Umbilical cord milking in pre-term neonates <30 weeks

Umbilical cord milking i.e. moving blood along the umbilical cord from the mother to the baby is a simple intervention carried out at the time of birth which aims to reduce anaemia in pre-term babies.

**Indication**

Infants less than 30 weeks completed gestation should have cord milking performed

Note: cord milking may not be beneficial in the following groups of babies. Discuss with paediatric registrar or consultant.

- Monochorionic multiple pregnancy
- Major congenital cardiac disease
- Congenital malformation
- Fetal hydrops

**Method**

- Cord milking should be carried out by the midwife or doctor delivering the baby.
- Normal preparations for pre-term birth should be made.
- Once the baby is born he or she should be placed at or below the level of the placenta.
- Babies born by Caesarean section should be placed on the mother’s thighs.
- The cord should remain unclamped until cord milking is completed.
- Approximately 20cm of cord should be milked by hand from the mother towards the baby. The cord can be milked by compressing it between two fingers and pushing blood along the cord vessels towards the infant. This should be done swiftly 3-4 times at a rate of approximately 10cm/second i.e. quite slowly.
- The procedure should take no longer than 20 seconds to complete.
- The cord should then be clamped and cut and normal post-natal resuscitation and care be commenced.

**Background information regarding umbilical cord clamping**

**Benefits**

- Reduction in transfusion requirement and attendant risks (*Hosono, Rabe*)
- Reduction in initial hypotension (*Hosono, Rabe*)
- Reduction in IVH (intra-ventricular haemorrhage) (*Rabe*)
- Less ventilatory support (*Hosono*)
- Less oxygen dependence (*Hosono*)
- Lower incidence of necrotising enterocolitis

**Potential risks**

- Hyperbilirubinaemia
- Delay in post natal care and temperature loss (these are minimised by active cord milking rather than delayed cord clamping)
- Excess volume loading
- Polycythaemia and sequelae
**Background**

**Anaemia is a significant problem for pre-term neonates.**

Anaemia is a significant problem for pre-term infants and the majority of pre-term babies will require one or more blood transfusions during their admission to the neonatal unit. The anaemia seen in pre-term babies is multi-factorial in origin. Frequent blood tests, poor bone marrow function, haemolysis, sickness all contribute. Blood transfusion is a safe procedure but like all therapeutic interventions has risks associated with it and effort is made to reduce the number of transfusions that infants require during their stay on the neonatal unit.

**Delayed cord clamping has been shown to reduce the need for transfusion.**

At pre-term births concerns about the need for urgent resuscitation and temperature management have encouraged attendants to clamp the umbilical cord immediately so that post-natal resuscitation and care can start as soon as possible.

Delaying cord clamping to allow the cord to pulse and transfer blood from the placenta to the baby was first suggested in the 1960s. Several studies have supported its use and have found benefit. A Cochrane review of seven randomised controlled trials published in 2007 (Rabe et al.) found a significant reduction in the number of blood transfusions required by babies following delayed cord clamping of between 30 and 120 seconds (RR 2.01, 95% CI 1.24-3.27). The meta-analysis did not find any increase in adverse outcomes in these babies.

**Studies have suggested additional benefits**

Studies suggest that by increasing initial haematocrit the number of blood transfusions required can be reduced and may also have other benefits for the pre-term neonate.

Rabe’s Cochrane review found less IVH (RR1.74, 95% CI 1.08-2.81) and fewer transfusions required for initial hypotension (RR 2.58, 95% CI 1.17-5.67) in babies less than 37 weeks.

**Delayed cord clamping versus active cord milking**

Concerns about delay in resuscitation are valid, particularly in those babies who are extremely small and extremely premature. It is well established that attention to thermal care and early resuscitation in these babies significantly improves their outcome. Active cord milking allows for swift intervention and resuscitation and attention to thermal care and should take less than 20 seconds to complete.

