



Fifteen-minute consultation: stabilisation of the high-risk newborn infant beside the mother

Natalie Batey,¹ Charles W Yoxall,² Joe A Fawke,³ Lelia Duley,⁴ Jon Dorling^{1,5}

¹Department of Neonatology, Nottingham University Hospitals NHS Trust, Nottingham, UK

²Department of Neonatology, Liverpool Women's Hospital, Liverpool, UK

³Department of Neonatology, University Hospitals of Leicester NHS Trust, Leicester, UK

⁴Nottingham Clinical Trials Unit, University of Nottingham, Nottingham, UK

⁵Division of Child Health, Obstetrics & Gynaecology, University of Nottingham, Nottingham, UK

Correspondence to

Dr Jon Dorling, Division of Child Health, University of Nottingham, E floor East Block, Queens Medical Centre, Derby Road, Nottingham NG7 2UH, UK; jon.dorling@nottingham.ac.uk

Received 30 January 2017

Accepted 6 March 2017

Published Online First

27 July 2017

ABSTRACT

Paediatric and adult resuscitation is often performed with family present. Current guidelines recommend deferred umbilical cord clamping as part of immediate neonatal care, requiring neonatal assessment next to the mother. This paper describes strategies for providing care beside the mother using both standard resuscitation equipment and a trolley designed for this purpose.

INTRODUCTION

Family presence at both paediatric and adult resuscitation is common and part of international resuscitation guidelines.^{1 2} Being present at resuscitation can decrease anxiety and feelings of helplessness and improve grief for the family.^{3 4} Having the family present does not seem to interfere with or impede clinical care.³

For parents of high-risk infants, the first experience of their baby may be on the neonatal unit, and many parents describe touching their baby for the first time as a particularly powerful experience.⁵ Delay in this first contact may be due to concerns around maternal or infant health or simple physical separation.⁶

Current guidance is to defer umbilical cord clamping for uncompromised term and preterm infants.^{7 8} For high-risk infants, assessment following newborn life support (NLS) algorithms of whether stabilisation is needed must therefore take place while the cord is intact. Having the infant beside their mother facilitates this assessment.

We have developed two strategies for providing stabilisation beside the mother: the first using standard equipment and the second using a mobile trolley (LifeStart).^{9 10} These were developed as part of a programme of work aimed at improving the quality of care an outcome at very

preterm birth. Working with an industry partner, we developed the LifeStart trolley ([figure 1](#)). This is a small, mobile, height-adjustable trolley with a horizontal platform and heated mattress; additional resuscitation equipment, including gas cylinders, can be mounted on side rails.¹¹ Both strategies for providing care beside the mother were used for infants born before 32 weeks gestation in the Cord Pilot Trial¹² and for other high-risk births.⁹ The Cord Pilot Trial compared umbilical cord clamping after at least 2 min with clamping within 20 s. Providing care and stabilisation beside the mother ensured that neonatal care was the same regardless of when the cord was clamped.

PLANNING BEFORE THE BIRTH

To facilitate neonatal care beside the mother at birth, significant planning involving the multidisciplinary team (MDT) is needed. Guidance should be drawn up with input from all those involved in the care of the woman and her baby ([figure 2](#)). This should include planning for births within the labour suite and the obstetric theatres.

Training materials should be developed and can include presentations, documents, videos and simulation scenarios. In our experience, simulations with all members of the MDT, based on NLS scenarios and protocols, adapted with care beside the mother, were the most effective at embedding practice. Continual training, integrated into changeover inductions for rotating junior doctors, ensures new members of the team are familiar with procedures.

WHAT EQUIPMENT TO USE

Different types of equipment can be used to provide neonatal care beside the mother. We have experience of using both



CrossMark

To cite: Batey N, Yoxall CW, Fawke JA, et al. *Arch Dis Child Educ Pract Ed* 2017;**102**:235–238.



Figure 1 The LifeStart trolley.

standard equipment (the Draeger Resuscitaire and Fisher and Paykel CosyCot) and the LifeStart trolley. The set up required for each of these platforms is slightly different.

Standard equipment

For standard equipment, a solid-based mattress should be used, and the side barriers of the platform lowered to create a flat surface. At vaginal births, wheel the platform longitudinally alongside the mother's bed and lock the wheels. Adjust the height of both the platform and the mother's bed so they are at the same level, and slide the mattress part-way across the side of the mother's bed to provide a stable surface for stabilisation of the neonate. Rotate the overhead heater to cover the area directly over the infant (figure 3).

