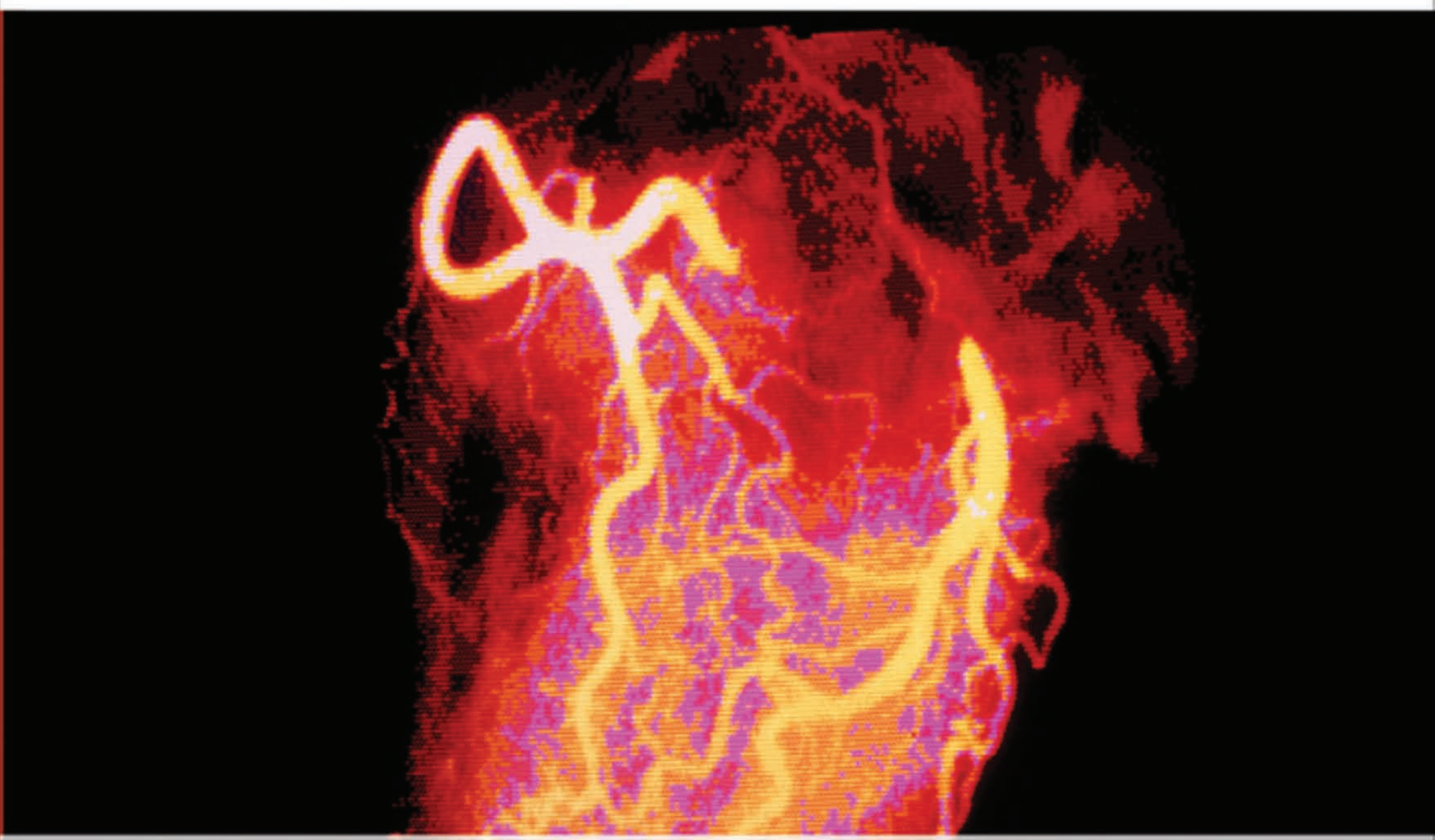
ABC of Interventional Cardiology

SECOND EDITION

Ever D. Grech



WILEY-BLACKWELL www.abcbookseries.com BMJ | Books

ABC of

Interventional Cardiology

Second Edition

ABC series

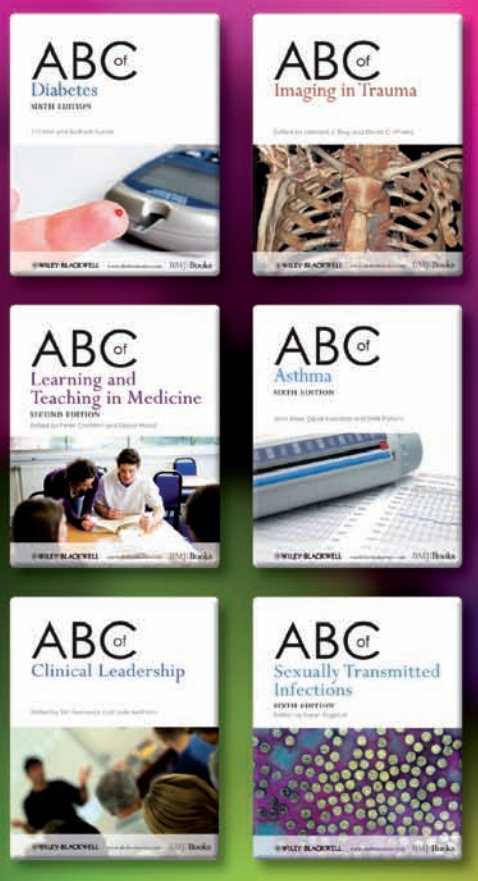
An outstanding collection of resources - written by specialists for non-specialists

The *ABC* series contains a wealth of indispensable resources for GPs, GP registrars, junior doctors, doctors in training and all those in primary care

- **Now fully revised and updated**
- **Highly illustrated, informative and a practical source of knowledge**
- **An easy-to-use resource, covering the symptoms, investigations, treatment and management of conditions presenting in day-to-day practice and patient support**
- **Full colour photographs and illustrations aid diagnosis and patient understanding of a condition**

For more information on all books in the *ABC* series, including links to further information, references and links to the latest official guidelines, please visit:

www.abcbookseries.com



WILEY-BLACKWELL

BMJ | Books

ABC of

Interventional Cardiology

Second Edition

Ever D. Grech
Consultant Cardiologist
South Yorkshire Cardiothoracic Centre, Northern General Hospital, Sheffield, UK

WILEY-BLACKWELL
A John Wiley & Sons, Ltd., Publication

BMJ Books

This edition first published 2011, © 2011 by Ever D. Grech
Previous edition: 2003

BMJ Books is an imprint of BMJ Publishing Group Limited, used under licence by Blackwell Publishing which was acquired by John Wiley & Sons in February 2007. Blackwell's publishing programme has been merged with Wiley's global Scientific, Technical and Medical business to form Wiley-Blackwell.

