Guideline for Management of Umbilical Cord Clamping



Trust Ref: C56/2021 November 2021 - 2024

1. Introduction and Who Guideline applies to

This guideline is aimed at all Health care professionals involved in the care of infants within Maternity and Neonatal Services.

Aim

This guideline provides an outline of deferred cord clamping (DCC) / management at birth.

Related documents:

- Thermal Protection of the Newborn UHL Obstetric and Neonatal Guideline (C166/2016)
- Resuscitation at Birth UHL Neonatal Guideline (B35/2008)
- Intrapartum Care UHL Obstetric Guideline (C60/2019)
- Meconium Stained Liquor at Delivery UHL Neonatal Guideline (C103/2008)
- HIV Screening and Management in Pregnancy UHL Obstetric Guideline (C63/2004)

Key Points

1	Current RCUK recommendation where possible, is for DCC for at least 60 seconds after birth in preterm and term babies
2	DCC improves survival in preterm infants
3	Maintaining normothermia with gestational appropriate thermal care is crucial when conducting DCC (<i>Note: placental blood is also warm</i>).
4	DCC avoids the induced bradycardia caused by immediate cord clamping
5	DCC improves haematological indices

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Title: Umbilical cord management Authors: Dr Avineet Kaur and Dr Joe Fawke on behalf of the DCC QI group V:1 Approved by: Neonatal Services Governance & Neonatal Guidelines Groups: November 2021 Maternity Guidelines & Maternity Governance Groups: December 2021 Trust Ref No: C56/2021 NB: Paper copies of this document may not be most recent version. The definitive version is held on InSite in the <u>Policies and Guidelines</u> Library & in the BadgerNet library

Inclusion criteria

• All gestations

Exclusion Criteria*

• **Need for immediate resuscitation** (Unless DCC can be achieved alongside stabilisation/ resuscitation)

- DCC not felt to be safe by neonatal or maternity team
- Cord issues e.g. cord snapping or prolapse.
- Placental abruption or early separation.
- Uterine inversion.
- Monochorionic twins
- Maternal concern e.g. Postpartum haemorrhage (PPH), shock, seizure etc
- Known severe fetal hypervolemia, e.g. hydrops fetalis
- Maternal HIV-positive status with high viral load

Key benefits of DCC

See summary of evidence section in <u>Appendix 1</u> for more details.

Preterm (adapted from the meta-analysis by Seidler et al ⁽¹³⁾)

- Improves survival in preterm infants (2,5,13)
- Avoids the induced bradycardia caused by immediate cord clamping (ICC) and associated abrupt cardiovascular changes
- Result in a 20-30% increase in circulating blood volume which: (2,5,13)
 - $\circ\,$ Reduces blood transfusion (\downarrow in 'any transfusion' and \downarrow in 'total number of transfusions')
 - Higher haemoglobin & haematocrit at 24 hours
 - Higher haematocrit at 7 days
- Improved cardiovascular stability in first 24 hours including: ^(5,13)
 - Reduced receipt of inotropes
 - o Higher mean blood pressure in first 24 hours
- Fewer intraventricular haemorrhages (all grades) ⁽⁵⁾.
- One study suggested DCC may reduce risk of adverse neurodevelopmental outcome in preterm babies at 2 years of age ⁽⁶⁾.

Term (adapted from the meta-analysis by Gomersall et al ⁽¹⁴⁾)

- Lower incidence of iron deficiency in term infants ^(12, 14)
- DCC avoids the induced bradycardia caused by ICC and associated abrupt cardiovascular changes
- Higher haemoglobin in the first 24 hours
- Improved iron stores in infancy

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Potential harms (5,12)

- Higher peak bilirubin but no increase in receipt of phototherapy in preterm babies
- Slight increase in receipt of phototherapy for neonatal jaundice in term babies

Background

Deferred cord clamping (DCC) allows placental transfusion where blood passes from the placenta to the newborn baby.

DCC has no fixed time definition, but studies have considered clamping the cord at more than 30 seconds. An alternate approach is to clamp the cord after the lungs have been aerated (1,7)

DCC is recommended by multiple national and international groups (RCUK, ERC, ILCOR, WHO, BAPM, RCOG ^(3,4,15)). The RCUK NLS recommends DCC for at least 60 seconds after birth, for all gestations, unless it is contraindicated. Achieving this as part of newborn care requires planning and should feature in the pre-delivery team brief.