At caesarean section place the platform end on to the operating table and drape it with sterile towels (figure 4). Adjust the height of the platform and the operating table so they are at identical levels.

Team members involved in the planning phase:

- Neonatal team
- Midwives
- Obstetricians
- Operating theatre staff
 - Scrub nurses
 - Operating department practitioners
 - Anaesthetists
- Practice educators (from any of the above backgrounds)

Figure 2 Members of the MDT required for planning neonatal stabilisation bedside the mother. MDT, multidisciplinary team.

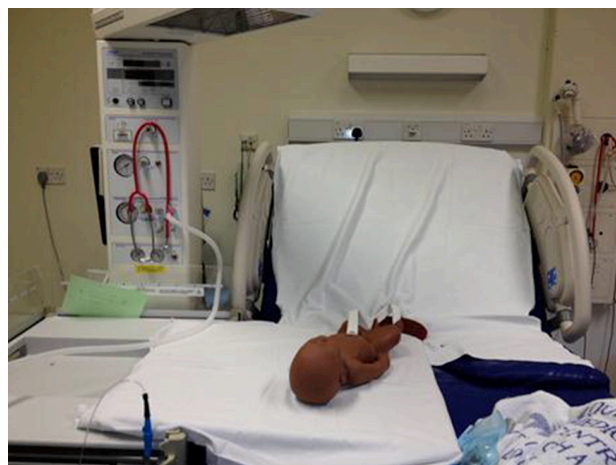


Figure 3 Demonstration of how to set up standard equipment for neonatal care beside the mother immediately after birth at vaginal births.

The LifeStart trolley

At vaginal births adjust the height of the platform so that it can rest on the mother's bed (figure 5). At caesarean section wheel the trolley end on to the operating table and adjust the height of the platform to the mother's thighs (figure 6). For both types of birth, the trolley is located with the neonatal interface facing the neonatal team.

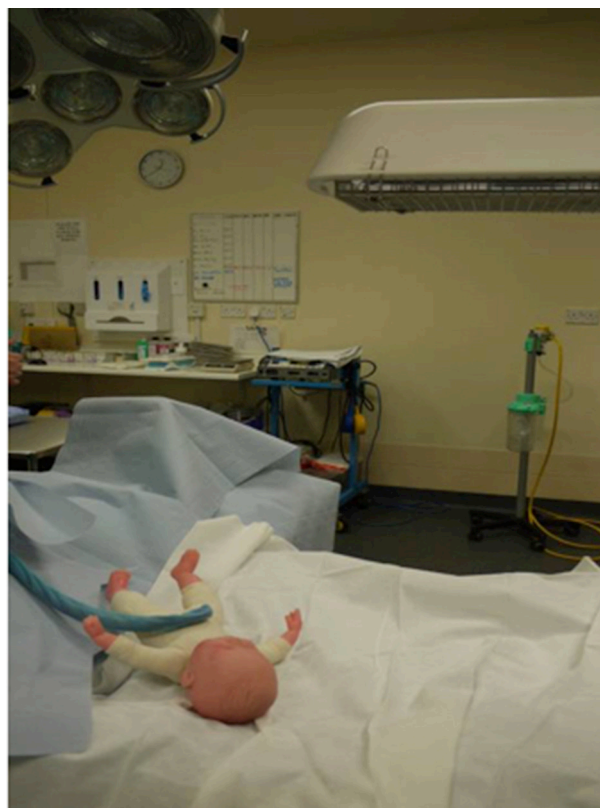


Figure 4 Demonstration of how to set up standard equipment for neonatal care beside the mother immediately after birth a caesarean section.



Figure 5 Demonstration of how to set up the LifeStart trolley for neonatal care beside the mother immediately after birth at vaginal births.

PROVIDING CARE WITH EITHER EQUIPMENT

Prior to birth the platform should be checked and the heater (overhead or mattress) switched on. For both vaginal or caesarean births, plans should be made to move the neonatal team quickly in the event of an obstetric emergency requiring greater access to the mother. Gases can be delivered from wall gas ports or cylinders according to local preference. Trailing gas hoses should be carefully positioned to avoid being trip hazards or impeding the trolley's wheels.

Following birth, neonatal assessment and stabilisation should be carried out in line with NLS guidelines. If the equipment is moved, stabilisation can continue at a suitable alternative position in the delivery room or obstetric theatre. While at the bedside the neonatal team are facing the mother and birthing partner; this facilitates communication as they can be updated regarding their baby's care.

Vaginal births

Prior to birth the midwife caring for the woman and the neonatal team need to discuss the potential management required for the individual baby and the best side of the bed to locate the platform or trolley.