Registered office: John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK

Editorial offices: 9600 Garsington Road, Oxford, OX4 2DQ, UK
The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, UK
111 River Street, Hoboken, NJ 07030-5774, USA

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com/wiley-blackwell

Library of Congress Cataloging-in-Publication Data

ABC of interventional cardiology / Ever D. Grech. – 2nd ed.
p. ; cm.
Includes bibliographical references and index.
ISBN 978-1-4051-7067-3 (pbk. : alk. paper)
1. Heart – Diseases – Treatment. 2. Coronary heart disease – Surgery. I. Grech, Ever D.
[DNLM: 1. Cardiovascular Diseases – therapy. WG 120]
RC683.8.A33 2010
616.1′2 – dc22

2010039150

ISBN: 978-1-4051-7067-3

A catalogue record for this book is available from the British Library.

Set in 9.25/12 Minion by Laserwords Private Limited, Chennai, India

1 2011

Contents

List of Contributors

Abdallah Al-Mohammad
Consultant Cardiologist, South Yorkshire Cardiothoracic Centre, Northern General Hospital, Sheffield, UK

Kevin S. Channer
Professor of Cardiovascular Medicine, Royal Hallamshire Hospital, Sheffield, UK

Ever D. Grech
Consultant Cardiologist, South Yorkshire Cardiothoracic Centre, Northern General Hospital, Sheffield, UK

Julian Gunn
Senior Lecturer and Honorary Consultant Cardiologist, University of Sheffield, Sheffield, UK

Gerald C. Kaye
Consultant Cardiac Interventional Electrophysiologist, Princess Alexandra Hospital, Woolloongabba, Brisbane, QLD, Australia

