

# Tips and Tricks in Endocrine Surgery



John C. Watkinson • David M. Scott-Coombes  
Editors

Neil Sharma • Michael J. Stechman  
Shahzada K. Ahmed  
Associate Editors

# Tips and Tricks in Endocrine Surgery

 Springer

*Editors*

John C. Watkinson  
ENT Department  
Queen Elizabeth Hospital  
Birmingham, UK

David M. Scott-Coombes, MS, FRCS  
Department of Endocrine Surgery  
University Hospital of Wales  
Cardiff, UK

*Associate Editors*

Neil Sharma, MBChB, MRCS, DOHNS  
Department of Otolaryngology  
Head and Neck Surgery  
University Hospital North Staffordshire  
Newcastle-under-Lyme, UK

Shahzada K. Ahmed  
Department of Ear, Nose and Throat Surgery  
Queen Elizabeth Hospital Birmingham  
University Hospital Birmingham NHS  
Foundation Trust  
Birmingham, UK

Michael J. Stechman, MBChB, MD  
Department of Endocrine Surgery  
University Hospital of Wales  
Cardiff, UK

ISBN 978-0-85729-982-6 ISBN 978-1-4471-2146-6 (eBook)

DOI 10.1007/978-1-4471-2146-6

Springer London Heidelberg New York Dordrecht

Library of Congress Control Number: 2013950912

© Springer-Verlag London 2014

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media ([www.springer.com](http://www.springer.com))

# Foreword

In spite of a somewhat protracted and tortuous development, endocrine surgery has now come of age with its recognition and acceptance as a true surgical speciality in its own right.

It is difficult to determine at which point exactly this event occurred, but it was probably sometime in the 1960s and 1970s when surgeons began to regard the endocrine system as a whole, appreciated the need to work closely with other disciplines (endocrinologists, biochemists, radiologists, pathologists, nuclear medicine specialists, basic scientists, etc.), and also began to publish books and journals devoted to the subject. Postgraduate courses in endocrine surgery started to appear and very soon national and international associations were born.

Dramatic progress in the basic science underlying the speciality, particularly in the areas of biochemistry, molecular biology, and genetics, has placed unique demands upon the endocrine surgeon and emphasized the imperative to continually keep abreast of the latest information and knowledge. A veritable explosion of endoscopic and minimally invasive surgical advances has placed additional pressures upon the endocrine surgeon to keep up-to-date and remain at the forefront of his speciality.

The standard textbook has always fulfilled an important function in the communication of new knowledge, but with the arrival of the digital age and the ever-expanding role of the Internet and rapid electronic information transfer, some might consider the place of the traditional textbook to be under threat.

However, I believe that there is still an important role for the concise focused text which can provide the reader with instant, easily accessible advice and guidance.

This book, *Tips and Tricks in Endocrine Surgery*, is such a text and will certainly fill a vacant niche in the literature. Its publication will add to the legitimacy of the debate regarding the ideal educational medium. It is always difficult to decide upon the precise type of audience to which such a text should be directed. This book will be of particular value to the higher surgical trainee in endocrine surgery as well as the established consultant.

The contributors have been handpicked across the breadth of the speciality, including otorhinolaryngologists with expertise in thyroid and parathyroid surgery.

Indeed the professional credentials of the two extremely experienced coeditors testify to this cross-speciality cooperation. There is an excellent balance of contributions from surgeons and medical endocrinologists, including a rare finding in such a book of chapters addressing disorders of the pituitary.

It might be thought invidious to single out any particular chapter for comment, but there are several scholarly highlights, particularly in the sections describing surgical techniques for open and minimally invasive adrenalectomy, which are worthy of mention. These chapters provide exceptional detail and are full of tips, tricks, and pearls of wisdom completely in keeping with both the title and ethos of the book.

In a multiauthor book it is challenging to establish a uniform style and format throughout. However, in *Tips and Tricks in Endocrine Surgery*, the contributors and editors have succeeded in producing an academically credible text which is extremely readable, comprehensive and detailed, and full of sound practical advice which will undoubtedly have the potential to contribute to the provision of better and safer clinical care.

