Cord clamping practices – beneficial for the newborn?

GYNZONE 2016
SYMPOSIUM OM NORMALE FØDSLER
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History

“Another thing very injurious to the child, is the tying and cutting of the navel string too soon; which should always be left till the child has not only repeatedly breathed but till all pulsation in the cord ceases. As otherwise the child is much weaker than it ought to be, a portion of the blood being left in the placenta, which ought to have been in the child.”

Erasmus Darwin, Zoonomia, 1801

1950: Pain relief (morphine) in labour gives compromised newborns in need of resuscitation

Shortly after: Early cord clamping becomes the norm in many western countries

1970: Active management of labour

2000: Implementation of STAN-technology

Fear of litigation prompts documentation of blood-gases in all labours

History

Definitions

Immediate cord clamping (ICC):
- Umbilical cord is clamped in the moment the baby is born

Early cord clamping (ECC):
- Umbilical cord is clamped before 30 sec after baby is born, or before onset of respiration

Delayed cord clamping (DCC):
- Umbilical cor is clamped after 2-3 minutes or after the pulsation has ceased and the cord is floppy and white.
Definitions

- Physiologic cord clamping (PhCC)
  - Umbilical cord is cut after placenta is born
- LOTUS birth
  - The placenta is attached to the baby until the cord is dry and falls off

The role of the placenta

- Keeps the baby alive...
- Produces important hormones to support pregnancy
- Facilitates gas exchange and thermo-regulation
- Transports oxygen and nutrients to all organs
- Transports carbon dioxide and waste-products away from the baby
- Protects the baby against infections

Neonatal transition

- Transition from intra- to extraterine life

Older medical and midwifery textbooks emphasize:

- Physiologic 3rd phase
- Support / stimulate the natural process
- Minimum intervention
- Placenta has resuscitating abilities
- The process is individual

Current guidelines

WHO 2012:

- In newly-born term or preterm babies who do not require positive-pressure ventilation, the cord should not be clamped earlier than one minute after birth
- Late cord clamping (performed after 1 to 3 minutes after birth) is recommended for all births while initiating simultaneous essential newborn care.

NICE 2014:

- Do not clamp the cord earlier than 1 minute… unless there is concern about the integrity of the cord or the baby has a heart-beat below 60 beats/minute that is not getting faster.
- Clamp the cord before 5 minutes in order to perform controlled cord traction as part of active management.
- If the woman requests that the cord is clamped and cut later than 5 minutes, support her in her choice. [new 2014]

Current guidelines

Helsebiblioteket (Norway):

- DCC (1-3 min) is recommended for all births (incl CS and premature) while providing essential care for the newborn
- ECC (< 1 min) is not recommended unless the newborn must be moved for intensive resuscitation. When positive pressure ventilation is needed, this can be initiated before cord clamping, provided that personnel and equipment are available near the infant (mother)
- Cord clamping must be performed aseptically in order to avoid infection. Double-clamp the cord and cut 2-3 cm from the skin, and apply rubber band

http://www.helsebiblioteket.no/legemer/dyrepark/arrangement-so-affaletter

Benefits - DCC at term:

- 45% increase in Se-ferritin / improved iron status
- Reduced prevalence of iron deficiency at 4 months (1 vs 10)
- Reduced prevalence of neonatal anemia (2 vs 10)
- Improved fine motor skills at age 4

Iron deficiency is associated with:

- Poor cognitive development
- Behavioral problems, autism and ADHD
- Iron supplement not always helpful

Benefits – DCC preemies:

- Reduced prevalence of:
  - Intraventricular hemorrhage
  - Neonatal sepsis (esp. boys)
  - Necrotizing enterocolitis (NEC)
  - Respiratory distress syndrome (RDS)

- Improved circulatory stability and cerebral perfusion
- Reduced need for blood transfusions
- Fewer days on respirator


