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The Comparison Between Delayed Cord Clamping and Immediate Cord Clamping on Fetal Outcomes

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Are newborns, who are delivered vaginally, that have their umbilical cord clamped immediately after birth at a disadvantage for improved health benefits compared to newborns who received delayed cord clamping?



Aydan Drake & Kelsey Mawyer

Abstract

- Delayed cord clamping is a procedure performed after the baby is born in which healthcare providers delay clamping the cord in order to allow blood from the placenta to be transferred into the newborn
 - it is performed 25 seconds to 5 minutes after birth
- The study that was used gathered data from 9 university hospitals over 4 different countries, involved 474 participants that were randomly chosen to either receive delayed cord clamping or immediate cord clamping
- Benefits: the increase of red blood cells and overall neonatal blood volume as well as the decreased risk of iron deficiency anemia
- Risks: polycythemia, hyperbilirubinemia, and respiratory distress
- Delayed cord clamping after 3 minutes of life is associated with better hemoglobin levels and a lesser incidence of anemia at 8 months of life
 - There is a lack of research that determines the effects of delayed cord clamping on full term infants.

Introduction

- Delayed cord clamping is a medical procedure performed postpartum in which the healthcare providers prolong the time of clamping the umbilical cord as a way to increase the amount of total blood volume in the infant by allowing the blood to continue to be circulated from the placenta after delivery (Borja, 2017)
- Placental transfusion of blood by delayed cord clamping allows the infant to receive 80-100 milliliters of blood and approximately 20-30 milligrams of iron (Bernado et al., 2020).
- By allowing the infant to receive more blood from its mother, it decreases the risk of iron deficiency anemia and the subsequent clinical manifestations of cognitive impairment and central nervous system dysfunction (American Pregnancy Association, 2017)
- Additional circulation to the neonate enables the infant to make blood cells more efficiently, thus decreasing the risk of developing anemia (Texas Children's Hospital, 2020)
- There is substantive evidence supporting the claim that delayed cord clamping is correlated with increased hemoglobin, hematocrit, and red blood cell levels (Bernardo et al., 2020)
- Although the duration of time to wait to clamp the cord varies among physicians and hospitals, many hospitals will use a standard wait time of 1 minute postpartum (Texas Children's Hospital, 2020). However, any wait time between 25 seconds and 5 minutes postpartum is considered to be delayed cord clamping (American Pregnancy Association, 2017).

Methods

- Must have parental consent prior to performing DCC (Bernado et al., 2020)
 - Due to the fact that it can alter the ability for umbilical cord collection
- 750 people, 9 university centers
- 4 countries
- Random grouping for cord clamping (immediate v delayed)
 - Immediate = 236
 - Delayed = 238
 - Doctors did not always follow protocol
- 9/236 of immediate (12%) = died or hemorrhaged (Katheria et al., 2019, p. 1878)

DELAYED CORD CLAMPING

Risks:

- Hyperbilirubinemia = buildup of bilirubin in blood
 - Bilirubin results from a breakdown of RBC
 - In the womb, placenta takes care of bilirubin - after delivery, the infant's liver must process the extra bilirubin
 - Causes jaundice (yellow tint to eyes and skin)
 - May need phytotherapy, however relatively common in infants
- Polycythemia = excess RBCs in circulation
 - Can cause issues with breathing + circulation and may lead to hyperbilirubinemia
 - with excess blood flow to infant there is an increased risk of developing blood hyperviscosity
- Resp distress = not enough surfactant in lungs after birth to keep airways + alveoli open
 - Buildup of damaged cells near lungs + buildup of CO2 in blood
 - Baby will have to be placed on ventilator
 - Delayed absorption of surfactant may causes tachypnea

Benefits:

- improved circulation, better establishment of RBC volume, dec need for blood transfusion, lower risk of necrotizing enterocolitis (ACOG, 2017)
- The cord should only be clamped immediately if the infant requires positive pressure ventilation following their delivery to allow for the most effective ventilation (WHO, 2019)

Positives:

- Placental transfusion by DCC gives baby about 80-100 mL of blood + an additional 20-30 mg of iron (Bernado et al., 2020)
 - Greater Hgb concentration in newborns and best iron storage between 3-6 months of life
 - Less incidence for neonatal hypotension
- DCC also allows transfer of immunoglobulins and stem cells (essential for tissue and organ repair) (ACOG, 2017)
 - Beneficial after cellular injury, inflammation, and organ dysfunction which are common w/ preterm birth
- DCC reduces the risk for brain bleeds in premature infants (Texas Children's Hospital, 2020)

Negatives:

- Early umbilical cord clamping (less than 1 min after birth) is not recommended unless the neonate is asphyxiated + needs to be moved for resuscitation (WHO, 2019)
- Respiratory distress as a result of not enough surfactant in lungs after birth to keep airways + alveoli open
 - Buildup of damaged cells near lungs + buildup of CO2 in blood
 - Baby will have to be placed on ventilator
 - Delayed absorption of surfactant may causes tachypnea

Evaluation & Analysis

- Benefits of DCC: (American Pregnancy Association, 2017)
 - Inc in placental transfusion
 - 60% inc in RBCs
 - 30% inc in neonatal blood volume
 - Dec risk of iron def anemia
- Greater risk of polycythemia, hyperbilirubinemia, and resp distress (American Pregnancy Association, 2017)
 - Hyperbilirubinemia = buildup of bilirubin in blood
 - Bilirubin results from a breakdown of RBC
 - In the womb, placenta takes care of bilirubin - after delivery, the infant's liver must process the extra bilirubin
 - Causes jaundice (yellow tint to eyes and skin)
 - May need phytotherapy, however relatively common in infants
 - Polycythemia = excess RBCs in circulation
 - Can cause issues w/ breathing + circulation and may lead to hyperbilirubinemia
 - w/ excess blood flow to infant there is an inc risk of developing blood hyperviscosity (inc blood thickness)
 - Resp distress = not enough surfactant in lungs after birth to keep airways + alveoli open
 - Buildup of damaged cells near lungs + buildup of CO2 in blood
 - Baby will have to be placed on ventilator
 - Delayed absorption of surfactant may causes tachypnea
- Benefits: improved circulation, better establishment of RBC volume, dec need for blood transfusion, lower risk of necrotizing enterocolitis (ACOG, 2017)
- The cord should only be clamped immediately if the infant requires positive pressure ventilation following their delivery to allow for the most effective ventilation (WHO, 2019)
- Late cord clamping (performed appx 1-3 min after birth) is recommended for all births (WHO, 2019)
- Early umbilical cord clamping (less than 1 min after birth) is not recommended unless the neonate is asphyxiated + needs to be moved for resuscitation (WHO, 2019)

Conclusion & Implications for Future Research

- Delayed cord clamping typically only occurs w/ preterm infants (American Pregnancy Association, 2017)
 - Lack of research on how DCC effects full term babies (American Pregnancy Association, 2017)
 - Standard care has been to clamp umbilical cord 10-30 secs after birth

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