

Umbilical Cord Clamping Time in Premature Infants

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Abstract

This paper provides a brief overview of benefits of delayed cord clamping according to the early clamping after birth.

Introduction: Optimal timing of cord clamping has long been a controversial issue. Recently many studies have shown that delayed cord clamping leads to remarkable decreases in risks of morbidity such as intraventricular haemorrhage, necrotising enterocolitis, hypoperfusion, need for transfusion and optimal haemoglobin haematocrit levels in preterm infants.

Conclusion: Delayed clamping of the umbilical cord will ensure more positive outcomes in preterm neonates.

Keywords Umbilical cord; Clamping time; Premature

Introduction

Increasing survival rates in extremely preterm infants depending upon improvement of intensive care facilities in the last 20 years, research is focused on discharging these infants with the least possible morbidity. Optimal timing of cord clamping has long been a controversial issue. Until recently, the general practise was to clamp the cord immediately after birth. Many studies have shown that delayed cord clamping leads to remarkable decreases in risks of morbidity such as intraventricular haemorrhage and necrotising enterocolitis in preterm infants. Delayed cord clamping provides an additional 20 to 30 ml of blood from the placenta to the infant and this additional blood volume is linked with neonatal benefits including better systemic pressure, a reduced need for inotropic support and fewer blood transfusions [1-9].

Because of these reported benefits, delaying cord clamping for at least 60 s when possible is recommended with a grade of A in the European Consensus Guidelines on Management of Neonatal RDS in Preterm Infants [10].

Although the optimal time of umbilical cord clamping for premature infants is still controversial, delayed cord clamping is accepted as reliable and has been widely implemented in recent years [10-14]. Concerns surrounding delayed cord clamping are related to delays in urgently needed resuscitation, hypothermia and development of hypertension and polycythaemia due to overload [15]. There was no increase in adverse side effects in several large-scale meta-analyses. The meta-analyses carried out so far have shown no differences between delayed cord clamping and early cord clamping groups in terms of APGAR scores and body temperatures taken on admission to the newborn unit. Clamping was delayed for 30 to 180 s in the studies evaluated in these meta-analyses. One study that evaluated the requirement for resuscitation did not show a difference between delayed cord clamping and early cord clamping groups in terms of routine and advanced requirements for resuscitation [16].

Furthermore, Klaempf et al. reported that the need for resuscitation in the delivery room was lower in the delayed cord clamping group [17].

Umbilical cord milking can be seen as an alternative to delayed cord clamping because it provides quicker placental transfusion, particularly under conditions in which preterm infants require urgent resuscitation. In recent years, delayed cord clamping has been performed at the mother's bedside concurrently with the resuscitation process, which has been carried out by means of a trolley that contains a gas flow meter, gas blender, and t-piece resuscitator. This equipment enables clinicians to continue resuscitation with an intact umbilical cord before clamping it. Because this equipment has had positive results so far, its use is likely to become widespread [18-24].

Delayed cord clamping enables transfer of the residual blood in the placenta to the baby. A Cochrane review evaluated four clinical trials in which cord clamping was delayed for 30 to 60 s [2]. The need for inotropic support was found to be significantly lower in the delayed cord clamping group. A Cochrane review also evaluated the need for blood transfusion in seven trials and concluded that was delayed cord clamping associated with a reduced need for transfusion. Similarly, a meta-analysis conducted by Backes ascertained that delayed cord clamping or umbilical cord milking provides better blood pressure and a reduced need for blood transfusion compared with ECC.

Although most of the studies in the literature have found higher haemoglobin and haematocrit levels in delayed clamping groups, some studies have reported no difference [7,8].

The concerns that delayed cord clamping may cause hyperbilirubinaemia and increase the need for phototherapy have been evaluated in many studies. In their systematic review, Rabe et al. [3] reported higher rates of phototherapy and clinical jaundice in infants who underwent DCC. A Cochrane review showed that there were no significant differences between the two groups in terms of the need for phototherapy, but bilirubin levels were higher with DCC [2].

BPD, oxygen treatment period and duration of mechanical ventilation were evaluated in several studies of delayed cord clamping [2,16].

Additional blood volume provided by placental transfusion helps to stabilise the cardiovascular status of the infant. When the umbilical cord is clamped early, relative hypoperfusion may develop and hamper the autoregulation of cerebral blood flow [1]. Previous meta-analyses have shown that the risk of intraventricular haemorrhage (IVH) at any stage is decreased with delayed cord clamping, but no differences have been observed between groups in terms of severe IVH [2-5].

IVH is one the most important factors that affect morbidity in preterm infants. Studies show that the neurodevelopmental outcomes of extremely-low-birth weight infants with low-grade IVH are not significantly different from those of infants without haemorrhage [25,26]. However, grade 3 to 4 IVH is a serious risk factor for neurodevelopmental disorders in preterm infants. When the results of on-going large multicentre trials for placental transfusion are reported, we will have more information on IVH and its long-term neurological outcomes [27].

According to these valuable studies, it is possible to deduce that clamping the umbilical cord after 60 to 90 s will ensure more positive outcomes in premature neonates.