Evidence of the efficacy of DCC in a baby that requires resuscitation is unclear and resuscitation remains the priority although in some cases resuscitation has been provided at mother's side with the umbilical cord intact. Umbilical cord milking has been considered where there is insufficient time for DCC, however it is not recommended in this guideline.

Practicalities of providing DCC

Most babies should receive DCC and there are relatively few exclusion criteria. Initial thermal care and assessment should follow current practice and where necessary NLS guidelines.

The only difference is the initial drying, stimulation and assessment of colour tone, heart rate and breathing should be done with the cord intact. This is likely to take approximately 30 seconds and will indicate if immediate resuscitation is required. As long as immediate resuscitation is not required it is reasonable to wait another 30 seconds before clamping the cord.

It is worth remembering that the baby is receiving warm, oxygenated blood through the cord during this time and some well babies can take ~60 seconds to establish regular breathing.

Duties and responsibilities

- All multidisciplinary staff involved in the delivery of term and preterm babies should assist in facilitating the practice of delayed cord clamping.
- If possible, parents should be made aware prior to delivery that delayed cord clamping will take place.

Responsibility of neonatal team if present at delivery

- A member of the neonatal team should be available to assess the baby with the cord intact to support DCC.
- For babies born at less than 30-week gestation a senior neonatal team member should undertake assessment of the baby to support DCC.
- For babies born by caesarean section, discuss with the obstetric team whether a neonatal team member is needed to assess the baby with the cord intact to support DCC (i.e. preterm birth or suspected fetal compromise).

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- Sterile field needs to be maintained in theatre.
- If assessing baby in theatre the Neonatal team member should wear surgical gown, hat and sterile gloves.
- For assessment of heart rate in theatre, ensure stethoscope is in sterile covering.
- Document if DCC was performed and time duration of DCC in baby notes or BadgerNet. Please ensure all eligible infants have DCC for a minimum of 1 minute, and if this cannot be achieved, please record time of cord clamping and reason in notes.
- Temperature check prior to leaving labour ward if baby is being admitted to the neonatal unit. If hypothermic, take active measures to achieve normothermia.



Deferred Cord Clamping in all gestations

Standard Resuscitare to be used:

- ⇒ Have equipment prepared (Standard resuscitaire in usual position; pre-warmed, neopuff circuit, masks, suction catheter)
- ⇒ Warm towels and thermoregulation as per gestation (Plastic bag and transwarmer should be available if required if temperature <36.5°C)</p>
- \Rightarrow $\;$ Communicate to all staff DCC will be done unless contraindicated



- Pale
- Unable to make accurate assessment and concerned about need for potential resuscitation

Resuscitation should follow NLS guidelines

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APPENDIX 1: Summary of Evidence for DCC

DCC has been shown to facilitate the normal physiological process which occurs during transition from intra-uterine life. If the cord is clamped immediately there is a drop in the heart rate which recovers with time and if the cord is clamped after the lungs are aerated this bradycardia does not occur.

When a baby takes their first breaths, the lungs are aerated leading to a fall in pulmonary vascular resistance and increased blood flow to the lungs, supplying most of the preload to the left ventricle. DCC facilitates this process by providing extra blood volume from the low resistance placental circuit, significantly increasing venous return to the heart, and therefore cardiac output. This process is particularly beneficial to the preterm baby who is at an increased risk of circulatory collapse and is vulnerable to fluctuations in cerebral blood flow which have been shown to occur when the cord is clamped immediately, prior to aeration of the lungs. The mechanism of action relates to a fall in ventricular preload, with a resultant reduction in left ventricular output and a drop in carotid artery and cerebral perfusion.

The following graph (*fig.* 1) depicts how DCC promotes increased physiological stability in the first five minutes after birth compared to immediate cord clamping (ICC) ^(10,11):



Table 1 benefits and risks of DCC:

