Barriers to deferred cord clamping in preterm infants

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ABSTRACT

Objectives To describe the range of practices employed by units conducting deferred cord clamping at very preterm birth.

Design Qualitative study using semistructured interviews with neonatal doctors, nurses, midwives, obstetricians and managers in a sample of UK maternity units.

Participants 33 neonatal doctors, neonatal nurses, midwives, obstetricians and managers.

Setting UK maternity units in 2012.

Results Four key themes emerged. The first concerns the variation in guideline content, the absence of a practice of stabilisation with cord intact, and issues with implementing and maintaining changes in practice. The second concerns the challenges in assessing eligibility. The third concerns the competing priorities of delivering the intervention and proceeding with other stabilisation manoeuvres and the associated anxiety experienced by professionals. The final theme relates to the issue of uncertainty as to optimal treatment choices.

Conclusions The evidence surrounding deferred cord clamping in very preterm infants is unclear. This study describes the reported practice of units deferring cord clamping in 2012 and will inform trial development.

What is already known on this topic

- Deferred cord clamping may benefit newborn babies.
- Deferred cord clamping was not widely practised in the UK in 2011.

What this study adds

- Techniques for deferred cord clamping varied widely, as did opinions about assessing eligibility.
- Practitioners reported anxiety during a period of delay, and ongoing uncertainty about optimal treatment choice.

INTRODUCTION

In the late 1960s, immediate cord clamping was introduced as part of a triad of interventions in the third stage of labour to prevent postpartum haemorrhage (PPH).[1] Systematic reviews have shown that, while uterotonic drugs reduce PPH, immediate clamping does not.[2 3] In preterm infants, deferred cord clamping (DCC) is associated with fewer blood transfusions, less necrotising enterocolitis and intraventricular haemorrhage, but more jaundice.[4] The UK Newborn Life Support course recommends DCC for 'at least a minute', with very preterm babies (born before 32 weeks gestation) excluded only if there is a need for resuscitation. For many practitioners, this represented a major change of practice which was incompletely adopted by the end of 2011/early 2012.[5]

The aim of this study was to describe the extent to which, how and why DCC, or cord milking/stripping (CM), was practiced for very preterm infants in centres known to have adopted placental transfusion techniques.

METHODS

Maternity units practicing 'delayed cord clamping or other efforts to facilitate a placental transfusion' were identified from a UK national survey,[5] from which a purposive sample, chosen to give geographical spread, a mix of teaching and district general hospitals, and published expertise in the field, were selected.

At each site, experienced practitioners from midwifery, obstetrics, neonatal nursing and neonatology or paediatrics were invited to take part. With participants' informed consent, semistructured interviews (see online supplementary appendix 1) lasting 20–40 min were conducted, digitally recorded and fully transcribed. Where these existed, we also obtained relevant guidelines.

All transcripts were anonymised and coded, following a process of constant comparison and using qualitative data software (NVivo10). Common themes were identified between sites, professional groups and individual clinicians.[6]

RESULTS

Seven sites were included, from which 33 practitioners were interviewed: 7 midwives, 7 neonatologists, 2 paediatricians, 6 neonatal nurses, 7 obstetricians and 4 managers.

Four main themes emerged from the analysis: variability in guidelines; assessing eligibility; competing priorities: anxiety about timing; persisting uncertainty. Quotes illustrating the themes are provided in online supplementary appendix 2.

Variability in guidelines

Guidelines varied widely in terms of technique and nature of recommendations (see table 1). Sites varied in the extent to which staff were aware of, and reported adherence to, guidelines. No two sites were practicing placental transfusion in the same way. No site had guidance for, or reported a practice of 'resuscitation', airway or breathing support of

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Table 1 Guidelines and practice concerning deferred Cord Clamping and cord milking for very preterm birth in 7 practising sites in the UK 2012

