

This document provides short summaries of the key evidence in this area and can be used to persuade your team of the rationale.

Multidisciplinary collaboration and use of QI methodology in the context of Optimal Cord Management

- Hoyle ES, Hirani S, Ogden S, et al. Quality improvement programme to increase the rate of deferred cord clamping at preterm birth using the Lifestart trolley. Arch Dis Child Fetal Neonatal Ed 2020;105(6):652-55. doi: 10.1136/archdischild-2019-318636 [published Online First: 2020/05/01]

Brief summary: In this study published by the Neonatal Team at Liverpool Women's Hospital, the authors undertook a quality improvement programme to increase the documented use of the LifeStart™ trolley to allow premature infants' (<32 weeks' gestation) resuscitation and stabilisation with an intact umbilical cord at delivery.

The 13-month programme from April 2018 to April 2019 was undertaken using Plan, Do, Study and Act (PDSA) cycles. The team reviewed data from 113 consecutive preterm (<32 weeks) deliveries to identify whether LifeStart™ was used and whether 2 min deferred cord clamping (DCC) was used in eligible infants. Episodes of non-compliance were analysed, causes established and interventions implemented to reduce similar future non-compliance. The authors communicated their findings in alternate monthly newsletters to staff, which also included lessons learnt from the reviews of non-compliance.

Using the PDSA cycle the authors found a rise in documented use of the Lifestart trolley from 10% at the start of the project to 79% in the final month. This in turn increased the rate of DCC significantly from 17% in the first 3 months to 92% in the last 3 months of the project ($p < 0.0001$). The learning from this project has been used to create an instructional video to help maintain the improved compliance rates.

- Sæther E, Gülpen FR, Jensen C, et al. Neonatal transitional support with intact umbilical cord in assisted vaginal deliveries: a quality-improvement cohort study. BMC Pregnancy Childbirth 2020;20(1):496. doi: 10.1186/s12884-020-03188-0 [published Online First: 2020/08/29]

Brief Summary: In this quality improvement study published from Norway, the authors evaluated if implementing a new delivery room protocol involving mobile resuscitation equipment (LifeStart™) reduced the prevalence of early cord clamping (ECC) in assisted vaginal deliveries in babies born at 36+0 to 43+0 weeks gestation. The study consisted of two phases: a baseline 8-month period (March-October 2017), when standard care was applied, followed by an 8-month intervention-period (November 2017-June 2018), where the new protocol and resuscitation equipment were implemented.

The authors found that the use of mobile trolley which could be placed at mother's delivery bed-side and used to offer cardio-respiratory support to the babies whilst the cord is still attached to the placenta, reduced the ECC from 13 to 1% ($P < 0.01$), with a 98% relative risk reduction for infants needing transitional support on a resuscitation table (adjusted OR 0.02, $P < 0.001$). Mean cord clamping time increased by 43% ($p < 0.001$). Although fewer infants were placed directly on mothers' chest ($n = 43$ [42%] vs $n = 69$ [75.0%], $P < 0.001$), there were no significant differences in needs for immediate transitional care or transfers to Neonatal Intensive Care Unit. Mandatory educational sessions and cross-professional simulation training are thought to contribute to the improvement in primary outcome of reduced ECC in this QI project.

Additional References

- Aliyev G, Gallo AM. Implementation of Delayed Cord Clamping in Vigorous Preterm Neonates. *J Obstet Gynecol Neonatal Nurs* 2018;47(6):803-11. doi: 10.1016/j.jogn.2018.09.003 [published Online First: 2018/10/08]
- Aziz K, Chinnery H, Lacaze-Masmonteil T. A single-center experience of implementing delayed cord clamping in babies born at less than 33 weeks' gestational age. *Adv Neonatal Care* 2012;12(6):371-6. doi: 10.1097/ANC.0b013e3182761246 [published Online First: 2012/11/29]
- Balakrishnan M, Falk-Smith N, Detman LA, et al. Promoting teamwork may improve infant care processes during delivery room management: Florida perinatal quality collaborative's approach. *J Perinatol* 2017;37(7):886-92. doi: 10.1038/jp.2017.27 [published Online First: 2017/04/14]
- Bates SE, Isaac TCW, Marion RL, et al. Delayed cord clamping with stabilisation at all preterm births - feasibility and efficacy of a low cost technique. *Eur J Obstet Gynecol Reprod Biol* 2019;236:109-15. doi: 10.1016/j.ejogrb.2019.03.012 [published Online First: 2019/03/25]
- Bolstridge J, Bell T, Dean B, et al. A quality improvement initiative for delayed umbilical cord clamping in very low-birthweight infants. *BMC Pediatr* 2016;16(1):155. doi: 10.1186/s12887-016-0692-9 [published Online First: 2016/09/15]
- Gams RL, Popp KK, Cramer J, et al. How to Engage Your Team to Implement Delayed Cord Clamping. *Nurs Womens Health* 2017;21(6):489-98. doi: 10.1016/j.nwh.2017.10.003 [published Online First: 2017/12/11]
- McAdams RM, Backes CH, Hutchon DJ. Steps for implementing delayed cord clamping in a hospital setting. *Matern Health Neonatol Perinatol* 2015;1:10. doi: 10.1186/s40748-015-0011-8 [published Online First: 2015/01/01]
- Perrone B, Ghirardello S. Placental Transfusion Strategies in Italy: A Nationwide Survey of Tertiary-Care Delivery Wards. *Am J Perinatol* 2017;34(7):722-28. doi: 10.1055/s-0036-1597995 [published Online First: 2017/01/07]
- Rich D. Delayed Cord Clamping: A Multidisciplinary Approach. *Journal of Obstetric, Gynecologic, & Neonatal Nursing* 2015;44(s1):S9-S10. doi: 10.1111/1552-6909.12670

