

A Surgeon's Guide to Anaesthesia and Peri-operative Care





A Surgeon's Guide to Anaesthesia and Peri-operative Care

Edited by

Jane Sturgess

Consultant Neuroanaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Justin Davies

Consultant Colorectal Surgeon, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Kamen Valchanov

Consultant Anaesthetist, Papworth Hospital, Cambridge, UK





CAMBRIDGEUNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org

Information on this title: www.cambridge.org/9781107698079

© Jane Sturgess, Justin Davies and Kamen Valchanov

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2014

Printed in the United Kingdom by Clays, St Ives plc

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication data

A surgeon's guide to anaesthesia and peri-operative care \prime edited by Jane Sturgess, Justin Davies, Kamen Valchanov.

p.; cm.

Includes bibliographical references and index.

ISBN 978-1-107-69807-9 (Paperback)

I. Sturgess, Jane, editor of compilation. II. Davies, Justin, editor of compilation. III. Valchanov, Kamen, editor of compilation.

[DNLM: 1. Anaesthesia-methods. 2. General Surgery-methods.

3. Peri-operative Care-methods. WO 200] RD81

617.9'6-dc23 2013046224

ISBN 978-1-107-69807-9 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

Every effort has been made in preparing this book to provide accurate and up-to-date information which is in accord with accepted standards and practice at the time of publication. Although case histories are drawn from actual cases, every effort has been made to disguise the identities of the individuals involved. Nevertheless, the authors, editors and publishers can make no warranties that the information contained herein is totally free from error, not least because clinical standards are constantly changing through research and regulation. The authors, editors and publishers therefore disclaim all liability for direct or consequential damages resulting from the use of material contained in this book. Readers are strongly advised to pay careful attention to information provided by the manufacturer of any drugs or equipment that they plan to use.



Contents

List of contributors vii Foreword: Professor Michael Parker ix

Section I — Basic sciences

- 1. **General physiology** 1 Kamen Valchanov
- 2. **System-specific physiology** 13 Jane Sturgess
- Pain and analgesia 35
 David Sapsford
- 4. **Local anaesthetics** 48 David Tew
- Sedation 59
 Justin Davies and Jane Sturgess
- 6. **Physics and measurement** 63 Ari Ercole

Section II — Anaesthesia and peri-operative care for surgical specialties

- Cardiothoracic cases 77
 Kamen Valchanov and Pedro Catarino
- 8. **Colorectal cases** 91 Jane Sturgess and Justin Davies
- Upper gastrointestinal cases 102
 Mark Abrahams and Richard Hardwick
- 10. Hepatobiliary and pancreatic cases 116Hemantha Alawattegama and Paul Gibbs
- 11. **Endocrine cases** 125 Pete Hambly and Radu Mihai

- 12. **Vascular cases** 137 Fay Gilder and Paul Hayes
- 13. **Organ transplant cases** 147 Nicola Jones and Christopher J.E. Watson
- 14. Otorhinology, head and neck cases 161Helen Smith and Neil Donnelly
- 15. **Paediatric cases** 168
 Simon Whyte and Sonia
 Butterworth
- 16. Plastic, reconstructive and cosmetic cases 181Andrew Bailey and Charles Malata
- 17. **Neurosurgery cases** 197
 Jane Sturgess and Ramez Kirollos
- 18. **Trauma cases** 208 Rhys Thomas and Wayne Sapsford
- Orthopaedic cases 223
 David Tew and Alan Norrish
- Urology cases 236
 Hemantha Alawattegama and Manit Arya
- Bariatric cases 246
 Michael Margarson and Christopher Pring

Section III — At a glance

22. **Scoring systems** 259
Jane Sturgess and Justin Davies

V



vi	Contents		

- 23. Modes of mechanical ventilation 269
 Kamen Valchanov
- 24. **Fluids** 273 Jane Sturgess
- 25. **Coagulation** 277 Jane Sturgess
- 26. Pre-operative echocardiography 281Kamen Valchanov
- 27. **Common drugs and doses** 285 Jane Sturgess
- 28. Physiology and risk in special circumstances 288
 Jane Sturgess

- 29. Medicolegal aspects of consent 294Kamen Valchanov
- 30. **Nerve injury** 298 Jane Sturgess
- 31. **Pre-operative investigations** 302 Joseph E. Arrowsmith
- 32. **Enhanced recovery** 310 Jane Sturgess
- 33. Post-operative cognitive dysfunction 312Ram Adapa

List of abbreviations 317 Index 320



Contributors

Mark Abrahams

Consultant Anaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Ram Adapa

Consultant Anaesthetist and Honorary Visiting Senior Research Fellow, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Hemantha Alawattegama