Throughout the book there are many references to the importance of team work and a multidisciplinary approach to difficult and complex endocrine problems. It is worth remembering that this is not a new concept in surgery. The famous Dr. Charles H. Mayo, a veritable doyen of thyroid surgery at the Mayo Clinic, wisely said, “The keynote of progress in the twentieth century is system and organization – in other words, ‘team work.’” Few would today disagree with this sentiment.

I hope that Scott-Coombes and Watkinson’s book will join the standard texts in the quest for provision of a continuum of information and opinion in the speciality. I enthusiastically recommend it to all endocrine surgeons.

Wales, UK

Malcolm H. Wheeler, MD, FRCS

# Preface

This book was conceived from discussions between us about surgical teaching and multidisciplinary working. We believe there is still a place in the modern era for a text that simplifies a subject with a series of learning points, generated from the expert contribution of a number of specialities. This book aims to do just that. An international multidisciplinary faculty has combined to bring together the relevant endocrine topics, and the algebraic generic sum of their wisdom, learning, and experience means that anyone reading this text can do so in the confidence of knowing that the subject essentials will be both up-to-date and comprehensive.

Have a good read and spread the word!

Birmingham, UK  
Cardiff, UK

John C. Watkinson  
David M. Scott-Coombes, MS, FRCS





# Contents

## Part I Adrenal

<b>1 Adrenal and Paraganglioma: Presentation, Assessment, and Diagnosis</b> . . . . .	3
Andrew Lansdown and Aled Rees	
<b>2 Cushing's Disease and Syndrome</b> . . . . .	13
Thomas W.J. Lennard	
<b>3 Management of Conn's Syndrome</b> . . . . .	19
Vasilis A. Constantinides and Fausto Palazzo	
<b>4 Pheochromocytoma and Paraganglioma</b> . . . . .	29
Michael J. Stechman	
<b>5 Adrenocortical Carcinoma and Open Adrenalectomy</b> . . . . .	37
Radu Mihai	
<b>6 Adrenal Metastasectomy</b> . . . . .	43
Gregory P. Sadler	
<b>7 Minimally Invasive Adrenal Surgery</b> . . . . .	47
Barney Harrison	

## Part II Pancreas/Neuroendocrine

<b>8 Diagnosis and Preoperative Assessment (Algorithms) for Pancreatic NETs</b> . . . . .	57
Rachel Troke and Karim Meeran	
<b>9 Localization of Pancreatic and Gastrointestinal NETs</b> . . . . .	63
James E. Jackson and Tara D. Barwick	

<b>10</b>	<b>Surgery for Pancreatic Neuroendocrine Neoplasms (pNENs)</b> . . . . .	77
	Thomas Clerici and Bruno Schmied	
<b>11</b>	<b>Gastrointestinal Neuroendocrine Tumor (NET) Surgery</b> . . . . .	91
	Per Hellman and Peter Stålberg	
<b>Part III Thyroid</b>		
<b>12</b>	<b>Assessment of Goiter</b> . . . . .	107
	Helen Cocks and Kristien Boelaert	
<b>13</b>	<b>Surgery for Benign Thyroid Disease</b> . . . . .	115
	Sharan Jayaram, Kristien Boelaert, and Ian D. Hay	
<b>14</b>	<b>Management of the Indeterminate Thyroid Nodule</b> . . . . .	123
	Dae Kim and Jeremy Freeman	
<b>15</b>	<b>Differentiated Thyroid Cancer</b> . . . . .	131
	Osama Al Hamarneh and John C. Watkinson	
<b>16</b>	<b>Medullary Thyroid Cancer</b> . . . . .	137
	Barney Harrison and Bruno Carnaille	
<b>17</b>	<b>Anaplastic Thyroid Cancer</b> . . . . .	143
	Caroline Connolly and John Glaholm	
<b>18</b>	<b>Thyroidectomy Technique</b> . . . . .	149
	Neil Sharma and John C. Watkinson	
<b>19</b>	<b>Surgery for Thyrotoxicosis</b> . . . . .	155
	Sonia Kumar and R. James England	
<b>20</b>	<b>Retrosternal Goiter</b> . . . . .	161
	Neil Sharma and John C. Watkinson	
<b>21</b>	<b>Lymph Node Surgery for Thyroid Cancer</b> . . . . .	167
	Neil Sharma and Ashok Shaha	
<b>22</b>	<b>Complications in Thyroid Surgery and How to Avoid Them</b> . . . . .	175
	M.A. Alzahrani and Gregory W. Randolph	
<b>23</b>	<b>Revision Thyroid Surgery</b> . . . . .	181
	Ram Moorthy and Neil Tolley	
<b>24</b>	<b>Extended Surgery for Extra-thyroidal Disease Invasion</b> . . . . .	187
	Ajith Paulose George and Maninder Singh Kalkat	
<b>25</b>	<b>Managing the Airway in Thyroid Surgery</b> . . . . .	195
	Scott Russell	