	Preterm Infants	Term Infants			
	Possible reduction in mortality: Fogarty et al ⁽²⁾ : RR 0.68 (95% CI 0.52-0.90), NNT 33. Sub- group analysis Infants <28wk, RR 0.70 (95% CI 0.51-0.95) NNT 20.	Higher birth weight: Cochrane ⁽¹²⁾ : (12 trials, 3139 infants), 101g increase in mean birth weight, MD 101g, (95%CI 45-157).			
Benefits	Seidler et al ⁽¹³⁾ : (16 studies, 2988 infants) RR of 0.80 (95% CI: 0.63 to 1.02). Demonstrated possible reduction in preterm infant mortality.	Higher haemoglobin concentration: Cochrane ⁽¹²⁾ : (Four trials, 884 infants). 24- 48hours of life MD -1.49g/dL (95% CI - 1.78 to -1.21).			
	Reduced need for inotropic support: Cochrane ⁽⁵⁾ : RR 0.42 (95% CI 0.23-0.77).	Gomersall et al ⁽¹⁴⁾ : Higher Hb at 24hrs, MD 1.17g/dL, (95% CI 0.48-1.86).			
	Seidler et al ⁽¹³⁾ : First 24 hours of life RR 0.36, (95% CI 0.17-0.75). Higher value of lowest mean arterial blood pressure in the first 12 hours of life, MD: 1.79 mmHg, (95%CI 0.53-3.05).				
	Reduction in blood transfusion: Cochrane ⁽⁵⁾ : (7 trials, 392 infants) RR 0.61, (95%CI 0.46–0.81).	Lower incidence of iron deficiency: Cochrane ⁽¹²⁾ : (Five trials, 1152 infants) Three-six months, RR 2.65, (95% CI 1.04 –			
	Fogarty et al ⁽²⁾ : Reduction by 10% (95% CI 6-13%).	6.73). Gomersall et al $^{(14)}$: No difference in concerning at 4 formation			
	number of blood transfusions per infant, MD: -0.63 , 95% CI: -1.08 to -0.17).	anaemia ai 4-omonins.			
	Increased Peak Haematocrit: Fogarty et al ⁽²⁾ : 2.73% (95% CI 1.94 – 3.52).				
	Seidler et al ⁽¹³⁾ : MD: 2.63%, (95% CI: 1.85 to 3.42).				
	Fewer intraventricular haemorrhages:Cochrane ⁽⁵⁾ :(10 trials, 539 infants) All grade RR 0.59 (95% CI 0.41-0.85).Note: No difference with severe IVH ^(2.5,13) .				
	May reduce risk of adverse neurodevelopmental outcome in preterm babies at 2 years of age. ^{(6)*}				
S	Higher peak bilirubin level: Fogarty et al ⁽²⁾ : (7 trials, 320 infants) MD 15mmol/L (95% CI 5.62-24.40).	Increase in need for phototherapy Cochrane ⁽¹²⁾ : (7 trials 2324 infants), 2.47% in ICC vs 4.36% in DCC group. RR 0.62 (95% CI 0.41 – 0.96)			
Risk	Seidler et al ⁽¹³⁾ : (Six RCTs, 908 infants) little or no difference for hyperbilirubinemia treated by phototherapy. RR 0.99, (95% CI 0.95 to 1.03).	Gomersall et al ⁽¹⁴⁾ : (13 trials, 2691 infants) Higher phototherapy use in DCC group. RR 1.54 (95% CI 1.01 to 2.34).			
* Adverse neurodevelopmental outcome: Criteria for a moderate/severe impairment met in any one of five functions: motor, cognitive, speech/language, hearing or vision. For motor, this was defined as a Bayley-III gross motor scale score <7. For cognitive and speech/language functions, this was defined as having a composite score <85.					

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Education and Training

None

Audit standards

All babies (Term and preterm) who do not meet the exclusion criteria should receive at least 60 seconds of deferred cord clamping (100%).

