

Comparison of the Frequency of Neonatal Anemia in Early Verses Delayed Umbilical Cord Clamping

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ABSTRACT

Aim: To compare the frequency of neonatal anemia in early verses delayed umbilical cord clamping.

Methods: This Study was carried out over a period of six months from 20th December 2010 to 19th June 2011 in Pediatric Medicine and Gynaecology & Obs Department of Lahore General Hospital, Lahore. This was a randomized controlled study. Total 200 cases were selected (100 cases of early cord (Group A) clamping and 100 cases of delayed cord clamping (Group B). Umbilical cord was clamped at 30 second of the birth of babies in group-A at 120 seconds of the birth of baby in group-B.

Results: Majority of the mothers i.e., 31(31%) were found between 26-30 years in Group-A, while in Group-B 35(35%), mean and standard deviation in Group-A was recorded as 26.64±6.21 while in Group-B 27.02±5.87, 57(57%) in Group-A and 61(61%) in Group-B were found male, comparison between early versus delayed umbilical cord clamping and anemia in full term newborns shows that 13(13%) in Group-A and 4(4%) in Group-B were found anemic. Chi square test was applied and p value was found 0.02 which was <0.05.

Conclusion: Comparison of the frequency of neonatal anemia in early verses delayed umbilical cord clamping demonstrates that neonatal anemia is significantly lower in delayed cord clamping.

Keywords: anemia, cord clamping, early versus delayed

INTRODUCTION

Before birth nutrition to the baby is provided by placenta via the umbilical cord. The umbilical cord contains two arteries and one vein. The vein supplies the fetus with oxygenated and nutrition rich blood conversely the arteries drains deoxygenated and nutrition depleted blood from the fetus. Umbilical cord is clamped after birth to separate it from placenta¹. Timing of umbilical cord clamping is variable in different setups but there are no set recommendations formulated for umbilical cord clamping. It is clamped as early as 15 seconds immediately after the birth of baby to as late as 5 minutes when umbilical cord pulsations cease². Early cord clamping deprive the new born with essential 80 to 100 ml of blood .The additional blood can supply extra iron amounting to about 50mg/body weight. This iron gets stored in babies and prevent anemia later in life³.

Infants who experience iron deficiency during the first 6-12 mo of life are likely to experience persistent effects of the deficiency that alter functioning in adulthood. A lack of sufficient iron intake may significantly delay the development of the central nervous system as a result of alterations in morphology, neurochemistry, and bioenergetics⁴.

There is a significant correlation between the Hb levels of the mothers and their children. Iron deficiency anemia is the major health problem of children and adults. There are various factors contributing to anemia in infants and school going children like inadequate dietary intake, imbalance in consumption, utilization, increased nutritional demand of iron^{5,6}. Delayed umbilical cord clamping facilitates more blood to go into the fetus from placenta and reduce chances of anemia and RBCs transfusion in early infancy⁷.

The rationale of study is that the for the umbilical cord clamping there are no set protocols in our hospital, some of the gyaenacologists are practicing early umbilical cord clamping while others are doing delayed umbilical cord clamping, however our literature analysis shows more beneficial effects of delayed umbilical cord clamping⁸, so by my study we can prove to the gyaenacologists that delayed cord clamping is beneficial to the child in preventing anemia in newborn as well as to develop set recommendations of umbilical cord clamping in our hospital. So that by doing simple maneuver like delaying umbilical cord clamping in the neonates we can enhance iron stores and prevent anemia in them.

MATERIAL AND METHOD

This study was conducted from 20th December 2010 to 19th June 2011 in the Department of Pediatric Medicine and Gyae & Obs Department of Lahore

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General Hospital, Lahore. This was a randomized controlled study. Sampling was done by non-probability method. 200 Newborns delivered in Lahore General Hospital, 100 newborns in each group was calculated with 80% power of test, 1.5% margin of error and taking expected percentage of anemia (haematocrite <45%) at 6th hour after umbilical cord clamping that was 8.9% with early cord clamping and 0% with delayed cord clamping in new born neonate.

Healthy neonates with no congenital anomalies and full term babies (gestational age between 37 to 41 weeks) were included. However babies of mothers having anemia (hemoglobin level <10g/dl), Twin pregnancy (ultrasonography after 28 weeks gestation), Antepartem hemorrhage (history of vaginal bleeding in mother as mentioned in record, RH-incompatibility (mother and baby blood groups), Infant of diabetic mother (history of maternal diabetes), Intrauterine growth retarded babies weight <2.5kg and risk factors for sepsis like maternal fever, premature rupture of membranes >18 hours (history of mother as mentioned in records) were excluded in the study. After fulfilling the inclusion and exclusion criteria, 200 neonates born in Lahore general hospital labour room were enrolled. After taking oral and informed consent the selected neonates were randomized into two groups by using random number table. In group A early umbilical cord clamping was done within 15 seconds of birth, in group B delayed umbilical cord clamping by 3 minutes then we followed the newborn and drew blood sample and send it to our laboratory for Haematocrite level at 6th hours after birth. All this information was collected through was entered into proforma. Data was analyzed using SPSS version 10. Quantitative variables such as age was presented as +SD. Qualitative variables such as gender and anemia was presented as %age and frequencies. To compare percentage of anemia between the two groups, Chi-square was used and P value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 200 patients comprising 100 in each group fulfilling the inclusion/exclusion criteria were enrolled to compare the frequency of neonatal anemia in early verses delayed umbilical cord clamping. Group-A shows 28(28%) between 20-25 years of age, 31(31%) between 26-30 years, 21(21%) between 31-35 years, and 20(20%) with >35 years while in Group-B 24(24%) were between 20-25 years, 35(35%) between 26-30 years, 28(28%) between 31-35 and 13(13%) with >35 years of age. Mean and standard deviation was also calculated and in Group-A it was recorded as 26.64±6.21 while in Group-B