Figure 6 Demonstration of how to set up the LifeStart trolley for neonatal care beside the mother immediately after birth at caesarean section (note: the neonatal team should be scrubbed to maintain the sterility).

Just prior to birth the equipment should be moved to the agreed position and the wheels should be locked.

If deferred umbilical cord clamping is taking place, the position of the umbilical cord needs to be considered. If the woman gives birth in a semirecumbent position, the baby should be placed on the mattress with the cord over mother's thigh, but if giving birth in the lithotomy position, the baby should be passed underneath the thigh. Care is needed to ensure that no pressure is applied to the cord.

Caesarean section

Prior to birth, the optimal positioning of the neonatal resuscitation equipment should be agreed with the theatre team. This is usually between the operating obstetrician and the diathermy machine with the surgical assistant and the scrub nurse on the opposite side of the operating table.

Maintaining the sterile field is essential. Prebirth equipment checks of all non-sterile equipment are needed, and then the platform covered in sterile drapes to ensure continuation of the sterile field. At least two members of the neonatal team should scrub, another member of the team opens packets and handles non-sterile equipment. For example, inserting the end of the suction catheter into the tubing.

Shortly before birth the platform or trolley is moved into the agreed position and its wheels locked. At birth, the obstetrician either passes the baby to the neonatal team or for a very preterm birth places the baby's feet first into a sterile plastic bag or wrap. The stethoscope, hat and laryngoscope handle are not placed on the sterile field until after the obstetrician has placed the baby on the platform to minimise the risk of contact with non-sterile equipment.

CURRENT EVIDENCE AND FUTURE RESEARCH

With good planning and training we have shown that stabilisation of very preterm infants can be conducted beside the mother using both forms of resuscitation platform.^{9 10} Despite initial anxieties about the equipment and providing care in front of parents, preliminary feedback from parents and clinical staff about care beside the mother appears largely positive.^{13 14} Parents who expressed their opinion commented that they were pleased that the baby was so close to them and appreciated being able to witness management and converse and interact with clinicians. Many mothers spontaneously touched their baby and others did when invited to do so. Some parents found it stressful watching their baby receive treatment, but none regretted the decision to have their baby beside them. Parents raised concerns about staff experiences including whether they felt pressure from resuscitating at the bedside.

Clinicians wondered about the impact on parents of watching stabilisation at birth. They felt, however, that parents being closer to their baby was important,

Best practice

and the close proximity aided communication between the clinical team and the parents.¹⁴ Access to the baby and the ability to assess the baby were undiminished, although access to equipment has been raised as a potential concern.¹⁵

Further evaluation of care beside the mother in a wide range of settings is needed and should include use of standard equipment as well as the LifeStart trolley. As well as further evaluation of parents¹⁶ and clinicians' experiences, this should include assessment of outcome for babies and parents including, but not restricted to, temperature on admission to the neonatal intensive care unit, breast milk received, maternal anxiety, depression and perception of bonding.

CONCLUSION

With good MDT planning and working delivery room neonatal care can be provided beside the mother. It is important to develop a framework of teaching packages and to provide continual MDT training.

Acknowledgements The authors would like to thank those involved in the planning and implementation of bedside care at each centre. This paper details independent research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research funding scheme (RP-PG-0609-10107). The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health. The funder had no role in study design, conduct, analysis or reporting.

Contributors NB wrote the first draft. NB, BY, JF and JD were involved in planning and implementing bedside care in their local centres. NB, BY, JF and JD have contributed to training other centres. LD is lead for the preterm birth programme and chief investigator for the Cord Pilot Trial. All authors contributed to and approved the final version.

Competing interests LD is principle investigator for the improving quality of care and outcome at very preterm birth programme funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research funding scheme (RP-PG-0609-10107). CWY and LD contributed to development of the Lifestart trolley. The Cord Pilot Trial was registered (ISRCTN21456601) and the results have been accepted for publication in the *Fetal and Neonatal Edition of Archives of Disease in Childhood*.

Patient consent Obtained from patients.

Ethics approval Nottingham REC 2 (NRES reference 12/EM/0283).

Provenance and peer review Commissioned; internally peer reviewed.

