain CT (such as tomography), are performed as needed.
Since there is no laboratory for platelet alloimmunization, not all patients are tested as recommended. However, in 2 cases in which neonatal alloimmune thrombocytopenia was strongly suspected, platelet genotyping was performed at the Indian Institute of Immunohematology, Mumbai. All diagnoses were made according to diagnostic criteria defined in indexed medical records. All newborns were treated according to standard NICU procedures according to the latest recommendations in the medical literature
Relevance:

Results calculated to be satisfactory if the patient met all of the following.
All serious problems must be eliminated regularly.
The baby must be breastfed or breastfed.
All weight must be lost for 3 consecutive days.
> Ⅲ The child's weight at discharge must be equal to or greater than 1.5 kg.

Unsatisfied:
If the patient does not follow any of the above procedures
Report - Description self-report
At least every two weeks all newborns Every 6 months should be followed. A detailed physical examination is performed at each visit. Body weight and head circumference were measured and plotted against the Agarwal Chart of Growth and Development of Affluent Indian Children (1994)52. A period of negative growth indicates below 3 percent Neurodevelopment was assessed using the Denver II Scale. It is not designed as an IQ test and is used for learning disabilities, speech disorders, etc. cannot produce diagnoses. Same age. There are 125 missions/tasks in DenverII;
the test form is divided into 4 parts of 53,54. Personal - Fine Motor -Social Adjustment Speech Gross Motor Denver II described below
Normal: no delay and no more than one stimulus per test
br > Bad Person: 2 or more warnings and/or 1 or more warnings.

In this case, a test is performed 1-2 weeks later to detect temporary things such as fatigue, fear and pain. But if the test is "passed," the child still performs poorly compared to children of the same age. Each newborn's final performance at the sixth month of observation is recorded and this performance is used to evaluate the infant's overall outcome53,54. Of the 179 patients studied, 8 patients were lost to follow-up and health details. The conditions are uncertain and therefore are excluded when assessing the baby's outcome. According to their physical and brain development at the sixth month, newborns are classified as good (g), fair (f), poor (p) and full-term (e) results. In two separate cases, infants were classified as having poor outcomes regardless of their physical development if their neurodevelopmental outcomes were unreliable according to the Denver II Developmental Scale. Record all deaths at discharge and after recovery.

Statistics:
Descriptions are presented as numbers or percentages. Categorical variables were compared between groups using the chi-square test. Continuous variables were analyzed using unpaired two-tailed Student's t test or one-way analysis of variation (ANOVA). "P" values below 0.05 were considered significant.
Chi-square test:
Observed Ï2 = (O-E)2 /E O
Over E
One-way ANOVA (analysis of variance):
F = Variation within group/between group Variation within variation = SD2 SD is the standard deviation
Student's t test:
t = mean difference/standard error of difference
SE = SD/n SE is standard error, SD is Standard Deviation >Independent variables were variables that showed a significant association in univariate analysis (intrauterine growth restriction, delayed capillary refill on entry, presence or absence of congenital anomalies, mechanical ventilation, exaggerated physiological jaundice, mode of delivery, DIC, and refractory epilepsy) and are known to influence outcomes in NICU graduates factors (age at presentation, gestational age, peripartum asphyxia, meconium aspiration syndrome, hyaline membrane disease).

OBSERVATION AND RESULTS

According to the defined inclusion and exclusion criteria, 179 consecutive newborns admitted to the hospital were included in our study. As mentioned before, the subjects were divided into three groups according to their platelet counts11-15.

Prevalence of thrombocytopenia in our NICU:
The overall prevalence of thrombocytopenia was 39%.
The overall prevalence of severe thrombocytopenia (<50,000/μL) was 11%. Severe thrombocytopenia was responsible for 28.17% of all neonatal thrombocytopenia.
The mean platelet count for each group was 1.603, with standard deviation +/- 0.71
As shown in the pie chart, the most common diagnostic interval in the non-thrombocytopenia group is: peripartum16. The most common diagnosis in the mild-moderate group is sepsis, and in the severe thrombocytopenia group, the most common diagnosis is sepsis with disseminated intravascular coagulation.

Predisposing factors:

Many predisposing factors associated with neonatal thrombocytopenia have been investigated and their importance in affecting thrombocytopenia has been determined17.