27.02±5.87 (Table 1). Where 57(57%) in Group-A and 61(61%) in Group-B were found male while remaining 43(43%) in Group-A and 39(39%) in Group-B were female (Table 2).

Table 1: Age distribution (n=200)

| Age (yrs) | Group A | Group B |
|-------------|------------|------------|
| 20-25 | 28(28%) | 24(24%) |
| 26-30 | 31(31%) | 35(35%) |
| 31-35 | 21(21%) | 28(28%) |
| >35 | 20(20%) | 13(13%) |
| Mean & S.D. | 26.64±6.21 | 27.02±5.87 |

Table 2: Gender distribution of newborns (n=200)

| Gender | Group A | Group B |
|--------|---------|---------|
| Male | 57(57%) | 61(61%) |
| Female | 43(43%) | 39(39%) |

Comparison between early versus delayed umbilical cord clamping and anemia in full term newborns was done where we found 13(13%) in Group-A and 4(4%) in Group-B were found anemic while the remaining 87(87%) in Group-A and 96(96%) in Group-B were found non-anemic. Chi square test was applied and p value was found 0.02 which was <0.05 (Table 3).

Table 3: Comparison between early versus delayed umbilical cord clamping and anemia in full term newborns (n=200)

| Anemia | Group A | Group B |
|--------|---------|---------|
| Yes | 13(13%) | 4(4%) |
| No | 87(87%) | 96(96%) |

P Value was = 0.02 which is less than 0.05

DISCUSSION

The optimal time to clamp the umbilical cord in preterm and full-term neonates after birth continues to be a matter of debate. Although there is no conclusive evidence, delayed cord clamping seems to be beneficial in preterm and full-term neonates without compromising the initial postpartum adaptation phase or affecting the mother in the short term.

The idea behind the study was that for the umbilical cord clamping there are no set protocols in our hospital, some of the gynaecologists are practicing early umbilical cord clamping while others are doing delayed umbilical cord clamping, however the literature analysis shows more beneficial effects of delayed umbilical cord clamping⁸, so in the light of the study we could prove to the gynaecologists about the effective timing of cord clamping which may be beneficial to the child in preventing anemia in newborn as well as to develop set recommendations of umbilical cord clamping in our hospital.

Ononeze AB, Hutchon DJ refers to the studies that delaying cord clamping for at least 30 seconds is

associated with less need for blood transfusion and respiratory support, while in 2004, Rabe et al recommended delayed cord clamping for up to 120 seconds in preterm birth.⁹ While in our study we delayed 3 minutes for cord clamping in the study group.

A study conducted by Cernade JMC and workers⁸ with the view to determine effect of timing of cord clamping on venous hematocrit value and clinical outcome at term and concluded that early cord clamping at 15 seconds leads to anemia (haematocrite <45%) which was compared with delayed umbilical cord clamping by 3 minutes at 6th hours of life. At 6th hour of life 8.9% of newborns were anemic in whom early umbilical cord clamping was done versus 0% anemia in whom umbilical cord clamping was delayed by 3 minutes.

While the results of the current study are in agreement with the study mentioned and shows only 4% of the neonates with anemia in delayed clamping group and 13% of the neonates in early clamping group were found anemic.

Two more previous randomised controlled trials on delayed cord clamping have reported beneficial effects on infant Hb, but the infants were followed upto three months of age^{10,11}. Another published trial from Mexico had a follow-up of six months, but did not find a difference in Hb, although the iron status at six months was significantly higher in the delayed cord clamping group. This lack of difference in Hb is most likely due to the fact that iron deficiency was relatively uncommon in the Mexican study population. Hb is normally not affected until iron stores are depleted.

The limitation of the study was that we did not include any side effects/complications of delayed cord clamping but no side effects/complications were observed. However, Kugelman A, and colleagues^{12,13} evaluated the immunologic and infectious consequences of delayed versus immediate cord clamping in premature infants (<35 weeks) during the neonatal period and concluded that delayed compared to immediate cord clamping did not affect the immunologic or the infectious status of infants born even at <35 weeks during the neonatal period, which further adds that delayed cord clamping is safe and no complications found.

Our hypothesis that anemia is more frequent in neonates with early versus delayed umbilical cord clamping is justified with the support of the results of the current study and the studies mentioned above. So by doing simple maneuver like delaying umbilical cord clamping in the neonates we can enhance iron stores and prevent anemia in them and also reduce

the need for iron replacements and blood transfusions in first few years of life and can improve quality of life of our children.

CONCLUSION

Comparison of the frequency of neonatal anemia in early versus delayed umbilical cord clamping demonstrates that neonatal anemia is significantly lower in delayed cord clamping.

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