Nutritional management in newborn babies receiving therapeutic hypothermia: two retrospective observational studies using propensity score matching

Chris Gale,[1*] Dusha Jeyakumaran,[1] Cheryl Battersby,[1] Kayleigh Ougham,[1] Shalini Ojha,[2] Lucy Culshaw,[3] Ella Selby,[3] Jon Dorling[4] and Nicholas Longford[1]

[1]Neonatal Medicine, School of Public Health, Faculty of Medicine, Imperial College London, London, UK
[2]Division of Graduate Entry Medicine, School of Medicine, University of Nottingham, Nottingham, UK
[3]Bliss, London, UK
[4]Dalhousie University, Halifax, NS, Canada

*Corresponding author christopher.gale@imperial.ac.uk

Declared competing interests of authors: Chris Gale reports grants from the Medical Research Council (MRC) (London, UK) and the National Institute for Health Research (NIHR) during the conduct of the study, and grants from NIHR, Mason Medical Research Foundation (London, UK), Rosetrees Trust (Edgeware, UK) and from the Canadian Institute for Health Research (Ottawa, ON, Canada), outside the submitted work. He reports a grants from Chiesi Pharmaceuticals (Parma, Italy) outside the submitted work for a research study and a personal fee from Chiesi Pharmaceuticals to support attendance at an educational meeting. Chris Gale is vice chairperson of the NIHR Research for Patient Benefit London Regional Assessment Panel (2016–present). Chris Gale was an unremunerated member of the Neonatal Data Analysis Unit Steering Board that oversees the National Neonatal Research Database (2014–20). Cheryl Battersby reports personal fees from AbbVie Pharmaceuticals (Maidenhead, UK) and Chiesi Pharmaceuticals, outside the submitted work. Cheryl Battersby sits on the NIHR Health Technology Assessment (HTA) Prioritisation Panel for Maternal, Child and Mental Health Care (2019–present) Cheryl Battersby is an unremunerated member of the National Neonatal Research Database Steering Board (April 2020 to present). Shalini Ojha reports grants from the MRC and the Arts and Humanities Research Council (Swindon, UK), outside the work. Jon Dorling reports grants from Nutrinia Ltd (Ramat Gan, Israel), outside the submitted work. The grant from Nutrinia Ltd in 2018 was for part of his salary to work as an expert advisor on a trial. He was a member of the NIHR HTA General Board (2017–18) and the NIHR HTA, Newborn and Child Health Panel (2013–18). Nicholas Longford's post is in part funded by the Healthcare Quality Improvement Programme (London, UK) as part of the National Neonatal Audit Programme (London, UK). Nicholas Longford reports grants from Chiesi Pharmaceuticals, outside the submitted work.

Published June 2021
DOI: 10.3310/hta25360

Plain English summary

Nutritional management in therapeutic hypothermia

Health Technology Assessment 2021; Vol. 25: No. 36
DOI: 10.3310/hta25360

NIHR Journals Library www.journalslibrary.nihr.ac.uk

Plain English summary

Every year, approximately 1200 babies in the UK suffer a lack of oxygen to the brain around birth. This is called hypoxic–ischaemic encephalopathy and can lead to brain injury or death. To treat hypoxic–ischaemic encephalopathy, babies receive cooling treatment in which their body temperature is lowered.

Doctors do not know the best way to give nutrition to babies receiving cooling treatment. Babies can either be fed milk into their stomach (enteral nutrition) or be given nutrients through their veins (parenteral nutrition). We compared babies who were fed milk while they were being cooled with babies from whom milk was withheld while they were being cooled to see if there was a difference in the frequency of necrotising enterocolitis, a severe gut disease. In addition, we compared babies who received parenteral nutrition while they were being cooled with babies who did not to see if there was a difference in infections. Finally, we looked at other outcomes, including survival and breastfeeding.

We used the National Neonatal Research Database, which holds de-identified (i.e. no baby can be identified) information on all babies who have received NHS neonatal care. We used a statistical approach to match babies in each group (i.e. fed babies and not fed babies) as closely as possible so that any difference in outcomes was because of different nutrition and not because of other differences.

We included > 6000 babies with hypoxic–ischaemic encephalopathy. Approximately one in three babies received milk feeds and one in four babies received parenteral nutrition during cooling. Necrotising enterocolitis was very rare.

More babies who were fed milk during cooling had good outcomes (e.g. being breastfed at discharge) and fewer had necrotising enterocolitis. Most of these babies received only a small amount of milk in the first 3 days. More babies given parenteral nutrition had infections, but also more survived.

This suggests that it is probably safe and may be beneficial to feed babies milk during cooling. More research should look at milk feeding and parenteral nutrition during cooling.

Health Technology Assessment

ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

Impact factor: 3.370

Health Technology Assessment is indexed in MEDLINE, CINAHL, EMBASE, the Cochrane Library and Clarivate Analytics Science Citation Index.

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (www.publicationethics.org/).

Editorial contact: journals.library@nihr.ac.uk

The full HTA archive is freely available to view online at www.journalslibrary.nihr.ac.uk/hta. Print-on-demand copies can be purchased from the report pages of the NIHR Journals Library website: www.journalslibrary.nihr.ac.uk

Criteria for inclusion in the *Health Technology Assessment* journal

Reports are published in *Health Technology Assessment* (HTA) if (1) they have resulted from work for the HTA programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA programme

Health Technology Assessment (HTA) research is undertaken where some evidence already exists to show that a technology can be effective and this needs to be compared to the current standard intervention to see which works best. Research can evaluate any intervention used in the treatment, prevention or diagnosis of disease, provided the study outcomes lead to findings that have the potential to be of direct benefit to NHS patients. Technologies in this context mean any method used to promote health; prevent and treat disease; and improve rehabilitation or long-term care. They are not confined to new drugs and include any intervention used in the treatment, prevention or diagnosis of disease.

The journal is indexed in NHS Evidence via its abstracts included in MEDLINE and its Technology Assessment Reports inform National Institute for Health and Care Excellence (NICE) guidance. HTA research is also an important source of evidence for National Screening Committee (NSC) policy decisions.

This report

The research reported in this issue of the journal was funded by the HTA programme as project number 16/79/03. The contractual start date was in September 2017. The draft report began editorial review in December 2019 and was accepted for publication in June 2020. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

This report presents independent research funded by the National Institute for Health Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, NETSCC, the HTA programme or the Department of Health and Social Care. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, NETSCC, the HTA programme or the Department of Health and Social Care.

Published by the NIHR Journals Library (www.journalslibrary.nihr.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).