Maternal Factors:

Maternal PIH:
It is associated with thrombocytopenia. The majority of pregnant women due to hypertension were more in both groups IIa and IIb (27.45% and 95% respectively). The P value obtained by the card method is <0.001 and is highly significant. The difference between maternal pregnancy due to thrombocytopenia and hypertension was also calculated and the result was 4.8 with a confidence interval of 0f 2.4-9.3.
Other important factors of the mother such as gestational diabetes, Rh incompatibility, premature rupture. The presence of membranes, antepartum hemorrhage, place and mode of birth were not associated with thrombocytopenia18.

Neonatal factors:

Age at presentation:
Patients were divided into 3 groups according to the age at presentation 72 hours before and after. . It was determined that most of the patients in Group IIb (severe thrombocytopenia) (55%) developed after 72 hours compared to the other groups (25% and 21.57%). This relationship is significant; Our study shows that children with severe thrombocytopenia can present 72 hours later compared to children with mild to moderate thrombocytopenia and children without thrombocytopenia. This relationship is exemplary. The chi-square test yielded a significant αP value for association of 0.012.
Gestational age assessed by the New Ballards scoring system was not associated with neonatal thrombocytopenia. The relationship between gestational age and platelet count was analyzed using an analysis of variance.19

Sepsis:
Blood cultures showed that sepsis was associated with thrombocytopenia. While the prevalence of sepsis was 60% in the severe thrombocytopenia group, it was 33% in the mild-severe thrombocytopenia group and 25% in the non-thrombocytopenia group. Platelet counts in septic and non-septic newborns were also compared with the Student T test and the correlation was very good.20
Only 13.89% of infants with thrombocytopenic sepsis had clinical evidence of DIC. There is no relationship between gram-negative sepsis and thrombocytopenia.

DIC:
DIC is diagnosed by an increase in PT, APTT and fibrin degradation products and is associated with severe thrombocytopenia. While 35% of the severe thrombocytopenia cases had evidence of DIC, only 1.9% of the mild-severe thrombocytopenia group had such evidence. DIC is caused by perinatal asphyxia or sepsis, accounting for 37.5% and 62.5% of cases (i.e., DIC cases), respectively.21

Perinatal Asphyxia:
There are no statistics regarding diagnosis and diagnosis. Perinatal asphyxia and thrombocytopenia.

NEC:
NEC is associated with thrombocytopenia; 10% and 11% of infants in groups IIa and IIb, respectively, are diagnosed with NEC. Although there were no cases of NEC in Group I.22

Candidauria:
Candidauria is another site associated with neonatal thrombocytopenia, especially in massive thrombocytopenia.

Assisted ventilation:
The proportion of babies with severe thrombocytopenia receiving assisted ventilation is higher. Other factors such as hypoxia, APGAR score, exchange rate, hyperbilirubinemia, meconium aspiration syndrome, and respiratory distress were not associated with the infants.

Thrombocytopenia
Mucosal bleeding is associated with thrombocytopenia. The incidence of bleeding was 50% in the severe thrombocytopenia group, 15.7% in the mild-moderate thrombocytopenia group, and 19.6% in the non-thrombocytopenia group. For this reason, bleeding occurs more frequently in babies with thrombocytopenia. This relationship was found to be significant with an αP value of 0.002 using the chi-square test.

Student's T test was used to objectively evaluate the statistical relationship between neonatal platelet count and bleeding. The results are shown in the table below. Our study found a significant relationship between platelet count and bleeding in infants.

The number of intracranial hemorrhages in Group IIb (severe thrombocytopenia group) is higher than the other two groups (40%). Chi-square test was used to analyze the relationship between ICH and severe thrombocytopenia (ICH in group IIb and ICH in both groups). > Purpura treatment, when petechiae occur, the border of the skin lesion is red, not white. Those smaller than 1 cm are called petechiae, and those larger than 1 cm are called purpura. Purpura and petechiae formation have been associated with thrombocytopenia. Purpura/petechiae was present in 45% of patients in Group IIb.

Diagnosis of shock
Evidence of delayed capillary refill is an important risk factor for thrombocytopenia. In the severe thrombocytopenia group, the frequency of capillary refill time over 3 seconds is 50%. Most symptoms are mild to moderate thrombocytopenia and moderate thrombocytopenia are absent in the thrombocytopenic group Symptoms of neurotic depression. Gastrointestinal bleeding findings are more common in group IIb, but their relationship with the severe thrombocytopenia group is not significant.

