



Early versus Delayed cord clamping in Term neonates.

Samina Mumtaz¹, Shagufata Tabassum², Saima Afzal³

1. MBBS, FCPS
Consultant Gynecologist
Nishtar Hospital, Multan.
2. MBBS, FCPS
Assistant Professor Gynea & Obst
Nishtar Hospital, Multan.
3. MBBS, FCPS
Consultant Gynecologist
THQ Hospital, Multan.

Correspondence Address:

Dr. Samina Mumtaz
Department of Gynecologist
Nishtar Hospital, Multan.
dr_samina14@hotmail.com

Article received on:

15/02/2020

Accepted for publication:

24/09/2020

ABSTRACT... Objective: To compare mean hemoglobin levels of neonates after early and late cord clamping. **Study Design:** Randomized Controlled Trial. **Setting:** Department of Obstetrics & Gynaecology at Nishtar Hospital Multan. **Period:** June 2019 to December 2019. **Material & Methods:** A total of 60 women booked and unbooked were included in study. Selected patients randomized into group A and B, each group comprising of 30 patients depending upon the envelope with assigned treatment (either early or delayed cord clamping) picked up by the patient. **Results:** In present study, two groups were made. Group A consisted of 30 neonates in whom early cord clamping was done while in group B delayed clamping was done in 30 neonates. Mean age of mothers was 28.4 ± 0.4 vs. 28.6 ± 0.5 years in group A and B respectively. There were 25 mothers (83.3%) in group A and 21 mothers (70%) in group B between 25–30 years. There were 5 mothers (16.7%) in group A and 8 mothers (26.7%) in group B between 31–35 years of age. While none of the mother in group A and 1 mother (3.3%) in group B was between 36–40 years of age. Mean parity of the mothers was 1.1 ± 0.2 vs. 1.4 ± 0.2 in group A and B respectively. Eight mothers (85.4%) in group A and 7 mothers (82.5%) in group B were primipara. While 22 mothers (14.6%) in group A and 23 mothers in group B (17.5%) were para 1–3. Gestational age was 37–38 weeks in 13(43.3%) vs. 19(63.3%) women in group A and B respectively. While there were 17(56.7%) vs. 11(36.7%) women in group A and B respectively of the gestational age 39–40 weeks. Pre-delivery maternal mean hemoglobin levels was 11.9 ± 0.1 gm/dl vs. 12.3 ± 0.1 gm/dl in group A and B respectively. Pre-delivery maternal hemoglobin levels were 10–10.9 g/dl in 2 mothers (6.7%) vs. 1 mother (3.3%) in group A and B respectively. Neonatal mean hemoglobin levels were 16.8 ± 0.2 g/dl vs. 17.7 ± 0.1 g/dl in group A and B respectively. Out of the 31 booked mothers, neonatal mean hemoglobin level was 16.8 ± 0.2 g/dl vs. 17.9 ± 0.1 g/dl in group A and B respectively. While out of the 29 unbooked mothers, neonatal mean hemoglobin level was 16.7 ± 0.2 g/dl vs. 17.5 ± 0.1 g/dl in group A and B respectively. When compared the neonatal mean hemoglobin levels, there was significant difference between mean hemoglobin levels of neonates between the two groups ($p=0.000$). **Conclusion:** Delayed cord clamping in term neonates for a minimum of 2 minutes at birth is beneficial to the newborn in terms of improved hemoglobin levels. There is no significant difference seen in pre-delivery maternal hemoglobin levels and neonatal hemoglobin either in delayed cord clamping group or in early cord clamping group.

Key words: Delayed Cord Clamping, Early Cord Clamping, Neonatal Anemia.

