



ORIGINAL RESEARCH PAPER

Obstetrics & Gynaecology

EFFECT OF DELAYED VERSUS EARLY CORD CLAMPING ON HEMOGLOBIN AND SERUM BILIRUBIN LEVELS IN TERM INFANTS: A PROSPECTIVE COMPARATIVE STUDY

KEY WORDS: Delayed cord clamping, Early cord clamping, term neonates, hemoglobin, hyperbilirubinemia, anemia.

Dr. Shilpi Soni*	Junior Resident, Index medical College, Hospital and Research Centre, Indore *Corresponding Author
Dr. Pooja Deodhar	HOD and Professor, Index Medical College and Research Centre, Indore
Dr. Apoorva Singh	Junior Resident, Index Medical College, Hospital and Research Centre, Indore

ABSTRACT	Delayed cord clamping (DCC) has been advocated as a simple intervention to improve neonatal hematological outcomes, particularly in term infants. However, concerns regarding hyperbilirubinemia continue to limit its universal implementation. Objectives-To compare the effect of delayed cord clamping and early cord clamping on hemoglobin and hyperbilirubinemia in term neonates. Methods-This prospective comparative study was conducted over 18 months in a tertiary care teaching hospital. One hundred term neonates (<37 weeks gestation) were randomly allocated into two groups. In the early cord clamping (ECC) group (n=50), the umbilical cord was clamped within 30 seconds of birth, whereas in the delayed cord clamping (DCC) group (n=50), clamping was performed after 120 seconds. Hemoglobin and total serum bilirubin and incidence of neonatal anemia and significant jaundice were compared between the groups. Results-Mean hemoglobin was significantly higher in the DCC group than in the ECC group (14.13±2.08 vs 13.0±2.56 g/dL;p=0.007). Neonatal anemia (Hb <14.5 g/dL) occurred in 42% of infants in the DCC group compared with 72% in the ECC group (p=0.003). Significant hyperbilirubinemia (TSB >11 mg/dL) was observed in 26% and 22% of neonates in the DCC and ECC groups, respectively, with no statistically significant difference (p=0.639). No case of polycythemia was recorded. Conclusion- Delayed cord clamping for 120 seconds significantly improves hemoglobin concentration in term neonates without increasing clinically significant hyperbilirubinemia. DCC should be considered a safe and effective strategy for stable term deliveries.
----------	--

INTRODUCTION

Term birth remains a major contributor to neonatal morbidity and mortality worldwide. Premature infants are at increased risk of anemia, hemodynamic instability and intraventricular hemorrhage because of reduced blood volume and immature physiological adaptation. Umbilical cord clamping is one of the few modifiable interventions capable of influencing neonatal blood volume immediately after birth. Delayed cord clamping facilitates placental transfusion and improves neonatal iron stores and circulatory stability. Although several studies have demonstrated hematological benefits of DCC, concerns regarding jaundice and polycythemia have prevented widespread acceptance. Therefore, the present study aimed to compare the effects of delayed and early cord clamping on hematological parameters and hyperbilirubinemia in term infants.

CASE STUDY

Materials and Methods

Study Design

Prospective comparative study.

Study Duration

June 2024 to December 2025.

Participants

A total of 100 term neonates (<37 weeks) were enrolled.

Inclusion Criteria

Gestational age <37 weeks.
Active labor.
Written informed consent.

Exclusion Criteria

Congenital malformations.
Severe maternal illness.
Neonates requiring immediate resuscitation.

Intervention

ECC group (n=50):Cord clamped within 30 seconds.
DCC group (n=50):Cord clamped after 120 seconds.

210

Outcome Measures

Primary outcomes:

Hemoglobin.
Total serum bilirubin.

Secondary outcomes:

Neonatal anemia.
Significant jaundice.
Polycythemia.

Statistical Analysis

Data were analyzed using SPSS version 26.Student's t-test and Chi-square test were used. A p value <0.05 was considered statistically significant.