Damien Kenny
Specialist Registrar in Paediatric Cardiology, Bristol Royal Hospital for Children, Bristol, UK

Laurence O'Toole
Consultant Cardiologist, South Yorkshire Cardiothoracic Centre, Northern General Hospital, Sheffield, UK

Jonathan Sahu
Consultant Cardiologist, South Yorkshire Cardiothoracic Centre, Northern General Hospital, Sheffield, UK

Robert F. Storey
Reader and Honorary Consultant Cardiologist, University of Sheffield, Sheffield, UK

Kevin P. Walsh
Consultant Paediatric Cardiologist, Our Lady's Hospital for Sick Children, Dublin, UK

Preface

It is only 33 years since the first percutaneous transluminal coronary angioplasty (PTCA) was carried out by the pioneering Swiss radiologist Andreas Greuntzig in Zurich, heralding the dawn of interventional cardiology. In this short time, interventional cardiology has overcome many limitations and undergone major evolutionary changes – most notably the development of the intracoronary stent and more explicitly the drug-eluting stent. Across the world, many thousands of patients now safely undergo percutaneous coronary intervention everyday and the numbers continue to grow. In many countries, the numbers far exceed surgical bypass operations.

Although at first, PTCA was indicated only as treatment for chronic stable angina caused by a discrete, easily accessible lesion in a single coronary artery, this has now progressed enormously to encompass complex multi-lesion and multi-vessel disease. Moreover, percutaneous coronary intervention has now become widely used in the management of acute coronary syndromes (which principally include 'heart attacks') with definite benefits in terms of morbidity and mortality. The effectiveness and safety of these procedures has undoubtedly been enhanced by the adjunctive use of new anti-platelet and anti-thrombotic agents, and newer drugs are being evaluated. As drug-eluting stents address the Achilles' heel of angioplasty and stents – restenosis – the huge increase in percutaneous coronary procedures seen over recent years is likely to continue.

As the indications increase and more patients are treated, so inevitably do the demands on healthcare budgets. Although percutaneous intervention is expensive, this burden must be weighed against bypass surgery which is significantly more costly and multi-drug therapy which would be required over many years.

Although percutaneous coronary intervention has held centre stage in cardiology, major in-roads have also been made in non-coronary areas. Transcatheter valvular treatments – including actual new valve implantation, closure devices and ethanol septal ablation – have become effective and safe alternatives to surgery, as have paediatric interventional procedures. A greater understanding of cardiac electrophysiology and heart failure has led to important advances in the treatment of arrhythmias and resynchronisation therapy. Pacemakers, implantable cardioverter defibrillators (ICD) and cardiac resynchronisation therapy (CRT) are benefiting ever larger numbers of patients both in terms of life quality and mortality.

Where are we heading? This is perhaps the biggest question in the minds of many interventional cardiologists. New ideas and technology generated by industry, coupled with high levels of expertise, are fuelling advances in almost all areas of interventional cardiology. The next decade promises many new (and possibly unexpected) developments in this exciting and restless field of medicine.

In writing this book, I have endeavoured to present broad (and sometimes complex) aspects of interventional cardiology in a clear, concise and balanced manner. To this end, I have concentrated on an easy-to-read style of text, avoiding jargon and exhaustive detail where possible and supplemented with many images and graphics.

Ever D. Grech
Sheffield

Acknowledgements

I have many people to thank for their help in developing and producing this book. I am very grateful to my co-authors who have all willingly contributed their time and expertise. I would also like to recognise the positive efforts and invaluable assistance of the editors and publishers at Wiley-Blackwell. These include Laura Quigley, Adam Gilbert, Carla Hodge and Karen Moore. My thanks also to Dhanya Ramesh at Laserwords.

Finally, my enduring gratitude goes to my wife Lisa and our children Alexander and Frances for their unfailing encouragement, patience and love.

List of Abbreviations

CTO	Chronic total occlusion
HRT	Hormone replacement therapy
IVUS	Intravascular ultrasound
LAD	Left anterior descending (artery)
LCx	Left circumflex (artery)
Non-STEMI	Non-ST segment elevation myocardial infarction
PCI	Percutaneous coronary intervention
RCA	Right coronary artery
STEMI	ST segment elevation myocardial infarction