Review Article

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Efficacy of Delayed Cord Clamping on the Neonatal and Maternal Outcome: A Review Article

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Abstract

The timing for umbilical cord clamping (more specifically, immediate or early cord clamping versus delayed cord clamping) remains a controversial issue and a subject of continuing debate. Delayed cord clamping (DCC) has been shown to increase placental transfusion, leading to an increase in neonatal blood volume at birth of approximately 30%. In the term infant, although this may result in an increase in iron stores, thereby decreasing the risk of anemia, some studies shows increase the risk of jaundice and the need for phototherapy. In the preterm infant, DCC decreases the need for blood transfusions for anemia, the number of such transfusions and the risks of IVH (Intraventricular hemorrhage) and late-onset sepsis. Delayed cord clamping appears to be beneficial as compared to immediate cord clamping in term and preterm infants. The present review article taken in between (1993–2019).

Keywords: Immediate cord clamping; Delayed cord clamping; Neonate; Maternal.

Introduction

The umbilical cord is a tube like structure that link between fetus and placenta. Umbilical cord extends to from the fetal surface of placenta. Contains the two umbilical arteries and the umbilical vein. The umbilical cord carries oxygen, delivers nutrients from the placenta into the fetus blood circulation and removing waste products and deoxygenated blood.

WHO (2014) recommendation; Immediate or early cord clamping is generally carried out within the first 15–30 seconds after birth (or in the first 60 seconds). "Delayed" umbilical cord clamping is perform not earlier than 1 min after the birth, more than 1 minute or when the umbilical cord pulsation has ceased or unless the neonate is not breathing and needs to be immediately moved for resuscitation. In term or preterm infants who do not require bag and mask Ventilation, DCC is recommended while initiating simultaneous essential neonatal care for improved infant and maternal health and nutrition outcomes. There are many possible benefits of delayed cord clamping (DCC) as compared with immediate cord clamping (ICC),[1] DCC increases neonatal blood volume by increasing placental transfusion and improves transitional hemodynamic. DCC helps in reducing childhood anemia by increasing iron stores.[2]

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Optimal timing of cord clamping

WHO (2012): In term or preterm babies (newly born) the umbilical cord should not be clamped earlier than 1 min after birth who do not require positive-pressure ventilation, the cord should be clamped and cut to allow effective ventilation to be performed When term or preterm babies require positive-

pressure ventilation, Newly born babies who do not breathe spontaneously after thorough drying should be stimulated by rubbing the back 2–3 times before clamping the cord and initiating positive-pressure ventilation. Late cord clamping (approx 1–3 min after birth) is recommended for after every delivery, while initiating simultaneous essential neonatal care, early umbilical cord clamping (less than 1 min after birth) is not recommended unless the neonate is asphyxiated and needs to be moved immediately for resuscitation.

ACOG (2017): Recommends the term early and late umbilical clamping is defined as clamping within 1 minute of birth, and more than 5 minutes after birth respectively and delayed umbilical cord clamping suggested for at least 30–60 seconds after birth for most healthy term and preterm infants.[1].

The Royal College of Obstetricians and Gynecologists (2015): Also recommends for deferred umbilical cord clamping at least 2 minutes after birth for healthy term and preterm infants.[3]

The American College of Nurse-Midwives (2014): Recommends delayed umbilical cord clamping for 2–5 minutes after birth for term and preterm infants.[1,4]

WHO guidelines on basic newborn resuscitation (2012): For compromised term and preterm newborn who may require positive pressure ventilation or resuscitation, clamp and cut the cord immediately.[5]

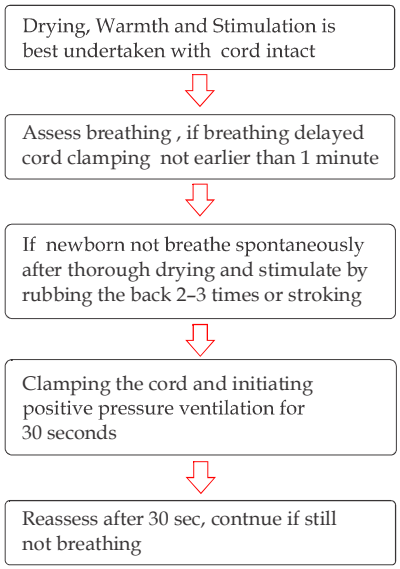

Fig. 1: The first 60 seconds of neonatal assessment

Indication for immediate cord clamping:

ICC: No respiratory effort, white color, poor tone, meconium liquor and no respiratory effort no response or HR < 100 after drying, HR < 100 at any time or regular respiratory effort not established by 90 seconds, double clamp cord and resuscitate.

Indication for delayed cord clamping

DCC: Clear liquor, baby reactive, meconium liquor and baby making any respiratory effort, no delay in respiratory effort, good or improving tone and color, normal APGAR calculated at 60 seconds.

Neonatal outcomes of DCC- term infants

Transfer of placental blood (approx. 80 ml) 1 minute after birth, and may reach to (approx 100 ml) 3–5 minutes after birth.[3] Higher circulating blood volume during the first 24 hours of life increasing up to 30% of the baby's blood volume at birth.[6] Delayed cord clamping improves iron stores in the first several months of life of newborn, thus decrease the risk of side effects associated with iron deficiency.[7,8] Increases hemoglobin concentration in infants thus reduces and prevents iron deficiency anaemia during the first year of life.[9] Favorable effect on developmental outcomes.[10] Facilitates transfer of immunoglobulin and stem cells, which are essential for tissue and organ repair.[11]

Neonatal outcomes of DCC- preterm infants

Found better red blood cell volume.[12] Improved transitional circulation.[13] Reduces the need for blood transfusion.[6] DCC is effective in reducing the risk for IVH (Intraventricular hemorrhage) and late onset sepsis.[14,15] Lower incidence of necrotizing entercolitis.[16]

Maternal outcomes

Delayed umbilical cord clamping does not increase the risk of postpartum haemorrhage or increased blood loss at delivery.[2,17] Delayed cord clamping does not associated with a difference in postpartum haemoglobin level or need for blood transfusion.[18]

Risk related to DCC

There is a slightly increase in the incidence of

jaundice that requires phototherapy in term infants which can be easily handled in resource-rich settings.[19] Occurrence of polycythemia in some evidences.[20]

Delayed cord clamping for special group

Multiple Gestation: At this time, there is not sufficient evidence to recommend for or against delayed umbilical cord clamping in multiple gestations

HIV mother: All pregnant, breastfeeding women and their infants with HIV positive should receive appropriate antiretroviral (ARV) drugs to prevention of mother to child transmission (PMTCT) of HIV. HIV status should be ascertained at birth, if not already known, and HIV positive women and infants should receive the appropriate ARV drugs.[21] Thus delayed cord clamping is recommended in all HIV positive mothers.

Limitations of studies reviewed

The definition of timing for ICC and DCC varies in the studies reviewed, especially with respect to the term infant. Most studies use 30 seconds to distinguish between ICC and DCC, but others define DCC as occurring more than one minute after delivery or after cord pulsations have ceased.

Conclusion

Overall, the available evidence appears to suggest that DCC likely to result in better neonatal outcomes (in both term and preterm infants) and maternal outcome as compared to immediate cord clamping. Therefore it's time to create awareness and recommend delayed cord clamping, however, there is insufficient evidence to date to support a recommendation to delay cord clamping in non-vigorous infants requiring resuscitation.

Prior publication- Nil

Support- Nil

Conflicts of interest- Nil

Permission- Nil

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