**26 Voice Change Following Thyroid and Parathyroid Surgery . . . . . 199**  
 Jeremy Davis and Meredydd Harries

**27 Postoperative Management of Thyroid Cancer . . . . . 205**  
 Beng K. Yap

**28 Recent Advances in Thyroid Surgery . . . . . 213**  
 Joel Anthony Smith and Gregory P. Sadler

**29 Outcomes and Audit in Endocrine Surgery. . . . . 223**  
 Richard Wight and David M. Scott-Coombes

**30 Consent and Litigation in Thyroid Surgery . . . . . 227**  
 Barney Harrison

**Part IV Parathyroid**

**31 Assessment of Hyperparathyroidism . . . . . 235**  
 Judit Konya, Mo Aye, R. James England, and Stephen L. Atkin

**32 Parathyroidectomy: Indications for Surgery and Localization . . . . . 245**  
 Gregory P. Sadler

**33 Surgery for Primary Hyperparathyroidism . . . . . 253**  
 R. James England and Hisham Mehanna

**34 Minimally Invasive Parathyroidectomy . . . . . 259**  
 Ioannis Christakis and Fausto Palazzo

**35 Reoperative Parathyroid Surgery. . . . . 267**  
 Thomas W.J. Lennard

**36 Renal Hyperparathyroidism . . . . . 271**  
 David M. Scott-Coombes

**Part V Pituitary**

**37 Presentation and Biochemical Assessment of Pituitary Disease . . . . 279**  
 John Ayuk and Penelope M. Clark

**38 Localization and Imaging of Pituitary Tumors. . . . . 287**  
 Lisha McClelland, Shahzada K. Ahmed, and Swarupsinh V. Chavda

**39 Diagnostic Work-Up and Nonsurgical Management of Pituitary Disease . . . . . 293**  
 Thomas J. Beech and Wiebke Arlt

**40 Hypophysectomy . . . . . 299**  
 Shahzada K. Ahmed, Rosalind Mitchell, and Alan Johnson

**Index . . . . . 305**



# Contributors

**Shahzada K. Ahmed** Department of Ear, Nose and Throat Surgery,  
Queen Elizabeth Hospital Birmingham, University Hospital Birmingham NHS  
Foundation Trust, Birmingham, UK

**M.A. Alzahrani** Otolaryngology – Head and Neck Surgery,  
Massachusetts Eye and Ear Infirmary, Boston, MA, USA

**Wiebke Arlt, MD, DSc, FRCP, FMedSci** Department of Endocrinology,  
Centre for Endocrinology, Diabetes and Metabolism (CEDAM),  
School of Clinical and Experimental Medicine, University  
of Birmingham, Birmingham, West Midlands, UK

**Stephen L. Atkin, MBBS, FRCP, PhD** Department of Diabetes,  
Endocrinology and Metabolism, University of Hull,  
Hull Royal Infirmary, Hull, UK

**Mo Aye, MBBS, FRCP, FRCPEdin** Department of Diabetes,  
Endocrinology and Metabolism, Centre for Metabolic Bone Disease Hull  
and East Yorkshire Hospitals NHS Trust, Hull Royal Infirmary, Hull, UK

**John Ayuk, MD, MRCP** Department of Endocrinology,  
Queen Elizabeth Hospital Birmingham, Birmingham, West Midlands, UK

University of Birmingham and Queen Elizabeth Hospital Birmingham,  
University Hospital Birmingham NHS Foundation Trust, Birmingham, UK

**Thomas J. Beech, MBChB, MSc, DOHNS, FRCS** ENT Department,  
University Hospital Birmingham, Birmingham, West Midlands, UK

**Tara D. Barwick, MSc, MRCP, FRCR** Department of Imaging, Imperial  
College Healthcare NHS Trust, Hammersmith Hospital, London, UK