References

1. Mercer JS, Vohr BR, McGrath MM, Padbury JF, Wallach M, et al. (2006) Delayed cord clamping in very preterm infants reduces the incidence of intraventricular hemorrhage and late-onset sepsis: A randomized, controlled trial. *Pediatrics* 117: 1235-1242.
2. Rabe H, Diaz-Rossello JL, Duley L, Dowswell T (2012) Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. *Cochrane Database Syst Rev* 8: CD003248.
3. Rabe H, Reynolds G, Diaz-Rossello J (2008) A systematic review and meta-analysis of a brief delay in clamping the umbilical cord of preterm infants. *Neonatology* 93: 138-144.
4. Hofmeyr GJ, Bolton KD, Bowen DC, Govan JJ (1988) Periventricular/intraventricular haemorrhage and umbilical cord clamping. Findings and hypothesis. *S Afr Med J* 73: 104-106.
5. Backes CH, Rivera BK, Haque U, Bridge JA, Smith CV, et al. (2014) Placental transfusion strategies in very preterm neonates: A systematic review and meta-analysis. *Obstet Gynecol* 124: 47-56.
6. Mercer JS, Erickson-Owens DA (2014) Is it time to rethink cord management when resuscitation is needed? *J Midwifery Womens Health* 59: 635-644.
7. Aladangady N, McHugh S, Aitchison TC, Wardrop CA, Holland BM (2006) Infants' blood volume in a controlled trial of placental transfusion at preterm delivery. *Pediatrics* 117: 93-98.
8. Ibrahim HM, Krouskop RW, Lewis DF, Dhanireddy R (2000) Placental transfusion: Umbilical cord clamping and preterm infants. *J Perinatol* 20: 351-354.
9. Oh W, Carlo WA, Fanaroff AA (2002) Delayed cord clamping in extremely low birth weight infants: A pilot randomized controlled trial (RCT). *Pediatr Res* 51: 365A-366A.
10. Sweet DG, Carnielli V, Greisen G, Hallman M, Ozek E, et al. (2013) European consensus guidelines on the management of neonatal respiratory distress syndrome in preterm infants: 2013 update. *Neonatology* 103: 353-368.
11. (2002) Türk Neonatoloji Derneği Tani ve Tedavi Protokolleri No. 1. Türk Neonatoloji Derneği Bülteni. Sayı: 6 – Güz.
12. Papile LA, Burstein J, Burstein R, Koffler H (1978) Incidence and evolution of subependymal and intraventricular hemorrhage: A study of infants with birth weights less than 1,500 g. *J Pediatr* 92: 529-534.
13. Committee on Obstetric Practice; American College of Obstetricians and Gynecologists (2012) Committee Opinion no. 543: Timing of umbilical cord clamping after birth. *Obstet Gynecol* 120:1522-1526.
14. WHO (2014) Guideline: Delayed umbilical cord clamping for improved maternal and infant health and nutrition outcomes. Geneva, World Health Organization.
15. Raju TN, Singhal N (2012) Optimal timing for clamping the umbilical cord after birth. *Clin Perinatol* 39: 889-900.
16. Elimian A, Goodman J, Escobedo M, Nightingale L, Knudtson E, et al. (2014) Immediate compared with delayed cord clamping in the preterm neonate: a randomized controlled trial. *Obstet Gynecol* 124: 1075-1079.
17. Kaempf JW, Tomlinson MW, Kaempf AJ, Wu Y, Wang L, et al. (2012) Delayed umbilical cord clamping in premature neonates. *Obstet Gynecol* 120: 325-330.
18. Tarnow-Mordi WO, Duley L, Field D, Marlow N, Morris J, et al. (2014) Timing of cord clamping in very preterm infants: More evidence is needed. *Am J Obstet Gynecol* 211: 118-123.
19. Hosono S, Mugishima H, Fujita H, Hosono A, Minato M, et al. (2008) Umbilical cord milking reduces the need for red cell transfusions and improves neonatal adaptation in infants born at less than 29 weeks' gestation: A randomised controlled trial. *Arch Dis Child Fetal Neonatal Ed* 93: F14-F19.
20. Hosono S, Mugishima H, Fujita H, Hosono A, Okada T, et al. (2009) Blood pressure and urine output during the first 120 h of life in infants born at less than 29 weeks' gestation related to umbilical cord milking. *Arch Dis Child Fetal Neonatal Ed* 94: F328-F331.
21. Rabe H, Jewison A, Alvarez RF, Crook D, Stilton D, et al. (2010) Milking compared with delayed cord clamping to increase placental transfusion in preterm neonates A randomized controlled trial. *Obstet Gynecol* 117: 205-211.
22. March MI, Hacker MR, Parson AW, Modest AM, de Veciana M (2013) The effects of umbilical cord milking in extremely preterm infants: A randomized controlled trial. *J Perinatol* 33: 763-767.
23. Thomas M, Weeks A, Duley L, Yoxall B (2014) Providing newborn resuscitation at the mother's bedside: Assessing the safety, usability and acceptability of a mobile trolley. *BMC Pediatr* 14: 135.
24. Pushpa-Rajah A, Duley L (2013) CORD Pilot Trial. Immediate cord clamping versus deferred cord clamping for preterm birth before 32 weeks gestation: A pilot randomised trial ISRCTN21456601 in World Health Organization International Clinical Trials Registry Platform. Geneva, World Health Organization.
25. Bolisetty S, Dhawan A, Abdel-Latif M, Bajuk B, Stack J (2014) Intraventricular hemorrhage and neurodevelopmental outcomes in extreme preterm infants. *Pediatrics* 133: 55-62.
26. Payne AH, Hintz SR, Hibbs AM, Walsh MC, Vohr BR, et al. (2013) Neurodevelopmental outcomes of extremely low-gestational-age neonates with low-grade periventricular-intraventricular hemorrhage. *JAMA Pediatr* 167: 451-459.
27. <https://www.anzctr.org.au/Trial/Registration/TrialReview.aspx?id=335752>