Article Citation: Mumtaz S, Tabassum S, Afzal S. Early versus Delayed cord clamping in Term neonates. Professional Med J 2021; 28(5):656-660.
<https://doi.org/10.29309/TPMJ/2021.28.05.4578>

INTRODUCTION

Erasmus Darwin quoted “Another thing very injurious to the child is the tying and cutting of the navel string too soon which should always be left till the child has not only repeatedly breathed but till all the pulsation in the cord ceases. As otherwise the child is much weaker than it ought to be, a portion of blood being left in the placenta, which ought to have been in the child”.¹

The umbilical cord is the important connection between fetus & placenta to keep baby alive. It is a vital for fetal and maternal exchange of nutrients & waste products while allowing mobility of fetus that is pivotal for growth and neuro motor development of fetus.²

Once the fetus is born, umbilical cord is cut & the left stump should be dried & fall off within 5 to 15

days of birth.³

Delayed cord clamping is defined by American Pediatrics Academy, is ligation of umbilical cord after 2 to 3 minutes of birth or at stopping of pulsation, will lead to a heavy amount of blood transfusion from placenta towards the baby than clamping of cord done immediately at birth.^{4,5}

According to WHO recommendations, delayed cord clamping is recommended for improved mother and baby health & nutritional outcomes. Delayed cord clamping is ligation of cord after one minute of delivery.⁶

According to WHO early cord clamping for active third stage labor management is not recommended now.⁷

Delayed cord clamping after 2 to 3 minutes decrease the risk of iron deficiency anemia till 8 months of infancy as compared to early cord clamping at less than 1 minute that is immediately after delivery.⁸

Delaying the clamping of cord allows the time to transfer the fetal blood from placenta to the body at the time of birth. This transfusion of placental blood will give the infant with an extra 40% volume of blood.⁹

The placental blood transferred to the baby depends mainly on the time when the cord is clamped. Neonatal benefits associated with this cord clamping are high hemoglobin concentrations, less anemia in infancy, additional iron stores & better cardiopulmonary adaptation.^{10,11}

Delaying the clamping of cord is linked with improved developmental milestones till 4 years of age.¹²

An observational study of 109 home births where delayed cord clamping was performed indicated a higher spO₂ combined with lower heart rate during first minutes.¹³

Developing countries like Pakistan, with paucity

of resources and increase rate of infection transmission via transfusion of blood, the vital role of a decrease need for blood transfusion would be of great importance.

Delaying the clamping of cord as compared to early cord clamping lead to improved iron reserves & reduce incidence of iron depletion at age of 6 months, and a decrease incidence of anemia. As iron depletion in neonates even without anemia has been associated with impaired development, delayed clamping seems to be of great importance in full term neonates.

Delayed cord clamping is simple safe & effective and should be implemented in all deliveries.^{14,15}

MATERIAL & METHODS

This RCT randomized controlled trial was carried out in Obstetrics & Gynecology department Nishtar Hospital Multan from June 2019 to December 2019. Taking the two group mean + S.D. as 17.83+2.3 and 19.4 +1.98, with 80% power of test and 95% confidence interval, sample size is: n= 60 with 30 in each group. Sampling technique was non-probability purposive.

RESULTS

In present study, two groups were made. Group A consisted of 30 neonates in whom early cord clamping was done while in group B delayed clamping was done in 30 neonates. Mean age of mothers was 28.4±0.4 vs. 28.6±0.5 years in both groups respectively. There were 25 mothers (83.3%) in group A and 21 mothers (70%) in group B between 25–30 years. There were 5 mothers (16.7%) in group A and 8 mothers (26.7%) in group B between 31–35 years of age. While none of the mother in group A and 1 mother (3.3%) in group B was between 36–40 years of age as shown in Table-I.

Age (in years)	Group A	Group B
25 – 30	25(83.3%)	21(70%)
31 – 35	5(16.7%)	8(26.7%)
36 – 40	0(0.0%)	1(3.3%)
Total	30(100%)	30(100%)

Table-I. Age distribution of the mothers

Mean parity of the mothers was 1.1 ± 0.2 vs. 1.4 ± 0.2 in group A and B respectively. Eight mothers (85.4%) in group A and 7 mothers (82.5%) in group B were primipara. While 22 mothers (14.6%) in group A and 23 mothers in group B (17.5%) were para 1–3 (Table-II).

Gestational age was 37–38 weeks in 13(43.3%) vs. 19(63.3%) women in both groups respectively. While there were 17(56.7%) vs. 11(36.7%) women in group A and B respectively of the gestational age 39–40 weeks (Table-III).

