Kent Surrey and Sussex Neonatal Operational Delivery Network

Optimal Cord Management	
Authors	Vanessa Sturt, Senior ANNP Dr Vennila Ponnusamy, Consultant Neonatologist Joanne Macleod, Senior ANNP Heike Rabe, Professor of Perinatal Medicine, Honorary Consultant Neonatologist
Presented for approval to/on	Clinical Governance 11th August 2021
Last Reviewed	New guideline
Review date *(Max 3 years)*	August 2024
Distribution	Maternity and Neonatal Units in KSS
Implications of race, equality & other diversity duties for this document	This guideline must be implemented fairly and without prejudice whether on the grounds of race, gender, sexual orientation or religion.

Content

1. Introduction/background

Waiting before clamping and cutting the cord for at least one minute (DCC) has been shown to improve neonatal outcomes by reducing mortality by 27-30% in preterm neonates when compared to immediate cord clamping. DCC also provides better cardiovascular stability, improvement in blood pressures and reduction in the need for packed red cell transfusions by 10%. There is still lack of evidence on the recommended duration of DCC and benefits on long term neurodevelopmental outcomes for preterm infants.

If term infants receive DCC for 3-5 minutes their iron stores are improved for 6-12 months after birth and they have better neurodevelopmental outcomes at 4 years of age.

Physiological delayed or deferred cord clamping (DCC) is recommended as the preferred method of optimal cord management (OCM) by British Association of Perinatal Medicine (BAPM) as outlined in the published toolkit (1).

An alternative method of providing placental blood at birth to the infant has been studied as gentle umbilical cord milking (UCM) of the cord for 2-4 times with similar benefits to DCC in preterm infants. Recent meta-analysis of studies have demonstrated a reduction in mortality of 28-30% similar in magnitude to DCC for preterm infants when compared to early cord clamping (2,3). One study reported on an association of increased rates of intraventricular haemorrhage in babies less than 28 weeks gestation who received UCM compared to those who received 60 seconds of DCC (4). This finding was not confirmed in the meta-analysis of five comparative studies (2,3).

As UCM is not considered to be a physiological method, BAPM Optimal Cord Management toolkit recommends DCC as the preferred method and that UCM should only be performed if DCC for 1 minute cannot be performed. This approach would avoid immediately clamping and cutting the cord (ICC) which could cause harm to the infant.

BAPM, ILCOR, ERC and Resuscitation Council (UK) (1,5,6,7), have all recommended DCC for at least 1 minute in both term and preterm neonates, as early cord clamping can be harmful. The implementation requires joint team working between midwifery, obstetrics, anaesthetists, theatre staff and neonatal staff to ensure all babies are safely assessed and supported at birth whilst maintaining normothermia.

OCM also allows parents of preterm babies to have an experience similar to that of term births. Fathers or birth partners can be involved more at birth and be spokesperson for mothers.

2. Aim of the Guideline

This guideline aims to support the multidisciplinary perinatal teams to safely achieve OCM in both term and preterm babies. It is relevant to all staff caring for babies across neonatal and maternity services.

Contra-indications for OCM

There are immense benefits for achieving OCM in all infants. Latest evidence shows there are almost no contra Indications to achieving at least 1 minute of OCM. Early cord clamping should only be considered if there is

- A need for maternal resuscitation in the face of a massive acute maternal haemorrhage or
- A ruptured vasa praevia, snapped/trauma to the cord which could result in haemorrhage from the baby.

OCM in Term neonates

As recommended by World Health Organisation (8), DCC should be performed in all term neonates for at least 1-3 minutes as it increases the haemoglobin levels after birth and improves iron stores up to 4-6 months of age. Recent studies on term infants have shown that 3-5 minutes of DCC achieve better iron stores.

- If the baby is born in good condition – provide to skin to skin care on mothers' abdomen or thighs and clamp the cord at **3-5 minutes**.
- If resuscitation is required- UCM could be performed unless the team can perform resuscitation with the intact cord. Aim to clamp the cord **after 60 seconds but ideally at 3-5 minutes if able to continue with successful resuscitation**.
- Once clinically stable facilitate a birthday cuddle with the mother prior to transfer to neonatal unit.

