

Comparison of the Frequency of Neonatal Anemia in Early Versus Delayed Cord Clamping in Babies at Term

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ABSTRACT

Aim: To compare frequency of the anemia in neonates in early versus delayed umbilical cordclamping in term infants.

Study design: Randomized controlled trial.

Place and duration of study: Department of Obstetrics & Gynecology, Divisional Headquarters Hospital Mirpur AJK from 30th January 2021 to 29th July 2021.

Methodology: The study enrolled 96infants which were delivered at term within the gestational range of 37-41 weeks (as assessed on LMP). Those infants who were born to diabetic, sepsis mother or with inborn metabolic errors, jaundice neonatorum or Rh incompatibility and PROM were excluded from the study. Then selected women were placed randomly into two equal groups i.e. Group A (early cord clamping) & Group B(delayed cord clamping) by lottery method. Respective group selection was performed through randomization. In group a neonates, early cord clamping (cord clamping within 15 seconds of birth) was done while in group B neonates, delayed cord clamping (cord clamping after 3 minutes of birth) was done. In both groups, blood sample of all infants was sent after 6 hours of birth for hematocrit level measurement and neonatal anemia was noted.

Results: The mean age in years of patients in group A was calculated as 26.52±5.17 while in group B it was calculated as 27.17±3.89. The age of 80.21% patients was within 18 to 30 years and the mean gestational age was determined as 39.23±1.48 weeks. The mean gestational age in group A was 39.25±1.48 weeks and in group B was 39.21±1.49 weeks. Frequency of neonatal anemia in group A (early cord clamp) versus group B (delayed umbilical cord clamping) was 11 (22.92%) and 04 (8.33%) respectively with p-value of 0.049.

Practical Implication: we recommend that delayed umbilical cord clamping should be preferred in our routine practice for prevention of neonatal anemia.

Conclusion: This study concluded that the neonatal anemia is high after early cord clamping in infants at term as compared to delayed cord clamping

Keywords: Cord Clamping, Delayed, Anemia.

INTRODUCTION

The amount of blood flow from placenta to fetus is termed as placental transfusion^{1,2}. The estimated amount of total blood volume along with the fetal red blood cells as well as hematopoietic stem cells is 25-60 percent in fetoplacental circulation³. This transfusion through placenta post the birth provide an increase of 30% in the blood volume of the neonate.⁴ These additional bloods inform of plasma and red cell-mass provides supplementary iron of 40-50mg/kg amount⁵.

Nutritional supply is dependent on the umbilical cord prior the birth of a fetus. Umbilical cord constitutes of arteries and a single vein where this vein provides fetus oxygen rich nutritious blood. The arteries on the other hand supplies deoxygenated and depleted food from the fetus. Post-delivery the umbilical is separated from the placenta through clamping. Clamping timing varies in various setups with no specified recommendations available for its clamping. The clamping begins 15 seconds to 5 minutes post-delivery as soon as umbilical pulsations stops.⁶⁻⁷ The infant is attached through the umbilical cord with placenta and requires to be cut and clamped two sites. Third staging of labor is the timeline for this procedure which is identified as the time between infant and placenta delivery^{8,9}.

Within the recent WHO active management report on the third stage of labor a description as "cornerstone" has been given in context of obstetric as well as midwifery practicesadapted in 20th century⁹. Active management has included clinician interspersing in the procedure of placental-delivery complete three interconnected practices. This includes the administration of uterotonic-drug

accompanied with the early cord clamping and also cutting. While third as umbilical cord-controlled traction¹⁰.

Studies have revealed a decrease in the blood/kg of body weight up to 20 to 40ml in neonate with early cord-clamping (in the first 5 to 15 seconds of birth) verses delayed clamping (1-3 minutes after birth). There has been a long debate on the fact that early cord clamping escalates the risk of hypovolemic injury as well as loss of iron in new borns.^{3,4} Medical resources, diagnosis, and treatment must improve in developing countries. There are limited resources: access to medical and health resources; knowledge about disease; awareness, trainings, and awareness about health.²⁶⁻³²

MATERIALS AND METHODS

After permission from the ethical review committee, total number of 96 neonates born in the Department of Obstetrics & Gynecology. Informed consent 42 was taken from parents. Demographic characteristics like maternal age, gestational age, parity, maternal anemia, place of living and education status were noted. Then selected women were placed randomly into two equal groups i.e. Group A (early cord clamping) & Group B (delayed cord clamping) by lottery method. Respective group selection was performed through randomization. In group A neonates, early cord clamping (cord clamping within 15 seconds of birth) was done while in group B neonates, delayed cord clamping (cord clamping after 3 minutes of birth) was done. In both groups, blood sample of all infants was sent after 6 hours of birth for hematocrit level measurement and neonatal anemia was noted as per -operational definition. Chi square toll was used for analysis of frequencies where p-value ≤0.05 was taken as significant.