Pre-delivery maternal hemoglobin levels were 11.9 ± 0.1 gm/dl vs. 12.3 ± 0.1 gm/dl in group A and B respectively. Pre-delivery maternal hemoglobin levels were 10–10.9 g/dl in 2 mothers (6.7%) vs. 1 mother (3.3%) in group A and B respectively (Table-IV).

There were 15 mothers (50%) vs. 16 mothers (53.3%) in group A and B respectively who were booked while un-booked mothers were 15(50%) vs. 14(46.7%) in both groups respectively (Table-V).

Neonatal mean hemoglobin levels were 16.8 ± 0.2 g/dl vs. 17.7 ± 0.1 g/dl in group A and B respectively (Table-VI).

Out of the 31 booked mothers, neonatal mean hemoglobin level was 16.8 ± 0.2 g/dl vs. 17.9 ± 0.1 g/dl in group A and B respectively. While out of the 29 un-booked mothers, neonatal mean hemoglobin level was 16.7 ± 0.2 g/dl vs. 17.5 ± 0.1 g/dl in group A and B respectively (Table-VII).

When we compared the neonatal mean hemoglobin levels, there was significant difference between mean hemoglobin levels of neonates between the two groups ($p=0.000$).

Parity	Group A	Group B
Primipara	8(85.4%)	7(82.5%)
1 – 3	22(14.6%)	23(17.5%)
Total	30(100%)	30(100%)

Table-II. Parity distribution of the mothers

Age (in weeks)	Group A	Group B
37 – 38	13(43.3%)	19(63.3%)
39 – 40	17(56.7%)	11(36.7%)
Total	30(100%)	30(100%)

Table-III. Gestational age distribution of the mother

Hemoglobin Level (g/dl)	Group A	Group B
10 – 10.9	2(6.7%)	1(3.3%)
11 and above	28(93.3%)	29(96.7%)
Total	30(100%)	30(100%)

Table-IV. Pre-delivery maternal hemoglobin levels of the mothers

Booking Status	Group A	Group B
Booked	15(50%)	16(53.3%)
Unbooked	15(50%)	14(46.7%)
Total	30(100%)	30(100%)

Table-V. Booking status of the mothers

Variable	Group A Mean \pm S.E.M.	Group B Mean \pm S.E.M.
Age of mother (in years)	28.4 ± 0.4	28.6 ± 0.5
Maternal hemoglobin level (g/dl)	11.9 ± 0.1	12.3 ± 0.1
Parity	1.1 ± 0.2	1.4 ± 0.2
Neonatal hemoglobin level (g/dl)	16.8 ± 0.2	17.7 ± 0.1

Table-VI. Descriptive statistics

Booking Status	Hemoglobin Level Group A (Mean \pm S.D.)	Hemoglobin Level Group B (Mean \pm S.D.)
Booked	16.8 ± 0.2	17.9 ± 0.1
Unbooked	16.7 ± 0.2	17.5 ± 0.1

Table-VII. Mean hemoglobin level of neonates in relation to booking status of mothers

DISCUSSION

There is a debate about the optimal time for cord clamping at delivery. The important point of discussion is mother and baby safety. Many medical professionals used to do cord clamping and transfer the baby as quickly as possible. Neonates of under developed and developing countries are the main victims of early cord clamping, as this creates a hindrance in a free

of cost way of enhancing their small iron stores. In neonates born after uneventful pregnancies, delayed cord clamping had reasonable increase on iron levels at 4 months of birth with high ferritin levels, reduce iron deficiency anemia. In early neonatal period, less anemia is seen in the group in which delayed clamping of cord done. There seems to be no mentionable difference among the groups related to respiratory symptoms and need of phototherapy.^{11,12} There are certain benefits and harmful effects in early versus delayed cord clamping.

Benefits of early cord clamping are avoidance of postpartum hemorrhage, quick resuscitation of the baby, and stem cells harvestation. Delayed cord clamping gives time for placental blood transfusion to the baby, which can give the infant with an added 30% volume of blood, thereby preventing the anemia without increase jaundice risk or complications of hyper viscosity, polycythaemia.¹³

The pulmonary perfusion has only 8% cardiac output in utero but increases to 45% at birth, and the extra intravascular volume expansion helps the cardiopulmonary transition. Delaying the clamping of cord also reduce the risk of fetomaternal transfusion, which is important in Rh negative mother. In preterm babies, the incidence of cerebral hemorrhage is decreased. Infant anemia is linked with increased mortality and morbidity with impaired neuro motor system development. Its prevention is of prime importance and delayed umbilical cord clamping could be an effective way to decrease anemia and improve neonatal outcome.