OCM in Preterm neonates

In line with BAPM OCM toolkit and international guidelines, **all babies <37 weeks' gestation should have their umbilical cord clamped not earlier than 60 seconds or more after birth.**

Special Circumstances

The following section on special circumstances provides guidance to effectively implement OCM in all deliveries.

Complete placental abruption

In the circumstance, where the placenta is delivered at the same time as the baby due to complete placental abruption, it could be held above the baby with gentle application of pressure to the placenta for 60 seconds before clamping and lowering the placenta. Umbilical cord milking can also be considered in this circumstance.

Short cord length

A short cord length might interfere with the management of the mother or baby but can usually be addressed with optimal positioning. It should not be considered as an automatic indication for early cord clamping, nor a contraindication to OCM.

Multiple gestations

Studies of multiple births have demonstrated feasibility for providing delayed cord clamping to twins and triplets with outcomes comparable to that of singletons. It has also been shown that DCC for 1 minute is safe in monochorionic twins. Thus, multiple births should not be excluded from delayed cord clamping.

SARS-COV$_2$-19 positive mothers

While there is limited knowledge, there is no evidence to confirm that DCC will increase the risk of transmission to neonates of SARS-COV$_2$-19 positive mothers, given that the risk of vertical transmission is very low, and the baby is already exposed to placental circulation. Therefore, DCC for 1 minute can be performed in these circumstances if felt to be beneficial to the baby.

Other conditions of mother and fetus

Recent studies have shown the DCC for 1 minute can be performed safely in mother-baby dyads with Rhesus incompatibility, maternal HIV with low viral load in the mother, congenital cardiac abnormalities of the fetus, diaphragmatic hernia and fetus with Trisomy 21.

3. Thermoregulation during OCM

Hypothermia has been well documented in research to have a direct link to mortality and morbidity in preterm babies. Therefore, the routine use of putting babies into plastic bags should continue. Use of BAPM Normothermia toolkit would help to review practice and improve thermoregulation in all preterm deliveries.

Prior to delivery:

There are certain elements of temperature control that should be considered prior to delivery.

- Ensure a warm draught-free environment of 24-26°C: this may require temporary elevation of theatre temperature in anticipation of OCM. This may be uncomfortable for those scrubbed up.
- Ensure warm (sterile if in theatre) towels are available for holding the baby during OCM and for later transfer to the stabilisation area.
- Ensure (sterile if in theatre) plastic bag or thermal suit available for use in preterm babies as per unit guideline
- Ensure that the heat source is activated on the resuscitaire
- Ensure transwarmer or other thermal mattress is available and activated prior to as required. Do not use transwarmer on the heated resuscitaire, as it can overheat the baby.

At delivery:

- Dependant on birth weight and gestation, place the baby into a plastic bag/thermal suit immediately at birth and from the onset of OCM. Otherwise use warm towels to dry and stimulate the baby.
- Cover the baby's head with a hat as soon as possible
- Monitor the baby's temperature after OCM, ideally with continuous temperature monitoring
- Using continuous temperature monitoring, promote active thermoregulation at all times during ongoing stabilisation/resuscitation to maintain normothermia
- Once clinically stable facilitate a birthday cuddle with the mother prior to transfer to neonatal unit.

4. Supporting spontaneous breathing/lung inflation during OCM

Most preterm babies will establish spontaneous breathing with stimulation before 60 seconds of age, while still attached to the cord. So, the aim should be to keep the **airway patent**, allow/promote the baby to **establish breathing by themselves using gentle, but deliberate stimulation** before **clamping the cord**. This can be referred to as the **new 'ABC' approach**.

5. Basic equipment needed to support OCM

The following basic equipment would be useful to support the onset of spontaneous breathing and/ or lung inflation while performing OCM on mother's lap/abdomen or on her bed between her legs, especially in preterm babies.