Site	Guideline content pertaining to DCC in very preterm birth	Guideline content pertaining to CM in very preterm birth	Reported practice of DCC	Reported practice of CM	Recommended duration DCC	Duration reported in practice	Specific instructions about execution of CM in guideline (number of milkings, length of cord, height of baby etc	Delivery into plastic bag prior to cord ligation mandated in guideline	Guideline exclusions	Comments
Site 1 Tertiary Hospital	Presented as alternative options		Very few	All	None	5–10 s	No	No		Most babies <28 weeks delivered by caesarean section had CM—more variability at higher gestations
Site 2 tertiary hospital 6000–7000 deliveries	Discouraged	Recommended	Few	'standard practice'	NA	?	Yes	Yes		CM seen as safer than DCC in all circumstances
Site 3 medium size district hospital 5000–6000 deliveries	Recommended	Only if DCC seen as unsafe	70% in recent audit	Minority	30 s	30s	No	No	None	DCC considered as part of resuscitation process
Site 4 tertiary hospital 6000–7000 deliveries	Nil	Nil	Minority	Minority	No recommendation	?	No	No		DCC recommended for term births
Site 5 tertiary hospital	Recommended	Nil	Majority <28 weeks	Few, if any	45 s	30 s	No	No	Need for immediate resuscitation. Absent cord pulsation, or cord incised. Placental separation. Concerns for health of mother	
Site 6 smaller district hospital 2000–3000 births	Discouraged	Nil	Minority	Minority	Discouraged	0–30 s	No	No		'The consensus paediatric view, therefore, is that DCC should not be practised routinely on preterm babies., Policy advised CM where DCC could not be achieved.
Site 7 4000–5000 births tertiary hospital	Nil	Nil	Minority	Minority	NA	15–60 s	No	No	None	

CM, cord milking/stripping; DCC, deferred cord clamping.

very preterm infants with cord intact, although one Guidelines described DCC as 'part of the resuscitation process' (Site 3)

Intraunit variation in reported practice was most marked where neither DCC nor CM were supported by guidelines. Reported positions for DCC varied from above, or level with, the placenta to 6–20 cm below, avoiding tension in the cord, and were based on practicality rather than evidence: for example, placement on mothers' legs at section. Reported positions for CM were similar. Some clinicians practised DCC, CM or both techniques as a matter of routine, others only when they remembered, and often in ignorance of what colleagues were doing. Interviewees spoke of the need for a local clinical champion to move practice forward.

Placental transfusion practices were most commonly led by neonatologists or paediatricians; however, the most successful sites had also engaged the support of senior obstetricians. Lesser engagement across professions was associated with incomplete implementation. One site had introduced a requirement to state in the infant's notes why DCC had not been implemented in any given case, and this was believed to have helped to normalise the practice. Elsewhere, recording of DCC and CM was ad hoc rather than systematised.

CM was the preferred practice in two sites (table 1); elsewhere, it was viewed as a second-line therapy. In choosing CM over DCC, one person commented that the decision might be influenced by anxiety about health of the baby; others reported using both techniques in a single delivery, starting with delay, followed by CM. CM was more likely than DCC to be seen as an obstetric intervention—undertaken without negotiation or remark, whereas DCC required coordination of the delivery team as a whole.

The exact nature of the intervention varied by site (see table 1): sites where CM was regularly practised had more specific content in their guidelines; at others, personal preferences and perceptions of the baby's condition were stronger influences.

Assessment of eligibility

Participants agreed that most babies do not need immediate resuscitation; determining the need for resuscitation was the major challenge. Some questioned the need for immediate resuscitation, and the guideline for one site (Site 3) stated that the 'thirty second (delay) should be viewed as *part of* the infant's resuscitation not a hindrance to it' (emphasis in original). Most agreed with the paediatrician who said, 'If the baby came out pink, beginning to wriggle and beginning to make a respiratory effort… delayed cord clamping would be fine.' For other babies, decision making was less clear-cut and rested on largely subjective judgements of a combination of indications that included colour, tone, heart rate and breathing. No one was prepared to nominate a sole determining factor.

Individuals varied in the extent to which they were persuaded of the benefits of DCC or CM as balanced against potential risks, and described differing possible responses to similar situations: for example, with a baby that was 'white and floppy', one clinician would 'not want to be wasting time' and opt for immediate clamping, while another would 'try and get some blood back into the baby'.

Competing priorities: anxiety about timing

The most commonly expressed obstetric concern was maternal bleeding at caesarean section, with less experienced obstetricians reportedly more concerned about delay.

Unless the mother's condition was cause for concern, the onus of decision making rested with the neonatologist or paediatrician, and it could take confidence and courage in the face of one's own and others' anxiety to persist with the full recommended delay. As one neonatologist commented, 'I would hold my nerve for a full 30 s'. Clinicians with more experience were reported to be more likely to defer clamping and wait the full 30 s.

