Delayed Umbilical Cord Clamping

Appraised by: Samantha Erickson SN, Sydney Retterath SN, Connor Rosenau SN, Sydney Telehey SN
(NDSU School of Nursing at Sanford Bismarck)

Clinical Question:

For term infants in the immediate post-delivery period, does delayed cord clamping create better circulatory stability compared with immediate cord clamping?

Sources of Evidence:

Katheria, A. C., Wozniak, M., Harari, D., Arnell, K., Petruzzelli, D., & Finer, N. N. (2015). Measuring cardiac changes using electrical impedance during delayed cord clamping: A feasibility trial. *Maternal Health, Neonatology and Perinatology*, 1(15). doi: 10.1186/s40748-015-001603

McDonald, S., Middleton, P., Dowswell, T., & Morris, P., (2013) Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes. *Cochrane Database of Systematic Reviews,* (7), 1-96. doi: 10.1002/14651858.CD004074.pub3

Mercer, J. S. (2017). Effects of delayed cord clamping on residual placental blood volume, hemoglobin and bilirubin levels in term infants: A randomized controlled trial. *Journal of Perinatology.* 37(3), 260-264.

Zaramella, P., Freato, F., Quaresima, V., Secchieri, S., Milan, A., Grisafi, D., & Chiandetti, L. (2008). Early versus late cord clamping: Effects on peripheral blood flow and cardiac function in term infants. *Early Human Development, 84*(3), 195-200. doi:10.1016/j.earlhumdev.2007.04.003

Synthesis of Evidence:

Four articles were reviewed as evidenced in this report. A systematic review, a randomized control trial, and two quazi-experimental studies.

Katheria, et al. (2015) conducted a quasi-experimental study of 1 group of 20 newborn infants. Immediately when the infant was born, electrodes were placed on the infant's body to measure cardiac output, stroke volume, and heart rate before cord clamping and immediately after. Study found that cardiac output and stroke volume increased between 2 to 5 minutes of life for every minute the cord was left unclamped.

McDonald, et al. (2013) a systematic review of 15 random control trials which included 3911 pairs of mom and babies. Through review of labs such as hemoglobin and hematocrit, the multiple trials concluded that the infant's concentrations of iron storages improved with delayed cord clamping.

Mercer, (2017) conducted a randomized control trial on 73 babies. The study coordinators collected residual cord blood from the placenta to have labs drawn. Infants who received delayed cord clamping compared to infants who did not, had significantly higher hemoglobin levels after 24 to 48 hours with no difference in bilirubin levels. Term infants had early hematological advantages when receiving delayed cord clamping with no symptomatic polycythemia.

Zaramella, P., et al. (2008) conducted a quasi-experimental study that was performed on 22 healthy term infant babies. They were divided into two groups; one group received early cord clamping and the other group received late cord clamping. Assessments and lab draws of hematocrit, hemoglobin, bilirubin, echocardiograph, and blood pressure showed that late cord clamping can be more beneficial than early cord clamping.

Conclusions: Brief Summary of the Evidence

All four articles indicated an increase in hemodynamic stability in term infants in the post-delivery period after at least 2 minutes of delayed cord clamping. Overall, the research evidence found that there is a significant increase in lab values, such as hemoglobin and hematocrit.

Implications for Nursing Practice:

Based on the evidence, we have come to the conclusions that clamping the umbilical cord on healthy term infants after two minutes increased stroke volume, cardiac output, hemoglobin and iron levels, and overall cardiac stability through the first months of life. There were also noticeable benefits when the cord was milked, or clamping occurred after cord stopped pulsating no matter when that occurred. We recommend clamping the cord after at least two minutes and up to five minutes after delivery to promote the transfer of fetal blood from the placenta to the infant. If providers are unable to wait the recommended time limit or there are complications, we recommend milking the cord at least five times to promote the transfer of fetal blood.