- Plastic bag/plastic wrap/thermal suit for preterm and IUGR babies as per local guideline
- Heat source to aid thermoregulation
    - Transwarmer for infants < 28/40 or with IUGR
    - Warm towels
    - Hats

6. Practical considerations

a) Early cord clamping is contra-indicated, as it causes harm. Even in precipitate delivery, where neonatal team is not present, cord should not be clamped early to initiate resuscitation. Midwifery team should start gentle stimulation of the baby with intact cord, while keeping the baby warm for 1 minute. Only clamp the cord after 1 minute to move baby to resuscitaire.

b) Preterm babies are not delivered in the sac to the resuscitaire. Splitting the sac results in large amniotic fluid spill and increased difficulty in keeping the baby warm inside the plastic bag. The obstetrician should incise the sac at delivery and place only the baby inside the bag.

c) The cord should NOT be handled, assessing for an arterial pulse is not required as DCC is about placental venous return to the baby, and not arterial blood supply.

d) Always consider maintaining normothermia proactively

7. Multidisciplinary team working in preparation for OCM

- All multidisciplinary staff involved in the delivery of term and preterm babies should assist in facilitating the practice of OCM.
- Adequate training should be provided to all groups of staff involved in the delivery of neonates including theatre staff in each hospital. This should be provided on an ongoing basis regularly due to rotational work pattern of staff.
- Provide information and teaching about OCM to parents in antenatal classes
- Use of parent information leaflet would help to inform parents the benefits of OCM prior to birth and encourage them to incorporate OCM in their birth plan at booking.
- Clear local guidance with details of usual mode of stabilisation of preterm infants including details of respiratory support (with or without a special platform) based on the unit's infrastructure is necessary.
- An active approach to thermoregulation in all preterm and growth restricted babies is necessary throughout the stabilisation including during the duration of OCM.
- Ongoing audit on DCC can be performed through National Neonatal Audit Programme (NNAP) data. Regular review of local practice using BAPM OCM toolkit would help to improve practice through ongoing KSS QIP.

X. KSS network audit topics

Topic	Target
Regular multi-disciplinary staff training about OCM	90%
Insert OCM into unit guidelines	
Parents leaflets inform about OCM	
Parent information in antenatal clinics/classes documented	
Document all OCM for each delivery in maternal birth record, preterm and term Duration of OCM, whether milking was used, exception reporting for ICC	

8. Communication

Excellent communication is fundamental in the success of achieving OCM. Elements that should be considered are:

- A pre-delivery huddle with the perinatal team (Obstetricians /Midwives) to discuss the delivery plan in line with BAPM 'Preterm Optimisation Care bundle'
- Specific reminder to perform OCM in line with local guidance (OCM can be incorporated in the WHO checklist for theatres, see STEPP card example (appendix 1).
- Inform the parents of the plan for OCM, preferably pre-delivery counselling
- Preparation of equipment based on the type of delivery (vaginal/caesarean) and the gestation of the baby
- Discuss and confirm mode of respiratory stabilisation for the baby
- Role allocation of the team members prior to delivery
- Allocate a member of staff to scribe and communicate with parents if ongoing resuscitation is required
- Once the baby has been stabilised, consider a delivery room cuddle with parents for all gestational ages.

9. Role allocation

Specific role allocation alongside excellent communication can aid successful implementation of OCM. Depending on the level of neonatal unit, staff availability and staff experience this will need to be tailored to fit each specific team. Use of simulation helps to identify the advantages and limitations of each set up and team dynamics. This would assist in developing local guidance to suit the team. There are also suggestions of layouts available in the BAPM toolkit, which can be used to develop specific layouts for individual rooms and space.

10.Quality Improvement Tools

There are various tools available to help units implement OCM based on the prior experience, knowledge and practice. Please refer to the following for further information.

