Ursodeoxycholic acid to reduce adverse perinatal outcomes for intrahepatic cholestasis of pregnancy: the PITCHES RCT

Lucy C Chappell,^{1*} Jennifer L Bell,² Anne Smith,² Catherine Rounding,² Ursula Bowler,² Louise Linsell,² Edmund Juszczak,² Sue Tohill,¹ Amanda Redford,³ Peter H Dixon,¹ Jenny Chambers,⁴ Rachael Hunter,⁵ Jon Dorling,⁶ Catherine Williamson^{1†} and Jim G Thornton^{3†}

Declared competing interests of authors: Lucy C Chappell reports that she is chairperson of the National Institute for Health Research (NIHR) Health Technology Assessment (HTA) Clinical Evaluation and Trials Committee (January 2019 to present), a member of the NIHR Efficacy and Mechanism Evaluation (EME) Strategic Advisory Committee (from November 2019 to present) and is funded by a NIHR Professorship (award number RP-2014-5-019). Jon Dorling reports that he was funded by Nutrinia Ltd. (Ramat Gan, Israel) in 2017 and 2018 for part of his salary to work as an expert advisor on a trial of enteral insulin. Jim G Thornton reports that he is a co-author of the Cochrane review of treatment for obstetric cholestasis, a co-author of a previous trial of ursodeoxycholic acid to treat intrahepatic cholestasis of pregnancy and that he is a member of the NIHR HTA and EME Editorial Board.

Published December 2020 DOI: 10.3310/eme07090

¹Department of Women and Children's Health, School of Life Course Sciences, King's College London, London, UK

²National Perinatal Epidemiology Unit Clinical Trials Unit, Nuffield Department of Population Health, University of Oxford, Oxford, UK

³Division of Child Health, Obstetrics and Gynaecology, University of Nottingham, Nottingham, UK

⁴ICP Support, Sutton Coldfield, UK

⁵Research Department of Primary Care and Population Health, University College London, London, UK

⁶Division of Neonatal-Perinatal Medicine, IWK Health Centre, Halifax, NS, Canada

^{*}Corresponding author lucy.chappell@kcl.ac.uk †Joint senior authors

Plain English summary

The PITCHES RCT

Efficacy and Mechanism Evaluation 2020; Vol. 7: No. 9

DOI: 10.3310/eme07090

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

Plain English summary

Why did we do this trial?

Intrahepatic cholestasis of pregnancy is the commonest pregnancy-specific liver disorder in the UK. It affects around 5500 women per year, causing troublesome itching, raised maternal bile acid concentrations, premature birth and, in extreme cases, stillbirth.

The most popular current drug used to treat intrahepatic cholestasis of pregnancy is called ursodeoxycholic acid (commonly known as 'urso'), but it has not been tested in any large clinical trials to show whether or not it prevents premature birth and stillbirth. Our trial asked: 'If a woman has intrahepatic cholestasis of pregnancy, what are the effects on the baby if she is treated with ursodeoxycholic acid (or placebo)?'.

What did we do?

Between December 2015 and September 2018, we recruited 605 women with intrahepatic cholestasis of pregnancy. Half of the women received ursodeoxycholic acid and half received a placebo (a 'dummy' tablet containing no active ingredients). This is the most reliable way to test a drug.

During the trial we also:

- collected blood test results
- measured the women's itching level
- recorded birth information
- collected blood samples from some women to use for future research.

What did we find?

We found that ursodeoxycholic acid is not a drug that helps women with intrahepatic cholestasis of pregnancy. It did not reduce stillbirths or the chances of a baby needing to be admitted to a neonatal unit. It did not show any meaningful improvement in itching level for most women, nor did it reduce the woman's bile acid levels.

What does this mean for women with intrahepatic cholestasis of pregnancy?

It means that most women do not need to take ursodeoxycholic acid because it will not help their itching or protect their baby from stillbirth. Further research is needed to identify whether there is a group of women who may still benefit from taking ursodeoxycholic acid, or whether other drugs could reduce the itching in women with intrahepatic cholestasis of pregnancy and prevent premature delivery and stillbirth.