Open Access This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) license, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. See: <http://creativecommons.org/licenses/by/4.0/>

© Article author(s) (or their employer(s) unless otherwise stated in the text of the article) 2017. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

REFERENCES

- Bossaert LL, Perkins GD, Askitopoulou H, *et al*. European Resuscitation Council guidelines for resuscitation 2015: section 11. the ethics of resuscitation and end-of-life decisions. *Resuscitation* 2015;95:302.
- Tibballs J, Aickin R, Nuthall G, *et al*. Basic and advanced paediatric cardiopulmonary resuscitation - guidelines of the Australian and New Zealand Resuscitation Councils 2010. *J Paediatr Child Health* 2012;48:551-5.
- Dingeman RS, Mitchell EA, Meyer EC, *et al*. Parent presence during complex invasive procedures and cardiopulmonary resuscitation: a systematic review of the literature. *Pediatrics* 2007;120:842-54.
- Robinson SM, Mackenzie-Ross S, Campbell Hewson GL, *et al*. Psychological effect of witnessed resuscitation on bereaved relatives. *Lancet* 1998;352:614-7.
- Arnold L, Sawyer A, Rabe H, *et al*. Parents' first moments with their very preterm babies: a qualitative study. *BMJ Open* 2013;3:e002487.
- Bliss report. Transfers of Premature and Sick Babies. 2015 <http://www.bliss.org.uk/campaigns-and-policy-reports> (accessed Nov 2016).
- Resuscitation Council (UK). Resuscitation and support of babies at birth. <https://www.resus.org.uk/resuscitation-guidelines/resuscitation-and-support-of-transition-of-babies-at-birth/> (accessed Nov 2016).
- Wyllie J, Bruinenberg J, Roehr CC, *et al*. European Resuscitation Council guidelines for Resuscitation 2015: section 7. resuscitation and support of transition of babies at birth. *Resuscitation* 2015;95:249-63.
- Thomas MR, Yoxall CW, Weeks AD, *et al*. Providing newborn resuscitation at the mother's bedside: assessing the safety, usability and acceptability of a mobile trolley. *BMC Pediatr* 2014;14:135.
- Schoonakker B, Dorling J, Oddie S, *et al*. Bedside Resuscitation of Preterm Infants with cord intact is achievable using standard resuscitaire [abstract]. http://www.espr.info/templates/espr/images/pdf/9349_abstract_book_-_25sett13-it-it.pdf (accessed Nov 2016).
- Weeks AD, Watt P, Yoxall CW, *et al*. Innovation in immediate neonatal care: development of the Bedside Assessment, Stabilisation and initial Cardiorespiratory support (BASICS) trolley. *BMJ Innov* 2015;1:53-8.
- Pushpa-Rajah A, Bradshaw L, Dorling J, *et al*. Cord pilot trial - immediate versus deferred cord clamping for very preterm birth (before 32 weeks gestation): study protocol for a randomized controlled trial. *Trials* 2014;15:258.
- Sawyer A, Ayers S, Bertullies S, *et al*. Providing immediate neonatal care and resuscitation at birth beside the mother: parents' views, a qualitative study. *BMJ Open* 2015;5:e008495.
- Yoxall CW, Ayers S, Sawyer A, *et al*. Providing immediate neonatal care and resuscitation at birth beside the mother: clinicians' views, a qualitative study. *BMJ Open* 2015;5:e008494.
- Batey N, Schoonakker B, Dorling J, *et al*. PC.113?Experience of Providing Bedside Stabilisation of Preterm Neonates with Current Equipment: Abstract PC.113 Table. *Arch Dis Child Fetal Neonatal Ed* 2014;99(Suppl 1):A75.
- Harvey ME, Pattison HM. Being there: a qualitative interview study with fathers present during the resuscitation of their baby at delivery. *Arch Dis Child Fetal Neonatal Ed* 2012;97:F439-43.



Fifteen-minute consultation: stabilisation of the high-risk newborn infant beside the mother

Natalie Batey, Charles W Yoxall, Joe A Fawke, Lelia Duley and Jon Dorling

Arch Dis Child Educ Pract Ed 2017 102: 235-238 originally published online July 27, 2017

doi: 10.1136/archdischild-2016-312276

Updated information and services can be found at:
<http://ep.bmj.com/content/102/5/235>

These include:

References

This article cites 13 articles, 6 of which you can access for free at:
<http://ep.bmj.com/content/102/5/235#BIBL>

Open Access

This is an Open Access article distributed in accordance with the terms of the Creative Commons Attribution (CC BY 4.0) license, which permits others to distribute, remix, adapt and build upon this work, for commercial use, provided the original work is properly cited. See:
<http://creativecommons.org/licenses/by/4.0/>

Email alerting service

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Topic Collections

Articles on similar topics can be found in the following collections

[Best practice](#) (81)
[Open access](#) (17)

Notes

To request permissions go to:
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:
<http://group.bmj.com/subscribe/>