- BAPM Optimal Cord Management toolkit
- Perinatal Optimisation Care Pathway
- West of England AHSN PeriPrem Care bundle

11. Scope of Guideline Framework

The guideline applies to all Maternity and Neonatal Units covered by Kent Surrey and Sussex ODN. This includes the following hospitals:

Kent, Surrey and Sussex	
Medway Hospital NHSFT	-Medway Maritime Hospital, Gillingham
East Kent Hospitals University NHSFT	- William Harvey Hospital, Ashford -Queen Elizabeth the Queen Mother, Margate
Ashford and St Peter's NHSFT	-St Peter's Hospital, Chertsey
University Hospitals Sussex NHSFT	-Royal Sussex County Hospital, Brighton -Princess Royal Hospital, Haywards Heath - Worthing Hospital, Worthing
Frimley Health NHSFT	-Frimley Park Hospital
Surrey and Sussex Healthcare NHST	- East Surrey Hospital, Redhill
Maidstone and Tunbridge Wells NHST	- Tunbridge Wells Hospital, Pembury
Dartford and Gravesham NHST	- Darent Valley Hospital, Dartford
East Sussex Healthcare NHST	- Conquest Hospital, Hastings
Royal Surrey NHSFT	- Royal Surrey County Hospital, Guildford

12. Key Points:

- **Early cord clamping is harmful and contra-indicated in all situations**
- **Aim to provide at least 60 seconds of DCC in all infants**
- **Maintain patent airway to allow the baby to breathe spontaneously or assist with ventilation before cord clamping to promote physiological transition and benefits of OCM.**
- **Maintenance of normothermia is essential through stabilisation including the duration of OCM to reduce mortality and morbidity**
- **Successful implementation of OCM requires excellent team work and communication**
- **Having set allocated roles for team members and clear layout may be beneficial to the success of OCM. These will vary depending on individual units and staffing.**
- **Ongoing audit and QIP will help to improve the implementation rates of OCM.**

13. References

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14. Further Reading

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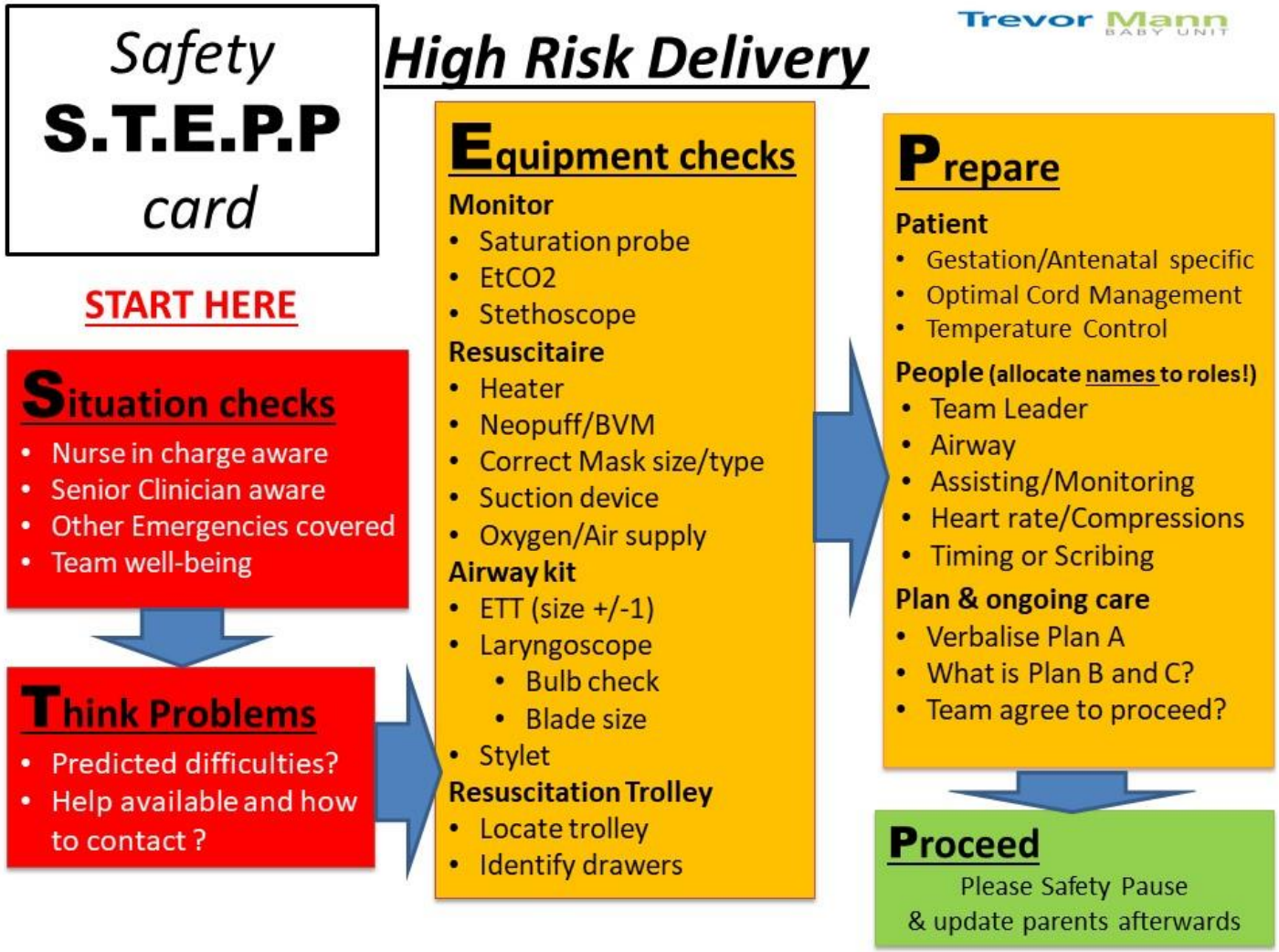
15. Version Control:

