

Selective laser trabeculoplasty versus drops for newly diagnosed ocular hypertension and glaucoma: the LiGHT RCT

Gus Gazzard,^{1,2*} Evgenia Konstantakopoulou,^{1,2}
David Garway-Heath,^{1,2} Anurag Garg,^{1,2}
Victoria Vickerstaff,^{3,4} Rachael Hunter,⁴
Gareth Ambler,⁵ Catey Bunce,^{1,6} Richard Wormald,^{1,2,7}
Neil Nathwani,¹ Keith Barton,^{1,2} Gary Rubin,²
Stephen Morris⁸ and Marta Buszewicz⁴ on behalf of
the LiGHT Trial Study Group

¹National Institute for Health Research Biomedical Research Centre, Moorfields Eye Hospital NHS Foundation Trust, London, UK

²Institute of Ophthalmology, University College London, London, UK

³Marie Curie Palliative Care Research Department, Division of Psychiatry, University College London, London, UK

⁴Research Department of Primary Care and Population Health, University College London, London, UK

⁵Department of Statistical Science, University College London, London, UK

⁶School of Population Health and Environmental Sciences, Faculty of Life Sciences and Medicine, King's College London, London, UK

⁷London School of Hygiene & Tropical Medicine, London, UK

⁸Department of Applied Health Research, Institute of Epidemiology and Health Care, University College London, London, UK

*Corresponding author g.gazzard@nhs.net

Declared competing interests of authors: Gus Gazzard, David Garway-Heath, Rachael Hunter, Gareth Ambler, Catey Bunce, Richard Wormald, Keith Barton, Gary Rubin and Marta Buszewicz have received a grant from the National Institute for Health Research (NIHR) for the submitted work. Gus Gazzard reports grants from Lumenis (Borehamwood, UK) during the conduct of the study; grants from Ellex Medical Lasers (Adelaide, SA, Australia), Ivantis, Inc. (Irvine, CA, USA) and Thea Pharmaceuticals (Keele, UK) outside the submitted work; and personal fees from Allergan (Dublin, Ireland), Alcon (Fort Worth, TX, USA), Glaukos Corporation (San Clemente, CA, USA), Santen Pharmaceutical Co., Ltd (Osaka, Japan) and Thea Pharmaceuticals outside the submitted work. David Garway-Heath reports personal fees from Aerie Pharmaceuticals, Inc. (Durham, NC, USA), Alcon, Allergan, Bausch + Lomb (Rochester, NY, USA), Quark Pharmaceuticals, Inc. (Ness Ziona, Israel), Quethera Limited and Roche (Basel, Switzerland); grants from the Alcon Research Institute; and grants and personal fees from Pfizer (New York, NY, USA) and Santen Pharmaceutical Co., Ltd, outside the submitted work. In addition, David Garway-Heath was a member of the Health Technology Assessment (HTA) Clinical Trials Board from 2014 to 2017. Keith Barton received a grant from NIHR for the Treatment of Advanced Glaucoma Study during the conduct of the study. In addition, Keith Barton reports grants from Johnson & Johnson Vision (Santa Ana, CA, USA), New World

Medical (Rancho Cucamonga, CA, USA), Alcon, Merck & Co. (Kenilworth, NJ, USA), Allergan and Refocus Group (Dallas, TX, USA); that he has had other financial relationships with Alcon, Merck & Co., Allergan, Refocus, AqueSys Inc. (Taipei, Taiwan), Ivantis, Carl Zeiss Meditec AG (Jena, Germany), Kowa Europe GmbH (Düsseldorf, Germany), Santen Pharmaceutical Co., Ltd, Transcend Medical (Scottsboro, AL, USA), Glaukos (San Clemente, CA, USA), Amakem NV (Diepenbeek, Belgium), Thea Pharmaceuticals, Alimera Sciences (Alpharette, GA, USA), Pfizer, Advanced Ophthalmic Implants Pte Ltd (Singapore), Vision Futures (UK) Ltd (London, UK), London Claremont Clinic Ltd (London, UK) and Vision Medical Events Ltd (London, UK), outside the submitted work; and that he has a patent with Ophthalmic Implants (PTE) Ltd. Stephen Morris was a member of NIHR Health Services and Delivery Research (HSDR) Research Funding Board (2014–19), the NIHR HSDR Commissioned Board (2014–16), the NIHR HSDR Evidence Synthesis Sub Board (2016), the NIHR HTA Clinical Evaluation and Trials Board (2007–10), the NIHR HTA Commissioning Board (2009–13), the NIHR Public Health Research Funding Board (2011–17) and the NIHR Programme Grants for Applied Research expert subpanel (2017–present). Marta Buszewicz was a member of the HTA Mental Health Panel from January to May 2018. In September 2018 this panel was amalgamated into the HTA Prioritisation Committee C (mental health, women and children’s health), of which Marta Buszewicz was also a member. Marta Buszewicz has also been a member of the NIHR Research for Patient Benefit, London, funding panel since May 2017.

Published June 2019

DOI: 10.3310/hta23310

Plain English summary

The LiGHT RCT

Health Technology Assessment 2019; Vol. 23: No. 31

DOI: 10.3310/hta23310

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

Plain English summary

Glaucoma is an eye condition in which the optic nerve becomes damaged and, if left untreated, will lead to loss of vision. Ocular hypertension (OHT) is the medical name for high pressure in the eye that increases the risk of getting glaucoma. Lowering the eye pressure is the only known way to prevent glaucoma from getting worse. Before this trial, the standard initial treatment of these conditions was the prescription of eyedrops to lower the pressure in the eye. An alternative is a laser therapy that is known to reduce the eye pressure. This study investigated if starting treatment of glaucoma or OHT with laser therapy (using eyedrops later, if needed) affected the patients' quality of life (QoL) more or less than starting treatment with eyedrops alone. The study also investigated if initial treatment with laser and initial treatment with eyedrops are equally good at controlling eye pressure and are equally safe and how much they cost the NHS. Patients were randomly assigned to starting treatment with either laser or eyedrops and the two groups were then compared.

The study found that for the first 3 years QoL was similar regardless of treatment. However, three-quarters of patients initially treated with laser did not need any eyedrops to control their eye pressure for 3 years. Patients initially treated with laser were less likely to require cataract surgery, and none needed any glaucoma surgery in the first 3 years. In contrast, among those patients treated with eyedrops, glaucoma surgery was required in 11 eyes (out of 622 eyes). Initial treatment with laser was cheaper than initial treatment with eyedrops.

The results of this study suggest that laser is an efficient, safe and cheaper alternative to eyedrops, and that three-quarters of the patients initially treated with laser do not need any eyedrops for the first 3 years of treatment.

ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

Impact factor: 4.513

Health Technology Assessment is indexed in MEDLINE, CINAHL, EMBASE, The Cochrane Library and the 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@nhr.ac.uk

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

The HTA programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

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.

For more information about the HTA programme please visit the website: <http://www.nets.nhr.ac.uk/programmes/hta>

This report

The research reported in this issue of the journal was funded by the HTA programme as project number 09/104/40. The contractual start date was in September 2012. The draft report began editorial review in September 2018 and was accepted for publication in December 2018. 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.

© Queen's Printer and Controller of HMSO 2019. This work was produced by Gazzard 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.nhr.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).

NIHR Journals Library Editor-in-Chief

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 Honorary Professor, University of Manchester, and Senior Clinical Researcher and Associate Professor, 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 Director, NIHR Dissemination Centre, 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 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