

TO STUDY THE EFFECTS OF DIFFERENT TIMING OF DELAYED CORD CLAMPING ALONG WITH MILKING ON HAEMATOLOGICAL PARAMETERS IN NEWBORNS - A RANDOMIZED CONTROL TRIAL

PRATIBHA PILANIA¹, URMILA MAHALA^{1*}, OM PRAKASH²

¹Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur, Rajasthan, India. ²Department of PMR, SMS Medical College, Jaipur, Rajasthan, India. Email: urmilamahala4@gmail.com

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ABSTRACT

Objectives: Evaluation of the hematological parameter in newborn by delayed cord clamping at 60 s and at 180 s. Comparison of the improvement in hematological parameters, that is, hemoglobin and serum ferritin in newborn by both methods.

Methods: This was randomized, controlled, and comparative study conducted during April 2021 to February 2022 at the Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur. The study included sample size of 60 cases (30 cases in each group). 60 cases were randomly allocated to either 60 s (Group A) or 180 s (Group B) groups of delayed cord clamping. The study included all singleton pregnant women >34 weeks of gestational age.

Results: Mean hemoglobin \pm standard deviation of neonate at birth for Group A was 13.53 ± 0.56 g/dL and for Group B it was 13.85 ± 0.55 g/dL. Mean hemoglobin \pm standard deviation at 6 month for Group A was 13.19 ± 0.53 g/dL and for Group B was 13.53 ± 0.55 g/dL. Mean serum ferritin \pm standard deviation of infant at for Group A was $12.46 \pm 0.45\%$ and for Group B was $12.86 \pm 0.55\%$.

Conclusion: Neonatal hemoglobin and serum ferritin were significantly higher in 180 s delayed cord clamping as compared to 60 s delayed cord clamping group.

Keywords: Delayed cord clamping, Hematological parameters, Singleton pregnant women.

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INTRODUCTION

Delayed cord clamping (usually from 30 s to more than 5 min) appears to be beneficial for term and preterm infants [1,2]. In a series of studies it was reported that 80-100 ml of blood transfers from placenta to newborn in the first 3 min after birth and up to 90% of that blood volume transfer was achieved in first few breaths in healthy term baby. In preterm infants, rates of IVH and NEC are lower and fewer newborns require transfusion when delayed umbilical cord clamping is employed. Placental transfusion of blood into the newborn by DCC result in increasing extrauterine weight, blood volume, and hemoglobin concentration, thereby increasing infant iron stores [3]. Umbilical cord milking has been considered as a method of achieving increased placental transfusion to the newborn in a rapid time frame, usually <10-15 s. This is an area of active research, and several ongoing studies are evaluating possible benefits and risks of umbilical cord milking.

The WHO recommends that the umbilical cord not to be clamped earlier than 1 min after birth in term or preterm infants who do not require positive pressure ventilation [4]. Recent neonatal resuscitation program guidelines from the American Academics of Paediatrics recommend delayed umbilical cord clamping for at least 30-60 s for most vigorous term and preterm infant.

Anemia due to iron deficiency is a major neonatal health issue, 70% of infants between 6 and 11 months of age were found to be anemic. Iron is the important factor in development of brain, including myelination, dendritogenesis, functioning of neurotransmitter, glial and neuronal energy metabolism and its deficiency has been associated with impaired motor and behavioral development [5]. Iron deficiency can be prevented by various methods such as delayed cord clamping and milking of cord.

METHODS

This was randomized, controlled, and comparative study conducted during April 2021 to February 2022 at Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur. The study included sample size of 60 cases (30 cases in each group). 60 cases were randomly allocated to either 60 s (Group A) or 180 s (Group B) groups of delayed cord clamping. The study included all singleton pregnant women >34 weeks of gestational age.

Selection criteria

Inclusion criteria

All the singleton pregnant women >34 weeks admitted in the labor room who gave consent to be the part of study were included in the study.

Exclusion criteria

The following criteria were excluded from the study:

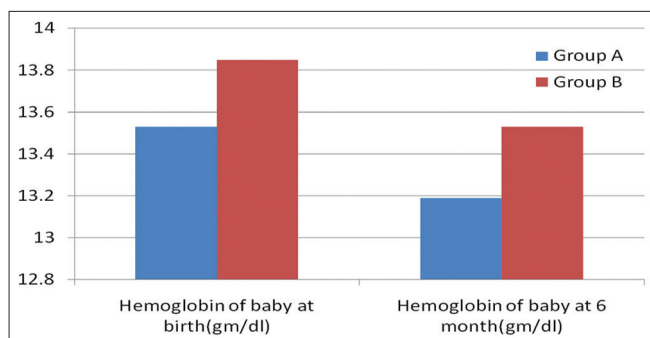
1. Medical conditions complicating pregnancy such as Rh incompatibility, heart disease, jaundice, epilepsy, and diabetes.
2. Pregnancy associated complications such as preeclampsia, eclampsia, gestational diabetes mellitus, pregnancy induced cholestasis, ante partum hemorrhage, and severe anemia.
3. Fetal conditions such as IUGR, birth asphyxia and respiratory distress, hydropsfetalis, and other congenital anomalies.
4. Women who participating in any other study.