During hospitalization:
Evaluation according to intravenous injection days, number of days, supplemental oxygen support and length of stay. All three variables were found to be associated with thrombocytopenia, with 87.5% of infants in the severe thrombocytopenia group and 82% of newborns in the moderate thrombocytopenia group requiring hospitalization pain for more than a week compared to those without thrombocytopenia. Only 50% of newborns need to stay in hospital for more than a week. This way. This suggests that severely thrombocytopenic infants may take longer to recover, or even take longer to recover.

Morality rate:
The death rate in the severe thrombocytopenia group was higher (60%) compared to the control group. The other two groups are 3.7% and 3.92% respectively. The table below describes the distribution of deaths by cause in each of the 3 groups; Sepsis is the most common cause of death in the total and severe thrombocytopenic group, accounting for 38.89% of deaths.

Available results:
And the severe thrombocytopenia group had the highest mortality rate. The percentage of infants who did not respond immediately was higher in the mild-to-moderate thrombocytopenia group and the no-thrombocytopenia group.

Still 6 months have passed since the release:
18 of 179 patients died and 8 were lost to follow-up. When evaluating the results in different groups, eight lost cases were excluded from the analysis. The results are classified as good, fair, bad and expired according to the development of the body and brain.

Neurodevelopment:
Among the cases followed, the percentage of patients with thrombocytopenia (31.57%) in the Denver IIb group (i.e., severe thrombocytopenia group) with a negative result (i.e., inconclusive result) was higher than the percentage of patients in the other two groups (16.57%). 5 and 26.5%) were higher.

Thrombocytopenia as an indicator:
< br>understanding how thrombocytopenia itself affects outcomes several logistic regressions were performed. As a first step, univariate analysis was used to evaluate the statistics of various variables, including

thrombocytopenia and outcomes. The table below summarizes the results of the univariate analysis. ﷺ values less than 0.05 are considered significant.

Twelve variables were associated with statistically significant (e.g. P <0.05) analysis. These variables, along with factors known to influence NICU outcomes (e.g., perinatal asphyxia, sepsis, NEC, MAS, respiratory distress), were repeated for all 17 independent variables and the difference between variables (6-month outcomes) was used SPSS version 13.0 Stepwise. logistic regression (multiple logistic regression analysis). - P - Values below 0.05 were considered significant.
The following variables are independently associated with the results (p value <0.05):

1. Age of presentation
2. Length of stay
3. Gestational age
4. Platelet count
5. Congenital anomalies, including congenital diseases
6. Refractory Seizures

The chi-square statistic is the -2 log-likelihood difference between the final model and the reduced model. Simple models are created by removing the effects of the final model. The null hypothesis is that all measures of the effect are 0. df-degrees of freedom.

a. This simplified model is equivalent to the final model because effects do not add degrees of freedom.

Response to treatment:
In our NICU this is assessed by the percentage of platelet count within 24 hours after bleeding or platelet bleeding.

Percentage increase in platelet count:
Comparison of percentage increase (% increase) plt.count / initial plt.count * 100) as a percentage of severe thrombocytopenia treatment Platelet count using Student paired t test There was no significant difference between blood and platelet transfusion groups.
24-hour blood donation, platelet transfusion and the percentage of platelet count after transfusion are shown below.

Discussion

Newborn thrombocytopenia is a common hematological abnormality in neonatal intensive care units (NICUs). The prevalence of this condition is slightly higher than other studies, with a higher risk in preterm infants. The frequency of neonatal thrombocytopenia is quite high, possibly due to the higher rate of infants with sepsis admitted to the NICU (31.3%) compared to the lower rate in other studies. The rate of moderate to severe thrombocytopenia in neonatal thrombocytopenia is also high at 28.17%, reflecting the higher incidence of sepsis from neonatal thrombocytopenia compared to other causes in the NICU22-25.
The average platelet count at admission to the NICU was 1.603 * 105 / µl, reflecting the higher prevalence of severe thrombocytopenia in our NICU. The overall etiological profile is similar to other NICU studies in India, with sepsis and perinatal asphyxia constituting the majority of admissions. Sepsis accounts for the majority of cases in the severe and mild to moderate thrombocytopenia groups, while peripartum asphyxia is the majority of applications in the group without thrombocytopenia. Sepsis with DIC accounted for 28% of patients with severe thrombocytopenia26.
Contrary to western medical literature, sepsis is the most common cause in our study, as it causes thrombocytopenia due to decreased production and increased consumption of platelets. This may be due to the higher incidence of sepsis on admission, premature infants, infants with IUGR, and perinatal asphyxia are also more likely to become infected than infants with platelets. However, to prove this hypothesis, the interaction between the above factors and sepsis needs to be evaluated27.
Negative alloimmune thrombocytopenia is one of the main causes of neonatal thrombocytopenia, but the incidence of this condition could not be documented in our NICU. However, two cases of NAIT were investigated, and one was found to be alloimmune to HPA-128.
Predisposing factors include maternal PIH, which is associated with neonatal thrombocytopenia (P<0.001) and an odds ratio of 4.8 (C.I, 2.4-9.3). However, in our study, maternal PIH was associated with severe thrombocytopenia, possibly due to the low incidence of infection in newborns.
There may be an association between thrombocytopenia and IUGR, as premature birth is associated with low platelet count. However, in our study, gestational age was not found to be associated with low platelet count, possibly because more babies had infections and sepsis compared to preterm babies29.