Efficacy and Mechanism Evaluation

ISSN 2050-4365 (Print)

ISSN 2050-4373 (Online)

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 EME archive is freely available to view online at www.journalslibrary.nihr.ac.uk/eme. 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 Efficacy and Mechanism Evaluation journal

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

EME programme

The Efficacy and Mechanism Evaluation (EME) programme funds ambitious studies evaluating interventions that have the potential to make a step-change in the promotion of health, treatment of disease and improvement of rehabilitation or long-term care. Within these studies, EME supports research to improve the understanding of the mechanisms of both diseases and treatments.

The programme supports translational research into a wide range of new or repurposed interventions. These may include diagnostic or prognostic tests and decision-making tools, therapeutics or psychological treatments, medical devices, and public health initiatives delivered in the NHS.

The EME programme supports clinical trials and studies with other robust designs, which test the efficacy of interventions, and which may use clinical or well-validated surrogate outcomes. It only supports studies in man and where there is adequate proof of concept. The programme encourages hypothesis-driven mechanistic studies, integrated within the efficacy study, that explore the mechanisms of action of the intervention or the disease, the cause of differing responses, or improve the understanding of adverse effects. It funds similar mechanistic studies linked to studies funded by any NIHR programme.

The EME programme is funded by the Medical Research Council (MRC) and the National Institute for Health Research (NIHR), with contributions from the Chief Scientist Office (CSO) in Scotland and National Institute for Social Care and Health Research (NISCHR) in Wales and the Health and Social Care Research and Development (HSC R&D), Public Health Agency in Northern Ireland.

This report

The research reported in this issue of the journal was funded by the EME programme as project number 12/164/16. The contractual start date was in March 2015. The final report began editorial review in May 2019 and was accepted for publication in March 2020. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The EME editors and production house have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the final report document. However, they do not accept liability for damages or losses arising from material published in this report.

This report presents independent research. 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, the MRC, NETSCC, the EME 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 EME programme or the Department of Health and Social Care.

© Queen's Printer and Controller of HMSO 2020. This work was produced by Chappell *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This issue may be freely reproduced for the purposes of private research and study and extracts (or indeed, the full report) may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

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

Editor-in-Chief of **Efficacy and Mechanism Evaluation** and NIHR Journals Library

Professor Ken Stein Professor of Public Health, University of Exeter Medical School, UK

NIHR Journals Library Editors

Professor John Powell Chair of HTA and EME Editorial Board and Editor-in-Chief of HTA and EME journals. Consultant Clinical Adviser, National Institute for Health and Care Excellence (NICE), UK, and Professor of Digital Health Care, Nuffield Department of Primary Care Health Sciences, University of Oxford, UK

Professor Andrée Le May Chair of NIHR Journals Library Editorial Group (HS&DR, PGFAR, PHR journals) and Editor-in-Chief of HS&DR, PGFAR, PHR journals

Professor Matthias Beck Professor of Management, Cork University Business School, Department of Management and Marketing, University College Cork, Ireland

Dr Tessa Crilly Director, Crystal Blue Consulting Ltd, UK

Dr Eugenia Cronin Senior Scientific Advisor, Wessex Institute, UK

Dr Peter Davidson Consultant Advisor, Wessex Institute, University of Southampton, UK

Ms Tara Lamont Senior Scientific Adviser (Evidence Use), Wessex Institute, University of Southampton, UK

Dr Catriona McDaid Senior Research Fellow, York Trials Unit, Department of Health Sciences, University of York, UK

Professor William McGuire Professor of Child Health, Hull York Medical School, University of York, UK

Professor Geoffrey Meads Emeritus Professor of Wellbeing Research, University of Winchester, UK

Professor John Norrie Chair in Medical Statistics, University of Edinburgh, UK

Professor James Raftery Professor of Health Technology Assessment, Wessex Institute, Faculty of Medicine, University of Southampton, UK

Dr Rob Riemsma Reviews Manager, Kleijnen Systematic Reviews Ltd, UK

Professor Helen Roberts Professor of Child Health Research, UCL Great Ormond Street Institute of Child Health, UK

Professor Jonathan Ross Professor of Sexual Health and HIV, University Hospital Birmingham, UK

Professor Helen Snooks Professor of Health Services Research, Institute of Life Science, College of Medicine, Swansea University, UK

Professor Ken Stein Professor of Public Health, University of Exeter Medical School, UK

Professor Jim Thornton Professor of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, University of Nottingham, UK

Professor Martin Underwood Warwick Clinical Trials Unit, Warwick Medical School, University of Warwick, UK

Please visit the website for a list of editors: www.journalslibrary.nihr.ac.uk/about/editors

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