In the absence of guidelines, delays of 10–30 s were reported, reflecting a cautious approach to risk in ignorance of optimal duration and sensitivity to the emotional tolerance of team members. Three people said they would delay clamping as long as they could feel pulsating of the cord. Responsibility for exact timing generally rested with the neonatal team. Anxieties lessened over time and engaging in concurrent activities, such as drying the baby or using the delay to assess the baby's condition, were helpful in managing anxiety.

Persisting uncertainty

In addition to uncertainties about eligibilty, positioning of the baby and duration of delay, there were inconsistencies in the sequence of administration of uterotonic drugs—between sites, practitioners and contexts. When given before cutting of the cord, reported timing varied from crowning, to delivery of the anterior shoulder or body. Few considered the timing of uterotonics administration relevant to DCC. Policies mandating uterotonic administration after cord clamping had been introduced at sites where DCC was routine practice for preterm birth (n=3). However, even here, practice was inconsistent and reportedly varied by mode of delivery, with uterotonics administered after clamping at section, but before in vaginal deliveries. The most uniform practice was reported at the site where DCC had been practised the longest time, and policy and practice were guided by a clear understanding that uterine contraction induced by drugs would restrict placental transfusion. Elsewhere, responsibility for the decision was considered to be solely that of the midwife or obstetrician, and members of the neonatal team were unable to say at what point the drug was given. Timing of administration was not considered relevant to CM.

DISCUSSION

This study uncovered variation in the nature and implementation of placental transfusion techniques at very preterm birth, among the small proportion of units aiming to facilitate them in late 2011/early 2012. Standard neonatal stabilisation practises, such as lung inflation, did not seem to be being delivered with cord intact. At the time, placental transfusion was not widely practised, and the results are, therefore, pertinent to clinicians wishing to develop and implement guidelines.[5 7 8]

The analysis is based on a small sample (consistent with qualitative methods) and relied on reported practice rather than direct observation, but is strengthened by inclusion of multiple professional perspectives.

Implementation seemed most successful where significant interdisciplinary discussion (including midwifery) in guideline development had led to 'buy in' across the unit. Audit, developments in record keeping and reinforcement, clinical leadership and training in actual practical techniques also appeared important drivers. Reported practical problems, such as difficulty obtaining sterile plastic bags were numerous—although a sterile plastic bag is available (Steridrape, 3M Health Care, Minnesota, USA). Optimal implementation would appear to depend to a high level on good quality communication between delivery and stabilisation professionals. A briefing immediately before delivery may facilitate this.

Opinions were broad, with limited overlap, reflecting scientific uncertainties about: the optimal form or combination of placental transfusion techniques; case selection; positioning of the baby; duration of delay, and timing of uterotonics. Some of these uncertainties may be resolved when ongoing studies report.[9] Importantly, stabilisation with cord intact may promote transitional cardiovascular stability, if recent animal evidence suggesting cord clamping prior to lung inflation may be harmful, is applicable to humans.[10]

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Competing interests None.

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REFERENCES

1 National Collaborating Centre for Women's and Children's Health. *Intrapartum care: care of healthy women and their babies during childbirth*. London: RCOG Press, 2007.
2 Westhoff G, Cotter AM, Tolosa JE. Prophylactic oxytocin for the third stage of labour to prevent postpartum haemorrhage. *Cochrane Database Syst Rev* 2013;(10):CD001808.
3 McDonald SJ, Middleton P, Dowswell T, *et al*. Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes. *Cochrane Database of Syst Rev* 2013;(7):CD004074.
4 Rabe H, Diaz-Rossello JL, Duley L, *et al*. Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. *Cochrane Database Syst Rev* 2012;(8):CD003248.
5 Singh Y, Oddie S. Marked variation in delivery room management in very preterm infants. *Resuscitation* 2013;84:1558–61.
6 Glaser BG. The constant comparative method of qualitative analysis. *Soc Probl* 1965;12:436–45.
7 Perlman JM, Wyllie J, Kattwinkel J, *et al*. Part 11: neonatal resuscitation: 2010 International consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Circulation* 2010;122:S516–38.
8 Richmond S, Wyllie J. Newborn life support. In: Nolan JP. ed *The resuscitation guidelines 2010*. London: The Resuscitation Council (UK), 2010 (Chapter 11).
9 http://www.controlled-trials.com/isrctn/pf/21456601
10 Bhatt S, Alison B, Wallace EM, *et al*. Delayed cord clamping until ventilation onset improves cardiovascular function at birth in preterm lambs. *J Physiol* 2013;591:2113–26.