Consultant Anaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Joseph E. Arrowsmith

Consultant Anaesthetist, Papworth Hospital, Cambridge, UK

Manit Arya

Senior Lecturer and Consultant Urological Surgeon, Division of Surgery and Interventional Science, University College London, London, UK

Andrew Bailey

Consultant Anaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Sonia Butterworth

Consultant Paediatric Surgeon, and Clinical Assistant Professor of Surgery, BC Children's Hospital, Vancouver, BC, Canada

Pedro Catarino

Consultant Cardiothoracic Surgeon, Papworth Hospital, Cambridge, UK

Justin Davies

Consultant Colorectal Surgeon, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Neil Donnelly

Consultant ENT Surgeon, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Ari Ercole

Consultant in Anaesthesia and Intensive Care, Addenbrooke's Hospital, Cambridge University Hospitals NHS Trust, Cambridge, UK

Paul Gibbs

Consultant HPB and Transplant Surgeon, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Fay Gilder

Consultant Anaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Pete Hambly

Consultant Anaesthetist, John Radcliffe Hospital, Oxford, UK

Richard Hardwick

Consultant Surgeon, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Paul Hayes

Consultant Vascular Surgeon, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

vii

viii

List of contributors

Nicola Jones

Consultant in Anaesthesia and Critical Care, Papworth Hospital, Cambridge, UK

Ramez Kirollos

Consultant Neurosurgeon, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Charles Malata

Consultant in Plastic and Reconstructive Surgery, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Michael Margarson

Consultant Anaesthetist and Director of Critical Care, St Richard's Hospital, Chichester, UK

Radu Mihai

Consultant in Endocrine Surgery, Honorary Senior Clinical Lecturer, John Radcliffe Hospital, Oxford, UK

Alan Norrish

Consultant Orthopaedic Surgeon, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Christopher Pring

Consultant Surgeon, Department of Bariatric Surgery, St Richard's Hospital, Chichester, UK

David Sapsford

Consultant Anaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Wayne Sapsford

Consultant Vascular and Trauma Surgeon, Barts Health NHS Trust and Homerton University Hospital NHS Foundation Trust, and RAF Consultant Adviser in Surgery, The Royal London Hospital, London, UK

Helen Smith

Consultant Anaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Jane Sturgess

Consultant Neuroanaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

David Tew

Consultant Anaesthetist, Addenbrooke's Hospital, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

Rhys Thomas

Consultant Trauma Anaesthetist and Pre-Hospital Care, 16th Air Assault Medical Regiment; Honorary Consultant Anaesthetist, Swansea Morriston NHS Trust (AMBU Health Board), Swansea, UK

Kamen Valchanov

Consultant Anaesthetist, Papworth Hospital, Cambridge, UK

Christopher J.E. Watson

Professor of Transplantation, University of Cambridge and Honorary Consultant Surgeon, Addenbrooke's Hospital, Cambridge, UK

Simon Whyte

Associate Head and Clinical Assistant Professor of Paediatric Anaesthesia, BC Children's Hospital, Vancouver, BC, Canada



Foreword

Successful outcome from surgery does not come about because of a surgeon's encyclopaedic knowledge of surgical conditions, nor from his or her masterly ability as a technical operator, although both of these components surely contribute. Good outcome is the result of multiple factors within a team framework, all contributing to the end result of surgery. Implicit within these constituents is the close relationship between the surgeon and the anaesthetist and the understanding each has of the complexities and difficulties with which the other might have to contend throughout the period of an operation, which includes the pre- and post-operative phases.

This book serves to inform surgeons of the intricacies and minutiae of anaesthesia in all aspects, ranging from day care local anaesthesia to cardiac bypass techniques. It is comprehensive and yet eminently readable and informative. The early chapters on basic physiology, combined with later chapters on fluids and commonly used drugs and dosages are fundamental to any trainee or practising surgeon and are beautifully composed. To miss these gems would be akin to ignoring the basic science lectures that are so important in the understanding of all medicine and surgery.

Subsequent chapters relate to specialty specific surgical fields and are particularly interesting and suitably detailed. In addition, there are chapters on associated subjects such as enhanced recovery, post-operative cognitive dysfunction and medico-legal aspects of consent. The editors have gone to considerable trouble to find authors with the specific knowledge and interests to produce a concise and yet wide-ranging book, which leaves the surgical reader admirably informed about his or her colleague's armamentarium of anaesthetic approaches, potential pitfalls and rescue strategies.

At this stage in my career I can only state that I wish this book had been written 40 years ago!

Michael Parker Professor of Laparoscopic and Colorectal Surgery, Council member, Royal College of Surgeons of England