Hyper viscosity and hyperbilirubinemia are potential consequences of placental transfusion but the safety of delayed cord clamping in appropriate-for-gestational-age term infants has been proved. There is lack of information on delayed cord clamping in small-for-gestational-age (SGA) infants. SGA infants from industrialized nations often manifest an increased rate of polycythemia caused by chronic hypoxemia in intrauterine life leading to increased erythropoiesis. These neonates are at high risk

of symptoms and clinical consequences of hyper viscosity.¹⁴

At first minutes of birth, the newborn receives a significant amount of transfusion of blood from the placenta. Baby kept 10 cm below the maternal abdomen at one to three minutes of birth increases its blood volume of 32%. Delayed clamping, defined as umbilical cord ligation at 2–3 minutes at birth or when pulsations stops, will result in a large transfusion of blood from placenta than early clamping of cord performed immediately after birth.¹⁵

Maternal hemoglobin levels were measured before delivery and no significant difference was observed in hemoglobin level of newborns in the same manner other complications of delayed cord clamping like hyperbilirubinemia hyper viscosity syndrome were not found in the newborns including in the study.

The study was conducted on a smaller number of patients. It is suggested that a larger multi-center study should be conducted in future.

CONCLUSIONS

Delaying clamping of the umbilical cord in full-term neonates for a minimum of 2 minutes following birth is of benefit to the baby in terms of hemoglobin levels. There is no significant difference observed with pre-delivery maternal hemoglobin levels and neonatal hemoglobin either in delayed cord clamping group or in early cord clamping group.



Copyright© 24 Sep, 2020.

REFERENCES

1. Dunn PM. Dr. **Erasmus darwin (1731-1802) of lichfield & placental respiration.** Arch Dis Child Fetal Neonata Ed.2003; 88: F346-F348.
2. Bosselmann S, Mielke G. **Sonographic assessment of umbilical cord.** Geburtshilfe & Frauenheilkunde 2015; 75(8) 808. <https://doi.org/10.1055/s-0035-1557819>. **PMid:** 26366000. **PMCID:** 4554503.
3. CarloWA, Ambalavanan N, Kilegman RM et al eds. **Nelson Textbook of pediatrics.** 20th ed Philadelphia, PA: Elsevier; Chap 105,2016.

4. Jaiswal P, Upadhyay A, Gothwal S, Chaudhary H, Tandon A. **Comparison of umbilical cord milking & delayed cord clamping on central blood flow in term neonates.** The Indian Journal of Pediatrics. 2015; 82 (10): 890-5. <https://doi.org/10-1007/S12098>.
5. McDonald SJ, Middleton P. **Effect of timing of umbilical cord clamping of term infants on maternal & neonatal outcomes.** Cochrane Database Syst Rev. 2008; 2 (2): CD004074. <https://doi.org/10-1002/14651858 CD004074-pub2>.
6. **WHO Guidelines; Delayed umbilical cord clamping for improved maternal & infant health and nutrition outcomes.** Geneva, World Health Organization; 2014. <https://who.int/nutrition/publications/cord.clamping>.
7. Jelin AC, Kuppermann M, Erickson K et al. **Obstetrician's attitudes & beliefs regarding umbilical cord clamping.** J Matern Neonatal Med 2014; 27 (14):1457-61.
8. Ashish KC, Nalini Singhal, Jageshower Gautum et al. **Effect of early versus delayed cord clamping in neonate on heart rate, breathing & oxygen saturation during first 10 minutes of birth randomized clinical trial.** J Maternal health, Neonatology & Perinatology. 2019, 5:7.
9. Farrar D, Airey R, Law GR, et al. **Measuring placental transfusion for term births; weighing babies with cord intact.** BJOG An Int J Obstet Gynaecol 2011; 118(1): 70-5.

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Samina Mumtaz	1st Author	
2	Shagufta Tabassum	2nd Author	
3	Saima Afzal	3rd Author	