**Kristien Boelaert, MD, PhD, MRCP** Department of Endocrinology, University  
Hospital Birmingham, Birmingham, UK

Centre for Endocrinology, Diabetes and Metabolism, Institute of Biomedical Research, School of Clinical and Experimental Medicine, University of Birmingham, Birmingham, UK

**Bruno Carnaille, MD** Department of Endocrine Surgery, University Hospital, Hopital Huriez, Lille, France

**Swarupsinh V. Chavda** Department of Neuroradiology, Queen Elizabeth Hospital Birmingham, University Hospital Birmingham NHS Foundation Trust, Birmingham, UK

**Ioannis Christakis** Department of Thyroid and Endocrine Surgery, Imperial College NHS Trust, Hammersmith Campus, London, UK

**Penelope M. Clark, MSc, PhD, FRCPath** Regional Endocrine Laboratory, Clinical Laboratory Services, Queen Elizabeth Hospital Birmingham, Birmingham, West Midlands, UK

University of Birmingham and Queen Elizabeth Hospital Birmingham, University Hospital Birmingham NHS Foundation Trust, Birmingham, UK

**Thomas Clerici, MD** Department of Surgery, Kantonsspital St. Gallen, St. Gallen, Switzerland

**Helen Cocks, MD, MBChB, FRCS** Department of Otolaryngology, City Hospitals Sunderland NHS Trust, Sunderland, UK

**Caroline Connolly, MBChB, FRCR** Department of Oncology, Queen Elizabeth Hospital Cancer Centre, Birmingham, West Midlands, UK

**Vasilis A. Constantinides** Department of Thyroid and Endocrine Surgery, Imperial College NHS Trust, Hammersmith Campus, London, UK

**Jeremy Davis, MBBS, FRCS** ENT Department, Medway Maritime Hospital, Gillingham, Kent, UK

**R. James England, MBChB, FRCS (ORL-HNS)** Department of ENT/Head and Neck Surgery, Hull and East Yorkshire Hospitals NHS Trust, Castle Hill Hospital, Cottingham, East Riding of Yorkshire, UK

**Jeremy Freeman** Department of Otolaryngology, Head and Neck Surgery, Mount Sinai Hospital, Toronto, Canada

**Ajith Paulose George, MBChB, FRCS (ORL-HNS)** Department of Otolaryngology, Head and Neck Surgery, Russells Hall Hospital, Dudley, West Midlands, Birmingham Heartlands Hospital, UK

**John Glaholm** Department of Oncology, Queen Elizabeth Hospital Cancer Centre, Birmingham, West Midlands, UK

**Osama Al Hamarneh, MBBS, MRCS, DOHNS, MD** ENT Department, Queen Elizabeth Hospital, Birmingham, West Midlands, UK

**Meredydd Harries** Department of Otolaryngology, Head and Neck Surgery, Royal Sussex County Hospital, Brighton, UK

**Barney Harrison, MBBS, MS, FRCS Eng** Department of Endocrine Surgery, Royal Hallamshire Hospital, Sheffield, UK

**Ian D. Hay** Division of Endocrinology, Diabetes, Metabolism, and Nutrition, Mayo Clinic, Rochester, MN, USA

**Per Hellman, MD, PhD** Department of Surgical Sciences, Uppsala University, Uppsala, Sweden

**James E. Jackson, FRCP, FRCR** Department of Imaging, Hammersmith Hospital, London, UK

**Sharan Jayaram** Department of Otolaryngology, Head and Neck Surgery, University Hospital Birmingham, Birmingham, UK

**Alan Johnson** Department of Ear, Nose and Throat Surgery, Queen Elizabeth Hospital Birmingham, University Hospital Birmingham NHS Foundation Trust, Birmingham, UK

**Maninder Singh Kalkat, FRCS** Department of Thoracic Surgery, Birmingham Heartlands Hospital, UK

**Dae Kim** Department of Otolaryngology, Head and Neck Surgery, Queen Alexandra Hospital, Portsmouth, UK

**Judit Konya, MBBS** Department of Diabetes, Endocrinology and Metabolism, University of Hull, Hull Royal Infirmary, Hull, UK