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RESULTS

This study interpreted age median range between 18-40 years with a mean value of 26.82±4.06 years. The mean value of age in group A and group B patients was 26.52±5.17 and 27.17±3.89 years. The age of 80.21% patients was within 18 to 30 years (Table 1). Mean gestational age was 39.23±1.48 weeks. The mean gestational age in group A was 39.25±1.48 weeks and in group B was 39.21±1.49 weeks (Table 2). Mean parity was 3.34±1.11. The parity in group A was 3.23±1.21 and in group B was 3.65±1.02 (Table 3). Out of 96 neonates, 56 (58.33%) were males and 40 (41.67%) were females with male to female ratio of 1.4:1. Mean hematocrit levels of neonates in the group A (ECC group) and group B (DCC group) was 50.25±2.30 and 50.36±2.24 respectively. Distribution of patients according to maternal anemia, place of living and education status (Table 4-6). Frequency of neonatal anemia in group A (early cord clamp) versus group B (delayed cord clamping) was 11 (22.92%) and 04 (8.33%) respectively with p value of 0.049. Stratification of neonatal anemia with respect to age groups, gestational age and parity.

Table 1: Age distribution for both groups (n=96)

Age (yrs)	Group A		Group B		Total	
	No.	%	No.	%	No.	%
18-30	36	75.0	41	85.42	77	80.21
31-40	12	25.0	07	14.58	19	19.79
Mean±SD	26.52±5.17		27.17±3.89		26.82±4.06	

Table 2: Gestational age for both groups (n=96)

Gestational age (weeks)	Group A		Group B		Total	
	No.	%	No.	%	No.	%
37-39	24	50.0	25	52.08	49	51.04
40-41	24	50.0	23	47.92	47	48.96
Mean±SD	39.25±1.48		39.21±1.49		39.23±1.48	

Table 3: Distribution of patients according to parity in both groups (n=96)

Parity	Group A		Group B		Total	
	No.	%	No.	%	No.	%
1-3	28	58.33	26	54.17	54	56.25
4-5	20	41.76	22	45.83	42	43.75
Mean±SD	3.23±1.21		3.65±1.02		3.34±1.11	

Table 4: Distribution of patients according to maternal anemia (n=96)

Maternal anemia	Group A		Group B		Total	
	No.	%	No.	%	No.	%
Yes	12	25.0	12	25.0	24	25.0
No	36	75.0	36	75.0	72	75.0

Table 5: Stratification of neonatal anemia with respect to age groups

Age (years)	Group A		Group B		P value
	Yes	No	Yes	No	
18-30	09	27	04	37	0.075
31-40	02	10	00	07	0.253

Table 6: Stratification of neonatal anemia with respect to gestational age

Gestational age (wks)	Group A		Group B		P value
	Yes	No	Yes	No	
37-39	07	17	04	21	0.269
40-41	04	20	00	23	0.041

DISCUSSION

Umbilical cord connects fetus with placenta and is considered as a significant connection if fetomaternal interface. It provides mobility to the fetus and is essential for the neuro motor development skills of the growing fetuses.¹¹ The stump left post cord clamping sheds off within 5 to 15 days post birth. There has been various research on the timing of cord-clamping wherein the American Academy brought the concept of delayed cord clamping (2 to 3 min post-delivery) as the pulsation ceases, however research has also reported an excessive blood loss in this scenario than early cord clamping cases¹²⁻¹³.

Delayed cord clamping may not seem appropriate in situation where risk of its being forgotten are high or fetal distress rate is increased.¹⁴ In such cases cord milking is conducted for reducing the transfusion of blood as well as to increase the hemoglobin in pre and full-term infants. Augmented iron stores have been related with delayed cord clamping and cord milking however strongly affected the cerebral blood-flow dynamics¹⁵.

In conditions where the delay in umbilical cord clamping is done as 30 to 180 seconds post-delivery, ensures the transfer of placental blood in the newborn resulting in the increase in its iron stores¹⁷⁻¹⁸.

Cernade et al determined a strong association of the cord clamping time on venous-hematocrit value as well as the term clinical outcomes. Early clamping leads to anemia at 6th hour of life in 8.9% of the infant's cases as predicted by their research.¹⁹ Mitra et al in 2009 presented neonatal hemoglobin in the delayed cord clamping group as 17.4±1.0 in comparison to the 16.14±1.1 at 6 hours of delivery.²⁰ Similar has been reported in the present study results.

A research from Pakistan also elaborated the fact that mean hematocrit in early cord clamping group versus delayed cord clamping group the levels were as 34.2±2.4 and 45.7±4.2 respectively. The variance within both group values was statistically significant (p <0.001). Normal hematocrit (43.6±7.2) were observed only in 15% of the early cord clamping cases while it was observed 85% of the delayed cord clamping group respectively. In the present study result the hematocrit levels as well as variance is a result of the variables differences.²⁰⁻²¹ Rabeet al²² reviewed seven randomized controlled trials and in them he and his colleagues compared early as well as delayed cord clamping in more than 290 preterm infants. Similarly, a study conducted by Strauss et al²³ on 105 preterm-neonates found delayed cord clamping as a better choice where red blood cells amount increased as well as of the weekly hematocrit values were observed higher.

The present study also found similar findings. Delayed cord clamping is related with decreased anemia but also with the risk of polycythemia as well as hyperbilirubinemia. The current study however did not research these two terms which were elaborated in the Van Rheenen et al²⁴ review wherein it presented results with 12% upsurge in the risk of hyperbilirubinemia.

CONCLUSION

This study concluded that the neonatal anemia is high after early cord clamping in infants at term as compared to delayed cord clamping. So, we recommend that delayed umbilical cord clamping should be preferred in our routine practice for prevention of neonatal anemia.

Conflict of interest: Nil

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