Sepsis was associated with thrombocytopenia, especially acute thrombocytopenia (P = 0.008). While 60% and 33.3% of babies in the severe thrombocytopenia and mild-moderate thrombocytopenia groups developed sepsis, only 25% of the babies in the non-thrombocytopenia group developed sepsis. DIC, caused by bacterial toxins such as exotoxins and lipopolysaccharides causing endothelial dysfunction, is known to be caused by bacterial toxins30.

The spectrum of diseases that cause neonatal sepsis in our society is different from Western countries, and the type of toxins our body secretes and the frequency of DIC from these toxins also differ between our society and the West. In our study, no relationship was found between Gram-negative sepsis and thrombocytopenia, possibly due to differences in sepsis between various Gram-negative bacteria31.

Severe thrombocytopenic newborns should be investigated for IC bleeding, regardless of the diagnosis. The incidence of petechiae and purpura was associated with severe thrombocytopenia, with 45% of newborns suffering from these conditions. Malnutrition was the most common bleeding symptom in the severe thrombocytopenia group, possibly due to shock or excessive bleeding in sick infants known to have severe thrombocytopenia, especially septic neonates. Neurotic depression was most common in the no-thrombocytopenia and mild-to-moderate thrombocytopenia groups, possibly due to perinatal asphyxia32.

Hospital reports showed that 87.5% of infants with severe thrombocytopenia were hospitalized for more than a week, but they spent more time receiving intravenous fluids and oxygen supplements. The mortality rate is very high at 60%, with only 1.96% of patients with severe thrombocytopenia being hospitalized. The rate of "unsatisfactory" results was higher in the mild-to-moderate thrombocytopenia group (80.39%), 30% in the severe thrombocytopenia group, and 52.77% in the no-thrombocytopenia group33.

Short-term effects tested at 6 months showed that the rate of neurodevelopmental problems in infants with severe thrombocytopenia was higher than both groups (31.57%). If severe thrombocytopenia alone is responsible for adverse outcomes, all infants with severe thrombocytopenia and negative symptoms should develop IC bleeding. However, 33.3% of neonates with severe thrombocytopenia and mild symptoms had no evidence of IC bleeding, suggesting that underlying diseases causing low platelet count may also have negative effects on the brain34.

Thrombocytopenia can be used as a diagnostic tool in sick babies, as it indicates serious disease and a high probability of worsening symptoms. However, it is not considered a risk factor for poor outcomes, as low platelet count is not considered a cause of adverse results. The effectiveness of treatment was evaluated based on the percentage of platelet count 24 hours after intervention, and although whole blood transfusion is not as good as platelet transfusion in severe thrombocytopenia, it is a good alternative in cases where platelet concentrate is not available 35.

Conclusion

The prevalence of thrombocytopenia was high (39%), and the rate of severe thrombocytopenia was 11%. Sepsis is the cause of severe and mild to moderate thrombocytopenia. Predisposing factors associated with neonatal thrombocytopenia include maternal PIH, age at presentation, sepsis, NEC, DIC, candiduria, and assisted ventilation. In our study, IUGR, prematurity and perinatal asphyxia were not associated with neonatal thrombocytopenia.