**Sonia Kumar, MRCS (Eng), DOHNS** Department of Otolaryngology, Royal Berkshire Hospital, Reading, Berkshire, UK

**Andrew Lansdown** Department of Endocrine Sciences, Institute of Molecular and Experimental Medicine, Centre for Endocrine and Diabetes Sciences, School of Medicine, Cardiff University, Cardiff, UK

**Thomas W. J. Lennard, MBBS, FRCS, MD** Department of Surgery, Royal Victoria Infirmary, Newcastle Upon Tyne, UK

**Lisha McClelland** Department of Otolaryngology, Queen Elizabeth Hospital Birmingham, University Hospital Birmingham NHS Foundation Trust, Birmingham, UK

**Karim Meeran** Department of Endocrinology, Imperial Centre for Endocrinology, Hammersmith Hospital Campus, London, UK

**Hisham Mehanna, PhD, BMedSc (hons), MBChB (hons), FRCS, FRCS (ORL-HNS)** Department of Head and Neck Surgery, School of Cancer Sciences, Institute of Head and Neck Studies and Education, University of Birmingham, Birmingham, UK

**Radu Mihai, MD, PhD, FRCS** Department of Endocrine Surgery, John Radcliffe Hospital, Oxford, UK

**Rosalind Mitchell** Department of Neurosurgery, Queen Elizabeth Hospital Birmingham, University Hospital Birmingham NHS Foundation Trust, Birmingham, UK

**Ram Moorthy, FRCS (ORL-HNS)** Otolaryngology- Head and Neck Surgery, ENT, Heatherwood and Wexham Park Hospitals NHS Trust, Wexham Park Hospital, Wexham Berkshire, UK

**Fausto Palazzo** Department of Thyroid and Endocrine Surgery, Imperial College NHS Trust, Hammersmith Campus, London, UK

**Gregory W. Randolph, MD** Otolaryngology – Head and Neck Surgery, Massachusetts Eye and Ear Infirmary, Boston, MA, USA

**Aled Rees, FRCP, PhD** Department of Endocrine Sciences, Institute of Molecular and Experimental Medicine, Centre for Endocrine and Diabetes Sciences, School of Medicine, Cardiff University, Cardiff, UK

**Scott Russell** Department of Anaesthetics, Queen Elizabeth Hospital, Birmingham, UK

**Gregory P. Sadler, MD, FRCS Gen Surg (Eng)** Department of Endocrine Surgery, John Radcliffe Hospital, Oxford, UK

**Bruno Schmied, MD** Department of Surgery, Kantonsspital St. Gallen, St. Gallen, Switzerland

**David M. Scott-Coombes, MS, FRCS** Department of Endocrine Surgery, University Hospital of Wales, Cardiff, UK

**Ashok Shaha** Jatin P. Shah Chair in Head and Neck Surgery and Oncology, Memorial Sloan-Kettering Cancer Center, New York, USA

**Neil Sharma, MBChB, MRCS, DOHNS** Department of Otolaryngology, Head and Neck Surgery, University Hospital North Staffordshire, Newcastle-under-Lyme, UK

**Joel Anthony Smith, FRCS (ORL-HNS), MBChB, BMedSc, DOHNS** Department of Otolaryngology, Head and Neck Surgery, University Hospital Birmingham, Queen Elizabeth Medical Centre, Birmingham, West Midlands, UK

**Peter Stålberg, MD, PhD** Department of Surgical Sciences, Uppsala University, Uppsala, Sweden

**Michael J. Stechman, MBChB, MD** Department of Endocrine Surgery, University Hospital of Wales, Cardiff, UK



**Neil Tolley, MD, FRCS** Department of Otolaryngology, Head and Neck Surgery, Imperial College Healthcare NHS Trust, St Mary's Hospital, London, UK

**Rachel Troke** Department of Endocrinology, Imperial Centre for Endocrinology, Hammersmith Hospital Campus, London, UK

**John C. Watkinson** ENT Department, Queen Elizabeth Hospital, Birmingham, UK

**Richard Wight** Department of Otolaryngology, Head and Neck Surgery, James Cook University Hospital, Middlesbrough, UK

**Beng K. Yap, MBChB, FRCP, FRCR** Department of Clinical Oncology, The Christie NHS Foundation Trust, Manchester, Lancashire, UK