REFERENCES

- 1. Bhatt S, Alison BJ, Wallace EM, Crossley KJ, Gill AW, Kluckow M, te Pas AB, Morley CJ, Polglase GR, Hooper SB. *Delaying cord clamping until ventilation onset improves cardiovascular function at birth in preterm lambs*. J Physiol. 2013 Apr 15;591(8):2113-26. doi: 10.1113/jphysiol.2012.250084.
- 2. Fogarty M, Osborn DA, Askie L, Seidler AL, Hunter K, Lui K, Simes J, Tarnow-Mordi W. *Delayed vs early umbilical cord clamping for preterm infants: a systematic review and metaanalysis.* Am J Obstet Gynecol. 2018 Jan;218:1-18. doi:10.1016/j.ajog.2017.10.231
- 3. Resuscitation Council UK. Advanced Resuscitation of the Newborn Infant 2nd Edition. London 2021. ISBN 978-1-903812-40-2
- Resuscitation Council UK. Newborn Life Support 5th Edition. London 2021. ISBN 978-1-903812-39-6
- Rabe H, Diaz-Rossello J, Duley L, Dowswell T. Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. Cochrane Database of Systematic Reviews. 2012. DOI: 10.1002/14651858.CD003248.pub3.
- 6. Armstrong-Buisseret L, Powers K, Dorling J, Bradshwa L, Johnson S, Mitchell E, Duley L. *Randomised trial of cord clamping at very preterm birth: outcomes at 2 years.* Arch Dis Child Fetal Neonatal Ed 2019, Aug 1; doi:10.1136/archdischild-2019-316912.
- Duley L, Dorling J, Pushpa-Rajah A, Oddie SJ, Yoxall CW, Schoonakker B, Bradshaw L, Mitchell EJ, Fawke JA on behalf of the Cord Pilot Trial Collaborative Group, et al. Randomised trial of cord clamping and initial stabilisation at very preterm birth. Archives of Disease in Childhood - Fetal Neonatal Edition 2018;103:F6-F14.
- Katheria A, Reister F, Essers J, Mendler M, Hummler H, Subramaniam A, Carlo W, Tita A, Truong G, Davis-Nelson S, Schmölzer G, Chari R, Kaempf J, Tomlinson M, Yanowitz T, Beck S, Simhan H, Dempsey E, O'Donoghue K, Bhat S, Hoffman M, Faksh A, Arnell K, Rich W, Finer N, Vaucher Y, Khanna P, Meyers M, Varner M, Allman P, Szychowski J, Cutter G. Association of Umbilical Cord Milking vs Delayed Umbilical Cord Clamping With Death or Severe Intraventricular Hemorrhage Among Preterm Infants. JAMA. 2019 Nov 19;322(19):1877-1886. doi: 10.1001/jama.2019.16004.
- 9. Katheria AC, Lakshminrusimha S, Rabe H, McAdams R, Mercer JS. *Placental transfusion: a review*. J Perinatol. 2017 Feb;37(2):105-111. doi: 10.1038/jp.2016.151.
- 10. Dawson JA, Kamlin CO, Wong C, te Pas AB, Vento M, Cole TJ, Donath SM, Hooper SB, Davis PG, Morley CJ. *Changes in heart rate in the first minutes after birth.* Arch Dis Child Fetal Neonatal Ed. 2010 May;95(3):F177-81. doi: 10.1136/adc.2009.169102.

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- 11. Blank DA, Badurdeen S, Omar F Kamlin C, Jacobs SE, Thio M, Dawson JA, Kane SC, Dennis AT, Polglase GR, Hooper SB, Davis PG. *Baby-directed umbilical cord clamping: A feasibility study. Resuscitation.* 2018 Oct;131:1-7. doi: 10.1016/j.resuscitation.2018.07.020.
- McDonald S, Middleton P, Dowswell T, Morris PS. Effect of timing of umbilical cord clamping on term infants on maternal and neonatal outcomes (Review). Cochrane Database Systematic Review 2013, Issue7: CD 004074. DOI: 10.1002/14651858.CD004074.pub3.
- 13. Seidler AL, Gyte GML, Rabe H, et al. Umbilical Cord Management for Newborns ,34 Weeks' Gestation: A Meta-analysis. Pediatrics. 2021;147(3):e20200576
- 14. Gomersall J, et al. Umbilical Cord Management at Term and Late Preterm Birth: A Metaanalysis. Pediatrics. 2021;147(3):e2020015404
- 15. Duley LMM, Drife JO, Soe A, Weeks AD et al, on behalf of Royal College of Obstetricians and Gynaecologists. Clamping of the Umbilical Cord and Placental Transfusion. Scientific Impact Paper No. 14. RCOG. 2015. https://www.rcog.org.uk/en/guidelines-researchservices/guidelines/sip14/

Key Words

Immediate cord clamping, Placental transfusion, Umbilical

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.

As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

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Contact and review details						
Guideline Lead (Name and Title)			Executive Lead			
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Details of Changes made during review:						
Date	Issue Number	Reviewed By	Description Of Changes (If Any)			
	1		UHL involved in CORD Pilot Trial			
			DCC audit			
May 2021			DCC Evidence presented to Neonatal Service			
May 2021			DCC guideline written			
November 2021			DCC guideline ratified by Neonatal Service			
December 2021			DCC guideline ratified by Maternity Service			

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