Any type of mucosal, cutaneous or intracranial bleeding is associated with thrombocytopenia. In addition to bleeding due to thrombocytopenia, delayed capillary filling is the most common finding. Death (60%) and neurodevelopmental delay (31.57%) were more common in the severe thrombocytopenia group. Additionally, low platelet count was found to be an independent risk factor for adverse outcomes in our NICU cohort.

It can be said that thrombocytopenia is quite common in our NICU admissions. Sepsis is the most important and common cause. Many maternal and infant factors can be associated with thrombocytopenia. Infants with severe thrombocytopenia often bleed and have unstable vital signs, such as poor presentation. Adverse immediate and short-term outcomes were associated with severe thrombocytopenia at presentation. The most important result of our study is that it may be an indicator of severe thrombocytopenia in newborns. However, further research with similar results in this area is needed to expand this explanation and apply it to all outreach to children. Whole blood transfusion is a good alternative to platelet concentrate in treatment.

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Table 1: Subject distribution in the various groups

Groups	Description	Number of subjects	Percentage of the total
Group I	No Thrombocytopenia(150,000/**µ**L)	108	61%
Group II	Thrombocytopenia (<150,000/**µ**L)	71	39%
Group IIa	Mild to moderate thrombocytopenia (<150,000/**µ**L & 50,000/**µ**L)	51	28%
Group IIb	Severe Thrombocytopenia (<50,000/**µ**L)	20	11%

Table 2: Showing the mean platelet count in each of the groups

	Group I	**Group IIa**	**Group IIb**
Mean platelet count	2.04	1.15	0.37
Standard deviation	0.47	0.27	0.096

Etiologic profile:
The etiologic profile of infants in the various groups has been illustrated in the pie charts below**.**

Table 3: Maternal PIH and thrombocytopenia

	Group I	% withingroup	Group IIa	% withingroup	Group IIb	% within group
H/O MaternalPIH present	21	19.44	14	27.45	19	95
No history of maternal PIH	87	80.55	36	70.58	1	5

Intra uterine growth retardation:

IUGR as assessed by the Colorado intra uterine growth charts was not significantly associated with thrombocytopenia.
Gestational age:

Table 4: Platelet counts and gestaional age

Gest. age	**28-33**	**34-35**	**36-37**	**>37**	
Mean plt. count	1.08	1.02	0.90	0.84	**ANOVA, F= 1.03**
St. dev	± 0.4	± 0.37	±0.42	±0.46	**p= 0.39**

Table 5: Septicemia and thrombocytopenia

Septicemia	**GroupI**	**% within group**	**GroupIIa**	**% within group**	**GroupIIb**	**% within group**	**'P' value**
No	81	75	34	66.66	8	40	
Yes	27	25	17	33.33	12	60	**P=0.008**

Table 6: Platelet count and septicemia

	Septicemia	**No Septicemia**	
Mean Platelet count	1.76	1.33	**t=0.48, p<0.001,HS**
St. dev	± 0.69	± 0.67	

Only 13.89% of the septicemic neonates with thrombocytopenia had lab evidence suggestive of DIC. There was no association between gramnegative septicemia and thrombocytopenia.

Table 7: Perinatal asphyxia and thrombocytopenia

	Group I	% within group	GroupIIa	% within group	GroupIIb	% within group	p-value
No. of cases with Perinatalasphyxia	34	31.48	15	29.41	4	20	P=0.59

Table 8: NEC and thrombocytopenia

	GroupI	% within group	GroupIIa	%	GroupIIb	% within group	p-value
NEC	0		6	11.76	2	10	**p<0.001**

Table 9:Candiduria and thrombocytopenia

Candiduria	Group I	% within group	GroupIIa	% within group	GroupIIb	% withingroup	p-value
Yes	1	0.92	0		6	30	
No	107	99.07	51	100	14	70	**p<0.001**

Clinical impact of thrombocytopenia:

Mucosal Bleeding:

Table 10: Mucosal bleed and thrombocytopenia

	Group I	%	GroupIIa	%	GroupIIb	%	
Mucosal Bleed	17	15.74	10	19.60	10	50	
No MucosalBleed	91	84.26	41	80.40	10	50	**P=0.002**

Table 11: Platelet count and bleeding

	Mean platelet count ($*10^5$/µL)	Number of neonates	
No bleed	1.70	145	T=3.72
Bleed	1.16	34	P=0.001

Intra cranial bleeding:

