

Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes

Changing the timing of cord clamping and cutting from immediately after delivery of the baby to 1–3 minutes after delivery of the baby improves the iron status of the infant. Potential adverse effects on the infant of delayed cord clamping and cutting, such as jaundice requiring phototherapy, should be considered, especially in under-resourced settings.

RHL Commentary by Abalos E

1. INTRODUCTION

The timing of cord clamping and cutting is frequently regarded as one of the components of active management of the third stage of labour (other components are administration of a prophylactic uterotonic at or after delivery of the baby, controlled cord traction and uterine massage). However, there is no consensus on the precise meaning of the word "early" in this context. Trials evaluating active management of the third stage of labour have used a variety of definitions of early cord clamping and cutting, ranging from immediately after delivery of the baby to up to one minute after birth. The same confusion also exists with regard to the definition of "late" or "delayed" cord clamping and cutting. These terms are generally understood to mean a delay of 2–3 minutes after birth, or when cord pulsation has ceased. However, their exact definition remains unclear.

The precise timing of clamping and cutting the umbilical cord may be important as there is some evidence of potential benefits for the baby when the cord is not clamped and cut immediately after birth. Physiological studies have shown that there is a transfer from the placenta of about 80 ml of blood at 1 minute after birth, reaching about 100 ml at 3 minutes after birth (1, 2). These additional volumes of blood can supply extra iron amounting to 40–50 mg/kg of body weight. When this extra iron is added to the approximately 75 mg/kg of body iron that a full-term newborn is born with, the total amount of iron can reach 115–125 mg/kg of body weight, which may help prevent iron deficiency during the first year of life (3). On the other hand, there is also evidence to suggest that delayed umbilical cord clamping and cutting may put newborns at a higher risk of polycythemia, hyperbilirubinemia, and other neonatal disorders (4). Regarding maternal outcomes, there is very little evidence to suggest that the timing of cord clamping and cutting has an impact on the incidence of postpartum haemorrhage. The objective of this Cochrane review was to determine the impact of different policies related to the timing of cord clamping and cutting on the mother and her newborn (5).

2. METHODS

All relevant available trials have been included in the review. The methods used in the evaluation of trial quality and analyses of data were adequate.

Participants in the trials were generally healthy pregnant women giving birth vaginally. Among the included trials, one study (Argentina) also included some women who gave birth by caesarean section. In one trial in India, the women were anaemic, and the trial in Zambia was conducted in a malaria-endemic area. The timing of early cord clamping and cutting was consistent between studies at less than one minute (mostly within 15 seconds of birth). The timing of late clamping and cutting was variable (one trial had more than two arms): 1 minute in two trials (106 women in the late cord clamping and cutting arm); 2 minutes in one trial (237 women); 3 minutes in three trials (577 women); delayed until the cord stop pulsating in three trials (132 women); delayed until the cord stopped pulsating or 5 minutes in one trial (483 women); and after placental descent in two trials (108 women). Six trials (out of 11) did not specify either use or timing of any uterotonic. Use of uterotonic drugs was variable in the studies reporting this intervention (before cord clamping and cutting at delivery of the anterior shoulder, or after cord clamping and cutting).

3. RESULTS

The review includes 11 trials, involving 2989 mothers and their babies. Five of these trials (involving 2236 women and infants) had investigated differences between early and late cord clamping and cutting in terms of risk of postpartum haemorrhage. There was no significant differences between the two groups in these trials. Only two trials had measured other maternal outcomes, such as risk of blood transfusion, manual removal of placenta, or duration of the third stage of labour. No differences between the two groups were found for those outcomes. For the baby, there was a significant increase in newborn haemoglobin levels (weighted mean difference 2.17 g/dL; 95% CI 0.28–4.06) in the late cord clamping and cutting group compared with early cord clamping and cutting group (three trials, 671 mother–baby pairs), although this effect did not persist past 6 months. Infant ferritin levels remained higher in the late clamping and cutting group than the early clamping and cutting group at six months. No significant differences were found in other neonatal outcomes such as Apgar score less than seven at 5 minutes (two trials, 1342 neonates), admission to special care baby nursery or neonatal intensive care unit (three trials, 1293 infants), respiratory distress (four trials, 1387 infants), polycythaemia (three trials, 463 infants), or clinical jaundice (five trials, 1828 infants). In spite of the latter, however, significantly more infants (relative risk 0.59; 95% CI 0.38–0.92) in the late cord clamping and cutting group required phototherapy for jaundice than in the early cord clamping and cutting group (five trials, 1762 infants). These results were influenced by a large unpublished trial (Mc Donald 1996, PhD thesis) in which late cord clamping and cutting was done when cord pulsation had ceased or at 5 minutes if cord pulsation had not ceased.

4. DISCUSSION

4.1. APPLICABILITY OF THE RESULTS

The trials included in this review were performed in Argentina, Australia, Canada, India, Libya, Mexico, United Kingdom, USA and Zambia.

Hence, the findings of the review can be expected to be applicable to all settings where births are attended by skilled health-care providers.

4.2. IMPLEMENTATION OF THE INTERVENTION

This is a low-cost intervention. It would require some training of health-care providers, especially in the detection of signs or symptoms of respiratory distress or other neonatal complications requiring immediate care. All trials were hospital-based, however, and available evidence comes from deliveries performed by trained staff. In WHO recommendations for management of the third stage of labour (6), the term skilled attendant is defined as "...health professionals who have been educated and trained to proficiency in skills needed to manage normal labour and delivery, recognize the onset of complications, perform essential interventions, start treatment and supervise the referral of mother and baby for interventions that are beyond their competence or are not possible in the particular setting. Depending on the setting, health-care providers such as auxiliary nurse-midwives, community midwives, village midwives and health visitors may also have acquired appropriate skills, if they have been specially trained".

In settings where active management of the third stage of labour is the norm, it should be easy to change the timing of cord clamping and cutting from immediately after delivery of the baby to 1–3 minutes after the delivery of a healthy term infant. Implementation of this intervention would be particularly relevant in under-resourced settings, where access to good nutrition is limited during childhood. To counter the possibility of over-transfusion of blood to the baby (as a result of contraction of the uterus after administration of a uterotonic drug), the administration of a prophylactic uterotonic as part of active management of the third stage of labour could be delayed to after clamping and cutting the cord. Education and training of health-care staff would be necessary to ensure that they have the skills to implement these interventions. Potential adverse effects on the well being of infants, such as jaundice requiring phototherapy, would need to be considered. Early clamping should be performed if the baby requires immediate resuscitation.

4.3. IMPLICATIONS FOR RESEARCH

There is a need to conduct randomized controlled trials for women delivering at home, irrespective of the development status of the country. Contribution of timing of the umbilical cord as part of active management of the third stage of labour package should be determined in terms of maternal outcomes such as postpartum haemorrhage and maternal morbidity. Short- and longer-term neonatal and infant outcomes, such as neurodevelopment, need to be evaluated. Future research should also be aimed at women's views related to this intervention.

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