Addressing staff concern and decreasing resistance to change to implement optimal cord management

- Oddie S, Rhodes P. Barriers to deferred cord clamping in preterm infants. Arch Dis Child Fetal Neonatal Ed2014;99(5):F391-4. doi: 10.1136/archdischild-2014-305968 [published Online First: 2014/06/07]

Brief Summary: This qualitative study used semi-structured interviews with perinatal team professionals from purposively selected 7 maternity units in UK to understand enablers and barriers to deferred cord clamping in preterm births.

The study was performed in 2012. Seven maternity units who declared themselves as practising deferred cord clamping in a national survey were selected. Semi-structured interviews were conducted involving 33 practitioners (7 midwives, 7 neonatologists, 2 paediatricians, 6 neonatal nurses, 7 obstetricians and 4 managers). Four main themes of barriers emerged from the interviews: guideline variability, differences in assessing eligibility for DCC, duration of DCC and uncertainty about competing priorities i.e. need for resuscitation or temperature stability.

Availability of specific, clear guidelines, multidisciplinary 'buy in' and involvement in developing those guidelines, training and clinical leadership appeared to enable successful and consistent deferred cord clamping practices. Lack of these factors acted as barriers to effective implementation of deferred cord clamping.

Take home message: Units considering implementation of optimal (or deferred) cord clamping should invest in clinical champions across the perinatal service to develop clear and specific guidelines on the subject. This should be supplemented by adequate training and deployment frameworks underpinned by robust communication strategies and audits.

- Jelin AC, Zlatnik MG, Kuppermann M, et al. Clamp late and maintain perfusion (CLAMP) policy: delayed cord clamping in preterm infants. J Matern Fetal Neonatal Med 2016;29(11):1705-9. doi: 10.3109/14767058.2015.1061496 [published Online First: 2015/07/03]

Brief Summary: In this randomized controlled trial from USA, the authors hypothesized that implementation of a DCC policy in preterm infants would result in improved neonatal outcomes, despite initial clinician resistance. In September 2011, the unit implemented a DCC policy (30–60 s) for singleton infants born at <35 weeks gestation. The authors conducted a pre-test/post-test analysis of neonatal outcomes among singletons delivered between 24+0 - 34+6 weeks gestation from 2009 to 2013 (2 years pre-implementation and 2 years post-implementation).

The analysis found that despite multiple routes of policy dissemination, DCC was attempted in only 49% of the deliveries. However, infants delivered post-policy implementation (n = 196) had a significant decrease in IVH, significant increase in initial hematocrits, and improved temperatures compared with infants delivered pre-implementation (n = 204). Authors concluded that despite clinician resistance, after implementation of a DCC policy, preterm singleton infants had improved temperatures, increased hematocrits and a decreased prevalence of IVH without significant differences in adverse outcomes, suggesting that the benefits of DCC outweighed the risks.

Additional References

- Jelin AC, Kuppermann M, Erickson K, et al. Obstetricians' attitudes and beliefs regarding umbilical cord clamping. *J Matern Fetal Neonatal Med* 2014;27(14):1457-61. doi: 10.3109/14767058.2013.864275 [published Online First: 2013/11/13]
- Liu LY, Feinglass JM, Khan JY, et al. Evaluation of Introduction of a Delayed Cord Clamping Protocol for Premature Neonates in a High-Volume Maternity Center. *Obstet Gynecol* 2017;129(5):835-43. doi: 10.1097/aog.0000000000001987 [published Online First: 2017/04/07]
- Pantoja AF, Ryan A, Feinberg M, et al. Implementing delayed cord clamping in premature infants. *BMJ Open Qual* 2018;7(3):e000219. doi: 10.1136/bmjopen-2017-000219 [published Online First: 2018/10/03]
- Rhoades JS, Bierut T, Conner SN, et al. Delayed Umbilical Cord Clamping at <32 Weeks' Gestation: Implementation and Outcomes. *American journal of perinatology* 2017;34(11):1048-53. doi: 10.1055/s-0037-1603591 [published Online First: 2017/05/25]