Table 12: IC bleeding and thrombocytopenia

	Group I		Group IIa		Group IIb	
Intra cranial hemorrhage	4	23.52	2	3.921	8	40
Non intra cranial hemorrhage	13	76.47	8	15.68	2	10

Table 13: Purpura and thrombocytopenia

	Group I		Group IIa		Group IIb		
Petechiae/ purpura	5	4.63	2	3.93	9	45	
No petechiae/purpura	103	95.37	49	96.07	11	55	**p<0.001**

Table 14: Mortality analysis

	Septicemia	MAS	RDS	Perinatal asphyxia	Congen anom. incl. CHD	Pre-maturity	Total
Mortality in group I	0	1	1	0	2	0	4

Mortality in group IIa	0	1	0	0	1	0	2
Mortality in group IIb	7	1	0	2	0	2	12
% Mortality	38.89	16.67	5.56	11.11	16.67	11.11	18

Table 15: Immediate outcome and thrombocytopenia

Immediate outcome	**Group I**		**Group IIa**		**Group IIb**		
Expired	2	1.85	1	1.96	12	60	**P<0.001**
Not satisfactory	57	52.77	41	80.39	6	30	
Satisfactory	49	45.37	9	17.64	2	10	

Table 16: Outcome analysis in the groups

Group	**Mortality**	**Lost for follow up**	**Regularly followed up**
I	4 (3.7%)	5	101
IIa	2 (3.92%)	2	48
IIb	12 (60%)	1	7

Table 17: Univariate analysis of the association between various variables and

Premature rupture of membrane	2.682	0.262
Antepartum hemorrhage	1.39	0.50
Gestational age	21.01	<0.001
Intrauterine growth retardation	21.78	<0.001
Prolonged capillary refill	14.49	0.001
Thrombocytopenia	43.1	<0.001
Disseminated intravascular coagulation	17.23	<0.001
Duration of stay	11.99	0.002
Mechanical ventilation	8.59	0.014
Refractory seizures	7.55	0.023
Hyperbilirubinemia needing phototherapy or exchange transfusion	14.5	0.001
Meconium aspiration syndrome	1.48	0.45
Respiratory distress syndrome	3.74	0.154
Congenital anomalies including CHD	7.78	0.002
Necrotizing enterocolitis	2.32	0.31
Perinatal asphyxia	1.76	0.416
Septicemia	1.09	0.58

Table 18: Variables that had independently influenced the outcome of the neonates. (Multiple logistic regression; SPSS 13.0.)

Effect	**Model Fitting Criteria**	**Likelihood Ratio Tests**		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	P value
Intercept	203.854(a)	.000	0	.
Age at presentation	211.184	7.330	2	.026
Duration of stay	214.866	11.012	4	.026
thrombocytopenia	218.879	15.025	4	.005
Congenital anomalies (incl. CHD)	221.911	18.057	2	.000
Refractory seizures	209.875	6.022	2	.049

Gestational age	217.983	14.129	4	.007

Table 19: Platelet increment post transfusion

	Plat. transfusion	**Blood transfusion**	
Mean increase %	99.6±66.5	78.69±59.8	t=0.68 P=0.50

the outcome

Variable	**Chi-square value**	**'P' value**
Age of presentation	1.05	0.59
Sex	0.34	0.85
Place of delivery (home/ hospital)	1.13	0.56
Maternal age	1.56	0.46
Mode of delivery	112.3	<0.001
Pregnancy induced hypertension	1.44	0.49
Gestational diabetes ellitus	3.20	0.201

Table 20: Prevalance of thrombocytopenia in various studies

Studies on neonatal thrombocytopenia in NICU	Prevalance of thrombocytopenia
Castle et al[14]	22%
Hale oren et al[18]	5.4%
Beiner et al[20]	31%
Sharana gouda et al[4]	22.45%
Present study	39%

Table21 : Prevalance of septicemia in various studies

Studies on neonatal thrombocytopenia in NICU	**Prevalence ofsepticaemia**
Castle et al[14]	**10%**
Hale oren et al[18]	**5.4%**
Sharanagouda et al[4]	**28.17%**
Present study	**45%**

Table 22 –prevalance of mucosal bleeding

Studies on neonatal thrombocytopenia in NICU	Prevalance of mucosal bleeding
Castle et al[14]	70.11%
Beiner et al[20]	82.33%
Mehta et al[21]	68.23%
Sharana gouda et al[4]	64.70%
Present study	60%

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