Blood transfer – time and amount

- Cord clamping after cease of pulsation gives:
  - 116g higher birth weight
  - 110ml higher blood volume
  - Increased blood volume by 32 ml / kg birth weight
  - 21-23 ml placental residual volume

- Amount of blood transferred by DCC accounts for 25-20% of potential blood volume at birth regardless of delivery method


Blood transfer – time and amount

Blood volume and gestational age

- Total circulating blood volume in fetus, cord and placenta is 110–115 ml/kg
- GA 30 weeks: 50% in placenta
- GA 40 weeks: 30% in placenta

Wardrop C and Holland B: The roles and vital importance of placental blood to the newborn infant. J Perinat Med 1995;23:139-43

ICC / ECC = 30–50% blood loss

Newborns lose:
- Blood volume
- Blood pressure
- Erythrocytes
- Oxygen
- Stem cells
- Iron
- Nutrients
- Gentle transition

DCC – high priority

Infants subject to hypoxia / asphyxia
- Umbilical cord compression
- Shoulder dystocia
- Instrumental deliveries
- Breech

Premature infants
- 50% of baby’s blood is still in the placenta
- Extra vulnerable when oxygen delivery is compromised
- Resuscitation measures might harm
Cord blood donation / banking?

DCC — the baby’s first stem cell transplant
- Stem cells may have important protective, preventive and reparative functions, not only for the infant, but also later on in life
- ACOG: “The routine storage of umbilical cord blood as “biologic insurance” against future disease is not recommended.

Ethical issue – the newborn as a blood donor?
- No adult is allowed to donate more than 10%
- ICC results in donations of 20-30%
- Children in other settings are not allowed to donate
- Informed consent?

CORD BLOOD IS BABY BLOOD — DO NO HARM!

New research

- During DCC: venous and arterial umbilical flow occurs for longer than previously described and is unrelated to cessation of pulsations
- Placental transfusion: Complex and dependant upon several factors, including breathing, and whether venous and/or arterial flow is still present

Hooper, SB et al. Arch Dis Child Fetal Neonatal Ed 2015;100:F355-F360 A physiological approach to the timing of umbilical cord clamping at birth

Paradigm shift?

“Indeed, one of the commonest reasons for why umbilical cords are hastily clamped at birth is to initiate respiratory support. However, it could be argued that these infants would receive the greatest benefit if the respiratory support was provided while the umbilical cord remained attached to the placenta”

Implication for the future

"Separation of the vast majority of babies from their mothers at birth is no longer acceptable. The common justification for separation at birth is the need for resuscitation. This can however be readily provided at the side of the mother with the placental and cord circulation intact using specially designed equipment."

D. Hutchon & N. Bettles 2016

Implication for the future

"Ambubag and mask is usually all that is necessary to start a baby breathing. Providing ventilation of the baby with the cord intact while it lies between the legs of the mother on a clean flat surface on the floor is the obvious low tech solution."

D. Hutchon & N. Bettles 2016

Further readings
Scandinavian resources:
- [https://www.facebook.com/SenAvnavling/](https://www.facebook.com/SenAvnavling/)
- [https://www.facebook.com/groups/987183282961/?fref=ts](https://www.facebook.com/groups/987183282961/?fref=ts)
- [http://www.helsebiblioteket.no/fagprosedyrer/ferdige/avnavling-av-nyfodte](http://www.helsebiblioteket.no/fagprosedyrer/ferdige/avnavling-av-nyfodte)

International resources:
- [http://www.cordclamping.org/](http://www.cordclamping.org/)
- [http://www.bloodtobaby.com/](http://www.bloodtobaby.com/)
- [http://cordclamping.info/publications/publications.htm](http://cordclamping.info/publications/publications.htm)
- [https://www.facebook.com/delayedcordclamping/?fref=ts](https://www.facebook.com/delayedcordclamping/?fref=ts)

On behalf of generations to come:

DO

NO

HARM!