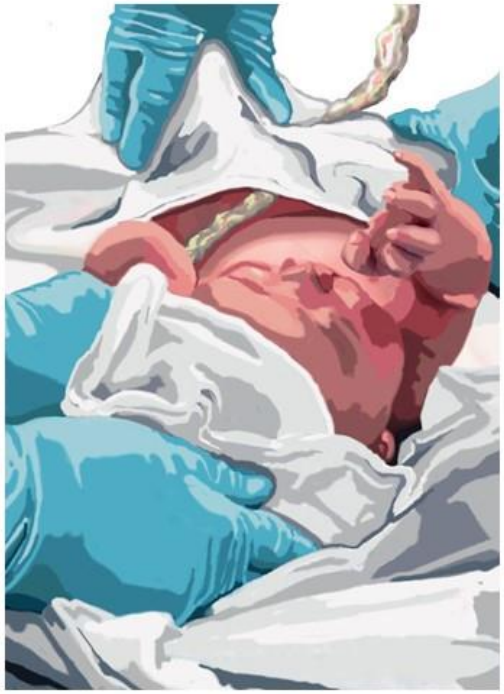
Version	Date	Details	Author(s)	Comments
Review date:				

16. Appendix 1



Appendix 2

Pathway Term Infants



Place baby between or on mother´s thigh or abdomen

Dry baby

Assess Baby

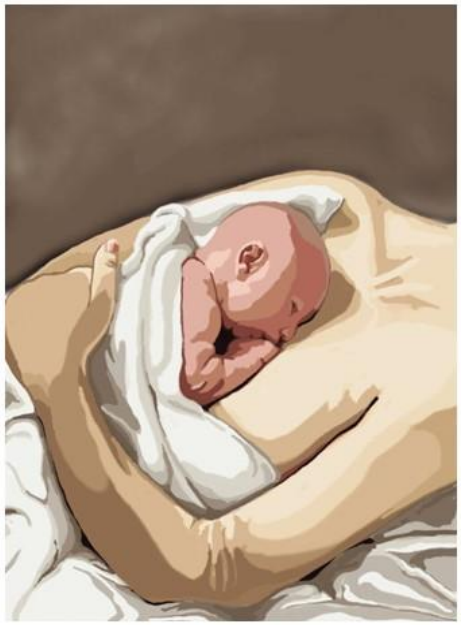
Term Pathway

Drying

Assess Baby

Skin to Skin

Term Pathway



Drying

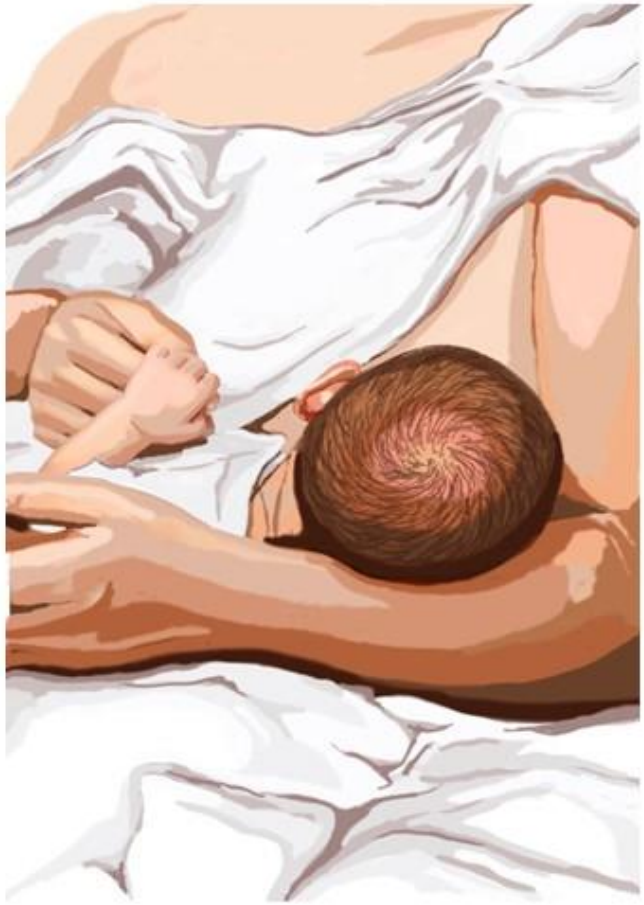
Assess Baby

