Delayed Cord Clamping Guideline

Definition

"Delayed cord clamping" (DCC) is defined as not clamping the umbilical cord for between 30 seconds to 2 minutes following delivery. "Immediate cord clamping" (ICC) refers to clamping of the cord within 30 seconds of delivery. The World Health Organisation recommends deferring cord clamping until at least 1 minute after birth. This is an evidence-based simple but effective intervention that improves neonatal outcomes.

Fetal Adaptations to Neonatal Life

Birth stimulates neonatal respiration. Lung expansion via breathing and crying decreases pulmonary vascular resistance and therefore increases the blood flow directed to the pulmonary circulation.

Clamping the cord disrupts oxygenated blood flow from the umbilical vein, reducing neonatal cardiac preload by up to 40%. It also occludes the umbilical arteries and increases cardiac afterload by increasing peripheral vascular resistance. The overall effect is reduced cardiac output.

DCC allows blood from the placental circulation to be transfused passively into the neonatal circulation to facilitate a more physiological transition from fetal to neonatal transition. It does this by minimising swings in cardiovascular pressures. This is in contrast to ICC, where blood must be redirected from other organ systems, leading to their under perfusion and swings in blood pressure impacting on cerebral perfusion.

The transfer of blood to the neonate postnatally via the umbilical vessels is termed "placental transfusion". DCC can provide an additional 80-100ml of blood to the term neonate, which increases its blood volume to 90ml/kg of body weight, versus 65-75ml/kg in fetal life.

Benefits of Delayed Cord Clamping

1. Better cardiorespiratory transition to neonatal life
   - Including a more stable blood pressure, even without changes in net blood volume

2. Improved iron stores
   - An additional 20-30mg/kg of iron is made available with DCC, which is sufficient for the metabolic needs of a neonate for the first 3-6 months of life

3. Generalised improved outcomes in preterm and low birthweight infants
    - Reduced incidence of intra-ventricular haemorrhage
    - Reduced blood transfusion requirements
    - Reduced incidence of late onset sepsis
    - Reduced incidence of necrotising enterocolitis
    - Improved circulatory stability
    - More optimal oxygen transport with fewer days on oxygen and ventilation

4. Improved developmental outcomes

5. Transfer of maternal stem cells (an immunologic boost)

Untoward Effect

1. Small increase in need for phototherapy for neonatal jaundice
    - Possible increase in transient polycythaemia and peak bilirubin level

Meconium as a Caution to Delayed Cord Clamping

- This is a contentious subject amongst practitioners due to the presumed increased risk of meconium aspiration syndrome with DCC

- The vigorous neonate, regardless of the degree of meconium:
    - It is unlikely that this neonate will have aspirated particulate meconium in utero
    - This neonate is very likely to spontaneously breathe
    - Wipe the neonate's nose and mouth of visible meconium (this is not "stimulation")
    - Perform DCC assuming the neonate remains well (the act of cord clamping alone will stimulate the neonate to cry, therefore it is in the neonate's best interest to have undergone DCC vs ICC)

- The non-vigorous neonate:
    - It is likely that this neonate will have already aspirated meconium in utero
    - Wipe the neonate's nose and mouth
    - Assess neonatal condition and if HR <100bpm, perform ICC and transfer to the resuscitaire for neonatal resuscitation +/- airway suctioning

Contraindications to Delayed Cord Clamping

- Neonatal asphyxia requiring immediate resuscitation
- Disrupted cord integrity (e.g. intentional or accidental severing/trauma during delivery)
- Placental abruption

- Postpartum haemorrhage
- Monochorionic twins

Recommendations for Practice

- The (resuscitaire) clock should be started at the time of delivery

- Ensure the neonate is kept adequately warm following delivery
  - The environmental temperature should be 24-26°C (aiming >25°C)
  - Dry the neonate and either cover or wrap them
  - Deliver preterm neonates <33 weeks into a plastic bag

- Vaginal delivery:
  - Rest the neonate either below the level of the perineum or onto the mother's abdomen or chest (this does not negatively impact placental transfusion and improves bonding with immediate skin to skin)

- Caesarean section:
  - Rest the neonate below the level of the incision, in-between the mother's legs

- Position the neonate's head higher than its body

- Assess the condition of the neonate
  - Palpate the cardiac apex and ensure heart rate is >100bpm
  - Neonates who do not breathe spontaneously should initially be stimulated by rubbing the back 2-3 times

- Duration of delay:
  - Healthy term neonates: at least 1 minute or until the cord stops pulsating
  - Preterm neonates in good condition: up to 3 minutes

- Consider "milking the cord" where DCC is not possible due to neonatal condition
  - Strip a 20cm length of cord towards the neonate three times (2 seconds each time) prior to clamping

- Clear communication between teams is crucial; it is good practice to jointly form a plan pre-delivery, which may change rapidly depending on neonatal condition

- Document the time of cord clamping in the neonatal resuscitation and maternal labour notes

References

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