Transition for the neonate

Can we do resuscitation on intact cord?

David J R Hutchon
Emeritus consultant obstetrician
Darlington Memorial Hospital,
England.
Transition for the neonate

Should we do resuscitation on intact cord?

David J R Hutchon
Emeritus consultant obstetrician
Darlington Memorial Hospital, England.
The 2015 ILCOR

“There is insufficient evidence to recommend an approach to cord clamping for infants who require resuscitation at birth, and more randomized trials involving such infants are encouraged.”

The following are the major new recommendations:

- Cord clamping should be delayed for at least 1 minute in babies who do not require resuscitation.
- For babies requiring resuscitation, resuscitative intervention remains the priority. But not at expense of circulation.

Should delayed cord clamping be done for an asphyxiated newborn needing resuscitation?

This practice would depend upon the experience of the provider. The WHO 2012 Guidelines on Basic Newborn Resuscitation state that the cord should be clamped and cut to allow for effective ventilation in term or preterm babies requiring positive-pressure ventilation. However, if the clinician has experience in providing effective positive-pressure ventilation without cutting the cord, ventilation can be initiated at the perineum with the cord intact to allow for delayed cord clamping.
HANDOVER
Obstetrician - expert in fetal care and birth “hands over” to neonatologist – expert in neonatal care.

TRANSITION
from fetal placental breathing to neonatal pulmonary breathing.
'Our little miracle' Ella the ice baby, who died in the womb and was stillborn, amazes doctors by coming back to life after 25 MINUTES

But despite a seemingly uncomplicated birth, Rachel’s placenta had ruptured during the labour, restricting the baby’s oxygen and blood supply. ‘I’d held her for no more than two seconds when the midwife told Jason to pull the emergency cord,’ Miss Claxton said.

‘All of a sudden there were doctors everywhere.
E. Mortality Risk

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>DCC / Milking</th>
<th>ECC</th>
<th>Total</th>
<th>Total</th>
<th>Weight</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercer 2006</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>36</td>
<td>33.8%</td>
<td>0.14 [0.01, 2.67]</td>
<td>2006</td>
</tr>
<tr>
<td>Hosono 2008</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>20</td>
<td>29.0%</td>
<td>0.67 [0.12, 3.57]</td>
<td>2008</td>
</tr>
<tr>
<td>March 2013</td>
<td>2</td>
<td>36</td>
<td>4</td>
<td>39</td>
<td>37.1%</td>
<td>0.54 [0.11, 2.78]</td>
<td>2013</td>
</tr>
</tbody>
</table>

Total (95% CI) 92 95 100.0% 0.44 [0.15, 1.28]
Total events 4 10
Heterogeneity: Chi² = 0.86, df = 2 (P = 0.65); I² = 0%
Test for overall effect: Z = 1.50 (P = 0.13)

Figure 4: Meta-analysis and forest plots for neonatal morbidities

A. Total IVH

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>DCC / Milking</th>
<th>ECC</th>
<th>Total</th>
<th>Total</th>
<th>Weight</th>
<th>Risk Ratio M-H, Fixed, 95% CI</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibrahim 2000</td>
<td>2</td>
<td>16</td>
<td>4</td>
<td>16</td>
<td>8.1%</td>
<td>0.50 [0.11, 2.35]</td>
<td>2000</td>
</tr>
<tr>
<td>Mercer 2003</td>
<td>3</td>
<td>16</td>
<td>5</td>
<td>16</td>
<td>10.1%</td>
<td>0.60 [0.17, 2.10]</td>
<td>2003</td>
</tr>
<tr>
<td>Mercer 2006</td>
<td>5</td>
<td>36</td>
<td>13</td>
<td>36</td>
<td>26.2%</td>
<td>0.38 [0.15, 0.97]</td>
<td>2006</td>
</tr>
<tr>
<td>Hosono 2008</td>
<td>3</td>
<td>20</td>
<td>5</td>
<td>20</td>
<td>10.1%</td>
<td>0.60 [0.17, 2.18]</td>
<td>2008</td>
</tr>
<tr>
<td>Oh 2011</td>
<td>4</td>
<td>16</td>
<td>3</td>
<td>17</td>
<td>5.9%</td>
<td>1.42 [0.37, 5.37]</td>
<td>2011</td>
</tr>
<tr>
<td>Gokmen 2011</td>
<td>2</td>
<td>21</td>
<td>0</td>
<td>21</td>
<td>1.0%</td>
<td>5.00 [0.25, 98.27]</td>
<td>2011</td>
</tr>
<tr>
<td>March 2013</td>
<td>9</td>
<td>36</td>
<td>20</td>
<td>39</td>
<td>38.7%</td>
<td>0.49 [0.26, 0.93]</td>
<td>2013</td>
</tr>
</tbody>
</table>