Skin to Skin

Clamp and cut Cord

Syntocinon if clinically indicated

Term Pathway

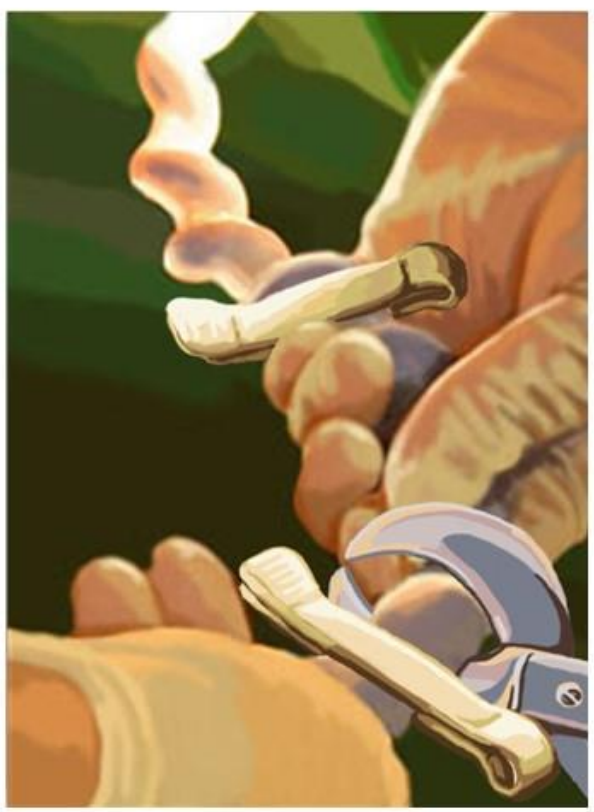


Wait for 3-5 minutes

- Drying
- Assess Baby
- Skin to Skin
- Cut Cord
- Syntocinon if clinically indicated
- Breastfeed

Appendix 3

Preterm Pathway



Wait for 1 minute

- Assess Baby
- Wait for at least one minute
- Clamp and Cut Cord
- Syntocinon if indicated