In Jan 2008 Hosono et al. published a study looking at actively milking the umbilical cord at the time of delivery. The study was a randomised controlled trial carried out at a tertiary neonatal centre in Japan. They looked at pre-term babies of less than 29 weeks gestation. Twenty babies in each arm of the trial were randomised to immediate cord clamping or cord milking. The babies in the intervention group ‘were placed at or below level of the placenta and about 20cm of the umbilical cord was vigorously milked towards the umbilicus two to three times before clamping the cord.’ The milking speed was about 10cm per second.

The group found a reduction in the number of blood transfusions required and an increase in initial blood pressure and in addition found a reduction in the number of days that the babies required mechanical ventilation and supplemental oxygen. The study is summarised in further detail at the end of this guideline.
Summary of significant literature

Umbilical cord milking reduces the need for red cell transfusions and improves neonatal adaptation in infants born at less than 29 weeks’ gestation: a randomised controlled trial. Hosono et al. *Archives disease childhood, fetal and neonatal* 2008; 93:14-19.

**Aim**
To umbilical cord milking on the need for blood transfusion and morbidity in very pre-term infants

**Method**
Group from Nihon University Hospital, Japan. Level 3 neonatal unit. Prospective, randomised controlled trial, not blinded. Babies 24-28 weeks gestation recruited Jan 01-Dec 02
Excluded multiple births, hydrops, congenital abnormalities
40 babies recruited and randomised to immediate cord clamping (20) or active milking of cord (20)

**Intervention**
‘Infants were placed at or below level of the placenta and about 20cm of the umbilical cord was vigorously milked towards the umbilicus two to three times before clamping the cord. The milking speed was about 20cm/2 seconds.’

**Results**
No significant difference in baseline characteristics between the two groups
Mortality – milked 2 (sepsis, intestinal perforation), control 3 (IVH, intestinal perforation, sepsis) non significant difference (p=0.63)

<table>
<thead>
<tr>
<th>Morbidity</th>
<th>Control</th>
<th>Milked</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb at birth g/l</td>
<td>141</td>
<td>165</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Number of transfusions in first 3 weeks</td>
<td>2.5</td>
<td>0.7</td>
<td>0.02</td>
</tr>
<tr>
<td>Total transfusions</td>
<td>4.0</td>
<td>1.7</td>
<td>0.02</td>
</tr>
<tr>
<td>Initial mean BP mmHg</td>
<td>28</td>
<td>34</td>
<td>0.03</td>
</tr>
<tr>
<td>Ventilation duration (days)</td>
<td>36.1</td>
<td>21.9</td>
<td>0.04</td>
</tr>
<tr>
<td>Supplemental oxygen (days)</td>
<td>46.6</td>
<td>23.4</td>
<td>&lt;0.01</td>
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</tbody>
</table>

No significant differences in the following outcomes:

<table>
<thead>
<tr>
<th></th>
<th>Control n=20</th>
<th>Milked n=20</th>
<th>95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polycythaemia</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDS</td>
<td>13</td>
<td>14</td>
<td>0.33-4.73</td>
<td>0.74</td>
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<tr>
<td>PDA</td>
<td>7</td>
<td>5</td>
<td>0.15-2.43</td>
<td>0.49</td>
</tr>
<tr>
<td>IVH</td>
<td>5</td>
<td>3</td>
<td>0.11-2.60</td>
<td>0.43</td>
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<tr>
<td>PVL</td>
<td>2</td>
<td>1</td>
<td>0.04-5.37</td>
<td>0.52</td>
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<td>ROP &gt;2</td>
<td>10</td>
<td>6</td>
<td>0.09-1.39</td>
<td>0.14</td>
</tr>
</tbody>
</table>

Mean serum peak bilirubin and length of phototherapy - no significant difference between the two groups

**Conclusion**
Authors conclude that cord milking is safe and reduces the need for transfusion and respiratory support.
In 2011 Rabe published a study in 58 babies <33/40 showing that milking the cord four times achieved a similar amount of placento-fetal blood transfusion compared with delaying clamping the cord for 30 seconds. 

A large systematic review by Fogarty in 2018 showed that delayed clamping reduced mortality, but did not evaluate cord milking which may also be of benefit. 

References