Total (95% CI) 161 165 100.0% 0.58 [0.39, 0.87]
Total events 28 50
Heterogeneity: Chi² = 4.83, df = 6 (P = 0.57); I² = 0%
Test for overall effect: Z = 2.64 (P = 0.008)

"Placental transfusion"

Figure 1. Weight change from birth to cord clamping.

One baby gained at least 214 gms, this equals 204 mls blood volume
Placental circulation after birth

The placental circulation continues for several minutes until stopped by vasospasm in the umbilical arteries and vein.

There is a significant oxygen content 3.7 to 3.77 kPa in the blood returning to the baby.

Oxygenated blood returning from the placenta to the baby

90 seconds
Immediate cord clamping leads to lower oxygen saturation for the first few minutes after birth.
Effects of cord clamping

Venous occlusion

Arterial occlusion (40% of CCO)

Fig 1. Direct measurement of the umbilical arterial pressure in a healthy term neonate delivered by caesarean section showing the arterial surge associated with umbilical cord clamping even 35 s after birth.

There is a transient increase in Carotid Artery pressure and flow soon after cord clamping.

But, by 1 minute both Carotid Artery pressure and flow begin to drop profoundly to <50% baseline.

They recover slowly after ventilation onset.

Could this lead to a transient loss of consciousness?

Bhatt et al. *J Physiol* 2013; 591:2113-26

Figure courtesy: Dr. Stuart Hooper
Lamb studies
What did the Data Say?

- Otherwise, if there is a long delay between UCC and lung aeration, the infant will be exposed to a hypoxic episode superimposed on top of a period of severely restricted cardiac function.

- The combined effects of these two adverse events are potentially catastrophic, leading to a severe hypoxic/ischaemic event.

The redistribution of blood into the baby occurs faster if the baby is breathing.

Summary

• Delaying cord clamping until the ventilation is established assures a smoother change during transitional circulation


• (Ensures that a normal physiological transition is not interfered with)
Somersault manoeuvre

Cord blood gases from the intact cord
Delayed umbilical cord clamping at birth
has effects on arterial and venous blood
gases and lactate concentrations. BJO
115: 697-703.

26/08/2016
Resuscitation with cord intact using standard resuscitation trolley

RCOG London Congress 2007

Difficult to move trolley quickly enough

Interference with operating surgeon

Not practical for assisted vaginal births

Problems with short cord.
Requirements

**LifeStart trolley**

- A stable warm platform with Inditherm mattress

- Medirails for **user preferred equipment**
  i. Tom Thumb PEEP
  ii. Bird Oxygen Blender
  iii. Suction

- Hands free height adjustment

- Small footprint
- Good mobility
Requirements

**LifeStart trolley**

- Co-operation by obstetricians, midwives and neonatologists

- Simulation practice in all modes of birth

- Written roles for each member of the team to be agreed

- Committed teamwork
Position and role of each member of the team will vary from unit to unit and needs to be worked out and agreed. It must be documented and then practiced in simulated situations so that every member of the team knows their role.

EXAMPLE SET UPS
Normal births

Resuscitation with cord intact

When the infant needs resuscitation, delay clamping for 60 seconds with the infant placed between the mother's legs.

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Bedside resuscitation of newborns with an intact umbilical cord: Experiences of midwives from British Columbia

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Delayed Cord Clamping:
A review of its introduction within a medium-sized UK consultant-led maternity unit.