RESULT

Table 1- Baseline characteristic of study population

Variable	ECC (n=50)	DCC (n= 50)	P- value
Gestational Age	35.56+- 1.24	35.38 +- 1.22	0.360
Birth weight (kg)	2.24 +- 0.12	2.25 +- 0.14	0.741
Vaginal delivery	41%	26%	0.051
LSCS %	58%	74%	

No statistically significant differences were observed between the two groups with respect to baseline characteristics

Table 2- Comparison of Apgar scores

Apgar	ECC	DCC	P- value
At 1 min	6.42+- 0.52	6.58 +-0.54	0.001
At 5 min	8.54 +-0.52	8.58+- 0.54	0.707

Apgar scores at 1 and 5 minutes were comparable between the two groups.

Table 3: Comparison of hemoglobin

Parameter	ECC	DCC	P value
hemoglobin	13 +- 2.56	14.13 +-2.08	0.007

Mean hemoglobin values were significantly higher in the delayed cord clamping group

Table 4: Incidence of Neonatal Anemia

www.worldwidejournals.com

Variable	ECC	DCC	P- value
Hb <14.5 g/dL	36	21	0.003
Hb <11 g/dl	13	3	0.006

The incidence of neonatal anemia was significantly lower in the DCC group.

Table 5: Comparison of serum bilirubin levels

Parameter	ECC	DCC	P value
Total serum bilirubin (mg/dL)	9.38 +- 1.62	9.82 +- 1.74	0.193

No significant difference in mean serum bilirubin levels was observed between the groups.

Table 6: Incidence of hyperbilirubinemia

Variable	ECC %	DCC %	P-VALUE
TSB > 11 mg/dL	22 %	26%	0.639

The incidence of significant hyperbilirubinemia was comparable between the groups

Table 7: Polycythemia and safety outcomes

Outcome	ECC	DCC
Polycythemia (>65%)	0	0
Lowest hb (g/dL)	7.1	11.2
Highest hb (g/dL)	16.8	19.2

No cases of polycythemia were observed in either group

DISCUSSION

The present study demonstrated that delayed cord clamping significantly improved hematological outcomes in term infants. Mean hemoglobin values were significantly higher among infants receiving delayed cord clamping. Furthermore, the incidence of neonatal anemia was markedly reduced.

These findings are in agreement with the studies by Fogarty et al., Rabe et al., and Tarnow-Mordi et al., which reported improved blood volume and reduced anemia following delayed cord clamping.

Despite concerns regarding jaundice, the present study found no significant increase in hyperbilirubinemia among neonates undergoing DCC. Similarly, no infant developed polycythemia, confirming the safety of a 120-second delay.

The findings support delayed cord clamping as a physiological method of placental transfusion that provides improved hematological stability without increasing neonatal morbidity.

CONCLUSION

Delayed cord clamping for 120 seconds significantly increases hemoglobin levels and reduces neonatal anemia in term infants without increasing clinically significant hyperbilirubinemia or polycythemia. Routine implementation of delayed cord clamping should be encouraged in stable term deliveries.

REFERENCES:

- Mercer JS, Vohr BR, McGrath MM, Padbury JF, Wallach M, Oh W. Delayed cord clamping in very term infants reduces the incidence of intraventricular hemorrhage and late-onset sepsis: a randomized controlled trial. *Pediatrics*. 2006;117(4):1235-42.
- Rabe H, Diaz-Rossello JL, Duley L, Dowswell T. Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at term birth on maternal and infant outcomes. *Cochrane Database Syst Rev*. 2012;8:CD003248.
- Fogarty M, Osborn DA, Askie L, Seidler AL, Hunter K, Lui K, et al. Delayed versus early umbilical cord clamping for term infants: a systematic review and meta-analysis. *Am J Obstet Gynecol*. 2018;218(1):1-18.
- Tarnow-Mordi W, Morris J, Kirby A, Robledo K, Askie L, Brown R, et al. Delayed versus immediate cord clamping in term infants. *N Engl J Med*. 2017;377(25):2445-55.
- Upadhyay A, Gothwal S, Parihar R, Garg A, Gupta A, Chawla D. Effect of delayed cord clamping in term neonates: a randomized controlled trial. *Indian Pediatr*. 2013;50(2):187-91.
- World Health Organization. Delayed umbilical cord clamping for improved maternal and infant health and nutrition outcomes. Geneva: World Health Organization; 2014.
- American College of Obstetricians and Gynecologists' Committee on Obstetric Practice. Delayed umbilical cord clamping after birth. *Obstet Gynecol*. 2020;136(6):e100-e106