RESULTS

In this study, we observed 60 patients admitted at Department of Obstetrics and Gynaecology, SMS Medical College Jaipur. Out of 60 patients majority of the patients that is 43.33% were from 25 to 28 years of age.

Table 1: Distribution of patients according to neonatal hemoglobin

Hemoglobin of Baby (g/dl)	Group A		Group B		p-value
	Mean	SD	Mean	SD	
At birth	13.53	0.56	13.85	0.55	0.02
At 6 months	13.19	0.53	13.53	0.55	0.01



Here, we found that mean hemoglobin of neonate at birth for Group A was 13.53±0.56 g/dl and for Group B it was 13.85±0.55 g/dL. Mean hemoglobin at 6 months for Group A was 13.19±0.53 g/dl and for Group B it was 13.53±0.55 g/dl. There was significant difference seen in both group (p<0.05) (Table 1).

Here, we found that mean serum ferritin of neonate at 6 months was 12.46±0.45% in Group A and 12.86±0.55% in Group B. The p value was 0.02. There was significant difference found in this group (p<0.05).

DISCUSSION

Placental transfusion is the transfer of placental blood to the infant during the first few minutes after birth [6]. This procedure is associated with the lower rates of mortality in preterm infants and with the prevention of iron deficiency anemia in term neonates [7,8] (Table 2).

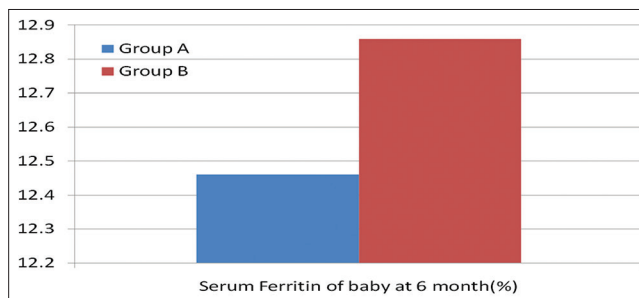
Placental transfusion can be performed through the traditional delayed cord clamping or umbilical cord milking and may represent an important procedure for ensuring the newborn a smooth transition to extra-uterine life. Delayed cord clamping and umbilical cord milking can in fact both enhance arterial oxygen content and hemodynamic stability and can be easily provided also in low-resource settings.

Songthamwat et al. [9] found that maternal age for delayed cord clamping group at 30 s was 28.6 years and gestational age was 38.9 weeks and for delayed cord clamping at 1 min group it was 29 years and gestational age was 38.8 weeks. In the present study, maternal age for delayed cord clamping group at 60 s was 26.8 years and gestational age was 36.9 weeks and for delayed cord clamping at 1 min group it was 26.63 years and gestational age was 37 weeks. There is no significant correlation maternal age, gestational age, and hematological parameters of newborns.

In our study, group male neonates were 53.3% and 43.3% male neonates in Group B. About 56.6% patients in Group A and 73.3% patients in Group B were middle class. Majority 83.3% patients in Group A and 86.6% patients in Group B had normal BMI. About 80% patients in Group A and 96.6% patients in Group B were of rural. Majority 70% patients in Group A and 50% patients in Group B were unbooked. Majority 40% patients in Group A and Group B were of gravida [2]. About 46.6% patients in Group A and 53% patients in Group B used LSCS as mode of delivery. Mean weight of neonate in Group A was 2.66 kg and for Group B it was 2.77 kg. Mean maternal Hb for Group A was 11.88 g/dl and for Group B it was 11.89 g/dl. They all are not significant in hematological parameters outcome.

Table 2: Distribution of patients according to serum ferritin of neonate

Serum ferritin of baby (%)	Group A		Group B		p-value
	Mean	SD	Mean	SD	
At 6 months	12.46	0.45	12.86	0.55	0.02



Gupta et al. also demonstrated that mean hemoglobin and ferritin at 3 months of age were significantly higher in delayed cord clamping group [10]. The largest trial to evaluate the effect of delayed cord clamping was done on 476 term babies by Chaparro et al. [11] in Mexico. They did serial evaluation of hematological parameters from birth till 6 months of age and reported higher mean corpuscular volume, ferritin, body iron, and stored iron. Songthamwat et al. [9] demonstrated that mean neonatal hemoglobin level was higher in the delayed cord clamping group (18.1 g/dl vs. 16.4 g/dl).

In our study, mean hemoglobin of neonate at birth for Group A was 13.53 g/dl and for Group B it was 13.85 g/dl. Mean hemoglobin at 6 months for Group A was 13.19 g/dl and for Group B it was 13.53 g/dl. Mean serum ferritin of neonate at 6 months was 12.46% in Group A and 12.86% in Group B. Neonate hemoglobin and ferritin value significantly high in delayed cord clamping at 180 s in comparison with delayed cord clamping at 60 s.

CONCLUSION

Neonatal hemoglobin and ferritin were significantly different following DCC; at 60 s and at 180 s. The longer the time we got better result. Therefore, 180 s DCC should be considered for neonatal anemic prevention when compared with 60 s DCC.

AUTHORS CONTRIBUTION

All the authors contributed to the preparation of the final manuscript.

CONFLICT OF INTEREST

None.

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