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Results
• 1973 births were reviewed (born late 2012-13)
• 1904 (96.5%) received at least 1 minute DCC
• 1456 (73.8%) received 2-4 minutes DCC
• 141 (7.14%) infants had an Apgar score <5 at 1 minute
• 41 (2.07%) babies had Apgar score <7 at 5 minutes
• 81 infants were transferred to the resuscitaire for intervention (4.08%). Newborn resuscitaire measures in this instance were crudely identified as any action requiring transfer to a delivery room resuscitaire within the first 5 minutes of life.
• 50 (2.55%) were admitted to SCBU for respiratory care following delivery.
• Few (3.5%) of babies did not benefit from DCC

Discussion
1. The introduction of DCC has resulted in a significant reduction in the number of babies born within our consultant-led unit receiving resuscitative measures at birth. Ashington now very much supports the practice of “assisted transition” from placental to pulmonary respiration. The act of delaying the separation of the infant from mother in itself appears to prevent infants receiving resuscitation that they don’t require.

Background
This tentative review was undertaken to identify issues which could be examined in further studies to determine the impact of introducing “Delayed Cord Clamping for all” within an obstetric service providing low/high risk care.

Delayed Cord Clamping (DCC) was introduced within our maternity unit in 2009. DCC is recommended for up to 3 minutes within our low risk intrapartum care guidelines. A minimum of 1-2 minutes of DCC is advised for infants born by instrumental delivery/LSCS regardless of indication for delivery. This audit was planned to determine if this was being put into practice.

The resident neonatal staff, a team of Advanced Neonatal Nurse Practitioners (ANNP), work with the midwifery/obstetric teams to ensure infants benefit from DCC. Practice changes such as sitting alongside the obstetrician at instrumental deliveries were introduced.

Methods
A review of the most recent cohort of deliveries was undertaken. This looked at:
- Was DCC practised?
- How many babies required resuscitative measures?
- What proportion of infants born at term were admitted to the Special Care Baby Unit (SCBU) for respiratory care?
- These data were reviewed in light of what is known about resuscitation practice before the introduction of DCC.

Future Action
- Consultant obstetricians and senior midwives will continue to remind junior staff at induction.
-Duration of DCC is now included in neonatal documentation which will facilitate further audit. The reason for NOT doing DCC has to be documented.
- Senior nurses and midwives attending delivery will continue to advocate DCC and the notion that allowing for normal physiological transition most babies will resuscitate themselves.
- A more formal project will add validity and transferability to the findings of this audit.

References
Remote resuscitaire

Many babies moved over to resuscitaire away from mother do not need any more care than could have been carried out by the mother

Mother and father “think the worst”

Two or three minutes seem like hours!
Consent

Montgomery ruling

In the UK valid consent has moved away from what the simply providing information as to the standard medical practice to that of providing the information regarding the risks that a reasonable woman would wish to know in order to provide the consent.

Would a reasonable woman want to know the effects of early cord clamping in order to get her baby over to the resuscitare?
Thank you

Yes, resuscitation of the neonate at birth can be carried out with an intact cord.

David J R Hutchon
Retired obstetrician from Darlington Memorial Hospital.

Questions?
Results

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- 1904 (96.5%) received at least 1 minute DCC
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- 50 (2.55%) were admitted to SCBU for respiratory care following delivery.
- Few (3.5%) of babies did not benefit from DCC
- Resuscitation incidence prior to introducing DCC was 15% (333/2470 births in 2006). At this time 4.5% of term infants were admitted to SCBU for respiratory problems.
Discussion

1. The introduction of DCC has resulted in a significant reduction in the number of babies born within our consultant-led unit receiving resuscitative measures at birth. Ashington now very much supports the practice of "assisted transition" from placental to pulmonary respiration. The act of delaying the separation of the infant from mother in itself appears to prevent infants receiving resuscitation that they don’t require.
APGAR = 2

Problem is lack of cerebral circulation

NOT

lack of oxygen